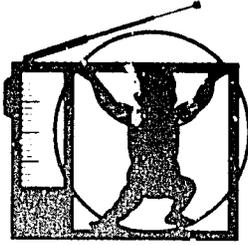


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Communication for Child Survival

HEALTHCOM

Office of Health and Office of Education • Bureau for Science & Technology • Agency for International Development

**Measuring Use of Oral Rehydration:
Conceptual Issues and Evidence
from HEALTHCOM Surveys**

**Annenberg School of Communications
University of Pennsylvania**

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MEASURING USE OF ORAL REHYDRATION:
CONCEPTUAL ISSUES AND EVIDENCE FROM HEALTHCOM SURVEYS

A SPECIAL REPORT

by

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HEALTHCOM oral rehydration questionnaires are divided into two sections: a knowledge and attitude section and a last episode of diarrhea section. The knowledge and attitude section includes caretakers' knowledge of diarrhea, dehydration, rehydration, and preparation of oral rehydration solution or water-sugar-salt solution. This section also contains questions on "ever use" and "future use" measures which are asked in particular studies. The section concerning the last case of diarrhea only asks questions pertaining to the most recent episode of diarrhea in that household. This section contains questions on how the caretaker knew the child had diarrhea, the severity of diarrhea, where the caretaker sought advice for treating the diarrhea, and how that case of diarrhea was treated, if it was treated at all. Explanations of questions are presented in bold text.

"LAST CASE USE" QUESTIONS

1. I would like to know the names and ages of the children under five years of age in your household.

- 1. name _____ age _____
- 2. name _____ age _____
- 3. name _____ age _____

2. Do any of these children have diarrhea today?

1. yes if more than one child is mentioned, continue asking questions about the younger one

2. no go to 4

3. Which child is it?

_____ Name _____ go to 6

Question 4 is used to limit recall period on "last case use" measures displayed in Table 3.

4. When was the last time any of these children had diarrhea?

- 1. 0-2 weeks ago
- 2. 3-4 weeks ago
- 3. 1-3 months ago
- 4. 4 months - 1 year
- 5. more than 1 year ago
- 6. I don't remember
- 7. no response
- 8. none has ever had diarrhea

if 6, 7, or 8 then the following questions are not asked

5. Which child was that?

_____ Name _____

6. In your opinion, how sick was the child? Was (child)

- 1. not at all sick
- 2. a little sick
- 3. very sick
- 4. don't remember

At this point there is a series of questions on the definition and severity of diarrhea as well as places the respondent went for advice about treating the diarrhea. These questions are not discussed in this report and are not included here.

In country B there is a separate questionnaire for every child in the household under the age of five. Therefore the questions above are worded differently and are repeated for every child. Questions 3 and 5 are not asked and questions 2 and 4 ask: Does this child have diarrhea now? - and - When was the last time this child had diarrhea? All the questions below are the same except where noted.

7. Did you give the child something at home so that the diarrhea would improve?

1. yes
2. no following questions not asked

Question 8 is used as the "unaided" measure of use.

8. What did you give the child at home to treat the diarrhea?

Question 9 is the "aided" recall measure and was asked in countries C and E only.

9. Did you or any other person give the child a mixture of [oral rehydration mixture promoted] here at home when the child had diarrhea?

1. yes
2. no

Question 10 is discussed in the "correct use" section of the report and was asked in country D only.

10. You said you gave [oral rehydration mixture promoted] to your child with diarrhea. Did the child drink it?

1. no, child refused to drink at all
2. no, but child drank a little
3. yes, child drank readily
4. I don't remember
5. no response
6. other (specify) _____

Question 11a was asked in county D and question 11b was asked in country B. These questions were discussed in the section on including extra fluids when measuring oral rehydration use. Results are displayed in Table 4.

11d. While the child had diarrhea did s/he drink more, less or the same amount of liquids as before the diarrhea?

1. more
2. less
3. same
4. stopped drinking

11b. During the diarrhea, did you give your child more, less or an equal amount of liquids as before the diarrhea?

1. more
2. less
3. same
4. no liquids

"EVER USE," "FUTURE USE," AND PREPARATION KNOWLEDGE

These questions are located in the diarrhea knowledge and attitude section of HEALTHCOM questionnaires. The "ever use" measures are different in every survey we report in Table 1. In the following example each "ever use" measure is preceded by the country in which it was used. The last country mentioned is country A and the "ever use" measure is followed by the future use and the correct preparation measures.

"ever use" for country B

respondent is shown ORS packet

1b. Do you have or have you had this product in your home?

1. yes
2. no do not ask 2b.

2b. Have you ever used it?

1. yes
2. no

"ever use" for country C

1c. Have you ever heard about the home mixture of sugar and salt which treats diarrhea?

1. yes
2. no

2c. Have you ever used this mixture to help a child who has diarrhea?

1. yes
2. no

"ever use" for country D

1d. Have you ever given home-made [oral rehydration promoted] to a child who has diarrhea?

1. yes
2. no
3. don't know

"ever use," "future use" and "correct preparation" for country A

1a. Have you ever used water-sugar-salt to treat your child's diarrhea?

1. yes
2. no

1b. If your child has diarrhea again is this the method of treatment you will use?

1. yes
2. no

1c. We talked to you before about water-sugar-salt solution. Have you ever made it yourself?

1. yes
2. no

1d. Do you know how to make it?

1. yes
2. no do not ask next question

1e. How do you make it?

1. clean water or boiled water
2. make it fresh every day
3. add water

if mentioned ask How much? _____

4. add sugar

if mentioned ask How much? _____

5. add salt

if mentioned ask How much? _____

INTRODUCTION

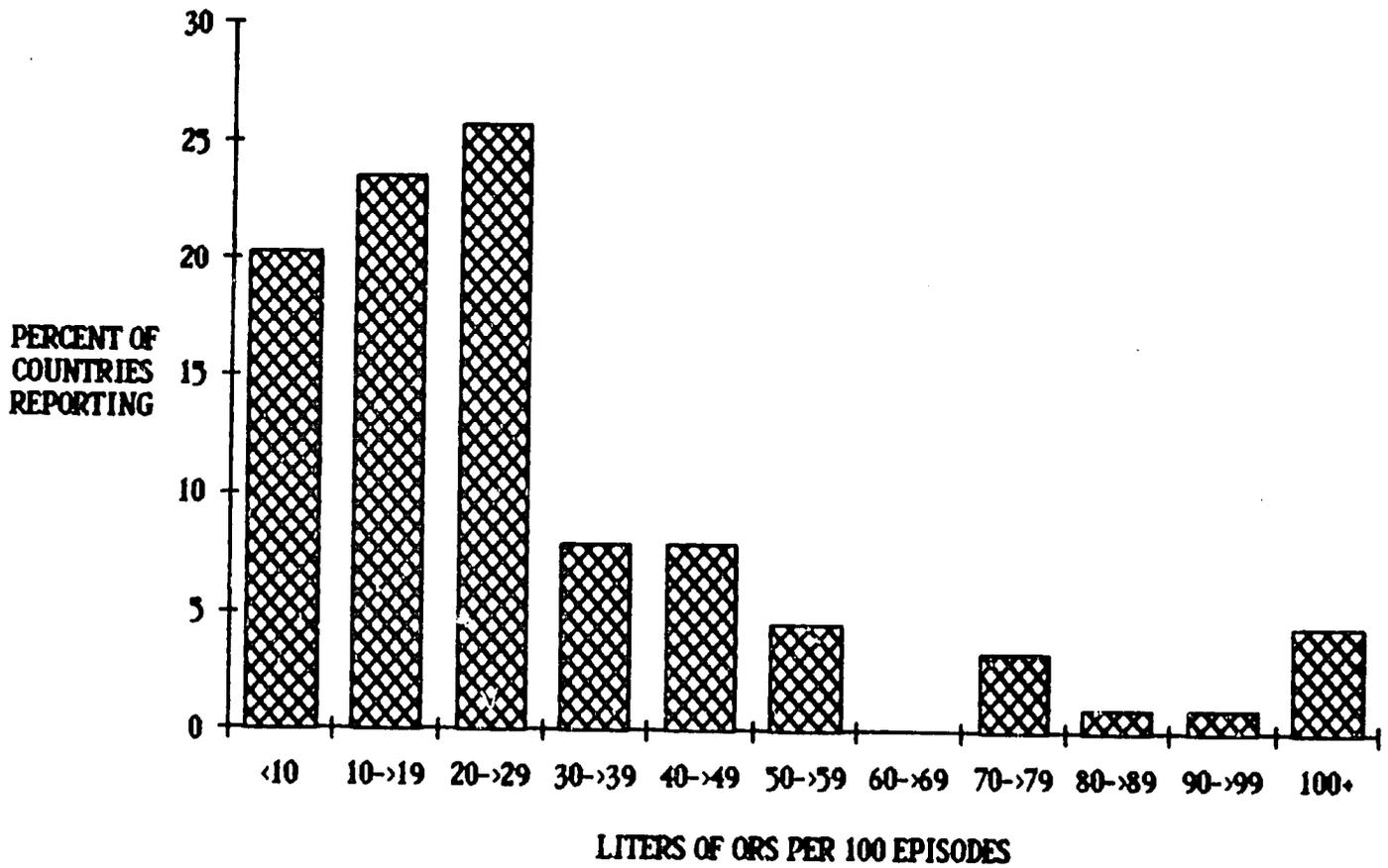
According to the latest UNICEF report, "The State of the World's Children 1989," 112 countries have instituted programs promoting the use of oral rehydration to treat or prevent dehydration due to diarrhea. Reported rates of use in these countries range from less than five to more than 100 liters of oral rehydration solution per 100 episodes of diarrhea (Figure 1). Clearly, some national programs have been more "successful" than others, and differences in reported use rates undoubtedly relate to such factors as the program's quality, the length of time it has been operating, accessibility of packets or ingredients, and the intensity with which oral rehydration is promoted. However "success" may also depend on the indicator chosen to define it.

This report summarizes the conceptual issues and the evidence about measuring oral rehydration accumulated from six HEALTHCOM¹ evaluation surveys. Because the focus is on methodology rather than country-specific levels, countries will not be identified.

¹Health Communication for Child Survival (HEALTHCOM) is a five-year communication project designed to assist developing countries in using multiple communication channels to promote the widespread use of child survival strategies. HEALTHCOM is sponsored by the Office of Health and the Office of Education within the Bureau for Science and Technology of the U.S. Agency for International Development, and is administered by the Academy for Educational Development. The Annenberg School of Communications at the University of Pennsylvania has been contracted to carry out evaluations of HEALTHCOM activities at 15 different sites.

We would like to thank members of the HEALTHCOM evaluation group for helpful comments on an earlier draft, and Lorraine Ritacco for editorial assistance.

FIGURE 1
REPORTED ORAL REHYDRATION USE RATES



This figure displays the distribution of oral rehydration use rates among the 89 countries for which UNICEF provides data. Reported use rates range from 10 liters of solution per 100 episodes (20 percent of the countries) to more than 100 liters per 100 episodes (4.5 percent of the countries). More than one liter can be used for a single episode.

INTRODUCTION

According to the latest UNICEF report, "The State of the World's Children 1989," 112 countries have instituted programs promoting the use of oral rehydration to treat or prevent dehydration due to diarrhea. Reported rates of use in these countries range from less than five to more than 100 liters of oral rehydration solution per 100 episodes of diarrhea (Figure 1). Clearly, some national programs have been more "successful" than others, and differences in reported use rates undoubtedly relate to such factors as the program's quality, the length of time it has been operating, accessibility of packets or ingredients, and the intensity with which oral rehydration is promoted. However "success" may also depend on the indicator chosen to define it.

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In each case our intention is to demonstrate that choice of indications and procedures for measurement have important effects on the apparent success of a program.

The best indication of the success of diarrheal disease control programs is reduction in mortality from and hospitalization due to diarrhea. Measuring these effects is difficult and requires large sample sizes, so use of oral rehydration is often employed as a proxy measurement. While a number of studies have indicated that use of oral rehydration can lower mortality (and it seems likely that higher use rates would correlate with greater reduction in mortality), the exact relationship between levels of use and true program success has not yet been determined.

One of the difficulties in determining this relationship is that oral rehydration and prevention of dehydration can be achieved using a variety of solutions -- World Health Organization (WHO)-formula packet solutions, water-sugar-salt solutions, rice water-sugar-salt solutions, or simple home-prepared extra fluids such as rice water and various herbal decoctions -- some of which are more efficient rehydrators than others. Another is that the context of use varies from country to country: in an area with few clinics and hospitals the effect of a given level of use on outcome will be different than in a more medicalized area.

Even though there is no simple, direct correlation between oral rehydration use rates and success, it is important to measure

use. Apart from its presumed relation to reduction of mortality and hospitalization, the level of use of the oral rehydration solution(s) recommended by a national program is an important indicator of program effectiveness. National programs, while they strive to achieve reductions in mortality, must direct their attention to changing aspects of case management, including increased use of oral rehydration therapy. Specific case management recommendations vary from country to country, of course. WHO emphasizes early use of home fluids to prevent dehydration, use of WHO-formula packet-based solution (ORS) with some clinic involvement for more serious cases, and clinic-supervised oral rehydration (or in extreme cases, rehydration using intravenous fluid) for children with moderate to severe dehydration. However, countries may choose to vary from the WHO standard and recommend the use of water-sugar-salt solutions, or encourage home use of ORS solutions, for example.

A perfectly successful program would be one for which 100 percent of the cases received treatment appropriate to the specific level of illness consistent with national norms. A perfect indicator of success, then, would be one which accurately estimated the proportion of cases which received the appropriate treatment in a given time period.

However, no program that we know about has measured its success against this criterion, nor could we imagine any large sample study that would achieve it. Such a study would entail

defining the degree of illness for a particular episode on the one hand, and detailing the nature of treatment, including preparation of solutions and volumes ingested, on the other. Both diagnosis and treatment are likely to be poorly approximated without direct observation.

Nonetheless, in considering alternative approaches to estimating the success of a program, the indicators should be compared to this gold standard. Published reports show that the ways in which success has been measured do vary widely, in themselves and as reflections of the "true" criterion for success. Differential reported success among programs is thus a function of real differences in their operational effectiveness; it also may reflect the use of different indicators. To give two examples from the recent literature:

1. In a cross-sectional study in Senegal, 1000 mothers of children less than five years old were asked what they usually used for their children's diarrhea (one response elicited), whether they had ever heard of oral rehydration solution made from packets, and whether they had ever used it (Fontaine et al., 1984). Although 35 percent of mothers reported hearing about ORS and 18 percent said they had used it at least once, the report emphasizes the finding that less than one percent used it regularly.

2. In contrast, a survey of 373 village mothers in rural counties in five provinces in China asked "Which of the following

methods do you use in treating infants with dehydration [emphasis ours] from diarrhea" (multiple responses accepted) and "What do you consider the best types of treatment for diarrhea (not necessarily including dehydration)" (Taylor and Yu, 1986). Although rice water or porridge (66 percent) and "oral solutions" (55 percent) were mentioned by mothers as among the best types of treatment for diarrhea, the use rate emphasized in the publication is the 34 percent of mothers who said that water-sugar-salt solution was a method that they used for treating infants with dehydration.

It is interesting to note that in the China study 45 percent of the mothers said they used rice water for treatment of dehydration. In many countries this is now a recommended home fluid for treatment of diarrhea, and would be counted as a positive response on the questionnaire recommended by WHO for cluster surveys of mothers (WHO, 1986). The question on the WHO-recommended survey form, "What fluids was the child given to drink for the treatment of the diarrhea", asks about specific episodes of diarrhea that occurred during the last two weeks (WHO, 1986). Responses are cumulated in two categories: oral rehydration solution and recommended home fluids.

While differences between national rates cannot be attributed solely to differences in measurement, differences in survey method such as those between the Senegal and China surveys and between these surveys and the method recommended by WHO definitely affect

estimated use rates. Determining the effect of various aspects of measurement on estimated use rates is impossible when individual studies differ both in method and in the underlying use rates being estimated.

Fortunately, evaluation of the HEALTHCOM project has generated a series of surveys that permits examination of the effect of some aspects of measurement on estimated use rates. Within individual surveys in this evaluation project, questions about oral rehydration use were asked in several different ways, thus controlling for the variation in underlying use rate. In addition, although questionnaires have evolved over the lifetime of the project, surveys carried out in different countries have used a similar method and similar questionnaires.

CONCEPTUAL ISSUES

Measures of oral rehydration use differ mainly in the definition of use, but the source of information and how data are collected also affect estimated use rates.

Definition of use

The three main types of use questions that are asked in HEALTHCOM evaluation surveys about use of oral rehydration -- "ever use", "last-case use" and "future use" -- differ in the time period to which they refer (see Appendix for examples of the questions

used in the HEALTHCOM surveys). Questions that generate the "last-case use" measure refer to the eligible child in the household who had the most recent episode of diarrhea, the timing of this episode, and treatment used for it. The questions that are used to produce "ever use" and "future use" measures are less episode-specific and refer to whether or not the respondent has ever used oral rehydration to treat a child's diarrhea or whether the respondent will ever use oral rehydration as a treatment. The proportions of respondents who have ever used the recommended oral rehydration solution and of those who intend to use it mainly indicate the program's reach. Use during the last episode indicates not only the program's reach but also the acceptability of oral rehydration and accessibility of the packets or ingredients.

For each of these types of use a further distinction can be made, that is, "use at all" or "correct use". "Use at all" simply measures whether oral rehydration was given or not. "Correct use" measures involve two further distinctions concerning the amount of solution taken and whether the solution was prepared in the recommended manner.

The simplest question concerning amount is whether or not the child actually drank the oral rehydration solution. Determining whether or not a "sufficient" amount was taken would require many more questions, first to determine the total amount of rehydrating liquids taken (both recommended and other fluids) and then to

estimate the amount that should have been taken. This "sufficient" amount is related to the child's weight and the severity of diarrhea (volume, consistency, frequency and duration). It is nearly impossible to determine these amounts accurately using a retrospective questionnaire.

Whether or not the oral rehydration solution was properly prepared is a somewhat easier measure of "correct use" to estimate. While possible to carry out for any type of rehydration solution, it has most often been used for solutions made from packets and for water-sugar-salt solutions. The oral rehydration solution packets contain premixed dry ingredients and need only to be dissolved into the correct amount of clean cool water (usually one packet to one liter). Preparation of water-sugar-salt solution is more complex, involving measurement of all three ingredients. One typical recipe is one teaspoon of salt and eight teaspoons of sugar dissolved in one liter of cool clean water. Depending on the volume of water and the type of measuring utensils recommended, recipes can seem very different; not infrequently, in a single country, several recipes have been taught by different organizations.

Knowledge of correct preparation can be measured in several ways: by asking the respondent if s/he knows how to prepare the solution; by asking for a description of how a solution should be made; or by asking for a demonstration of how a solution is made. In the latter two cases, because the process is complex, a scoring

system or index of correctness is usually used. The underlying assumption is of consistency of knowledge, that is, someone who knows at the time of the survey how to prepare a solution is assumed to have prepared it correctly when it was used. One problem with this approach is that the respondent might not have prepared the liquid herself; this can occur if the major source of oral rehydration is clinics. An additional concern is what solution is considered acceptable. One program may accept only water-sugar-salt, or WHO-formula packet solutions; other programs might accept specific home fluids or any home fluid use at all. If one program claims 10 percent use and another claims 50 percent use, comparison is meaningless if the first includes only packet solution use and the second accepts the use of any additional fluids during an episode.

Source of information

Information about use can be obtained directly, from interviews with parents (usually the mother), caretakers, or health care providers, or indirectly, from records such as clinic or hospital records, or records of packet sales.

The appropriate denominator for calculating use rates is episodes of diarrhea. The choice of which source of information to use depends on the objectives of the diarrhea disease control program: if oral rehydration is being promoted to be used for all episodes of diarrhea to prevent dehydration, information needs to

be obtained about a representative sample of all episodes of diarrhea. In this instance, the best source of information will be interviews of parents or caretakers in homes, because often children with mild diarrhea are not brought to clinics. However, if oral rehydration is being promoted to be used only for serious episodes of diarrhea it will be more efficient to find out about use of oral rehydration for a representative sample of serious episodes. If researchers have good evidence that all such episodes will be seen at clinics, then information can be obtained from interviews of a sample of parents or caretakers at clinics. Some proportion of children with serious diarrhea may not be seen at clinics -- either because it is too costly or too far to bring the child, or because people have little confidence in the treatment available at the clinic, or in some cases because the child dies before s/he can be brought to the clinic. This proportion varies from country to country, and within countries may vary by clinic catchment area.

In some cases, because of logistic considerations, it may be necessary to interview parents at clinics, or to rely on clinic records. In these cases the possibility of selection bias and its effect on the estimated use rate should be addressed. Another time when information from clinics may be of interest is in countries where health care providers are an important source of oral rehydration solution(s), and the rate at which they recommend oral rehydration strongly affects use rates. In this case bias arising from parents' decision about whether to bring the child to the

clinic may be less important than bias arising from the referral level of the health care providers interviewed. For example, village health workers who make regular visits to households under their care probably see fewer serious cases of diarrhea than health workers at clinics, who in turn see fewer than physicians at referral hospitals.

Method of data collection

As discussed above, information about use can be obtained from a variety of sources. Respondents can be interviewed once, or more than once. In the latter case, especially if respondents are visited many times (as in the weekly or biweekly monitoring that is common in field trials), there may be a problem of "training" respondents to give correct answers through the repeated questioning, which can lead to overestimated use rates. Even within a single interview, questions can be constructed to aid recall or not.

The validity of data obtained about oral rehydration use is affected by the same factors that affect all survey results, most importantly by interviewer quality and training and by language. The importance of these and other factors in relation to health interview surveys has been treated extensively elsewhere (Ross and Vaughan, 1986) and will not be discussed in detail in this report. Rather, we will focus on several factors that affect estimates of use rates for which we have evidence from the HEALTHCOM evaluation

surveys. These factors can be classified as related to definition of use, respondent characteristics, and specifics of questionnaire construction.

EVIDENCE CONCERNING EFFECTS OF DIFFERENT FACTORS ON USE RATES

Definition of use

The surveys discussed in this report included questions that allow calculation of several different types of use rate. Episode-specificity of the questions, recall period, whether correctness of use was considered, and the form of oral rehydration all affected the use rates.

More episode-specific oral rehydration use measures will yield lower use rates. The "last case use" measure is episode-specific, while "ever use" and "future use" measures are not. Table 1 displays results from four HEALTHCOM surveys. "Last-case use" measures consistently yield lower use rates than "ever use" measures, and in the one case where it was included, the "future use" question yielded the highest use rate.

Table 1²

Use rate by type of use

	<u>Last case use</u> [*]	<u>Ever use</u>	<u>Future use</u>
Country A	51 (132)	75 (413)	92 (413)
Country C	35 (261)	67 (1040)	Not asked
Country B	19 (282)	60 (1460)	Not asked
Country D	5 (2168)	33 (9187)	Not asked

*In countries A and C last-case use is based on reports for the most recent episode within the past month. In countries B and D last-case use is based on reports for the most recent episode within the past two weeks.

For "last-case use" longer recall periods will yield higher use rates. Many researchers follow the WHO recommendation of basing "last-case use" on use of oral rehydration for any episodes occurring during the two weeks before the survey. This method implies a large sample size, especially if the period prevalence of diarrhea is low; thus other researchers ask about use for diarrhea cases that have occurred in the past four weeks. As the recall period allowed for inclusion of diarrhea episodes is expanded the number of episodes recalled decreases, and the proportion of severe episodes increases. For example, in country E 17 percent of households reported an episode occurring in the two weeks before the survey, but only 8 percent reported an episode in the two weeks before that (see Table 2). This fall-off occurs because respondents tend to forget mild cases and remember the more

²For all tables, the numbers in the parentheses are the number of respondents asked that question. For tables that indicate the statistical significance of a comparison, unless noted otherwise, significance was tested using a Z score for comparing proportions.

serious cases: for only 6 percent of the episodes in the last two weeks was the child said to be "very sick", in contrast to 10 percent of the episodes in the previous two weeks.

Table 2

Association between recall period, diarrhea prevalence, and proportion of episodes reported as severe

<u>Time episode occurred</u>	<u>Diarrhea cases per 100 households</u>	<u>Proportion with child "very sick"</u>
Day of survey	7 (1200)	6 (79)
1-15 days before	17 (1200)	6 (198)
16-30 days before	8 (1200)	10 (98)

All contrasts of period prevalence rates are statistically significant ($p < .05$). The proportion of serious cases among episodes occurring 16-30 days before is significantly different ($p < .05$) from the proportion serious among current episodes or episodes 1 - 15 days before.

More severe cases are more likely to receive treatment, including oral rehydration. Thus expanding the recall period will increase reported oral rehydration use rates.

In contrast, when only current cases are used, the oral rehydration use estimates are at their lowest. In addition to the lack of recall bias, this effect occurs because some of the current cases of diarrhea have just started and oral rehydration has not yet been initiated. Thus these cases will be recorded as not treated using oral rehydration, even though they will be treated

with it. Table 3 displays results from two HEALTHCOM surveys. The categories in the table are mutually exclusive. It is important to note that while recall bias effects in both countries are significant, the relation of the bias to time and the magnitude of the effect are very different.

Table 3

Effect of recency of last episode on oral rehydration use rates

	<u>Current</u>	<u>1-14 days ago</u>	<u>15-30 days ago</u>	<u>31+ days ago</u>
Country B	16 (116)	21 (164)	24 (62)	40 (113)
Country D	5 (929)	6 (1239)	8 (277)	8 (2610)

Results for both countries are statistically significant (p <.05). Significance was tested using the chi-square statistic.

This recall effect has to be taken into account in fielding surveys in countries where diarrhea incidence is seasonal. When a survey takes place during or just after the diarrhea season, it is likely that a greater proportion of recalled cases will be mild (and less likely to be treated using oral rehydration) than when the survey is fielded several months after the end of the diarrhea season.

"Correct use" measures will yield lower oral rehydration use rates than "use at all" measures. Most use rates of oral rehydration are simply based on questions that determine whether oral rehydration was used or not (see Appendix). In a HEALTHCOM

survey in country D, mothers who reported using oral rehydration were asked whether or not their children actually drank the solution that was given to them. While five percent of recent diarrhea cases in this country were given oral rehydration solution, in only one percent of the cases did the child actually drink all of the solution given (n=2168, p< .05).

As for correct use, in country A three-quarters of the mothers interviewed reported having used oral rehydration (water-sugar-salt solution) to treat diarrhea, that is, the "ever-use" rate was 75 percent. However, the proportion of mothers who reported having used it and knew the amounts of the three ingredients used to make water-sugar-salt solution was only 17 percent (n=413, p< .05); most mothers who reported using it did not know how to make a "correct" solution.

Measures restricted to a specific form of oral rehydration will yield lower rates than more general measures. Most oral rehydration programs are concerned with promoting a specific form of oral rehydration, and thus most use measures are concerned with either packet-based oral rehydration solution or water-sugar-salt solution. In some countries, however, use of any extra fluids -- water, tea, or juices, as well as the prepared oral rehydration solutions -- is now considered acceptable oral rehydration practice. In general, the greater the variety of fluids that are accepted as oral rehydration for the purposes of measuring use, the higher are the use rates obtained.

Table 4 displays results from two HEALTHCOM surveys. Two use rates are shown: one for which the definition of oral rehydration was limited to WHO-formula packet solution and a second rate based on an expanded definition of oral rehydration that included sugar-salt solution and teas as well as packet-based solution. Both rates were estimated from responses to the question "What did you use to treat the child?" asked about the most recent episode.

Table 4

	<u>Restricted definition</u>	<u>Expanded definition</u>	<u>n of cases</u>
Country B	20	28	(282)
Country D	5	19	(3307)

For both countries use rates obtained with the restricted definition were significantly different from those obtained using the expanded definition ($p < .05$).

Respondent characteristics

The surveys discussed in this report were all obtained from parents or caretakers in the home. Use rates were affected by whether mothers or caretakers were interviewed and by the maximum age of the children of the mothers sampled.

Excluding caretakers as possible respondents may yield biased oral rehydration use rates. Many surveys sample only mothers, but there are instances when many mothers work and are not the primary caretaker of the eligible children. In these cases both mothers and other caretakers are considered eligible respondents. In a HEALTHCOM survey in country C, 20 percent of respondents were caretakers of children. Mothers were more likely to report having used oral rehydration the last time a child had diarrhea than caretakers (39 percent to 25 percent, $p < .05$). One possible reason for this difference might be that caretakers know less about what happened during the last episode because they were not there full-time, and thus fail to report use of oral rehydration. However, the similar distribution of caretakers' and mothers' responses about other aspects of the last episode (timing, severity) suggests that this result signals a real difference in the way mothers and caretakers treat children with diarrhea. If the sample of respondents had excluded caretakers, the oral rehydration use rate would have been overestimated and important information about a group to target would have been missed.

Limiting the sample of respondents to mothers with younger children will lead to higher use rates. Oral rehydration therapy is mainly promoted as a treatment for young children, and thus eligibility of respondents is usually determined by the presence of a young child in the household -- most often a child under the age of five, though sometimes a child under the age of three. The cut-off age for eligibility is of some importance because evidence

suggests that mothers tend to give oral rehydration more often to younger children than to older children (Foote et al., 1985). Table 5 indicates the use rates that would have been estimated for two countries in the HEALTHCOM series if the sample had been restricted to mothers of children less than one year old, or children less than three years old, or children less than five years old. In both countries, restricting the sample to mothers of infants rather than mothers with a child less than five would have increased the estimated use rate five percent, while limiting it to mothers of children less than three years old would have made no difference.

Table 5

Use rates associated with cut-off age of child

	<u>Sample=Mothers of children age</u>		
	<u><1 yr</u>	<u><3 yrs</u>	<u><5 yrs</u>
Country B	24 (115)	18 (241)	19 (280)
Country C	40 (115)	36 (246)	35 (261)

For country C, use rates calculated using different cut-off ages are not significantly different. For country B, the use rate for mothers of children less than one is significantly different ($p < .05$) than the other two use rates.

Questionnaire construction

This section discusses bias associated with "aided-recall" versus "unaided" questions and the use of filter questions.

Use rates based on "aided-recall" questions will be higher than those derived from "unaided" questions. The simplest type of "aided-recall" question is one that asks directly about the solution of interest: "Did you give the child a solution made using [brand name of WHO-formula packet]?" This type contrasts with "unaided" (sometimes called open-ended) questions such as "What did you give the child?" "Aided-recall" questions will elicit more answers indicating use of oral rehydration than "unaided" ones for two main reasons. First, because respondents answering "aided-recall" questions want to please the interviewer or appear knowledgeable or competent or modern, they say "yes" when asked if they used a particular treatment. Second, respondents answering "unaided" questions may find it difficult to remember all the treatments given, may have used more treatments than the interviewer is ready to record, or may think that oral rehydration solution (particularly the home-prepared type) is insufficiently "medical" to be named as a treatment. In two HEALTHCOM surveys both "unaided" and "aided-recall" questions were asked about the most recent episode. In both countries the "last-case use" rates based on the "aided-recall" question were about a third higher than those based on the "unaided" question.

Table 6

"Last-case use" rates based on "aided-recall" and "unaided" questions

	<u>"Aided-recall"</u>	<u>"Unaided"</u>	<u>n of cases</u>
Country C	47	36	(261)
Country E	24	19	(298)

"Last-case use" in country C allows a recall period of one month; in country E it excludes current cases but allows a recall period of one month for completed cases. For each country, "aided" recall use rates were significantly different ($p < .05$) than "unaided" use rates.

CONCLUSION

The surveys discussed here were all surveys of mothers or caretakers in the home. Many of the same factors that affect use rates generated by these surveys apply to surveys of health personnel, and those who carry out and those who use the results of such surveys need to be aware of the measurement issues discussed in this report.

We recommend that surveys include "last-case use" measures. "Ever-use" measures are valuable as an indicator of how many people have tried the recommended oral rehydration solution(s), and a large difference between "ever-use" and "last-case use" suggests a problem of availability or acceptability that should be identified. However, "ever-use" is not an appropriate measure for comparisons. The implied denominator for this measure -- all recalled episodes of diarrhea for the child -- is unknown and

likely to be different in different situations, and thus any estimates of use based on this measure will be unstable. "Future use" measures suffer from similar problems; the implied denominator is anticipated episodes, which might vary, for example, according to socioeconomic status.

Differences in measurement lead to differences in estimated use rates. When using use rates to evaluate any oral rehydration program, researchers and program directors should carefully consider how these rates have been estimated. Whenever two different programs are compared, or measurements of the same population at different times are compared, differences in measurement must be taken into account before concluding that one use rate is higher than another.

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