

**Formative research in preparation for promotion of zinc  
treatment for childhood diarrhea:**

**Cross-country comparison of diarrhea treatment practices  
and implications for programs**

**Background document prepared for the meeting “Planning for  
Implementation of Zinc for Treatment of Diarrhea,” Baltimore, Maryland,  
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## **Formative research in preparation for promotion of zinc treatment for childhood diarrhea: Cross-country comparison of diarrhea treatment practices and implications for programs**

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## I. Summary of formative research on diarrhea treatment practices

Data presented: This document summarizes some of the findings from formative research on diarrhea treatment practices that has been conducted as part of three different projects:

1. INCLEN- Childnet, JHU, WHO Multi-centric project on Acceptability and Cost-effectiveness of Zinc supplementation;
2. WHO, JHU, USAID Multi-country study of effectiveness of zinc treatment in children; and
3. ICDDR,B, Government of Bangladesh, Gates project on large-scale implementation of zinc treatment.

Most of the data presented in the tables in Section II of this report are preliminary. Furthermore, a variety of data collection methods have been used making direct comparisons impossible in many cases. Finally, some investigators were unable to provide data as they are still entering or analyzing data. In any case, the intent of presenting the data here in this form is to provide a basis for discussion of the global strategy for introducing zinc treatment for childhood diarrhea at the meeting “Planning for Implementation of Zinc for Treatment of Diarrhea,” Baltimore, Maryland, USA, 22-23 June 2004.

ORS production, marketing, knowledge and use: Data on ORS sachets are presented in several of the tables. In most countries, ORS sachets are produced by several companies, and are available in both the public and private sector. Although overall use is high, there is concern that ORS is not being used in a way most likely to prevent mortality from dehydration. In-depth examination of how ORS is used in Bangladesh found that 1) Proportions are changed to conserve the packet, 2) People are unsure how long to keep the prepared solution, 3) Care providers are unaware of the appropriate age to start giving ORS, 4) Many care providers feel that ORS is only appropriate for “watery” diarrhea. A key concern in several countries is that ORS causes vomiting, or does not taste good. The new low-osmolarity formulation of ORS addresses many of these concerns. The latter observation is apparently common to several countries: people feel ORS is only appropriate or necessary for certain types of diarrhea. Of most concern is that sunken fontanel, a key sign of severe dehydration in young children, in several countries is thought to be a “traditional” illness that is most appropriately managed with traditional treatments (see Table 6). Furthermore, in some African countries such as Mali, ORS is not readily available outside of government health facilities, greatly reducing the likelihood that it will be used.

### **Implications for promotion of zinc treatment**

- All countries require promotion of the new low-osmolarity formulation of ORS. This promotion provides an opportunity to provide further information on ORS, and address concerns people have about it.
- While awareness of ORS is high, people require further information on its preparation and use. They also need to be informed that it is appropriate for all forms of diarrhea, both mild and severe.
- In countries where ORS is not available in the private sector, consideration needs to be given to private sector production and marketing.

Inappropriate treatment practices: Table 9 summarizes findings on non-recommended treatments for diarrhea from the formative research. Antimicrobials including penicillin and cephalosporin antibiotics and metronidazole are widely used to treat uncomplicated diarrhea. In some countries intravenous saline and IM antibiotics are common treatments, while in others these practices are relatively rare. This situation likely is making a significant contribution to the spread of antimicrobial resistance.

### **Implications for promotion of zinc treatment**

- Efforts to discourage unnecessary and inappropriate antimicrobial use should be an integral part of interventions to promote zinc treatment.
- An unresolved issue is the economic benefit to providers in the private and informal sectors of promoting zinc treatment instead of intravenous saline and IM antibiotics, as the latter are undoubtedly more profitable treatments for them to prescribe or administer.

Acceptability of zinc treatment: Preliminary data indicate that zinc treatment will be highly acceptable. Where willingness to pay has been examined, people have expressed willingness to pay \$0.20-0.25 for the 14 day course of treatment. Compliance with a full course of treatment has been high where this has been measured, although it is not yet known what compliance levels will be like under “real world” conditions. Some issues have emerged that might be considered when producing and marketing zinc tablets. In several countries some parents have expressed a preference for a syrup rather than a pill. In Pakistan some people stated that the tablets are too large and therefore not appropriate for children, and also suggested that the tablets have a different color. There is considerable data from Bangladesh that were collected in developing a marketing plan for zinc treatment that offer a base for thinking about what issues to explore in other countries. Key concerns of parents when their children have diarrhea include weakness, reduced appetite, and failure to recover quickly. These concerns might be useful to consider when deciding what key benefits of zinc treatment to mention. In some countries parents pay large amounts of money to treat their children with intravenous saline and other treatments when the diarrhea becomes severe. In this context, reduction in severity as a result of zinc treatment not only benefits the child’s health, but can result in considerable cost savings for the parents.

### **Implications for promotion of zinc treatment**

- While acceptability of zinc treatment, willingness to pay and compliance with a full course of treatment all appear so far to be high, further monitoring is needed to assess what levels will be under routine program conditions.
- Branding, packaging and formulation of the zinc treatment will need to be adapted to the needs of specific countries.
- A wider range of benefits of zinc treatment need to be considered, including lower treatment costs when the diarrhea is less severe.

## II. Summary tables on diarrhea treatment practices

**Table 1. Policy environment for large scale promotion of zinc treatment for diarrhea**

	Latin America	Asia				Africa and Middle East			
	Brazil	Bangladesh	Pakistan	India	Philippines	Ethiopia	Egypt	Mali	South Africa
<b>Participation in research on implementation of zinc treatment for diarrhea</b>									
INCLIN- Childnet, JHU, WHO Multi-centric project on Acceptability and Cost-effectiveness of Zinc supplementation	Yes	No	No	Yes: Lucknow, Nagpur	Yes	Yes	Yes	No	Yes
WHO, JHU, USAID Multi-country study of efficacy of zinc treatment in children less than 6 months of age	No	No	Yes	Yes	No	Yes	No	No	No
WHO, JHU, USAID Multi-country study of effectiveness of zinc treatment in children	No	No	Yes	Yes	No	No	No	Yes	No
ICDDR,B, Government of Bangladesh, Gates project on large-scale implementation of zinc treatment	No	Yes	No	No	No	No	No	No	No
<b>Plans for production of zinc tablets and promotion of zinc treatment</b>									
National steering committee or working group exists to support zinc introduction	No	Yes				Not yet possible		Yes	
Zinc included in national formulary of essential drugs	No	No				Not Yet		Not yet	
Plans for local production of zinc tablets	No	Yes						No	
Transfer of technology for local production has been initiated	No	Yes						No	
Plans for social marketing of zinc treatment	No	Yes	Yes	Yes				No	

**Table 2. Status of utilization and promotion of ORS sachets and other treatments**

	Latin America	Asia				Africa and Middle East			
	Brazil	Bangladesh	Pakistan	India	Philippines	Ethiopia	Egypt	Mali	South Africa
<b>Status of sales and marketing of ORS sachets</b>									
Local production of ORS sachets	Yes	Yes	Yes	Yes		Yes	Yes	No	
ORS sachets available in health facilities and pharmacies	Yes	Yes	Yes	Yes		Yes	Yes	Yes	
ORS sachets available in shops and markets	No	Yes	Yes	Yes		Yes	Yes	No	
Commercial marketing of local brands of ORS sachets	Yes	Yes	Yes	Yes		Yes	Yes	No	
<b>Diarrhea treatment practices according to recent national household survey (DHS or equivalent)</b>									
* number in parenthesis is DHS estimate for Sikasso region									
Year of most recent national survey	1996	99/00	90/91	98/99	1998	2000	2000	2001*	1998
Children with diarrhea treated with ORS	44%	60%	39%	27%	43%	13%	34%	13% (16%)	59%
Children with diarrhea treated with SSS	16%	25%	11%	3%	49%	32%	37%	22% (16%)	69%
Children with diarrhea treated with antibiotic	NA	NA	11%	Pill-52.7% Inj.-14.8%	NA	NA	24%	NA	NA
Children with diarrhea. given more fluids than usual	55%	50%	9%	22%	58%	35%	17%	53% (63%)	57%
Children with diarrhea given same or more amount of food	NA	NA	8%	Same-43% More 10%	21%	2%	4%	40%	14%

**Table 3. Diarrhea treatment practices according to recent research on zinc treatment for diarrhea**

\*\* \*Figure quoted is for ORT and not specifically for ORS

	<b>Bangladesh Rural</b>	<b>Bangladesh Urban</b>	<b>India</b>	<b>Ethiopia</b>	<b>Mali</b>
<b>Treatments given</b>					
Children with diarrhea treated with ORS	55%	44%	160/415 (39%)**	53%	11%
Children with diarrhea treated with SSS	19%	4%	**	NA	NA
Children with diarrhea treated with antibiotic	30%	29%	2.65 %	27%	60%
Children treated with metronidazole	27%	44%			
Children with diarrhea. given more fluids than usual			0.7% 53%	NA	18%
Children with diarrhea given same or more amount of food			Usual food (60%) Special Food (24%)	NA	40%
<b>Sources of care</b>					
None	27%	44%			
Private MB BS doctor	3%	15%			0%
Unlicensed allopath, traditional medicines	45%	17%			75%
Drug vendor/market	4%	13%			54%
MOH or NGO CHW or equivalent	2%	< 1%			43%

**Table 4. Formative research results: Treatment practices for diarrhea and dysentery**

	<b>Brazil</b>	<b>Bangladesh</b>	<b>India</b>	<b>Pakistan</b>	<b>Mali</b>
Terms commonly used for mild or “routine” cases of diarrhea	Green diarrhea/ <i>esverdeada</i> <i>barriga fôfa</i>	Loose motion/ <i>Patla paikhana</i> Stomach upset/ <i>pet phapa</i>	<i>Dast</i> <i>Panni Jaisi Tatti</i> Foul smelling stools	<i>Dast</i> /diarrhea, various kinds: green, white, yellow, watery	Diarrhea/ <i>Konoboli</i> Regular diarrhea Watery diarrhea
Treatments commonly given for mild diarrhea	ORS, SSS	ORS Various medicines from shopkeepers Drinks from religious healers	Salt Sugar Solution (SSS) ORS	ORS Herbal treatments Various tablets: metronidazole etc. Syrups	Herbal teas, especially from guava leaves Antibiotics ORS
Sources of treatment for mild diarrhea	Traditional healers, CHW, Family physicians, pharmacies	Religious/traditional healers Shopkeepers Private doctors	Govt. Facility Home-(For SSS)	General stores Medicine shops Traditional medicine vendors Private clinics	Mothers in law or other older women Market drug vendors Traditional healers Village drug kit manager (for ORS) Community health center
Typical cost of treatment of a case of mild diarrhea				\$1 to \$10	Less than \$0.25, free for traditional meds
Terms commonly used for dysentery	“Disinteria”	Dysentery <i>amasha</i> Bloody dysentery <i>rokto amasha</i> White dysentery <i>Shada amasha</i>	Blood with stools	<i>Paichish</i> - Dysentery <i>Mikkh wari paichish</i> – Dysentery with mucus	<i>Togotogonin</i> <i>Konorojoli</i> <i>Kunfilanitu(cholera)</i>
Treatments commonly given for dysentery	Cotrimoxazol, Acido Nalidixico	First treatment are foods with cooling properties; con-sumption of “hot” foods to be avoided Antibiotics	ORS	ORS, but also antibiotics, metronidazole	Same as mild diarrhea, often also w/ anti-malarial drugs
Sources of treatment for dysentery	Pharmacies, Health facilities	If symptoms persist or worsen, medicine shopkeeper or homeopathic doctor For severe illness, trained physician	Govt. Facility Pvt. Practioner	Same as for mild diarrhea, but also private clinics and hospitals	Same as mild diarrhea, but also community health center (CSCom)
Typical cost of treatment of a case of dysentery				\$5-10	.18 - \$7.45 USD



**Table 5. Formative research results: Treatment practices for dehydration**

	<b>Brazil</b>	<b>Bangladesh Rural</b>	<b>Bangladesh Urban</b>	<b>Pakistan</b>	<b>Mali</b>	<b>India</b>
Terms commonly used for dehydration		<i>Panishunnota</i> (Term used in radio and television) <i>Koliza shukaye jai</i> –liver became dry <i>Shorir shukaye gache</i> -body drying up <i>Pani er tan utthe</i> -child is thirsty <i>Tota shukaye jai</i> -dry throat <i>Panir obhab</i> -lack of water <i>Pani nai</i> -deficiency of water <i>Rocto nai</i> -deficiency of blood	<i>Panishunnota</i> (Term used in radio and television)  <i>Pani nammya jai</i> -water is going out <i>Pani jaiga</i> -water is going <i>Pani bahir hoei jai</i> –water is going out <i>Panir obhab</i> -scarcity of water <i>Pani porey jai</i> -water is falling	<i>Jism mein pani ghat ji vio</i> - loss of water in body	<i>Jintanya</i> – Lack of water  (For the most part, dehydration is generally not recognized or treated as other than diarrhea)	<i>Sharir Se Panni Nikalna</i> Loss of water from body
Treatments commonly given for dehydration	ORS Herbal teas SSS	Home salt, sugar solution ORS (for 1-2 days) Syrups		ORS herbal drinks IV drip ( <i>thelhi</i> or <i>drip</i> )	Traditional medicines ORS.	Excessive Fluids ORS
Sources of treatment for dehydration	Health facilities, Family physicians	Home Local corner store Medicine shopkeeper		Private clinic Private hospital Shopkeeper	Mothers, elder women Village drug kit managers	Home Govt. Facility
Typical cost of treatment of a case of dehydration		US\$ 0.05-0.10		Usually <\$5, but can cost >\$100 for IV treatment in private hospital	Free, or ORS costs .17-.22 USD	

**Table 6. Formative research results: Treatment practices for sunken fontanel**

	<b>Brazil</b>	<b>Pakistan</b>	<b>Mali</b>
Terms commonly used for sunken fontanel	<i>Moleira funda</i>	<i>Tarro ma khad</i>	<i>Nguna worolen / ngunadeni</i> <i>Ngunaba</i>
Treatments commonly given for sunken fontanel	Healers	Herbal medicines ( <i>Sutyoon</i> <i>Phakyoon</i> )	Incantations / benedictions <i>klichi</i> , performed by elder women or healers Traditional medicines prepared from tree leaves
Sources of treatment for sunken fontanel		Traditional healers	Traditional healers or village women
Typical cost of treatment of a case of sunken fontanel			Free, or small gift is given

**Table 7. Knowledge and use of oral rehydration therapy and ORS sachets**

	<b>Brazil</b>	<b>Bangladesh</b>	<b>Mali</b>	<b>Pakistan</b>	<b>India</b>
Awareness of ORS – formative research	54% (three states; survey)	High	High, especially in villages with Save the Children drug kits	High 92% aware of it 78% have used it	High
DHS: Percent heard of ORS	DHS 1996: 82.6%		DHS 2001: 67.6% Zinc survey: 81.8%	DHS 1990/91: 87.9%	
DHS: Children with diarrhea give ORS or recommended home solution		DHS 1999/2000: 72.4%	DHS 2001: 30.2%		DHS 1998/1999: 29.0%
Knowledge of how to prepare / administer ORS	Good; 85%	Good on a superficial level, but inadequate when examined in more detail, see below*	High	Correct preparation 63%	Good
Perceived advantages of ORS sachets as treatment for diarrhea	Good	<ul style="list-style-type: none"> <li>- Reduces weakness caused by diarrhea</li> <li>- Replaces water loss</li> <li>- Is “cool” and therefore counteracts the heat caused by diarrhea</li> <li>- Reduces stool frequency and output</li> <li>- Because it is sold in packets, perceived to be more effective</li> </ul>	Replaces lost fluids caused by diarrhea	Replaces lost fluids	It helps cure diarrhea

	<b>Brazil</b>	<b>Bangladesh</b>	<b>Mali</b>	<b>Pakistan</b>	<b>India</b>
Perceived disadvantages of ORS as a treatment for diarrhea		-Will not stop the output - May increase output - The cooling properties of ORS may cause cold - give over several days - Too expensive for very poor families - Difficult to administer, particularly to infants - Excessive salty taste	Inability to stop / cure diarrhea Cost	Some children refuse to take it Some children vomit	None
Main source of ORS sachets	Health facilities, CHW, pharmacies	Corner store Medicine shopkeepers	Village drug kit Community health center	Lady Health Worker Government clinic Medicine shop	Govt. facility – free supply Market
Number of ORS sachets typically purchased	2-3	1 at a time	Rarely more than 1 sachet used per diarrhea episode, if at all Average=3 sachets (ZNB baseline survey)	2-3 packets	1-2 packets
Price at government facilities	No charge	No charge	\$.17 - .22	No charge	No charge
Price in private sector	Limited availability in private sector	\$0.08-0.10	Limited availability in private sector	\$0.08-0.12	\$ 0.20-0.35
Level of awareness of sugar-salt solution	75%	High	High	High	Good
Level of knowledge on how to prepare sugar-salt solution	45%	Generally low	Low-medium, although reported use was even less common than ORS	Very low	Good

\* Not straightforward. Problems: 1) Proportions are changed to conserve the packet, 2) People are unsure how long to keep the prepared solution, 3) Care providers are unaware of the appropriate age to start giving ORS, 4) Many care providers feel that ORS is only appropriate for “watery” diarrhea

**Table 8. Perceptions of zinc treatment for diarrhea**

	<b>Brazil</b>	<b>Bangladesh</b>	<b>Mali</b>	<b>India</b>	<b>Pakistan</b>
Formulation of zinc tablets used for the study	Tablets	Dispersible Nutriset	Dispersible Nutriset	Dispersible Nutriset	Dispersible Nutriset
Overall acceptability of zinc treatment	Very good	83.5% suggested that they would use in future	Very high	Good acceptability	Very high
Perceived benefits of zinc treatment	Very good	Not explored	Efficacious, hygienic, Will complete treatment with ORS	It is effective in curing diarrhea	Want to try it before they say how well it works
Perceived disadvantages of zinc treatment	None	Not explored	Few reported, but include Potential cost Ability to remember full 2 week course	"Too long" duration of administration Vomiting.	
Reactions to taste of zinc tablets	None	93% suggested it was the same or better tasting than other medicines	Sweet, candy-like Overall positive	Acceptable taste.	Good, some say taste is too sweet: "Child will eat, his mother will also eat"
Willingness to pay		Not explored	High, probably up to \$0.27	Yes	\$0.26-0.34
Acceptability of administering zinc treatment for 14 days	Good	94.7% willing to take the first tablet of a 10 day treatment	Apparent willingness to administer for 2 wks, although this may be the most challenging.	Most of them accepted Zinc tab. for 14 days.	
Level of compliance with 14 days of treatment, if measured	90%	55.8% took full 10 day treatment	High, although may be in part due to close monitoring and observer bias	99% compliance.	
Side effects of zinc treatment reported by parents	Vomits	Not fully explored— however of the 44% percent who did not complete the treatment, 27.9% claimed that they stopped because the child was vomiting	Quick reduction in diarrheal symptoms (w/in 3 days) Increase in child's appetite Overall significant improvement in health. Two reported cases of vomiting, n=29	Vomiting reported by few patients.	

**Table 9. Non-recommended treatments for diarrhea**

	<b>Brazil</b>	<b>Bangladesh</b>	<b>Mali</b>	<b>Pakistan</b>
Prevalence of oral antimicrobial use for simple diarrhea	Low (<5%)	30%	61.1%	Not measured, probably 30-50%
Types of oral antimicrobials commonly used for simple diarrhea	Cotrimoxazole Nalidixic acid Amoxicillin	Naladixic acid Cotrimoxazole Erythromycin	Kunbleni ( <i>tetracycline</i> ) Less commonly: cotrimoxazole metronidazole, & ampicillin	Various cephalosporins IM Various formulations containing metronidazole
Sources of oral antimicrobials for simple diarrhea	Health facilities (public sector), pharmacies	MBBS (physicians) Unlicensed allopaths	Market vendors Ambulatory & fixed vendors in village Community health centre	Medicine shops General stores Private clinics
Amounts paid for oral antimicrobials	None	.50 – \$1.00 (US)	Often purchased as loose pills, \$0.02-0.04 per pill	\$1-3
Prevalence of intravenous rehydration for dehydration	25%	<1%	Apparently extremely rare	Common for cases of diarrhea judged to be severe
Sites where intravenous rehydration administered	Emergency room	--	Only possible at district hospital	Private clinics Private hospitals District hospital
Amounts paid for intravenous rehydration				\$2.50-\$5 in private clinic Can be >\$100 in private hospital
Prevalence (measured or approximate) of IM injections for diarrhea	Very low (<5%) DHS 1996: 4.5%	<1%	DHS 2001 0.7% 2.6% Zinc baseline survey	Common, not measured
Types of drugs injected	Gentamicin	--	Vocalaine, Penicillin & Quinamax	Most often cephalosporins: Cefizox, Cefox, Zinacef, Rocephin
Providers who administer injections	Nurse, auxiliary of nurse	--	CSCom or CSRef personnel, occasionally mobile nurse	Private doctors and quacks

**Table 10. Childhood Diarrhoeal Illnesses- Findings from urban site in Dhaka, Bangladesh**

Diarrhoeal Illness Name	Sources of Treatment	
	Home treatment	Outside treatment
1. Loose Motion ( <i>Patla paikhana</i> )	Homemade saline or ORS.	Go to ' <i>kabiraj</i> ' (religious healer/traditional healer) for blessed water/to be blessed.
2. Stomach Upset ( <i>Pet phapa</i> )	*ORS or rice saline (in severe cases) at home. *Herbal medicines	<i>Prefer to go to trained doctor—often purchase medicine from shopkeeper.</i>
3. Chitka Paikhana ( <i>Chitka kalo paikhana</i> )	*If mother establishes a “friendship” with <i>chitka</i> tree then child gets cured. *ORS	<i>Hujur or Kabiraj</i> gives the child blessed water to drink or blessed oil to massage the breast. They also “blow” the body with spiritual words.
4. Stool Like Granule ( <i>Giri giri paikhana</i> )	Give child rice with curry, green banana, green papaya, or malta (local orange) juice, indigenous banana with seeds.	-----
5. Stomach Pain ( <i>Pet betha/pet kamrani</i> )	-----	If becomes watery, get medicine from shopkeeper. Otherwise, don't do anything.
6. Indigestion Defecation ( <i>Hojomer paikhana</i> )	Give ORS or homemade solution.	If don't recover, obtain medicine from shopkeeper
7. Puffy Dysentery ( <i>Fapha fapha amasha</i> )	Give the child rice with curry (the spices should be limited) and soft rice.	Obtain medicine from shopkeeper.
8. Pet Kamrani Paikhana ( <i>Pet kamrani paikhana</i> )	Give food remedies such as green banana, green papaya, some special fishes (without chili) pressed rice, etc.	-----
9. Blackish Stool/Bluish Stool ( <i>Kalo paikhana/ neel paikhana</i> )	Limit consumption of oily and spicy food by both child and breastfeeding mother.	-----
10. Stomach Problem ( <i>Pete gondogol/ shomosha</i> )	Avoid green leafy vegetables. Consume regularly cold foods such as gourd, curry with green papaya or green banana, ripe papaya, etc.	-----

**Table 11. Childhood Diarrhoeal Illnesses- Findings from rural site in Mirsarai, Bangladesh**

Diarrhoeal Illness Name	Sources of Treatment	
	Home treatment	Outside treatment
<b>1. Loose motion</b> ( <i>Patla Jaye/Patla paikhana / Patla</i> )	ORS	Allopathic medicines from shopkeeper
<b>2. Stomach upset</b> ( <i>Pat phapa</i> )	* Consume ginger juice with warm water. * Rub mustered oil on the child's abdomen.	If not recovered after home remedy, seek care with village doctor.
<b>3. Greenish stool</b> <i>Sobuj paikhana/ Kochcha/ Pata ronger paikhana (Leaf colored Stole)</i>	* Mother should maintain food restrictions avoiding such foods as fish, meat, leafy vegetables, and lentils. * Give child juice of 'chidoli' (indigenous) plant.	-----
<b>4. Blackish stool</b> ( <i>Kala paikhana</i> )	-----	-----
<b>5. Worm (Chir)</b>	Give the child hot water and rub 'Joitun' (local fruit) oil on the stomach.	Allopathic medicines, which can be obtained from village doctor.
<b>6. Hachor hachor paikhna</b>	Breastfeeding mother should maintain food restrictions.	-----
<b>7. Bluish Stool</b> ( <i>Chidoli paikhana/ Nila paikhana</i> )	Child should be given juice from the chidoli (local) plant.	-----
<b>8. Chaka chaka mukha/ Gote gote mukha</b>	Give child juice made from wild herbs or bark from a tree.	-----
<b>9. Norom Paikhana</b> ( <i>soft stool/loose stool</i> )	No remedies. It is cured naturally.	-----



### III. Executive Summary: Formative Research on Diarrhea Treatment Practices in Bougouni District, Mali

Objectives and Methods: Formative research was conducted in the Bougouni district of southern Mali from July through December, 2003. Employing primarily qualitative methods, information was gathered about local concepts of diarrhea and illness, household management and treatment seeking behaviors, practices and beliefs about childhood diarrhea and health. Beginning with in-depth interviews with parents of children experiencing diarrhea, illness narratives were recorded and explanatory models for childhood diarrhea explored (14). Building upon these findings and further exploring local terminology, household practices and decision making processes, treatment options and sources of care, semi-structure interviews with parents (19), village drug kit managers (12), community health care personnel (5), and finally village traditional healers (6) were conducted. Using information gathered from these interviews, messages and counseling materials aimed at promoting zinc were created, tested and refined using several methods, including focus groups with mothers of young children (2) focus groups with village drug kit managers (2), and trials of improved practices (29). Salient findings from these formative research activities are summarized below.

Local Terminology and Knowledge of Diarrhea: Several words exist in Bambara which describe diarrhea, the most general of which is *konoboli*. *Konoboli* refers to common, uncomplicated diarrhea characterized by frequent or loose stools, but can be further refined by adding adjectives, such as *gnibo konoboli* (teething diarrhea) or *konoboli gansan* (simple diarrhea). Serious forms of diarrhea are assigned names other than *konoboli*, the most common of which is *togotogonin*. This form of diarrhea may be simple diarrhea that has become severe, but is characterized by the presence of blood or pus in the stool, extreme weakness and/or stomach pains. Another severe form of diarrhea is *konorojoli*, which may also cause vomiting. While parents typically regard *konoboli* as a common childhood illness, they recognize that complicated forms such as *togotogonin* or *konorojoli* are potentially dangerous and may require more care. However, parents rarely identified their children as having anything other than simple diarrhea.

Perceived Causes of Diarrhea and Treatment: Parents believed that a large majority of cases of simple diarrhea were caused by either teething or provoked by an episode of malaria (*sumaya*). Although other causes of diarrhea were occasionally cited, such as transmission through breast milk, inappropriate foods or unclean water, most cases of diarrhea were attributed to one of these two main causes. Because teething is a normal developmental process and nothing can be done to 'cure' a child from teething, many parents therefore believed that nothing effective could be done to alleviate a child's diarrhea. Because diarrhea is often accompanied by a fever, many parents also believe that malaria (*sumaya*) is the ultimate cause. Intensive national and NGO efforts have focused on raising awareness about the signs and treatment of malaria, and many people immediately identify and treat any illness characterized by a fever as such.

Regardless of the cause of the diarrhea, treatment of diarrhea typically begins in the home with traditional medicines (*bamanafura*) and/or antibiotics that are available for purchase from market vendors. Traditional therapies are comprised of leaves, roots or bark which are boiled, strained

and cooled, creating a broth. This liquid is administered to the child both topically and orally 2-4 times per day. A broth made from the boiled leaves of a guava tree is the most popular traditional treatment for diarrhea. Antibiotics can be readily obtained from local vendors or in any market, and pills can be purchased individually or a few at a time to minimize the cost (less than .03 USD each). Tetracycline (*kunbleni*) is the most common antibiotic available from market vendors used to treat diarrhea.

If a child's illness does not improve after two or three days, parents may seek care outside the home from a village drug kit, community health center or traditional healer. Parents may obtain ORS packets from either the village drug kit or community health center, although use of ORS is relatively low and is usually combined with rather than used to replace other home treatments. Although the function of ORS is well understood, ORS is typically not used alone or as a first recourse because it is recognized that it cannot stop or cure diarrhea, only replace lost fluids. Mixing modern medicines with traditional ones is considered to be the most effective treatment strategy, and parents believe that use of ORS should be "completed" with something that can stop or cure the diarrhea, such as a traditional therapy or antibiotic. Also, when diarrhea is accompanied with a fever, drug kit managers and community health center personnel routinely prescribe chloroquine to combat the presumed case of malaria.

Although parents appreciated the use of ORS to replace lost fluids, signs of dehydration - particularly a sunken fontanel- are generally not associated with diarrhea. All parents who were interviewed believed that traditional medicines and incantations performed by traditional healers were the only effective treatment for a sunken fontanel. Also, while most parents believed that care should be sought at a health center if a child failed to improve after several days of treatment at home, some of the most severe illnesses were thought to be only treatable with traditional medicines.

Perceptions of zinc tablets: Community members expressed very favorable reactions to the zinc tablets, particularly commenting upon the sterile and attractive packaging. People enjoyed the sweet taste, and found the appearance of the white tablets to be appealing and clean. Some people remarked that it may be difficult to remember to administer a tablet for the prescribed fourteen days. In general parents expressed a strong willingness to purchase zinc to treat their child's diarrhea. Similarly positive feedback was received during trials of improved practices that were conducted with mothers whose child was currently experiencing a case of simple diarrhea. Mothers received a presentation of the counseling materials that had been developed as well as the combined ORS/zinc treatment, and were followed up in the home over the ensuing two week period. The counseling messages were well understood and received, and all 29 mothers were very enthusiastic and positive about the zinc treatment. A majority of the mothers indicated that their child's diarrhea dissipated within three days. Mothers were particularly pleased with the increase in appetite and that they observed in their children, and by the end of the two week period most reported that their child was steadily regaining weight. Although several administration methods were attempted, ultimately all the mothers found that dissolving the tablet in a small amount of water and giving it the child in a spoon was the most effective method. About half of the mothers thought it was best to provide the zinc supplementation first thing in the morning before the child had eaten so that it would be more readily accepted, while

the other half found it better to give to the child during or just following a feeding. Overall, acceptance of both the counseling messages and zinc treatment was very positive.

Favorable Factors for Implementation: Several factors lend themselves toward the successful implementation of zinc treatment in the Bougouni district. Although use of ORS is currently low, the prevalent existing notion that ORS should be used in conjunction with another curative makes the promotion of a joint ORS/zinc treatment familiar and sensible in the local context. Rather than supplanting ORS, promotion of zinc will probably reinvigorate and increase the use of ORS. Also, use of *kunbleni* and other antibiotics may likely decrease as zinc can fill the curative role that it once did, although the low price of single antibiotic tablets is difficult to compete with in this resource poor setting. As diarrhea is a very common occurrence in this region, parents appear eager to have access to any effective treatment for their children.

Unfavorable Factors for Implementation: Due to geographic and financial difficulties in accessing modern health care, most parents will likely still begin treating childhood diarrhea in the home with traditional therapies. Strengthening the village drug kit system and increasing community awareness about the causes and treatment of diarrhea will provide an important link in making zinc, as well as other essential medicines, accessible and utilized by the community. The predisposition in this region to identify any illness accompanied by a fever may also present challenges to the appropriate treatment of diarrhea. Lastly, including fathers and male heads of households in programming to promote zinc will also be important as they are often the financial gatekeepers to accessing health care for ill children outside the home.

#### IV. Executive Summary: Formative Research on Diarrhea Treatment Practices in Hala and Matiari Sub-Districts, Hyderabad District, Sindh Province, Pakistan

**Objectives and Methods:** The objective of the formative research was to gather information on the household management of childhood diarrhea in order to design an effective intervention for 1) promoting zinc treatment of diarrhea, 2) promoting continued ORS use, and 3) decreasing inappropriate antibiotic use. The research was conducted from September 2003 and February 2004 and employed a mixture of methods including illness narratives with parents of children with diarrhea (32), semi-structured interviews with parents (18), semi-structured interviews with various facility based providers (16), semi-structured interviews with various community based providers (25), and focus groups (4) to pre-test messages about zinc treatment. Facility-based providers interviewed included doctors, Family Health Technicians, Lady Health Visitors and dispensers. Community-based providers interviewed included private physicians, Community Health Workers, quacks, hakim (traditional healers), pharmacists, owners of general stores, and traditional drug sellers (*pansari*).

**Diarrhea treatment practices:** There are over 10 locally-recognized types of diarrhea. There is no one term that can be used on a questionnaire that will refer to all of these different types. Some types of diarrhea are thought to not be treated effectively by modern medicine, such as white diarrhea (*achha dast*) and green diarrhea (*sawa dast*). At that same time, there has been an apparent decrease in use of traditional treatments by many people, in favor of modern medicines. Treatment decisions are based to a large extent on the perceived severity of the diarrhea. Vomiting, very profuse watery diarrhea and lethargy are important indicators of severity for parents in Hala and Matiari. Mild forms of diarrhea are commonly treated with ORS sachets, herbal infusions, and various tablets and syrups. These treatments are obtained from private MBBS doctors, unlicensed providers (quacks), health centers and government hospitals. When diarrhea is perceived to be more severe, intravenous fluids are commonly given to the child, either in a private clinic or in a private hospital.

Typical severity	Types	Sources of treatment	Typical treatments
Mild	<i>Sawa dast, peela dast, darg darg dast, achha dast</i>	Private MBBS, quacks, health ctr, govt hospital	ORS, herbs, tablets, syrups
Medium	<i>Mitti jehra dast, badhazmi wara dast</i>	Same	Same + IV drip at clinic or hospital
Severe	<i>Pani jehra dast, rat wara dast, paichish (dysentery)</i>	Same + private hospital	Same + IV drip, antibiotic injection

The concept of dehydration is widely recognized, and is noted by the presence of wrinkled skin, sunken eyes, lethargy and/or sunken fontanel. It is referred to as “loss of water in body” (*jism mein pani ghat ji vio*), and is treated with ORS, herbal infusions and/or intravenous fluid (referred to as *thelhi* or *drip*). A case of sunken fontanel is often treated with herbal infusions.

In a sample of 63 informants, almost all had heard of ORS (92%), and used it (78%), although fewer could prepare it correctly (63%). Commercial formulations obtained from shops or drug

vendors are preferred to the generic formulations available free of charge from government health facilities. ORS is used with any type of diarrhea, whether or not signs of dehydration are present. Sugar-Salt-Solution (SSS) is less widely recognized (78%) and fewer have used it (42%). Parents stated that they use SSS only when ORS sachets are unavailable: at night or when people live in remote areas.

A wide variety of antimicrobials are commonly used to treat diarrhea. Parents often treat with drugs in the home remaining from a previous illness episode. The two groups of antimicrobials most commonly used are various tablets and syrups containing the antamoebic metronidazole alone (Abozole, Flagyl, Klint, Metrozine) or in combination (Daragon, Dependal, Diazol, Entamizole, Metodine, Zolen), and intramuscular injections of cephalosporin antibiotics (Cefizox, Cefox, Zinacef, Rocephin). Compared to previous studies (e.g. S.Q. Nizami et al. Soc Sci Med 1996; 42(8): 1133-1139), it appears that the proportion of diarrhea cases treated with various forms of oral metronidazole and IM cephalosporins is significantly higher, while the proportion treated with penicillin and related drugs, cotrimoxazole and antidiarrheal agents, such as kaolin and furoxone, has decreased. These trends will be quantified and confirmed in the baseline survey for the pilot study.

Costs associated with diarrhea treatment. When people discuss the costs of treating a child with diarrhea, they commonly include not only the cost of medications, but also the costs of transport to the facility and food and accommodation for family members when care is sought from a private hospital in Hyderabad. While treatment is free in government facilities, when treatments such as IV fluids and medications are prescribed and these treatments are not in stock at the facility, family members go to a private-sector pharmacy or medical store to obtain them. ORS sachets are sold for Rs. 5 to 7 in the private sector (\$0.08 to 0.12), and treatment of dehydration with IV fluids at a private clinic costs Rs. 150-300 per bag (\$2.50-5.00). The reported total costs (including drugs, consultation fees, transport, accommodation, and food) of treating a case of diarrhea are shown in the next table. Mild cases of diarrhea are typically treated for under Rs. 200 (\$3.50), and moderately severe cases for up to Rs. 500 (\$9). In a very limited number of cases, families reported to have spent high amounts for treatment of severe cases of diarrhea in private and public hospitals, up to Rs. 15,000 (\$260) for combined expenses related to in-patient care, treatments and related expenses at the private hospital in Hyderabad.

Where was diarrhea treated?	Reported total costs of treating a case of diarrhea, for differing levels of perceived severity		
	Mild	Moderate	Severe
At home	<Rs. 50 <\$1	Rs. 50-100 \$1-2	
Private clinic	Rs. 100-200 \$1.75-3.50	Rs. 300-500 \$5-9	Rs. 500-1500 \$9-26
Private hospital in Hyderabad			Rs. 5000-15000 \$85-260
Civil hospital in Hyderabad			Rs. 2000-5000 \$35-85

Perceptions of zinc tablets: Both parents and health providers were shown the dispersible zinc tablets, allowed to taste them and asked to comment. Their reactions tended to be similar. People found the white color acceptable, but recommended changing the color of the tablets to

orange, yellow or green. When people did not understand that the tablets were dispersible, they stated that it would be better to provide smaller tablets for children. Doctors stated that there should be a logo on the box, like the lion for paracetamol, the sword for aspirin, the key (*chabi*) or the green star (*sabz sitara*) for contraceptives. People liked the taste, but some felt it was too sweet, and this would encourage consumption by other members of the family. A few stated that the inner part of the tablet does not have a good taste. Doctors noted the label on the box stating that the tablets need to be maintained at below 30 degrees C, and wondered whether it is possible to follow this recommendation in Sindh where summer temperatures reach 50C. Parents expressed willingness to buy the zinc tablets, and suggested a cost of Rs. 1-1½ per tablet, or Rs. 15-20 for the strip (\$0.26-0.34).

Favorable factors for implementation: In general conditions are very favorable for the introduction of zinc treatment for childhood diarrhea in the study area. There is widespread recognition that diarrhea can be dangerous if not treated early, and that signs like frequent motions, very watery stools, lethargy, wrinkled skin, or bloody diarrhea indicate the need to seek treatment outside home. Geographic access to care is good, and transport is available except in some remote areas. ORS is widely available through public and private sources, with parents expressing a clear preference for commercial formulations. There is high awareness and reported use of ORS. There was a positive reaction to the zinc tablets, and willingness to pay for them.

Unfavorable factors for implementation: Unfavorable factors relate primarily to the organization of private medical practice. Providing IM injections of antibiotics and intravenous fluids is likely to be more profitable to private providers than sale of ORS and zinc. Parents want rapidly-acting treatments, and injections and intravenous fluids are perceived to act instantly. If a private provider prescribes both zinc and another treatment perceived to act rapidly such as an IM antibiotic, parents may choose to spend their limited funds on the latter.