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# Research / Recherche

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## Treatment patterns for childhood diarrhoea: evidence from demographic and health surveys\*

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*Treatment patterns for childhood diarrhoea among providers in public and private settings have been examined using data from 28 surveys in the Demographic and Health Surveys programme. In the majority of surveys, at least 50% of the children with diarrhoea who sought care from a health provider (public or private) received treatment that included oral rehydration salts (ORS). Private providers are a significant source of care for children with diarrhoea, but they are less likely to use ORS and more likely to prescribe unneeded drugs than providers in public settings. In countries where data are available, bloody diarrhoea appears to be undertreated. The results indicate that national public health programmes must continue to improve their strategies to ensure correct treatment of childhood diarrhoea by all health providers.*

### Background

Diarrhoea is responsible for about one in four deaths among under-five-year-olds in developing countries (1). In most cases, diarrhoea illness can normally be managed successfully with oral rehydration therapy (ORT) and continued feeding during and after the diarrhoea episode. Antidiarrhoeal drugs are not effective in treating watery diarrhoea; antimicrobials (antibiotics) are effective in treating only a small proportion of episodes of diarrhoea. The strategy recommended by WHO includes: (1) the prevention of dehydration through the proper treatment of diarrhoea in the home using available, home-prepared fluids; (2) the treatment of dehydration due to diarrhoea using a solution from packets of oral rehydration salts (ORS); (3) appropriate feeding during and after diarrhoea; and (4) selective use of intravenous fluids for severely dehydrated cases and

of antibiotics for suspected cases of cholera and shigella dysentery (2). WHO estimates that this strategy, if applied correctly, could prevent most deaths associated with watery diarrhoea, the remaining deaths being attributable primarily to severe complications of dysentery and to persistent diarrhoea. This strategy has been adopted by almost all developing countries.

In monitoring progress towards the goals for the mid-decade and year 2000 established by the World Summit for Children, both UNICEF and WHO have focused to date on correct case management in the home. This includes the provision of increased fluids, continued feeding, recognition of signs of dehydration and dysentery, and appropriate care-seeking. To achieve expected reductions in diarrhoea-related mortality, however, it is important that children with diarrhoea who are taken to a health provider receive appropriate treatment and advice: this includes ORS for all children with signs of dehydration, except the very small proportion who are unable to drink; in a few countries other fluids are recommended for children who are not dehydrated.

Reported ORS use among a subset of children with diarrhoea who were taken to a medical facility was described in a previous analysis of data from Demographic and Health Surveys (DHS) programme in 20 countries, conducted between 1986 and 1989. The results show wide variations in the proportions of children reported to have received ORS (either with or without drugs), from a low of 2% in Mali to a high of 77% in Trinidad and Tobago

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(3). Other evidence of the use of ORS in health facilities is available from observational studies of case management. In surveys conducted in 23 countries between 1990 and 1993, the percentage of children with dehydration who were treated correctly (given ORS at the facility if there was some dehydration, and given intravenous fluids if dehydration was severe) ranged from 0% to 84%, with a median of 20%.<sup>a</sup>

To date, however, no cross-national analyses have been conducted to describe the use of ORS by different types of health providers. Many caretakers seek treatment for children in settings outside the public health system, e.g., private medical providers, pharmacies, or other local practitioners. The limited evidence available suggests that, in these settings, ORS is used infrequently. In one household survey conducted in Egypt, ORS was given to 63% of children with diarrhoea who were taken to physicians, and to 29% of those not seen by a physician.<sup>b</sup> Two other studies in Egypt showed that children taken to public health facilities were more likely to receive ORS than those taken to private doctors.<sup>b,c</sup> In the metropolitan area of Cebu in the Philippines, public providers were more likely than private providers to use ORS in the treatment of dehydration (4); a community survey showed that mothers who consulted public providers were more likely to use ORS and less likely to use drugs in the treatment of childhood diarrhoea than those who consulted private practitioners (5).

A second issue in diarrhoea case management is the inappropriate use of drugs. Antidiarrhoeal drugs have no established clinical benefits and should not be used in the treatment of acute watery diarrhoea (6). They are not rehydration therapies and therefore cannot serve as a substitute for ORS. Antimicrobial drugs have been judged effective only in the management of cholera, shigella dysentery, amoebiasis and giardiasis, which together are estimated to account for approximately 15% of all diarrhoea episodes (7). At the very least, the inappropriate use of drugs is a wasteful use of family resources. In addition, some drugs (e.g., anti-diarrhoeals) are ineffective or dangerous, and it may be that the use of drugs delays or replaces the use of ORS (8).

Despite evidence of their inefficacy, antimicrobials and antidiarrhoeals are still frequently used in the treatment of watery diarrhoea, sometimes more frequently than ORS (9). In the comparative report on childhood morbidity and treatment patterns referred to above, the percentage of children reported to have received only anti-diarrhoeal drugs, and no ORS, ranged from 5% to 80%, with a median of 27%; in four of the 20 countries reviewed, over 50% of children presenting with diarrhoea received only drugs (3). Similar findings have been documented through 140 household surveys in 47 countries (2). A survey of dispensing patterns of pharmacists in Bangladesh, Sri Lanka, and Yemen found that drugs were prescribed more often than ORS (10). A recent study in Nigeria showed that retail pharmacies and patent medicine shop operators routinely prescribe drugs, particularly antibiotics, for both watery and bloody diarrhoea and that almost no one prescribed ORS for watery diarrhoea (11).

This paper describes the treatment received by children with diarrhoea, focusing particularly on those who were taken to medical service providers for treatment, and compares the use of ORS and drugs among children who were reported to have been taken to public (or government) facilities with those taken to private health providers.

## Data, definitions, and methods

This analysis draws on data from 28 demographic and health surveys conducted in 24 countries in phases I, II and III.<sup>d</sup> Surveys were included if they met two criteria:

- adequate information on both source of treatment outside the home for diarrhoea and the type of treatment provided (including ORS and drugs);<sup>e</sup> and

<sup>a</sup> CDD (Diarrhoeal Disease Control): ninth programme report 1992–1993. Unpublished document WHO/CDD/94.46, Geneva, World Health Organization, 1994.

<sup>b</sup> Social Planning, Analysis and Administration Consultants. Evaluation of NCDDP national campaign, KAP of mothers. Final report. Cairo, 1988 (cited by Miller (13)).

<sup>c</sup> Sinai Consultation Group. Diarrheal diseases: mother's treatment seeking behaviour and treatment choice. Cairo, 1988.

<sup>d</sup> Funded primarily by the United States Agency for International Development, the DHS programme has been operating in phases: phase I was implemented during 1984–89, the five-year phase II began on 1 September 1988 (overlapping the last year of DHS-I), the third phase overlapped the last year of DHS-II and began on 30 September 1992 for a five-year period. The programme has collected demographic and health data from nationally representative samples of women in at least 42 countries as of October 1994 (see *Demographic and health surveys newsletter*, 1994, 6(2). Macro International, MD, USA).

<sup>e</sup> Only 17 out of 28 surveys conducted during DHS phase I met this criterion. The remaining eleven surveys have not been included in the analysis primarily because the data were inadequate to address the analytic question. Indonesia is the only DHS phase-I country that did not include questions on diarrhoea.

— availability of survey data in the DHS standard recode format.

In four of the 24 countries covered by this analysis (Ghana, Kenya, Morocco, and the Dominican Republic), data were available for two successive surveys. All analyses were based on mothers' reports about the case management of diarrhoeal episodes among under-5-year-olds<sup>f</sup> during a two-week reference period preceding the survey.<sup>g</sup> Surveys were categorized into three groups (shown in panels 1, 2 and 3 in the tables), based on questioning patterns related to diarrhoea case management and dates of survey.

"Panel 1" category surveys, drawn from DHS phase I, include a direct link between the type of provider visited and the type of treatment received, allowing us to examine the relationship between provider-type and treatment-type directly. Six surveys are of that type: Kenya (1988/89), Uganda (1988/89), Egypt (1988/89), Tunisia (1988), Bolivia (1989), and Guatemala (1987). In these surveys, each mother of an under-5-year-old with diarrhoea in the previous two weeks was asked a direct question about whether the child was given ORS or a home solution, with four possible responses: ORS only; home solution only; both ORS and home solution; neither ORS nor home solution. The only exception is the Tunisia survey, in which the question referred to home solution only, and ORS was not included as a specific response option for those children who were treated at home. Next, a question was posed about the source of treatment outside the home, allowing only a single response, with the exception of the Egypt survey which accepted multiple responses. Then followed a question, in all six countries, about the type of treatment received from that source. The response categories were ORS, pills, capsules, syrup, injections, and intravenous fluid.<sup>h</sup>

Eleven surveys, also from DHS phase I, are categorized as "panel 2". In these surveys, data are available about the type of provider to whom the child was taken and what was given to treat the diarrhoea, but there is no direct link between questions about treatment source and treatment type. These data sets can provide useful indirect evidence of the relationship between the type of provider and the treatment received.<sup>i</sup> Eight of the eleven countries in panel 2 — Burundi (1987), Ghana (1988), Sri Lanka (1987), Thailand (1987), Morocco (1987), Colombia (1986), Dominican Republic (1986), and Trinidad and Tobago (1987) — had a common questioning pattern.<sup>j</sup> The source-of-treatment question was followed by a direct question about whether the child received ORS or a home solution, without any reference to the source; the question on the source allowed a single response, except for Sudan which accepted multiple responses. The next question asked about "... anything else done to treat the diarrhoea by mother or someone".

Another eleven surveys from DHS phases II and III provide more recent data and have been grouped as panel 3. They include surveys in Ghana (1993), Kenya (1993), Malawi (1992), Rwanda (1992), Zambia (1992), Morocco (1992), Indonesia (1991), Philippines (1993) Turkey (1993), Pakistan (1990/91), and the Dominican Republic (1991). In all surveys except Indonesia,<sup>k</sup> a question was first asked about what was given to treat the diarrhoea. The response categories included ORS, home solution, and drugs. The next question asked where the child was taken for care, and allowed multiple responses. As in panel 2, this pattern of questions does not

<sup>f</sup> Health-related information was collected as regards under-5-year-olds in phases I and II, and children under 3 years in phase-III surveys in which the DHS-III questionnaires were used. The 1993 Ghana survey is the only one included in this analysis, for which information on diarrhoeal morbidity and case management pertain to children aged 3 years.

<sup>g</sup> In all DHS-I countries, the mother was asked whether the child had diarrhoea in the last 24 hours. If the answer was negative, she was asked whether the child had diarrhoea during the last two weeks. There were three exceptions: the reference period was one week for Egypt; 15 days for Peru, and the last episode for Bolivia (3). In DHS phases II and III, the question about the occurrence of diarrhoea in the "last two weeks" was followed by a question about the "last 24 hours".

<sup>h</sup> There are some minor inter-country differences. For instance, in Egypt DHS-I, a question was asked on the use of drugs, no matter whether treatment was given by parents in the home or prescribed by a provider.

<sup>i</sup> A child may receive drugs from a provider after being given ORS in the home. One might argue that, to the extent that such situations prevail, the use of ORS prescribed by providers may be overestimated for these countries because of a lack of linkage in the data as noted earlier.

<sup>j</sup> In the Peru DHS, no separate question was asked on ORS/home solution. The site-of-treatment question was followed by a question on the type of treatment received referring to "anything done to treat the diarrhoea by mother or someone else". ORS and other drugs were included as response categories. In the Sudan DHS, three questions were asked on treatment type — ORS use, the use of home solution (if no ORS given), and "anything else done to treat the diarrhoea" (multiple treatments recorded). A question followed on the site of treatment, and multiple responses were permitted. In the Botswana DHS, a direct question was posed about the use of ORS or home solution. Following the question on the site of treatment, a question was asked about whether "anything (else) was done to treat the diarrhoea by mother or someone". ORS was also one of the response categories to this question.

<sup>k</sup> In Indonesia, the question regarding the use of ORS and home solution was followed by questions about the source of treatment and use of drugs.

result in a direct link in the data set between treatment source and treatment type.

Information on whether the child had diarrhoea was reported by the mother according to her perception. "Public" is used to refer to medical practitioners or facilities functioning under the direct control of the government, while "private" refers to providers that are not directly state-controlled. Providers were classified into the public or private category for 17 countries in panels 1 and 2 based on discussions with DHS personnel. For panel 3 countries, the classification was precoded in the questionnaire, providing detailed data on the source of treatment. The term "drugs" includes tablets, pills, capsules, syrup, injections, and intravenous fluids. The classification of providers into public and private categories, and the items included under drugs, are listed by country in the Annex at the end of this paper. The urban/rural classification refers to the location of the household to which the respondent belonged at the time of the interview and does not necessarily indicate the urban/rural residential status of the respondent.

Appropriate sampling weights have been used to adjust for oversampling of subpopulations in some of the countries.<sup>1</sup> Reports of significance are based on the use of  $\chi^2$  tests using unweighted observations.

## Results

**Home versus outside care for diarrhoea.** As shown in Table 1, a substantial proportion of children with diarrhoea were taken outside the home for care. The results suggest regional differences and indicate an increase in outside care from earlier to later surveys.

In countries with surveys in the late 1980s (panels 1 and 2), the percentage of children taken outside the home for treatment was highest in Sri Lanka (73%), lowest in Morocco (16%), and ranged between 28% and 56% for the remaining 15 countries in this group. These results suggest regional differences in care-seeking patterns. For example, it was more common for an African or Asian child than for a Latin American child to be taken outside the home for diarrhoea treatment. At least 40% of children with diarrhoea were taken outside for treatment in both countries of Asia and in five out of nine countries in sub-Saharan/North Africa, but in only one out of six countries in Latin America/Caribbean.

These differences should be interpreted with caution because the countries in each group are not necessarily representative of the entire region.

A rough comparison between earlier (panels 1 and 2) and more recent surveys (panel 3) suggests an increasing tendency to seek care for diarrhoea outside the home. A comparison of figures from the four countries with surveys at two points in time shows a uniform though moderate increase in the proportion of children with diarrhoea who received care outside the home (Ghana, 43% in 1989 and 53% in 1993; Kenya, 49% in 1988/89 and 59% in 1993; Dominican Republic, 29% in 1986 and 37% in 1991; Morocco, 16% in 1987 and 20% in 1992).

**Private versus public providers.** Among the children taken outside the home, the use of public versus private providers varied widely by country and over time. As shown in Table 1, the proportion of children receiving treatment from public providers was significantly greater in 10 of the 17 countries with surveys in the 1980s (panels 1 and 2). In five countries — Burundi, Colombia, Egypt, Guatemala, and Peru — private providers were the predominant source of treatment for childhood diarrhoea. The difference in the proportions of children taken to public providers and those taken to their private counterparts was not statistically significant at the 0.05 level for Thailand and for Trinidad and Tobago.

More recent data from the 11 panel-3 countries also show considerable variability in patterns of use for public and private providers. Significantly greater use of public than private providers was reported in Malawi, Rwanda, Zambia and Turkey, while the pattern is reversed in Pakistan and the Dominican Republic. In the remaining five countries — Ghana, Kenya (1993), Morocco (1992), Indonesia and the Philippines — the difference in the proportions of children treated between public and private providers is not statistically significant.

The proportion of mothers reporting the use of "other" providers (which included traditional practitioners and the unspecified category) appears to be larger in panel 3 than in panels 1 or 2, and is particularly high in Ghana, Kenya, Rwanda, and Zambia. This may be due to changes in the survey questionnaire between DHS phase I and phases II and III.

A marked increase over time in the reported use of private health providers for childhood diarrhoea was documented in the four countries with surveys at two points in time (Kenya, Ghana, Morocco, and Dominican Republic). Caution should be exercised when interpreting these results for two reasons. First, some proportion of the reported increases may be due to precoding of the source-of-treatment response options specific to public and private categories.

<sup>1</sup> Women of reproductive age were oversampled in urban areas or areas in which special projects were launched in most of the countries. No sampling weights were used for Ghana, Morocco, Tunisia, Peru, and Trinidad and Tobago, in which the survey did not oversample this subpopulation.

Table 1: Home care versus outside care for children (1–59 months) with diarrhoea, as reported by mothers, DHS

Country and year	No. of children	No. with diarrhoea	Reporting care in the home (%)	Reporting care outside the home (%):			
				Public providers	Private providers	Other providers <sup>a</sup>	Total
<i>Panel 1 (DHS I)</i>							
Egypt 1988/89 <sup>b</sup>	7671	1264	56.6	15.0 <sup>c</sup>	30.8	—	43.4
Kenya 1988/89	6370	830	50.7	38.1 <sup>c</sup>	8.7	2.5	49.3
Tunisia 1988	4133	873	68.5	21.4 <sup>c</sup>	9.7	0.3	31.5
Uganda 1988/89	4014	1053	66.5	24.7 <sup>c</sup>	6.9	2.0	33.5
Bolivia 1989	4978	1450	69.9	15.6 <sup>c</sup>	9.7	4.8	30.1
Guatemala 1987	4049	698	71.9	8.5 <sup>d</sup>	13.9	5.7	28.1
<i>Panel 2 (DHS I)</i>							
Botswana 1988	2984	299	53.0	44.5 <sup>c</sup>	1.4	1.1	47.0
Burundi 1987	3371	600	61.9	15.0	23.1	—	38.1
Ghana 1988	3551	960	56.9	30.5 <sup>c</sup>	12.6	—	43.1
Morocco 1987	5410	1604	84.0	11.3 <sup>c</sup>	3.7	0.9	16.0
Sudan 1989/90 <sup>b</sup>	5800	1801	43.6	33.0 <sup>c</sup>	23.7	2.8	56.4
Sri Lanka 1987	3841	231	27.4	43.1 <sup>d</sup>	26.5	3.0	72.6
Thailand 1987	3469	549	58.9	20.5	20.7	—	41.1
Colombia 1986	2550	484	68.8	6.6 <sup>c</sup>	24.6	—	31.2
Dominican Republic 1986	3978	1021	71.0	18.2 <sup>c</sup>	10.1	0.7	29.0
Peru 1986	2731	906	67.0	10.0 <sup>d</sup>	15.6	7.4	33.0
Trinidad and Tobago 1987	1852	113	50.4	26.5	23.0	—	49.6
<i>Panel 3 (DHS II &amp; III)<sup>b</sup></i>							
Ghana 1993	2025 <sup>e</sup>	410	47.3	18.3	20.2	14.6	52.7
Kenya 1993	5594	779	41.2	29.0	24.9	10.2	58.8
Malawi 1992	3730	818	44.6	35.2 <sup>c</sup>	16.4	5.0	55.4
Morocco 1992	4796	609	80.1	8.4	10.7	1.8	19.9
Rwanda 1992	4994	1089	65.6	22.5 <sup>c</sup>	2.7	10.7	34.4
Zambia 1992	5332	1216	28.0	46.5 <sup>c</sup>	11.9	19.7	72.0
Indonesia 1991	13260	1473	31.4	28.6	35.2	6.8	68.6
Pakistan 1990/91	5777	840	42.2	13.1 <sup>c</sup>	40.8	5.6	57.8
Philippines 1993	8458	855	55.5	20.6	18.3	8.3	45.5
Turkey 1993	3497	866	73.4	18.7 <sup>c</sup>	7.7	0.7	26.6
Dominican Republic 1991	3633	604	62.6	10.7	21.7	5.6	37.4

<sup>a</sup> Includes traditional healers and "unspecified" category.

<sup>b</sup> Multiple response was allowed for the question on the type of provider seen. Therefore the percentage for the total (care outside the home) is less than the actual total of percentages for "public", "private" and "other" providers.

<sup>c</sup> The difference in the proportion reporting using public vs private providers was significant at 0.001 level ( $\chi^2$  tests).

<sup>d</sup> Significant at the 0.05 level.

<sup>e</sup> Children under age 3 years.

ries in DHS phases II and III. Second, decisions on source of care can be affected by the availability and accessibility of various types of providers. Despite these limitations, the results suggest that private providers are an increasingly important source of care for children with diarrhoea in these four countries.

**Treatment patterns.** In the analyses that follow, we compare the proportion of children with diarrhoea who were taken outside the home for care and received ORS (either alone or in combination with drugs), and the proportion who received only drugs and no ORS. Table 2 presents these results by the type of provider visited (public or private).

(1) *Overall use of ORS (with or without drugs) and drugs (without ORS).* The percentage of children who received treatment that included ORS ranged from 8% to 78% with a median of 52% in 28 surveys; the percentage was  $\geq 50\%$  in 17 surveys, and in five others — Morocco (1987), Sudan, Sri Lanka, Philippines and Dominican Republic (1991) — it exceeded the percentage who received "drugs only". In the remaining six countries — Bolivia, Guatemala, Kenya (1988/89), Peru, Uganda and Turkey — the proportion of children who received ORS was lower than the proportion who received "drugs only". The results for individual countries may be the result of a variety of uncontrolled factors. For example, the

Table 2: Reported use of ORS and drugs for treatment of diarrhoea among children (1–59 months), by type of provider

Country and year	Type of provider	No. of children with diarrhoea taken to provider	Percent reported to have been given:		Country and year	Type of provider	No. of children with diarrhoea taken to provider	Percent reported to have been given:	
			ORS with or without drugs	Drugs only				ORS with or without drugs	Drugs only
<i>Panel 1 (DHS I)</i>					<i>Panel 3 (DHS II &amp; III)*</i>				
Egypt 1988/89 <sup>a</sup>	Public	190	61.2	37.2	Dominican Republic 1986	Public	186	59.7	19.0
	Private	389	49.6	48.6		Private	103	64.4	16.6
	Total	548	52.2 <sup>b</sup>	46.3 <sup>c</sup>		Total	289	61.4	18.2
Kenya 1988/89	Public	316	32.1	64.0	Peru 1986	Public	91	7.7	74.1
	Private	72	20.4	79.1		Private	141	8.5	83.7
	Total	388	29.9	66.8 <sup>d</sup>		Total	232	8.2	80.2
Tunisia 1988	Public	187	61.5	26.7	Trinidad & Tobago 1987	Public	30	80.0	3.3
	Private	85	32.9	61.2		Private	26	73.1	7.7
	Total	272	52.6 <sup>b</sup>	37.5 <sup>b</sup>		Total	56	76.8	5.4
Uganda 1988/89	Public	260	36.6	60.8	Ghana 1993	Public	75	66.7	29.3
	Private	72	19.0	74.9		Private	79	36.7	63.3
	Total	332	32.8 <sup>c</sup>	63.9 <sup>d</sup>		Total	155	51.0 <sup>d</sup>	47.1 <sup>b</sup>
Bolivia 1989	Public	227	59.2	37.6	Kenya 1993	Public	226	67.6	25.4
	Private	140	23.7	67.0		Private	194	32.8	56.7
	Total	367	45.6 <sup>b</sup>	48.9 <sup>b</sup>		Total	392	52.9 <sup>b</sup>	38.7 <sup>b</sup>
Guatemala 1987	Public	59	47.5	49.2	Malawi 1992	Public	288	71.9	13.6
	Private	97	11.3	47.4		Private	134	67.8	21.2
	Total	156	25.0 <sup>b</sup>	48.1		Total	418	70.6	15.9 <sup>d</sup>
<i>Panel 2 (DHS I)</i>					Morocco 1992	Public	51	80.4	9.8
Botswana 1988	Public	133	75.8	6.3		Private	65	35.4	49.2
	Private	4	50.0	35.6		Total	111	54.1 <sup>b</sup>	32.4 <sup>b</sup>
	Total	137	75.1	7.2	Rwanda 1992	Public	245	74.6	19.0
Burundi 1987	Public	90	65.4	10.5		Private	29	28.1	59.1
	Private	139	69.2	10.3		Total	271	69.5 <sup>b</sup>	23.6 <sup>b</sup>
	Total	229	67.7	10.4	Zambia 1992	Public	565	81.6	9.4
Ghana 1988	Public	293	52.9	26.6		Private	145	63.1	27.1
	Private	121	50.4	28.9		Total	697	78.0 <sup>b</sup>	12.9 <sup>b</sup>
	Total	414	52.2	27.3	Indonesia 1991	Public	422	71.4	24.9
Morocco 1987	Public	182	48.4	37.4		Private	518	41.3	52.5
	Private	60	28.3	51.7		Total	920	54.4	40.4 <sup>b</sup>
	Total	242	43.4 <sup>d</sup>	40.9 <sup>d</sup>	Pakistan 1990/91	Public	110	66.8	8.9
Sudan 1989/90 <sup>a</sup>	Public	595	45.0	30.1		Private	343	51.3	16.9
	Private	426	48.6	35.0		Total	441	54.1 <sup>c</sup>	15.4
	Total	972	46.1	32.2	Philippines 1993	Public	176	61.8	26.0
Sri Lanka 1987	Public	99	40.2	8.8		Private	157	33.3	54.9
	Private	61	32.8	7.0		Total	317	48.3 <sup>b</sup>	40.3 <sup>b</sup>
	Total	160	37.4	8.1	Turkey 1993	Public	162	30.5	50.3
Thailand 1987	Public	112	61.1	26.0		Private	67	21.1	57.4
	Private	113	67.9	26.5		Total	225	28.2	51.5
	Total	225	64.5	26.2	Dominican Republic 1991	Public	65	60.8	31.1
Colombia 1986	Public	32	74.7	19.5		Private	131	40.3	39.9
	Private	119	70.2	13.5		Total	192	46.6 <sup>c</sup>	37.2
	Total	151	71.2	14.7					

<sup>a</sup> For these countries, the question about the type of provider seen for diarrhoea treatment allowed a multiple response. A few children were reported to have been taken to both public and private providers. A child was *not* counted twice in the "total" if (s)he was reported to have been taken to both public and private providers. Therefore frequencies for "public" and "private" providers do not add to the "total" shown for children with diarrhoea taken to the provider in this group.

<sup>b</sup> The public-private difference in the use of ORS/drugs was significant at the 0.001 level based on  $\chi^2$  tests.

<sup>c</sup> Significant at the 0.01 level.

<sup>d</sup> Significant at the 0.05 level. All other results in the ORS and "drugs only" columns, which are not qualified by *b*, *c* or *d*, indicate that the relationship is not significant at the 0.05 level.

relatively low use of ORS reported from Peru can be attributed to a widely publicized incident in which four children died after drinking improperly produced ORS. Subsequently, ORS was taken off the market for some time, and the DHS was carried out during this period.<sup>m</sup>

(2) *Treatment patterns by type of provider.* ORS was prescribed for childhood diarrhoea more often by public than by private providers. This was particularly true for countries in panels 1 and 3. The relationship is statistically significant ( $P < 0.05$ ) for five of six panel-1 countries and nine of eleven panel-3 countries. For three additional countries in panels 1 and 3 — Kenya (1988/89), Malawi and Turkey — the pattern of results is in the same direction although statistical significance was not achieved.

Of the eleven panel-2 countries, Morocco (1987) is the only one in which public providers had a clear and significant lead over their private counterparts in the use of ORS. The failure to document statistically significant differences between public and private providers in the use of ORS for the remaining ten countries in panel 2 may be due to the absence of a direct link between provider type and treatment type, as well as to the absence of specific probing questions for ORS use.

Reports of treatment that was limited to drugs and did not include ORS were more common among children treated by private providers than among those treated by public providers. These differences were statistically significant ( $P < 0.05$ ) for panel-1 and panel-3 countries, with the exception of Guatemala, Pakistan, Turkey, and Dominican Republic. These differences were not statistically significant for ten of the eleven panel-2 countries, Morocco being the only country where "drugs only" treatment was observed among a significantly higher proportion of the children treated by private providers.

We also analysed the differences in treatment patterns between public and private providers among urban and rural respondents within nine panel-3 countries (results not shown).<sup>n</sup> The results were consistent with those found at the national level. In both urban and rural settings, children taken to public providers were more likely to be reported by their mothers as having received ORS during the diarrhoea episode. The sole exception was Ghana

(1993), where this pattern was found only in rural areas. Treatment limited to drugs was reported more frequently among children taken to private providers in five of the nine countries. This is consistent with national trends.

(3) *Changes in treatment patterns over time.* Findings from the four countries for which measurements are available at two points in time show mixed results (Table 2). In Kenya and Morocco, the reported use of ORS among children taken outside the home for diarrhoea treatment increased in the inter-survey period (in Kenya, from 30% in 1988/89 to 53% in 1993; and in Morocco, from 43% in 1987 to 54% in 1993), with concomitant decrease in the proportion of children with diarrhoea who received only drugs (in Kenya, from 67% to 39%; in Morocco, from 41% to 32%). In both countries, improvements appear to be attributable primarily to increases in the use of ORS and decreases in the use of drugs among public rather than private providers. As indicated above, changes in the questionnaire between earlier (DHS phase I) and later (DHS phases II and III) surveys may have contributed to the observed increases in ORS use, as the later questionnaire included a prompted response for ORS use if this was not offered spontaneously by the mother.

In Ghana and the Dominican Republic, the comparison of treatment patterns across the two surveys yields disappointing results. During the inter-survey period in Ghana, the use of ORS did not increase (52% in 1987 and 51% in 1993) and the use of drugs without ORS increased during the same time period (from 27% to 47%). In the Dominican Republic, reported treatment with ORS also declined (from 61% in 1986 to 47% in 1991) while treatment limited to drugs increased (from 18% to 37%). These findings appear to be attributable in large part to changes in treatment patterns among private as opposed to public providers.

(4) *Treatment patterns and presence of blood in stools.* Among diarrhoeal diseases of children for which drug use is appropriate, bloody diarrhoea is the most widespread. Correct treatment of bloody diarrhoea includes giving an antimicrobial drug that is effective against *Shigella*, as well as giving oral rehydration therapy and continuing to feed the child (12).<sup>o</sup> We therefore hypothesized that children reported by their mothers to have blood in their stool would be treated with drugs more often than those with non-bloody diarrhoea. Mothers' reports about

<sup>m</sup> Personal communication, Shea Rutstein, DHS, Macro International, 1995.

<sup>n</sup> The urban-rural variable was not in the data file for Malawi, due to the contractual agreement that DHS reached with the Malawian government prior to the survey. Rwanda was excluded from the urban/rural analysis because of few children with diarrhoea (only 17 cases) classified in the urban category.

<sup>o</sup> *The outpatient management of bloody diarrhea in young children. Update*, 16. WHO, Division of Diarrhoeal and Acute Respiratory Disease Control. 1994.

Table 3: Reported use of drugs, by presence of blood in stools, among children with diarrhoea who were taken to a health provider

Country	Children with diarrhoea	Percent taken to a provider	Of these, percent reporting use of drugs (with or without ORS)
Ghana 1993			
Blood in stools	81	58.0	82.9
No blood in stools	327	51.7	70.8
Kenya 1993			
Blood in stools	134	70.9 <sup>a</sup>	54.2
No blood in stools	636	56.9	58.2
Malawi 1992			
Blood in stools	154	58.6	33.0
No blood in stools	660	55.0	21.1
Morocco 1992			
Blood in stools	70	15.7	50.0
No blood in stools	538	20.4	44.1
Rwanda 1992			
Blood in stools	159	46.3 <sup>b</sup>	39.2
No blood in stools	924	32.3	51.2
Zambia 1992			
Blood in stools	185	83.3 <sup>b</sup>	42.6 <sup>c</sup>
No blood in stools	1025	70.1	31.9
Indonesia 1991			
Blood in stools	150	83.2 <sup>b</sup>	80.1
No blood in stools	320	67.0	75.1
Pakistan 1990/91			
Blood in stools	90	57.1	34.3
No blood in stools	736	58.1	33.8
Philippines 1993			
Blood in stools	61	54.7	63.1
No blood in stools	787	44.0	57.6
Dominican Republic 1991			
Blood in stools	40	46.1 <sup>c</sup>	82.1
No blood in stools	560	36.8	66.4

<sup>a</sup> The difference in the proportion between "blood in stools" and "no blood in stools" subgroups is statistically significant at the 0.01 level ( $\chi^2$  tests).

<sup>b</sup> Significant at the 0.001 level.

<sup>c</sup> Significant at the 0.05 level.

whether the stool contained blood were available in ten of the eleven countries in panel 3. Among children with diarrhoea, the proportions reported to have blood in the stool ranged from 7% in Philippines and Dominican Republic to 20% in Ghana.

The proportion of children with diarrhoea treated outside the home and the proportion reporting to have used drugs (with or without ORS) are presented in Table 3 according to the presence of blood in the stool, as reported by the mother. In five of the ten countries — Kenya, Rwanda, Zambia, Indonesia and Dominican Republic — children were significantly more likely to be taken outside the home for treatment if they had blood in the stool than if they did not. Although the results are not statistically significant for the remaining countries, most are in the expected direction. Among children with bloody diarrhoea who were taken outside the

home, dysentery appears to be undertreated: 50% or fewer of those children were reported to have received a drug in five countries.

No significant relationship was found between the presence of blood in the stool and the reported use of drugs in nine of ten countries; the exception was Zambia where children with blood in the stool were significantly more likely to be reported to have used drugs than those without blood in the stool. Contrary to our expectations, the results do not support the hypothesis that blood in the stool is associated with higher rates of reported use of drugs. This may be due to high background rates of drug use in the treatment of all forms of diarrhoea, but suggests that our findings on treatment patterns are not seriously overestimating inappropriate drug use by failing to account for the appropriate use of antimicrobials for children with bloody diarrhoea.



We also examined whether there is a significant difference in the use of drugs between public and private providers among children with bloody diarrhoea for eight countries (Ghana, Kenya, Malawi, Zambia, Indonesia, Pakistan, Philippines, and Dominican Republic).<sup>p</sup> Although the percentage of bloody diarrhoea cases treated with drugs was consistently higher among private providers than among public providers, the difference is not statistically significant except in Zambia and Pakistan.

## Discussion

This analysis, using data from 28 surveys, provides important information about care-seeking for childhood diarrhoea and treatment patterns among public and private health providers.

As in any secondary analysis, the results presented here are limited by the form and quality of the original data. Differences in questioning patterns, particularly between panel 2 and panels 1 and 3, limit the strength of the documented associations and require that the results be interpreted with caution. The absence of information on the type of diarrhoeal disease in all but 10 of the 28 surveys also limits the accuracy of the results, because we were unable to identify those diarrhoea cases for whom drug treatment was appropriate. In an effort to address this, we conducted analyses of treatment patterns based on the reported presence of blood in the stool for the 10 countries where sufficient data were available. No differences were found in the proportion of children reported to have received drugs based on the presence or absence of blood; this suggests that the estimates provided may not seriously overestimate drug treatment for children with watery diarrhoea. Even if a positive bias exists, there is no reason to expect that the degree of overestimation differs between public and private providers. The public-private disparities documented in the analysis are valid in their degree of difference, if not in absolute values. Despite the limitations, the results provide important information for diarrhoeal disease programmes which can be used to assist national and international public health managers in establishing priorities.

First, the results indicate that the proportion of children with diarrhoea who are taken to a medical provider varies widely, although there seem to be some broad regional patterns. As an early step in

efforts to reduce diarrhoea-related mortality, programme managers will need to continue to examine whether or not household decisions about care-seeking are appropriate — that is, whether caretakers are able to recognize the signs of severe illness and act on them by taking their child to a health provider.

Second, the results indicate that those children who are taken to a health provider do not always receive appropriate treatment. An encouraging finding was that, in the majority of countries surveyed, the majority of children with diarrhoea who sought care from a health provider, received treatment that included ORS. In two of the four countries with two successive surveys, there was an increase in the use of ORS by public providers between the first and the second survey. These are important achievements. On the other hand, there is considerable room for improvement in most if not all countries. In countries where data are available, bloody diarrhoea appears to be undertreated, even for children who were taken to health providers.

Third, the results clearly show that private providers are a significant source of care for children with diarrhoea, and that private providers in almost all countries are significantly less likely than public providers to provide appropriate case management for watery diarrhoea. Few routinely prescribe ORS, and many prescribe unneeded drugs. In countries where two surveys were conducted, private providers were slower than public providers in adopting ORS as an appropriate treatment, and in limiting drug use to those few cases for whom it is warranted.

We undertook this analysis to investigate diarrhoea treatment patterns among providers in public and private settings. Clinic-based studies of the quality of diarrhoea treatment are available for public providers,<sup>q</sup> but there are few studies of treatment patterns among private providers. The DHS surveys, although based on mothers' reports rather than clinic observations, provide a valuable starting point for understanding the behaviour of providers in both public and private settings. The results are remarkably consistent across widely varying health systems. They show that providers in private settings are less likely to use ORS than providers in public settings. This apparently simple finding has important programmatic implications, suggesting that national public health programmes must further investigate this issue and design strategies to ensure correct treatment of childhood diarrhoea by all health providers.

<sup>p</sup> Data on blood in the stool were available for ten countries, two of which we excluded: Morocco with only eight cases with blood in stools which were taken to a provider, and Rwanda with only six cases with blood in the stool taken to a private provider.

<sup>q</sup> *Interim report, 1995*. WHO, Division of Diarrhoeal and Acute Respiratory Disease Control.

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## Résumé

### Modalités de traitement de la diarrhée infantile: données des enquêtes démographiques et sanitaires

On a comparé ici l'usage fait des solutions de réhydratation orale (SRO) et des médicaments chez les enfants amenés en consultation chez des prestataires de soins du secteur public ou privé. L'analyse porte sur les données de 28 enquêtes effectuées dans 24 pays, choisis dans le cadre du Demographic and Health Surveys Programme, mis en oeuvre entre 1986 et 1993. Le pourcentage d'enfants ayant reçu un traitement comprenant l'administration de SRO se situe entre 8% et 78%, avec une médiane à 52%; ce pourcentage est supérieur ou égal à 50% dans 17 enquêtes. Le secteur privé constitue une source de soins importante pour les enfants atteints de diarrhée. Il est moins enclin à utiliser les SRO et davantage porté à prescrire des médicaments inutiles que le secteur public. Dans les pays pour lesquels on dispose de données, la diarrhée sanglante semble être insuffisamment traitée. Les résultats indiquent que les programmes nationaux de santé publique doivent poursuivre leurs efforts pour améliorer les stratégies qui visent à obtenir que l'ensemble des prestataires de soins traitent correctement la diarrhée infantile.

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## Annex

## Definitions of public and private providers, and drugs

Country and year	Public providers <sup>a</sup>	Private providers	Drugs
<i>Panel 1 (DHS I)</i> Egypt 1988/89	Government health service	Private doctor	Kaopectate, introquine, diabet; antibiotic & medicine not specified
Kenya 1988/89	Government hospital/clinic	Private doctor	Pill, syrup, injection & intravenous fluid
Tunisia 1988	Hospital, PMI, dispensary	Private doctor, pharmacist	Tablet syrup & injection
Uganda 1988/89	Hospital/clinic	Private doctor	Pill, syrup, injection & intravenous fluid
Bolivia 1989	Government hospital, health centre	Private doctor, consultant in private hospital, pharmacist	Pill, syrup, infection & intravenous fluid
Guatemala 1987	Government hospital, health centre, health post, IGSS	Private hospital or clinic, pharmacy	Medicines, injection & intravenous fluid
<i>Panel 2 (DHS 1)</i> Botswana 1988	Government health clinic, health post, or hospital	Private doctor/clinic	Pill, syrup, injection, & intravenous fluid
Burundi 1987	Hospital, health centre	Dispensary	Pill, syrup & injection
Ghana 1988	Government hospital/clinic	Private doctor	Pill, syrup & injection
Morocco 1987	Dispensary, health centre, government hospital	Private doctor	Pharmaceuticals & syrup
Sudan 1989/90	Government hospital, health centre, dressing stations, primary health care centre	Private doctor, private hospital, pharmacy	Pill, syrup, other pill/syrup, injection & intravenous fluid
Sri Lanka 1987	Government hospital/clinic	Western doctor	Pill, syrup & injection
Thailand 1987	Government hospital/clinic	Private doctor	Pill, syrup & injection
Colombia 1986	Hospital/clinic	Doctor	Pill, syrup & injection
Dominican Republic 1986	Government hospital, IDSS FF, clinic	Private clinic	Pill, syrup & injection
Peru 1986	Hospital/clinic	Doctor	Pharmaceuticals
Trinidad & Tobago 1987	Government hospital/clinic	Private doctor	Pill, syrup & injection
<i>Panel 3 (DHS II &amp; III)</i> Ghana 1993	Government hospital centre, health post, public mobile clinic, public community health worker	Private hospital/clinic, pharmacy, private doctor, mission, church, hospital/clinic non-government service, shop	Pill, syrup, antibiotics, injection
Kenya 1993	Government hospital, health post, mobile clinic, community health worker	Private hospital/clinic, pharmacy, doctor, mobile clinic, health centre, dispensary, shop	Pill, syrup, antibiotics, injection & intravenous fluid
Malawi 1992	Government hospital, pharmacy, dispensary, and other fixed facilities	Private pharmacy or doctor	Pill, syrup, antibiotics, injection, & intravenous fluid
Morocco 1992	Government hospital, health centre, health post, public mobile clinic, community health worker	Private hospital/clinic, pharmacy, doctor, shop	Pill, syrup, antibiotics, injection, intravenous fluids
Rwanda 1992	Government hospital, health centre, health post, community health worker	Private doctor	Pill, syrup, antibiotics, injection & intravenous fluid

(continued on page 146)

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**P.K. Muhuri et al.**

Country and year	Public providers	Private providers	Drugs
<i>(Annex, continued)</i>			
Zambia 1992	Government hospital, health centre, community health worker	Private hospital/clinic, pharmacy, doctor, mission hospital/clinic, shop	Pill, syrup, antibiotics, injection & intravenous fluid
Indonesia 1991	Government hospital, health centre, health post, health cadre	Private hospital, pharmacy, doctor, clinic, midwife, shop	Pill, syrup & ointment
Pakistan 1990/91	Government hospital, clinic, family welfare worker, lady health visitor	Private hospital/clinic, pharmacy, doctor, shop	Pill, syrup, antibiotics, injection, intravenous fluid
Philippines 1993	Government hospital, mobile clinic, community health worker, rural health unit, health station	Private hospital/clinic, pharmacy, doctor, mobile clinic, community health worker, shop	Pill, syrup, antibiotics, injection, & intravenous fluid
Turkey 1993	Government hospital, health centre	Private hospital/clinic, pharmacy, doctor	Pill, syrup, antibiotics, injection & intravenous fluid
Dominican Republic 1991	Government hospital, community health worker, public subcentre, public dispensary, rural clinic	Private pharmacy, public community health worker, private clinic or dispensary	Pill, syrup, antibiotics, injection, intravenous fluids

\* PMI = Maternal and Child Health Clinic; IGSS = Hospital and Institute for Social Security; IDSS FF = Hospital of the Institute for Social Security for Armed and Police Forces.