

Diarrhoea Dialogue



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Diarrhoea and immunization – a valuable ally?

Disentangling the causes of early childhood death in the developing world is complicated. The last issue of *Diarrhoea Dialogue* discussed the dangerous partnership between malnutrition and diarrhoeal disease. Improved feeding and widespread use of oral rehydration will prevent many unnecessary deaths and handicaps associated with impaired child growth and development.

Employing every strategy

The 1984 UNICEF report on The State of the World's Children recommends four techniques to make a 'revolution for children' a genuine possibility: oral rehydration therapy (ORT); growth monitoring; expanded immunization; promotion of breastfeeding and better weaning practices. All these strategies must be brought into play if the revolution is to succeed. All face similar constraints: cost; lack of local health care infrastructures; the time and the skills needed to educate families about how they can themselves make best use of limited resources to improve the quality of life for their children.

Shortcuts to bypass obstacles

In any battle, shortcuts to bypass obstacles can hasten overall victory. Measles, like malnutrition, seems inextricably linked with dangerous episodes of acute diarrhoea in young children. Two types of measles-associated diarrhoea are recognized. These are 'with-measles diarrhoea' occurring

around the time of the illness, and 'after-measles diarrhoea', occurring sometimes several months later. The diarrhoea mostly appears as severe dysentery with blood and mucus, rather than the watery type. Infections like Salmonella and Shigella play a major role and mortality rates are high. It seems that measles infection lowers childhood resistance to diarrhoeal infections in the environment and that this effect may persist for a significant period. Less measles may go hand-in-hand with less deaths from childhood diarrhoea.

Effective and economical

Immunization has greatly decreased the incidence of measles among children in western or more prosperous societies. Measles immunization is now an integral part of the Expanded Programme on Immunization (EPI), to which many developing countries are committed with the support of the World Health Organization and UNICEF. There is no doubt that immunization against the six major infectious childhood diseases – measles, tetanus, whooping cough, diphtheria, polio and tuberculosis – must greatly benefit child health throughout the world. Cost is comparatively small for the long term protection. According to the 1984 UNICEF Report, it is approximately five US dollars per child to cover both delivery systems and vaccines.

A cost-effective intervention?

Should measles immunization be urgently pushed as a cost-effective intervention to reduce the child death rate from diarrhoea?¹ Malnutrition, diarrhoeal and other childhood

infections interact together to kill. Measles immunization must be explored as a potential shortcut in diarrhoeal disease control and our main article in this issue sets a South Indian scene for this.

Investment bonus for the future

Investment in immunization technologies, training and delivery systems must, in any event, be a worthwhile use of resources because more effective vaccines against acute diarrhoeal infections are gradually being developed and their pathways to the periphery will already be in place. Progress with some new anti-diarrhoeal vaccines is reviewed on pages 3 and 7. Some readers may feel too much space in this issue is taken up with research matters. It may nevertheless reassure other readers to know that some effective anti-diarrhoea vaccines may become available before too long.

ORT still the front-line defence

Immunization is a preventive, protective intervention. Measles immunization may well turn out to be a valuable ally in the struggle to reduce diarrhoea morbidity and mortality among young children in the developing countries. Oral rehydration still remains the essential front-line treatment for all acute infectious diarrhoeas which cause dehydration, whether measles – associated or not.

KME and WAMC

¹Feachem R.G. and Koblinsky M.A. Bull. WHO. 1983. 61. 641-652. (Reprints from: Director, CDD Programme, WHO, 1211 Geneva, 27, Switzerland).

In this issue . . .

- Measles immunization in diarrhoeal disease control
- Expectations for a rotavirus vaccine
- Managing local immunization programmes

AHRTAG

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Swing to ORT in Britain

For the last ten years, most babies admitted with gastroenteritis to East Birmingham Hospital have been treated with oral rehydration. Over 90 per cent of the infants respond rapidly to the fluid given and can quickly return to their previous diet, whether breast milk feeds, cow's milk formula, or weaning foods. Infants who are in shock because of fluid loss, those in whom the diagnosis is unclear or where generalised sepsis is a possibility, and those too weak to drink are given intravenous fluids. Since about 1977, children with hypernatraemic dehydration have been treated on our unit with the same oral rehydration fluid as those with normonatraemic or hyponatraemic dehydration. Hypernatraemia has not in itself been considered a reason for intravenous therapy.

All babies are given a low sodium formula containing approximately 35 mmols of sodium per litre along with appropriate potassium and bicarbonate or lactate. This is a lower concentration than that recommended in the WHO formulation. However, in contrast to the WHO fluid, the formula is given as the only fluid intake, rather than alternating with free water. We have had no problems with this regimen. Probably the exact composition of oral rehydration solutions is of considerably less importance than some academic workers have suggested, except in cases of severe, watery, cholera-like diarrhoea. What is important is the use of oral rather than intravenous therapy in the vast majority of babies with acute

gastroenteritis. In Birmingham, as in Bangladesh, the use of oral fluid has revolutionised the management of acute infant gastroenteritis.

M. J. Tarlow, Senior Lecturer in Paediatrics, East Birmingham Hospital, Birmingham B9 5ST, UK.

Hospital practice foreshadows changes in GP prescribing

Between September 1979 and March 1980 Dr Little and his colleagues at a general hospital in Chatham, Kent studied the 181 children admitted with acute diarrhoea⁽¹⁾. Three years later, over the same eight months period, they again reviewed the 186 children admitted with diarrhoea⁽²⁾. During the first period, not a single case had been treated with oral glucose-electrolyte solution by the general practitioner before admission. By 1983, at least 10 per cent had received this specific oral rehydration therapy. It is not clear whether a greater awareness about the value of promoting drinking in diarrhoea was also associated with advice about increasing the ordinary fluid intake.

Other treatment prescribed by the GPs had changed even more. The number who had been given antibiotics had fallen from 22 to 7 per cent of cases, and those given 'anti-diarrhoeal drugs' like kaolin, had fallen even more sharply from 30 to 5 per cent.

(1) Little T M 1981. *British Medical Journal*, 4: 1300.

(2) Little T M 1983. *Personal communication*.

King Faisal International Prize

This important Saudi Arabian prize in medicine for 1983 has been awarded for work on diarrhoeal diseases. The outstanding and complementary research success of various groups has been recognized by equal division of the prize between: Professor John S. Fordtran, Department of Internal Medicine, Baylor University, Dallas, Texas; Dr William B. Greenough III, Director of the International Centre for Diarrhoeal Disease Research,

Dhaka, Bangladesh; Professor Michael Field, Department of Pharmacological and Physiological Sciences, University of Chicago. The triumph of oral rehydration therapy in reducing mortality and morbidity due to cholera and other acute infectious diarrhoeal diseases is based on the discoveries of these three scientists and their colleagues over the last 20 years.

ICDDR, B Journal

Diarrhoea Dialogue 12 announced the beginning of the *Journal of Diarrhoeal Diseases Research*, to be produced and

published by the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). The first two quarterly issues are now available and will be reviewed in *Diarrhoea Dialogue* 17.

Readers may also like to know that the proceedings of an international conference on 'Shigellosis: a continuing global problem', held in Bangladesh in 1981, are now available from ICDDR,B, GPO Box 128, Dhaka 2, Bangladesh. The book will be reviewed in a later issue of *Diarrhoea Dialogue*.

*The cost is US\$15.00 (developed countries) and US\$10.00 (developing countries) by surface mail. Air mail costs 10 per cent extra in Asia and 20 per cent extra elsewhere.

Early immunization against measles?

Measles immunization of young infants in high risk areas may soon be possible using a new aerosol (nose spray) vaccine. Babies inherit some protection against measles from their mothers but, where measles is a particularly common and serious infection, this may not last until the normal age (9-10 months) for immunization is reached. The new vaccine could be a valuable step forward and results from its field trials will be reported in a later issue of DD. *Sabin A B et al 1983 Successful immunization of children with and without maternal antibody by aerosolized measles vaccine Journal of the American Medical Association (JAMA) 249, 19, 2651-*

New directions

The January 1983 issue of *Directions*, a newsletter published by the Program for Appropriate Technology in Health (PATH), is a practical source of immunization-related information. For a free copy of *Directions* write to: PATH, Canal Place, 130 Nickerson Street, Seattle, WA 98109, USA.

In the next issue

- Breastfeeding - another worthwhile intervention?
- Country reports.

Expectations for a vaccine

Tom Flewett considers the prospects for a rotavirus vaccine and its role in diarrhoeal disease control.

It is generally agreed that most acute infectious diarrhoea in young children is caused by viruses rather than bacteria and it is among young children that most deaths from acute diarrhoea occur.

In many hospital-based studies, as much as 60 per cent of cases of acute diarrhoea are due to rotavirus infections, but this varies from year to year and from place to place. In South Africa, only about 15–17 per cent have been attributable to rotaviruses⁽¹⁾. Two questions arise:

1. Is it possible to develop a vaccine capable of preventing this disease?
2. Would this rotavirus vaccine make a significant impression on the number of fatal cases of acute infectious diarrhoea?

Serotype variation – a serious problem

The first great problem was to isolate rotaviruses in tissue culture to develop less powerful strains for use as a live oral vaccine. This has now been done. However, at least four serotypes exist which can be distinguished from each other by specific antibody. Will infection by one serotype provide immunity against infection by a different serotype? Nobody yet knows the answer to this. Dr Ruth Bishop's⁽²⁾ group (see DD14) recently found that rotavirus infection of newborns did not protect them against re-infection later on, although it appeared to reduce the severity of subsequent infections. Thus a vaccine, even if it did not altogether prevent the disease, might still save lives!

Potential of new techniques

The techniques of genetic engineering open up new possibilities for making vaccines. Rotavirus antigen could be implanted in common bacteria which normally colonize the small bowel and they would reproduce the antigen and

in this way immunize the patient. Alternatively, the strain of typhoid bacillus, Ty21a, used in the new anti-typhoid vaccine (see page 7) might carry the rotavirus antigen. The effectiveness of such vaccines is uncertain. The technology to make the experiment does, however, now exist.

Although some animal experiments suggest that infection by one rotavirus serotype does not give good protection against another⁽³⁾, there are nevertheless hopeful prospects. If a vaccine can contain the two main sub-groups of rotavirus, this may provide a useful degree of protection. More information is needed about the prevalence and severity of the different rotavirus serotypes.

Cross-disciplinary research

New kinds of rotavirus have recently been identified. Two serotypes of 'standard' piglet rotavirus are well established and these share a common group antigen with the rotaviruses commonly found in children. Recently, two new piglet rotaviruses have been discovered. These are quite different from the earlier piglet rotaviruses and also from each other, with no serological cross-reaction. A vaccine prepared against one could not be expected to protect against any of the others. Serological tests⁽³⁾ indicate that most pigs possess antibodies to these 'new' rotaviruses, so they must occur quite widely although rarely diagnosed.

Recent reports describe new human rotavirus strains in Australia, China, Brazil, France and Britain. They are serologically distinct, cannot be detected by current ELISA tests and are difficult to find on electron-microscopy. The best method of diagnosis so far may be to look for double-stranded DNA in faeces. The importance of these rotaviruses is unknown. They have not yet been

cultured and there is no immediate prospect of vaccines against them. Also, other completely new diarrhoea viruses are still being discovered⁽⁴⁾ in calves and it is likely similar types will be found to cause diarrhoea in humans.

Rigorous testing essential

Any vaccine launched which does not significantly reduce the total of diarrhoeal illness among young children will rapidly be discredited. The fact that there are various rotavirus serotypes and several other diarrhoea viruses means that manufacture will be difficult. Before a diarrhoea vaccine is marketed, fully adequate field trials must guarantee its effectiveness and these will need to be carried out over several years because of the variation in viruses and the periodic nature of viral diarrhoea. In the same place there can be 'good' and 'bad' years for rotaviruses.

ORT still the best bet

Prevention is always better than cure, but reliable vaccination against viral diarrhoea seems technically unlikely to become available soon. Luckily, the cheap, simple and life-saving technique of oral rehydration deals effectively with all acute infectious diarrhoeas, whatever their causal organism. It must be universally publicized and applied to save still more millions of the young children at risk.

Dr T.H. Flewett, Regional Virus Laboratory, East Birmingham Hospital, Birmingham, UK.

References

- (1) Schoub B D et al 1982 Variance in rotavirus infection rates in different urban population groups in South Africa. *Journal of Medical Virology*, 10: 171–179.
- (2) Bishop R F et al 1983 Clinical immunity after neonatal rotavirus infection. A prospective longitudinal study in young children. *New Eng Journal Med*, 309: 72–76.
- (3) Gaul S K et al 1982 Antigenic relationships among some animal rotaviruses; virus neutralization in vitro and cross-protection in piglets. *Journal of Clinical Microbiology*, 16: 495–503.
- (4) Woode G N et al 1982 Studies with an unclassified virus isolated from diarrheic calves. *Vet Microbiol.*, 7: 221–240.

Measles immunization in diarrhoeal disease

Priority intervention?

M. and V. I. Mathan consider whether measles immunization should be a priority in diarrhoeal disease control.

In 1961, an epidemic caused by *Salmonella* infection occurred in a village with a population of 527, close to Vellore in Southern India. There were 74 cases of acute diarrhoea. More than half the patients were children less than five years old and 17 of them had died by the time the field team reached the village. About a month before the diarrhoea epidemic there was an epidemic of measles in the same village. Fifteen of the 17 children with diarrhoea who died, mostly due to dehydration and electrolyte imbalance, had had measles four to six weeks before the diarrhoeal infection.

Measles and diarrhoea together often fatal

A prospective detailed study, in which 5,775 children in 12 villages in

Bangladesh were observed for a year, showed that measles and diarrhoea appeared to interact synergistically* to increase mortality and the irreversible effects of nutritional deprivation⁽¹⁾. Thirty-four per cent of diarrhoeal deaths were measles-associated. Measles was the single most important cause of death during the period and diarrhoea or dysentery was the most common complication of fatal measles cases.

For every 100 children below five years of age there are about 240 episodes of diarrhoea each year, and it is estimated that 2.1 to 5.2 per cent of such episodes are measles-associated⁽²⁾. In contrast to the average diarrhoea mortality rate of 1.4 per cent, five to 29 per cent of young children with measles-associated diarrhoea die.

Preventing more than 1 million deaths

An effective vaccine for immunization against measles has been available for some time and measles has almost been eradicated in several developed countries. Should measles immunization be a major priority in the control of diarrhoeal diseases? It has been estimated⁽²⁾ that between 6.4 and 25.6 per cent of diarrhoea deaths could be prevented by measles immunization. Assuming five million deaths each year due to diarrhoea among preschool children in the developing world, this estimate suggests that between 60,000 to 1¼ million diarrhoea deaths a year could be prevented by an effective measles immunization campaign. Clinical experience suggests that the cases that would benefit most from this are the children who develop severe diarrhoea and, possibly, diarrhoea associated with invasive organisms.

Cost-effectiveness

A good deal of the limited funds available in the third world for the



Save the Children Fund photograph

An older child receiving measles immunization in India. The recommended age is between 9–10 months.

prevention and control of diarrhoea is now spent on oral rehydration, with significant beneficial effects. To justify using some of these funds or to find extra funds for measles immunization as part of diarrhoeal disease control, the cost-effectiveness of such an approach needs to be carefully assessed. There is very little available in the way of hard data which directly estimates the effect of measles immunization on the incidence of acute diarrhoea and of severe diarrhoea leading to death. The cost of measles immunization has been variously estimated from US\$2 to 15 per head, much of which will be spent in getting properly designed delivery systems in place and working successfully. Well-controlled studies of the cost-effectiveness of measles vaccination as a factor in the control of diarrhoea in selected population groups are urgently needed.

Simple one year study

A quick answer could come from a simple study in a population of three to five thousand children below the age of three years. A preliminary census survey will identify the children who have either already had measles or who have received measles immunization. The children will be followed up for a year, using minimally trained volunteers recruited from the community under the supervision of one or two public health nurses. At the end of the year, data on the incidence of new cases of measles, the incidence of acute diarrhoeal diseases, the number of severe diarrhoeal cases and of deaths would be available. Using the initial survey data, it should then be possible to show whether immunity to measles is a significant factor in the mortality and morbidity. The cost of measles immunization can be worked out by a pilot study at the end of the year of surveillance in the same population.

Useful extra weapon at small cost

A major constraint for the control of diarrhoeal diseases among children in developing countries is the prohibitive cost, if a meaningful number of individuals are to be covered. This is because the prevention of most episodes of diarrhoeal disease depends on factors such as improved sanitation and water supplies, better nutrition and



WHO photograph

Measles immunization – preventing more than a million deaths?

extensive health education, most of which are interventions based on socio-economic progress.

Most clinicians who have experience with acute diarrhoea in developing countries feel that measles immunization would be a useful immediate weapon at a comparatively trivial cost, a feeling justified by (as yet) theoretical calculations. Some urgent but well-controlled field trials are obviously essential to determine cost-benefits, which could then present the policy makers with the possibility that 60,000 to 1¼ million deaths associated

with diarrhoea in the vulnerable age groups can be prevented.

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(1) *Koster F T et al 1981. Bulletin of the World Health Organization, 59: 901–908.*

(2) *Feachem R G and Koblinsky M A 1983. Bulletin of the World Health Organization, 61: 641–652.*

* *Synergistically* – acting together, each making the other more powerful.

Solving problems locally

The Gambia has effectively implemented a national immunization programme. Phil Gowers looks at the key role of organization and management at community level in achieving this success.

Even the best planned national immunization programmes can fail because of poor management at community level. These are some key factors that contribute to an effective programme:

Organization

Step 1: Examine the objectives of the plan and the population you serve. What is needed? Look for under-served areas. Calculate the number of immunizations to be given.

Step 2: Examine your resources carefully. Pay particular attention to transport, refrigerators, deep freezers, injection and sterilization equipment.

Step 3: What tasks must be carried out to achieve your objectives? The main areas of concern are the systems which ensure that your staff have done what is necessary to do the job properly. For example:

A. COLD CHAIN

- *Ordering replacements* – how do you order replacement refrigerators? Does the system work? If not, why not?
- *Spare parts* – are these available and does someone know how to repair your equipment? If not, train one or two team members and arrange for the supply of tools and spare parts. You should also have at least one, and preferably more, spare unused refrigerators.
- *Fuel supplies* – particularly kerosene, must be well organized. There must be a system for supply all the way to the clinics and an adequate reserve which will last while the request for replenishment is being processed.
- *Installation* – someone, probably your repair man, will need to check the siting of each refrigerator.
- *Monitoring* – someone at each clinic will need to be responsible for checking the temperature at least once a day. A chart should be hung on the door of the refrigerator.

B. VACCINES

- *Storage* – different vaccines have different storage requirements. Checklists on correct storage procedures will be necessary for each vaccine. A member of the team must be responsible for storage and checking when vaccines are going out of date. The same person should fill in the report forms and vaccine requests.
- *Receipt* – the person responsible for storage must also sign for all arriving vaccine and enter it into the stocks.
- *Monitoring* – forms will be needed to record vaccine used and people immunized. The forms should be simple to use.

C. INJECTION EQUIPMENT

- *What is needed* – what size of syringes and needles are needed and in what quantities? What method of sterilization will be used and what equipment needed? It is preferable to have enough syringes and needles sterilized to complete a whole clinic. Therefore the capacity of your method of sterilization is important – especially where there is no electricity. It may be necessary to use wood fires or kerosene stoves. If stoves are used, people must be trained to use and maintain them correctly. Your repair man will need the tools, spare parts and skills to repair the stoves.
- *Supply* – as with vaccines, look at the system of ordering, receipt and storage of equipment.

D. TRAINING

- *Trainers* – who is going to do the training and how? I think training should be carried out by your supervisors. The method should be based on teaching the tasks. The training modules produced by the WHO Expanded Programme on Immunization are an excellent aid⁽¹⁾.

- *Supervisors* – the trainers/supervisors must be trained themselves.
- *Method* – the system of training should be carefully designed. One way is to hold a 'main' training session of, say, a week for each centre and also have continuous training for supervisors when they visit centres.

Management

District Medical Officer (DMO)

The DMO will probably have overall responsibility but also has many other jobs to do. At community level, shared management where everyone takes some responsibility and which therefore leads to decisions everyone understands may be best. One way of achieving this is to have the staff of each immunization unit meeting together as a team. Encourage them to identify and resolve local problems locally. The DMO must visit each of these teams a few times each year.

Supervisor

The immunization programme will need special supervision because of the different components involved. Someone should be trained as a supervisor and visit several units once every six weeks or so to look at the quality of the tasks being performed⁽²⁾. By monitoring the process rather than simply the work done, the supervisor should be able to help and support the staff in their work. Supervision involves working along with others rather than just inspecting and instructing. Supervisors will need to be taught how to take on this role.

Phil Gowers (recently Medical Officer of Health, The Gambia), c/o London School of Hygiene and Tropical Medicine, Keppel Street, London WC1, UK.

⁽¹⁾*EPI Training Modules – for information contact the Expanded Programme on Immunization, WHO, 1211 Geneva 27, Switzerland.*

⁽²⁾*Fitzgerald S and Gowers P 1983 Blueprint for Success: The Gambian Immunization Programme. World Health Forum, Vol 4, pp79–82.*

Further reading

See AHRTAG's two books – *How to look after a refrigerator* and *How to look after a health centre store* (mentioned on page 8 of this issue).

Outlook for the future

Mike Levine and others describe field trials of a new oral vaccine in Chile and Egypt.

Typhoid fever is still an important problem in many less-developed areas of the world. Injectable anti-typhoid vaccines have long been available and provide 70 to 90 per cent protection for up to 7 years. Because they tend to cause fever, pain and swelling at the injection site, and a general feeling of being unwell in about one in four vaccinees, these vaccines are poor public health tools. Similar vaccines given by mouth do not cause these unpleasant reactions. However, they give little or no protection this way against typhoid fever, even in multiple doses. A potentially major breakthrough has been the development by Germainier and co-workers of a new strain of typhoid bacillus, Ty21a, suitable for use as a live oral vaccine⁽¹⁾.

First evaluations

Initial evaluation in North American volunteers produced no adverse reactions and the live Ty21a freeze-dried vaccine was shown to be both genetically stable and effective. The first field trial was carried out among young Egyptian schoolchildren, who were given 1 gm of NaHCO₃ (sodium bicarbonate) to neutralize stomach acid before swallowing each of the three doses of the reconstituted vaccine. Three years of surveillance showed 96 per cent vaccine efficacy⁽²⁾.

Field trials in Chile

With these encouraging results from Egypt, further field trials in Chile are taking place with the following aims:

- (1) to determine the efficacy of Ty21a given in a new form of enteric-coated capsules**
- (2) to evaluate the efficacy of fewer vaccine doses
- (3) to assess the vaccine's efficacy in an area where typhoid infection is particularly common and lethal.

During the first 18 months of surveillance, beginning in May and June 1982, there have been unexpected variations in vaccine efficacy among the initial group of 90,000 schoolchildren.

It is not yet clear whether these are due to the different formulation, the different dosage schedules or the much higher force of typhoid infection that exists in Chile as compared with Egypt.



Taking live oral typhoid vaccine in the Chilean field trial.

Sorting out the variables

From July to September 1983, in an attempt to resolve the relative importance of the different variables, 150,000 Santiago schoolchildren were randomly allocated to one of five groups:

Group 1 – Children were given three doses of Ty21a vaccine in enteric-coated capsules within one week.

Group 2 – Children were given three doses of vaccine with NaHCO₃ within one week, both substances being contained in easily soluble gelatin capsules.

Group 3 – Children were given three doses of vaccine in enteric-coated capsules as in Group 1, but the doses were each separated by an interval of three weeks.

Group 4 – Children were given vaccine and NaHCO₃ in gelatin capsules as in Group 2, but the doses were each separated by an interval of three weeks.

Group 5 – Children received three doses of placebo***

Doses of vaccine, irrespective of formulation or schedule, were intended to deliver 1 to 3 thousand million live organisms per dose.

Vaccinations were well tolerated and intensive epidemiological surveillance of the 150 thousand children is continuing.

Outlook for the future

In addition to Ty21a, other candidates for new anti-typhoid vaccines are already being investigated. The outlook for improved typhoid vaccines is therefore reassuring and the results from the extensive field trials in Chile are awaited with considerable interest.

Dr Myron M Levine, Dr Robert E Black and Dr Catherine Ferreccio, Center for Vaccine Development, University of Maryland School of Medicine, Baltimore.

(1) Germainier R and Furer E 1975
Isolation and characterization of GalE mutant Ty21a of S. typhi: a candidate strain for live, oral typhoid vaccine. Journal of Infectious Diseases, Vol 131, pp 443-558.

(2) Wahdan M et al 1982
A controlled field trial of live S. Typhi strain Ty21a oral vaccine against typhoid: three year results. Journal of Infectious Diseases, Vol 145, pp 292-295.

For further references, write to *Diarrhoea Dialogue*.

Authors' note

The Chilean field trials represent a collaborative effort on the part of the Chilean Ministry of Health, the Center for Vaccine Development of the University of Maryland School of Medicine, the Swiss Serum and Vaccine Institute, the World Health Organisation, the Pan American Health Organisation and the Walter Reed Army Institute of Research.

* Vaccine efficacy = degree of protection produced in a group who have been immunized compared with a similar unimmunized group.

** This special capsule covering resists acid digestion in the stomach and protects the live organisms for release when the capsules reach the more favourable environment of the small intestine. Such capsules would be more practical since treatment beforehand with NaHCO₃ would no longer be necessary.

*** A placebo is an inactive substance exactly similar in appearance to the active substance being tested.

Attitudes, beliefs and practices

We are working in one of the Rural Health Service Projects, undertaken by K E M Hospital, Pune. For the last two years we have been involved in the programme of Oral Rehydration Therapy (ORT) among the rural communities near Pune. We made some observations on attitudes, belief and practices in relevance to the acceptance of ORT. We are interested in fact to communicate this observation to those who are working in the field of ORT. We would, therefore, appreciate it if you could consider our material experience for publication in *Diarrhoea Dialogue*.

Dr L. D. Puranik and Dr N. R. Chaudhari, King Edward Memorial Hospital, Sardar Mudliar Road, Rasta Peth, Pune 411 011, India.

These are some of the main observations made by the King Edward Memorial Hospital Team:

"Village women had many different beliefs, attitudes and practices about the treatment of diarrhoea. These differed according to the location of the village. In communities situated close to main roads (and urban influence) women believe strongly that only injections can relieve diarrhoea. This is a result of their constant exposure to private medical practitioners who give injections frequently no matter what the illness. Also, women in these areas only consult doctors when the child has become seriously ill.

In more isolated areas, village women use herbal home remedies – not all of which are helpful. For example, one remedy 'Dikamali' is mixed with sugar and used for massaging the gums of children suffering from what mothers call 'teething diarrhoea'. This harmful practice is thought to make the gums stronger and teething easier so that the diarrhoea can then be controlled.

Nevertheless, with continuous health education and demonstrations of how to use ORT, over 80 per cent of rural

women (especially those in more isolated communities) are now using ORT when their children have diarrhoea. A great deal remains to be done, however, in convincing mothers living in peri-urban communities about the value of ORT."

Honey in ORT

Many thanks for the issue of *Diarrhoea Dialogue* which I got yesterday. They are useful indeed. I do hope you will be able to send me copies of the next issues – 15 of each, so that I can forward them to our Health Units.

We are now entering the hot season and so we will get more and more children with diarrhoea. We are trying our best teaching mothers and health workers about oral rehydration which is proved to be so useful in many cases. We have great problems with water, being in the semi desert land of Northern Kenya. We also lack sugar but there is honey locally made – so it can help!

Our Samburu mothers are very clever and willing to learn as they love their children so much!

Sr Rosita Perino, Archer's Post C.M., P.O. Box 43, Isiolo, Kenya.

Stopping the leak

In issue 8 you said that "stopping the leak is wrong". It is a pity that the concept in Egypt is to stop the leak. Most of the pediatricians here give combinations of antimicrobials and anti-diarrhoeals to their patients. As a senior house officer of paediatrics, I find infants are usually brought in to the hospital severely dehydrated after being given several prescriptions with these combinations.

– Before teaching mothers in Egypt, doctors should agree that it is dehydration that is fatal and not the diarrhoea itself.

Dr Bassma Nazmy, 10 Abou-El Karamat Street, Agouza, Guiza, Egypt.

Distributing ORS

This refers to your "Meeting the demand" note in the August 1983 issue of *Diarrhoea Dialogue*.

Maybe the producers of "fizzy drinks and cigarettes" could be asked to help in the distribution of ORS as part of their contribution to Health for All by the Year 2000?

Dr Eilif Liisberg, Public Health Administrator, Division of Family Health, WHO, 1211 Geneva 27, Switzerland.

Practical books

This issue of *DD* considers the interaction between measles and diarrhoea and the importance of measles immunization. Effective immunization programmes depend on supplies and efficient management at community level and proper maintenance of equipment and supplies. The Appropriate Health Resources and Technologies Action Group (AHRTAG) has published two books which deal with these important topics *How to look after a refrigerator* and *How to look after a health centre store*. Both publications are clearly laid out with many illustrations. They can be used by individuals or as the basis for training a team in a health centre.

Both books can be ordered from Teaching Aids at Low Cost (TALC), P.O. Box 49, St Albans, Herts, AL1 4AX, UK.

Price: How to look after a refrigerator £2.00 (plus p & p*)

How to look after a health centre store £3.00 (plus p & p*)

*Postage and packing rates

• Air speeded post – add on 30% of the total cost of the books. (Minimum postage and packing is £1.50)

• Please send International Money Orders/cheques in £ sterling only.

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