

# HEALTH BASICS: ORAL REHYDRATION THERAPY



## ORAL REHYDRATION THERAPY

Oral Rehydration Therapy (ORT) is the cheap, simple and effective way to treat dehydration caused by diarrhoea. When diarrhoea occurs, essential fluids and salts are lost from the body and must be quickly replaced. Many of the millions of children who die every year in developing countries from diarrhoea could be saved if they were given ORT promptly. This includes giving extra fluids at home such as tea, soups, rice water and fruit juices to prevent dehydration, and the use of oral rehydration salts (ORS) solution to treat dehydration. Made up with clean water the ORS drink contains the main elements that are lost from the body during diarrhoea. It is effective in treating dehydration resulting from all types of acute diarrhoeal diseases.

Many countries now have diarrhoeal disease control programmes, but ORT is still not nearly as widely used as it should be and more effective information dissemination and promotion of ORT is necessary.

### This leaflet

This leaflet answers some of the most common questions asked about ORT and we hope that it will be useful. Please send us any comments about your own work with ORT.

### What is dehydration?

Dehydration is the loss of water and body salts through diarrhoea. Early features are difficult to detect but include dryness of mouth and thirst. The signs of dehydration include: sunken fontanelle (in infants); fast, weak pulse; breathing faster than normal; loss of skin elasticity; sunken, dry eyes and reduced amount of urine. Rehydration is the correction of dehydration.

### What is ORT?

ORT is the giving of fluid by mouth to prevent and/or correct the dehydration that is a result of diarrhoea. As soon as diarrhoea begins, treatment using home remedies to prevent dehydration must be started. If adults or children have not been given extra drinks, or if in spite of this dehydration does occur, they must be treated with a special drink made with oral rehydration salts (ORS). The formula for ORS recommended by WHO and UNICEF contains:

3.5 gms sodium chloride
2.9 gms trisodium citrate dihydrate (or 2.5 gms sodium bicarbonate)
1.5 gms potassium chloride
20 gms glucose (anhydrous)

The above ingredients are dissolved in one litre of clean water. WHO has recently recommended a change in the complete formula, replacing 2.5 gms of sodium bicarbonate with 2.9 gms of trisodium citrate dihydrate. The new formula gives the packets a longer shelf life and is at least as effective in correcting acidosis and reducing stool volume. Packets containing sodium bicarbonate are still safe and effective.

### How does ORT work?

Acute diarrhoea normally only lasts a few days. ORT does not stop the diarrhoea, but it replaces the lost fluids and essential salts thus preventing or treating dehydration and reducing the danger. The glucose contained in ORS solution enables the intestine to absorb the fluid and the

salts more efficiently. ORT alone is an effective treatment for 90–95 per cent of patients suffering from acute watery diarrhoea, regardless of cause. This makes intravenous drip therapy unnecessary in all but the most severe cases.



A Haitian mother gives ORS solution to her child.

UNICEF photo by Nicole Toutoungi

### Can ORS be used for everyone?

ORT is safe and can be used to treat anyone suffering from diarrhoea, without having to make a detailed diagnosis before the solution is given. Adults need rehydration treatment as much as children, although children must always be treated immediately because they become dehydrated more quickly.

Produced by Diarrhoea Dialogue at AHRTAG, 85 Marylebone High Street, London W1M 3DE, UK.

# USING ORT TO PREVENT AND TREAT DEHYDRATION

## Preventing dehydration

Mothers must learn:

- to respond to diarrhoea immediately by giving extra suitable drinks (see paragraph on home solutions below).
- to recognize the signs of dehydration which need ORS or special care.

If ORT is given at home early on, dehydration can often be prevented and many children will not become so ill that they need to see a health worker.

## Home drinks to prevent dehydration

- Mothers can use household liquids, preferably those that have been boiled, such as rice water or carrot soup. Ideally these drinks should contain starches and/or sugars as a source of glucose and energy, some sodium and preferably some potassium.
- A simple salt/sugar solution, if these ingredients are available, is also suitable for early oral rehydration therapy. 1 level teaspoon (5 ml) of salt should be mixed with 8 level teaspoons of sugar in a litre of drinking water. Cooking salt can be used for this, but rock salt does not work as well because it will not dissolve easily. Molasses and other forms of raw sugar can be used instead of white sugar, and these contain more potassium than white sugar. *Do not use too much salt.* If the solution has too much salt the child may refuse to drink it. Also, too much salt can, in extreme cases, cause convulsions. Too little salt does no harm but is less effective in preventing dehydration. (A rough guide to the amount of salt is that the solution should taste no saltier than tears.)

## Measuring home solutions

Different countries and different communities use various methods for measuring the salt and sugar. Finger pinch and hand measuring, and the use of local teaspoons can be taught successfully. A plastic measuring spoon is available from Teaching Aids at Low Cost (TALC) with proportions to make up 200 ml of sugar/salt solution. Whatever method is used, people need to be carefully instructed in how to mix and use the solutions.

## WHAT TO DO IF DEHYDRATION OCCURS

If, despite extra home drinks, dehydration occurs, or the diarrhoea continues for more than two days, the child should be taken to see a health worker to be given *ORS solution*.

## How to assess the degree of dehydration

The table below describes what the health worker should ask and look for, and indicates which treatment plan to follow.

1. ASK ABOUT: DIARRHOEA	Less than 4 liquid stools per day	4 to 10 liquid stools per day	More than 10 liquid stools per day	Longer than 3 weeks duration (chronic diarrhoea) Blood or mucus in the stool
VOMITING	None or a small amount	Some	Very frequent	
THIRST	Normal	Greater than normal	Unable to drink	
URINE	Normal	A small amount, dark	No urine for 6 hours	
2. LOOK AT: CONDITION	Well, alert	Unwell, sleepy or irritable	Very sleepy, unconscious, floppy or having fits	Severe undernutrition
TEARS	Present	Absent	Absent	
EYES	Normal	Sunken	Very dry and sunken	
MOUTH and TONGUE	Wet	Dry	Very dry	
BREATHING	Normal	Faster than normal	Very fast and deep	
3. FEEL: SKIN	A pinch goes back quickly	A pinch goes back slowly	A pinch goes back very slowly	
PULSE	Normal	Faster than normal	Very fast, weak, or you cannot feel it	
FONTANELLE (in infants)	Normal	Sunken	Very sunken	
4. TAKE TEMPERATURE				High fever – 38.5°C (or 101°F) or greater
5. WEIGH IF POSSIBLE	No weight loss during diarrhoea	Loss of 25–100 grams for each kilogram of weight	Loss of more than 100 grams * for each kilogram of weight	
6. DECIDE	The patient has no signs of <b>dehydration</b>  Use Plan A	If the patient has 2 or more of these signs, he has <b>some dehydration</b>  Use Plan B	If the patient has 2 or more of these danger signs, he has <b>severe dehydration</b>  Use Plan C	If the patient has chronic diarrhoea, severe undernutrition, or high fever treat or refer to the nearest health clinic for treatment. If there is blood or mucus in the stool and high fever, suspect dysentery and treat with antimicrobials.

### PLAN A: NO DEHYDRATION \*

The health worker should discuss home drinks with the mother (see pages 1 and 3), feeding during diarrhoea and proper home hygiene. The mother should be given enough ORS packets for two days if:

- her child has been on Plan B.
- it is national policy to give ORS solution to all children who visit a health centre for diarrhoea treatment.
- the mother cannot come back if the diarrhoea gets worse.

Mothers given ORS packets to use at home must be carefully shown how to use them. The amount of ORS solution she should give is:

**AFTER EACH LOOSE STOOL:**

- 50–100 ml (¼–½ cup) of ORS solution for a child less than 2 years old.
- 100–200 ml for older children. Adults can take as much as they want.

*NOTE:* Children receiving ORS solution must also be given the usual amount of ordinary drinks they take each day. *They should not also be given salt and sugar solution.*

**PLAN B: FOR SOME DEHYDRATION** \*

**1. USE THIS TABLE TO SEE HOW MUCH ORS SOLUTION IS SUITABLE FOR 4–6 HOURS TREATMENT:**

Patient's weight in kilograms	3 5 7 9 11 13 15 20 30 40 50						
Patient's age *	2 4 6 8 10 12 18 2 3 4 6 8 15			adult			
	← months →			← years →			
Give this much solution for 4–6 hours	in ml:	200–400	400–600	600–800	800–1000	1000–2000	2000–4000
	in local unit of measure:						

\* Use the patient's age only when you do not know the weight.

If the patient wants more ORS solution, give more. If the eyelids become puffy, stop and give other fluids. Use ORS solution again when the puffiness is gone. If the child vomits, wait 10 minutes and then continue slowly giving small amounts of ORS solution.

- breastmilk feeds between drinks of the ORS solution, or
- 100–200 mls of clean water before continuing ORS if she does not breastfeed her child.

**2. IF THE MOTHER CAN REMAIN AT THE HEALTH CENTRE**

- tell her how much ORS solution to give her child
- show her how to give it
- watch her give it

**4. IF THE MOTHER MUST LEAVE ANY TIME BEFORE COMPLETING TREATMENT PLAN B, TELL HER:**

- to finish the 4–6 hour treatment as in 1. above
- to give the child as much ORS solution as he wants after the treatment
- to look for the signs of dehydration and, if the child has any, to return the next morning.

**3. AFTER 4–6 HOURS REASSESS THE CHILD. THEN CHOOSE THE SUITABLE TREATMENT PLAN.**

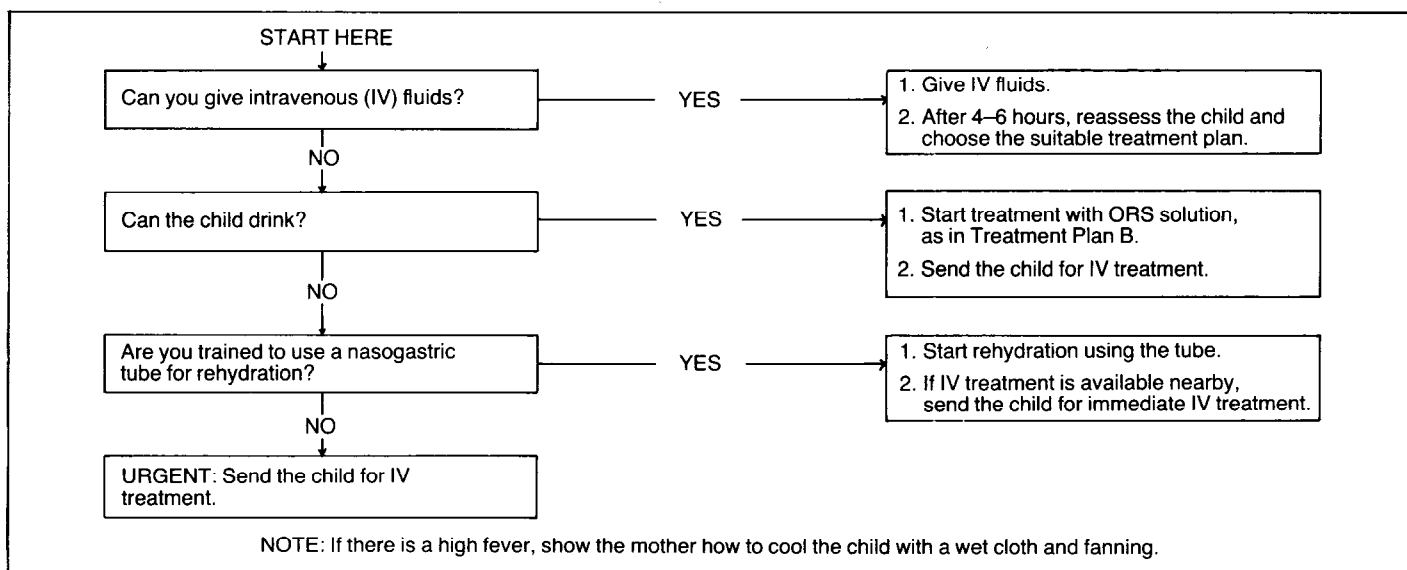
**NOTE:** FOR CHILDREN UNDER 12 MONTHS CONTINUING TREATMENT PLAN B AFTER 4–6 HOURS, TELL THE MOTHER TO GIVE:

Give her enough ORS packets for 2 days and show her how to prepare ORS solution.

Explain briefly how to prevent diarrhoea.

**PLAN C: FOR SEVERE DEHYDRATION** \*

Follow the arrows. If the answer to the question is 'yes', go across. If it is 'no', go down.



### What should be done if the child vomits?

Vomiting does not usually prevent the therapy from being successful. Mothers must be taught to persist in giving ORS solution, even though this requires time and patience. *They should give regular, small sips of fluid.* Giving ORT reduces nausea and vomiting and restores the appetite through correction of acidosis and potassium losses.

### Should feeding continue at the same time as ORT?

Feeding, especially breastfeeding, should be continued once dehydration has been corrected. Even if the diarrhoea continues or the child is vomiting, some of the nutrients are being absorbed. Suitable food should not be withheld, as the child may become malnourished. Once the diarrhoea episode has passed, the child should be given more food than usual to make up for losses during diarrhoea. Breastfeeding is particularly beneficial because breastmilk is easily digestible. It also contains protective substances which help to overcome the infection causing the diarrhoea.

### What sort of foods are good during diarrhoea?

- High energy foods such as fats, yoghurt and cereals are quite well absorbed during diarrhoea. Small, frequent feeds of energy-rich local foods familiar to the child should be given. A little vegetable oil can be added to foods such as millet or rice to increase the energy content.
- Foods high in potassium are important to restore the body's essential stores depleted during diarrhoea. Such foods include lentils, bananas, mangoes, pineapples, pawpaw, coconut milk and citrus fruits.
- Certain foods should be avoided during diarrhoea, for example those containing a lot of fibre such as coarse fruits and vegetables, wholegrain cereals and spicy foods.



WHO photo

Wherever possible, clean drinking water should be used to make up oral rehydration solution.

### Is it necessary to use drugs as well as ORT?

Drugs should not be used except in the *most severe* cases. Even then they should be administered with care, preferably after the organism causing the diarrhoea has been identified. Small children with dysentery and fever require an antibiotic. Refer such patients to a health service for advice. ORT on its own is usually enough to rehydrate the child. Unnecessary antibiotic therapy upsets the normal bacteriological balance of the intestine. Many anti-diarrhoeal preparations have proved to be either ineffective or too powerful for very small infants.

### Can the solution be made with dirty water?

The benefits of fluid replacement in diarrhoea far outweigh the risks of using contaminated water to make up oral rehydration solution. In situations where it is difficult to boil water, mothers are advised to use the cleanest water possible.

### Can ORS solution be stored?

Generally a made-up solution should be covered and not kept for more than 24 hours, due to the risk of bacteriological contamination. Packets of ORS should be stored carefully and not kept in temperatures of over 30°C or in conditions of high humidity. Where the ingredients to make up ORS are being stored in bulk the glucose/sucrose should be kept apart from the rest of the dry ingredients. The new citrate formula ORS has a longer shelf life.

*\*Treatment plans on pages 4, 5 and 6 taken from the CDD/WHO Supervisory Skills course, from the module on the treatment of diarrhoea.*



WHO photo

Small, frequent feeds of energy-rich local foods should be given during diarrhoea.

# ORT: COUNTRY EXAMPLES

## Trinidad and Tobago

"In 1980, the Ministry of Health began a programme with the help of the International Development Research Centre (IDRC) to promote ORT in Port-of-Spain. At that time, a third of all infant mortality was due to dehydration from diarrhoea. In 1981, an oral rehydration therapy unit was opened in the main hospital, run by nursing staff who had been trained by a paediatrician from the University of the West Indies. The unit was open daily and treated cases of mild to moderate dehydration using the locally produced ORS-GESOL. Mothers were also given advice on using ORT at home, and about feeding and diarrhoea. Some objections were raised to the leading role played by the nurses in the unit – who only referred patients to doctors when they thought it necessary. However, these attitudes changed when the success of the programme became clear. Over a six month period there were 540 admissions to the unit and only 20 of these were unsuccessfully treated. The oral rehydration programme also greatly reduced the number of admissions and deaths in the gastroenterology ward. The nursery in the ward has now been closed. The ORT facilities are now available all

over the island and a massive health education programme is continuing to promote the message of ORT . . ."

## India

"In Narangwal, deaths in children aged between 8 days and three years have been reduced by half through community workers using only oral rehydration therapy and penicillin . . ."

## Ethiopia

"Since the Ethiopian national programme began in 1980, more than 50 CDD managers have been trained successfully. Future plans include the establishment of an ORT training centre in Addis Ababa, with UNICEF support, the training of more than 300 nurses in diarrhoea management and supervisory skills, and the local production of ORS. The Programme's overall impact will be assessed in 1985 . . ."

## The Gambia

"The role of oral rehydration therapy in diarrhoeal disease control has been emphasized at two levels by the Gambian government. Health workers have been taught to administer ORT using oral rehydration salts, and

mothers have been taught to mix a safe sugar-salt solution at home. The message has been successfully reinforced by a media campaign – after one year 67 per cent of mothers could correctly mix a home solution and 47 per cent had used it once or more to treat their children. Not surprisingly, this early preventive treatment at home has led to a drop in the number of mothers taking children with diarrhoea to health centres from 85 per cent to 50 per cent . . ."

## Philippines

"The National ORT programme was introduced in the Philippines after encouraging field trials. ORT was accepted by mothers who saw the beneficial results of using it. An early problem was finding an easily available measuring device – initially local beer bottles were used as they were found in most homes. Later a drinking glass, originally the container for a popular brand of coffee, was found to be more practical. Good overall co-ordination of the national programme was essential to its success. Problems arose in the early stages when, for example, packets of salts were delivered without proper instruction to mothers by staff who were not trained properly . . ."

# HEALTH BASICS: ORT RESOURCE LIST

## Publications and newsletters

**The Management of Diarrhoea and use of Oral Rehydration Therapy – A Joint WHO/UNICEF Statement, 1983.** Available from WHO and UNICEF (see list of addresses). \* Free.

**Oral Rehydration Therapy (ORT) for Childhood Diarrhoea, 1984.** (Revised edition). Population Reports, Series L, No. 2, Issues in World Health. Available from Population Information Programme, John Hopkins University, USA (see list of addresses). Free.

**Proceedings of the International Conference on Oral Rehydration Therapy (ICORT), 1983.** Available from the United States Agency for International Development (see list of addresses). Free.

**Oral rehydration therapy – Information for Action Resource Guide, 1983.** Prepared for UNICEF by the World Federation of Public Health Associations (see list of addresses).

**Journal of Diarrhoeal Diseases Research.** Published quarterly by the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). Cost US\$15.00 to developing countries for four issues. (see list of addresses for ICDDR,B details).

## WHO Training Materials\*

**A Manual for the Treatment of Acute Diarrhoea – for use by physicians and other senior health workers.**

**Guidelines for the Trainers of Community Health Workers on the Treatment and Prevention of Acute Diarrhoea.**

*\*For a full list of all WHO materials on clinical management of diarrhoea, training, development of diarrhoeal disease control programmes etc. write to the Director of the CDD Programme at the address given on the resource list.*

## Bibliographies

**Resource Guide on Oral Rehydration Therapy, 1983.** US \$5.00 (prepaid, airmail). World Federation of Public Health Associations. Available from the American Public Health Association (see list of addresses).

**Oral Rehydration Therapy: An Annotated Bibliography, 1983.** Scientific Publication No. 445. Pan American Health Association. (Second edition). (see list of addresses).

**AHRTAG**

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## Newsletters

**Diarrhoea Dialogue.** Quarterly newsletter on all aspects of the prevention and control of diarrhoeal diseases. Available in English, Spanish, French, Portuguese and Arabic. Order from AHRTAG, UK. (See list of addresses.)

**Glimpse.** A newsletter reporting on the activities at ICDDR,B. Published 8 times a year. Free. (See list of addresses.)

**Mothers and Children.** Published three times a year in English, French and Spanish. Free to developing countries/US\$5.00 to others. Available from American Public Health Association, USA. (See list of addresses.)

**Salubritas.** Published quarterly in English at US\$10.00 year. Update on community health resource material. Available from American Public Health Association, USA. (See list of addresses.)

**World Neighbours in Action.** Quarterly 'how-to-do it' newsletter on primary health care published by World Neighbours. (See list of addresses.)

**Oral Rehydration: Bulletin of the Oral Rehydration Scheme of RUHSA.** Published bi-monthly by RUHSA, Christian Medical College, Vellore, P.O. Tamil Nadu 632 209, India.

## Health education and teaching aids

**Diarrhoeal Diseases Control: Examples of Health Education Materials 1982.** WHO/CDD. Examples of posters, flashcards and leaflets from diarrhoeal disease control worldwide.

Medex Workbook for Community Health Workers, No. 32: **Prevention and Care of Diarrhoea. 1983.** (US\$5.80, inc. surface mail. Available from The Medex Group - see address section).

**Helping Health Workers Learn.** Available from TALC, UK and the Hesperian Foundation, USA. (See list of addresses.)

## Specific country materials

Bangladesh: **Manual on Treatment and Prevention of Diarrhoea. 1980.** International Centre for Diarrhoeal Diseases Research, Bangladesh. (See address section.)

Small training manual and flipchart for CHWs.

The Gambia: **Health Workers Manual for the Management of Acute Diarrhoea in the Gambia. December 1981.** Health Education Unit, Department of Medical and Health Services, Banjul, The Gambia.

India: **Better Care During Diarrhoea.** Voluntary Health Association of India (see address section)

Small booklet about diarrhoea and dehydration for CHWs. Well illustrated with photographs. Gives teaching advice and health messages.

Indonesia: **Lina Regains her health with Sugar and Salt Solution.** Save the Children Fund, USA (see address section). Pamphlet and flip chart.

Jamaica: **What to do when your baby has diarrhoea. 1982.** Ministry of Health, P.O. Box 478, Kingston, Jamaica.

Liberia: **Caring for Children and Diarrhoea.** UNICEF/Inservice Education Division, Ministry of Health and Social Welfare, P.O. Bag 9009, Monrovia, Liberia.

Nicaragua: **Diarrhoea control and prevention material: Jornadas Populares de Salud,** Ministerio de Salud Publica, Managua, Nicaragua. In Spanish.

Zambia: **Special position paper on Nutrition and Diarrhoea.** Health Education Unit, P.O. Box 30205, Lusaka, Zambia.

## Sources of information

**Code:** Development of diarrhoeal disease control programmes (D) Health education and information (H) Training (T) Operational and applied research (R) Supply and distribution of ORS (S)

● **Academy for Educational Development (AED) (H) (T)**  
**Contact:** Dr William Smith  
1414 22nd Street, N.W.  
Washington D.C. 20037  
USA

● **Agency for International Development (AID) (D) (H) (T) (R) (S)**  
**Contact:** Mr Robert Clay  
Office of Health  
Bureau for Science and Technology  
Agency for International Development  
Washington D.C. 20523

● **American Public Health Association (APHA) (H)**  
**Contact:** Gayle Gibbons  
Clearinghouse on Infant Feeding and Maternal Nutrition  
1015 15th Street, N.W.  
Washington D.C. 20005  
USA

● **Appropriate Health Resources and Technologies Action Group (AHRTAG) (H)**  
**Contact:** Denise Ayres  
85 Marylebone High Street  
London W1M 3DE  
UK

● **Diarrhoeal Diseases Control Programme (CDD) (D) (H) (T) (R) (S)**  
**Contact:** Dr M H Merson  
World Health Organization  
1211 Geneva 27  
Switzerland

● **The Hesperian Foundation (H)**  
**Contact:** Dr David Werner  
P.O. Box 1692  
Palo Alto  
California 94302  
USA

● **International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDR,B) (H) (T) (R)**  
**Contact:** Dr W B Greenough III  
P.O. Box 128  
Dhaka  
Bangladesh

● **The Medex Group (H) (T)**  
Health Manpower Development Staff  
John A Burns School of Medicine  
University of Hawaii  
1960 East-West Road  
Honolulu  
Hawaii 96822  
USA

● **Pan-American Health Organization (PAHO) (D) (H) (T) (R) (S)**  
**Contact:** Mr C Drasbek  
525 23rd Street, N.W.  
Washington D.C. 20037  
USA

● **Population Information Programme (H) (T)**  
The John Hopkins University  
Hampton House  
624 North Broadway  
Baltimore  
Maryland 21205  
USA

● **Program for Appropriate Technology in Health (PATH) (H) (T) (S)**  
**Contact:** Vivien Tsu  
Canal Place  
130 Nickerson Street  
Seattle  
Washington 98109  
USA

● **Ross Institute of Tropical Hygiene (D) (H) (T)**  
**Contact:** Richard Feachem  
London School of Tropical Medicine and Hygiene  
Keppel Street (Gower Street)  
London WC1E 7HT  
UK

● **Save the Children Federation (H)**  
48 Wilton Road  
Westport  
CT 06880  
USA

● **Teaching Aids at Low Cost (TALC) (H)**  
**Contact:** Mrs B Harvey  
P.O. Box 49  
ST Albans  
Herts AL1 4AX  
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● **United Nations Children's Fund (UNICEF) (D) (H) (S)**  
**Contact:** Mr R Goodall  
United Nations  
T-Plaza 4-1234 C  
New York, NY 10017  
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● **Voluntary Health Association of India (VHAI) (H) (T)**  
C14 Community Centre  
Safdarjang Development Area  
New Delhi 110016  
India

● **World Neighbors (H)**  
5116 N Portland  
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OKA 73112  
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