From disease control to child health and development

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The control of diarrhoeal diseases, acute respiratory infections and other childhood killers—such as measles, malaria and malnutrition—is now combined in WHO’s Division of Child Health and Development. The need for integrated management of childhood illness is shown in its historical context.

WHO’s Division of Child Health and Development was established in 1996, inheriting long experience in the prevention and control of certain childhood diseases. Its forerunners, and their coming together in the interest of improved care for children, are described below.

Diarrhoeal disease control

Until the late 1960s the most frequent recommendation made by health professionals for combating diarrhoeal disease was to use antidiarrhoeal drugs to stop the flow, and to encourage patients to refrain from eating for at least 24 hours “to rest the gut”. Dehydrated patients received intravenous therapy if available. Where medications were scarce or expensive, families used traditional remedies. It was commonly felt that socioeconomic development was the key to tackling diarrhoeal disease, and it was undoubtedly true that the improvement of water supply and sanitation could diminish its incidence. Unfortunately, however, in many countries this might mean a very long wait, while some 5 million children were dying from diarrhoea globally every year.

Meanwhile, progress was being made in the treatment of cholera, particularly at the Cholera Research Laboratory in Dhaka and the Infectious Diseases Hospital in Calcutta. Most significant was the development of oral rehydration therapy, in which a solution of dried salts in clean water was given to patients to drink. In this way it became possible to diminish the use of intravenous fluids that were both expensive and hard to transport. When oral rehydration therapy was adopted in 1971 to complement the limited supply of intravenous treatment for thousands of patients in West Bengal the case fatality rate was reduced to one-tenth of that observed previously in similar situations.

WHO obtained the agreement of Vifor, a Swiss pharmaceutical firm, to produce packets of oral rehydration salts. The world body purchased these in bulk and sent them, with guidelines on use, to developing countries. The results were overwhelmingly positive, and WHO adopted a single formula for all patients, children and adults alike, and all forms of diarrhoea: sodium chloride, 3.5g/litre;
potassium chloride, 1.5 g/litre; sodium bicarbonate, 2.5 g/litre; glucose, 20 g/litre. Subsequently the sodium bicarbonate was replaced with trisodium citrate dihydrate at 2.9 g/litre to increase the stability and shelf-life of the undissolved salts.

WHO and UNICEF collaborated to find firms that could produce oral rehydration salts in large quantities and at reduced prices. Eventually the two world bodies promoted the production of the salts in developing countries. Oral rehydration salts were included in the WHO list of essential drugs.

Field trials in the Philippines showed that peripheral health workers could use oral rehydration therapy to treat children aged under five years with acute diarrhoea, and that if the children were fed simultaneously they gained weight during diarrhoeal episodes instead of losing it. The benefits of oral rehydration therapy were also confirmed in other countries.

WHO's Programme for the Control of Diarrhoeal Diseases was established in 1980. In a structure unique for WHO, research was combined with the development of materials and support for the creation of programmes in countries. It became clear that training courses were needed to enable health workers to administer the therapy and that methods of programme management would have to be put in place.

Access to packets of oral rehydration salts in health facilities increased consistently (Fig. 1). Where packets were not available for home use, sugar–salt solution was often promoted as a first line of defence against dehydration. Difficulties with inadequate recipes and incorrect preparation of sugar–salt solution led to the testing of other alternatives, such as cereal-based fluids prepared in the home. Manufacturers tried marketing flavoured and

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**Fig. 1**

*Estimated proportion of developing country populations with access to oral rehydration salts, 1985–1993*

![Graph showing the estimated proportion of developing country populations with access to oral rehydration salts from 1985 to 1993. The access rate increases from 50% in 1985 to 75% in 1993.](image-url)
coloured oral rehydration salts. Between 1979 and 1992 the number of packets supplied annually in developing countries increased from 51 million to 800 million, well over half of the latter being produced locally.

WHO concentrated on improving the practices of health workers, while UNICEF supported production of the salts and promoted their use as well as other aspects of home care. It was found that health workers performed quite well except in advising mothers on home care, and this element was therefore strengthened and given special attention in clinical training. The following rules of home care were drawn up:

- Give more to drink than usual during a diarrhoea episode.
- Give the child soft mashed foods and continue breastfeeding.
- Take the child to a health worker if danger signs appear, namely:
  - many watery stools;
  - repeated vomiting;
  - marked thirst;
  - eating or drinking poorly;
  - fever;
  - blood in the stools.

By 1990 the importance of oral rehydration salts and therapy was widely known and accepted in the prevention and management of dehydration. By the end of 1995 over 570 000 health workers had been trained in the management of diarrhoea cases, and virtually all health workers were aware of the therapy even if they had not received specific training. Even private medical practitioners and drug sellers, often reluctant to give up prescribing antibiotics, began to prescribe oral rehydration salts as an additional treatment and to advise mothers that they should encourage children suffering from diarrhoea to eat. Training in diarrhoea case management was updated in many medical schools. Use of unnecessary intravenous drips largely disappeared.

Research revealed that some traditional practices in households, such as giving children rice water to drink during a diarrhoea episode, were appropriate and could be strengthened. These practices had often been undermined by inappropriate medical advice. Family knowledge and behaviour gradually changed in response to intensive efforts in communication and improved advice from health workers. Families began encouraging children to eat and drink as soon as diarrhoea occurred, and mothers reported that they continued to breastfeed sick children. Progress in medical and home practices caused diarrhoea-related mortality to fall significantly.

The services and research components of the WHO Programme for the Control of Diarrhoeal Diseases were combined to produce topic-centred working groups, thus improving communication between specialists. New research and development activities were focused on major field problems. Good progress having been achieved in the management of dehydrating diarrhoea, increased attention was directed to dysentery, persistent diarrhoea, diarrhoea in severely malnourished children and other issues. Breastfeeding, especially exclusive breastfeeding for the first four to six months of life, was shown to be highly effective in preventing diarrhoea. A full-time specialist was engaged to work on the promotion of breastfeeding.
Control of acute respiratory infections

During the same period, data from countries showed that acute respiratory infections, principally pneumonia, caused even more deaths than diarrhoea. Access to the technology typically needed for detecting pneumonia was limited, and many cases were untreated. Conversely, simple cases of coughs and colds were sometimes unnecessarily treated with antibiotics. In the early 1980s a WHO collaborating centre at Goroka, Papua New Guinea, developed a simple approach to the detection of pneumonia, in which the respiratory rate was determined and an examination for chest indrawing was performed.

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Guidelines were developed and in 1984 WHO’s newly established Acute Respiratory

Fig. 2
Acute respiratory infections: case management research and development milestones

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tr>
<td>1980</td>
<td>WHO Collaborating Centre at Goroka, Papua New Guinea, develops simple approach to pneumonia detection</td>
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<tr>
<td>1985</td>
<td>WHO formulates control strategy and initiates control programme for acute respiratory infections</td>
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<tr>
<td>1990</td>
<td>First WHO guidelines on classification and treatment of acute respiratory infections</td>
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<tr>
<td>1995</td>
<td>Research and development programme launched</td>
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<tr>
<td>2000</td>
<td>Intervention studies demonstrate WHO approach can reduce mortality</td>
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- Clinical criteria for detecting pneumonia (chest indrawing and respiratory rate thresholds) validated and refined |
- Respiratory rate timers and oxygen concentrators developed and tested |
- Revised standard case management guidelines/training course field tested and finalized |
- Wheeze management guidelines tested |
- Bacterial drug resistance surveillance manual developed and field-tested |
- Safe, efficient methods for oxygen delivery identified and evaluated |
- Multicentre study of etiology and clinical signs of pneumonia, meningitis and sepsis in young infants and of pneumonia in malnourished children |
- Studies of antibiotic pharmacokinetics and efficacy studies |
- Simplified methods for surveillance of bacterial drug resistance sought |
- Guidelines for management of acute respiratory infections incorporated into clinical algorithms for integrated management of childhood illness |
tory Infections Programme launched a research effort to validate the use of clinical signs for diagnosis and evaluate the impact of the approach. The simplified standard case management proved effective and provided the basis for WHO efforts to reduce mortality caused by pneumonia (Fig. 2).

Like the Diarrhoeal Diseases Programme, the Acute Respiratory Infections Programme developed clinical management training courses for health workers, programme management methods, evaluation methods, and supportive technical documents. Between 1987 and 1995 over 250,000 physicians, nurses and other health workers participated in case management training. Because it is vital to detect pneumonia at an early stage, methods were developed whereby families could be helped to recognize danger signs.

In national programmes on acute respiratory infections, most attention has been directed at improving clinical practices. Health workers have learnt to count the respiratory rate, look for chest indrawing, and advise mothers on home treatment and danger signs. Techniques of applied anthropology and ethnography were adopted to gather information on local terms and practices and develop subsequent activities in child health. For example, a study in Viet Nam demonstrated the difference between understanding phrases determined by simple translation and understanding concepts elicited by ethnographic techniques. Mothers' recall of the danger sign of “fast or difficult breathing” was twice as good when health workers used the local term for “strong or tired breathing”.

It has been difficult to arrive at simple and effective activities for the prevention of pneumonia. In addition to the promotion of breastfeeding and the improvement of nutrition, it will probably be necessary to use new vaccines widely and to reduce indoor air pollution.

Since WHO's maintenance of two parallel single-disease programmes led to some duplication of effort, in 1990 they were merged to form the Division of Diarrhoeal and Acute Respiratory Disease Control. Similar mergers were undertaken in certain countries, and materials for combined programme management, training and evaluation were developed.

**Integrated management of childhood illness**

When a child arrives at a health facility he or she should not be regarded as a case of some particular disease, but as a sick person, possibly with several conditions at once (see box). A mother may take a child to a health facility for a problem that worries her, and it may prove to be a minor manifestation of a dangerous illness. She may, for instance, be concerned because her child refuses to eat. This could be a sign of dehydration, meningitis or another serious infection, or of a specific feeding problem. What should the health worker do in such circumstances?

The need for integration at health facilities so as to rationalize the endeavours of personnel became increasingly evident. By 1990 it was well documented that most childhood deaths were caused by a small number of conditions. As many as 70% of deaths were attributable to diarrhoea, pneumonia, measles, malaria and malnutrition. What simple intervention, parallel to those for treating dehydration and for detecting and managing pneumonia, could be developed for “sick children”? 
For many sick children a single diagnosis may not be apparent or appropriate

- Presenting complaint
  - Cough and/or fast breathing
  - Lethargy or unconsciousness
  - Measles rash
  - “Very sick” young infant

- Possible cause or associated condition
  - Pneumonia
  - Severe anaemia
  - P. falciparum malaria
  - Cerebral malaria
  - Meningitis
  - Severe dehydration
  - Very severe pneumonia
  - Pneumonia
  - Diarrhoea
  - Ear infection
  - Pneumonia
  - Meningitis
  - Sepsis

A working group was formed in 1992 to examine this question. Ten WHO programmes and UNICEF jointly devised clinical guidelines for the combined treatment of the major childhood illnesses, and a systematic process was then developed for assessing and treating them. A training course was devised to help health workers at first-level facilities learn and apply the integrated method. This approach, now called integrated management of childhood illness, eventually had its definition expanded to include preventive as well as management interventions at both the health facility and community levels.

The systematic process and the training course for improving health worker skills embraced the management of conditions causing the greatest numbers of deaths in the greatest number of places. In order to help each country to make the materials appropriate for its specific circumstances a method for adapting the generic materials was developed. In the light of lessons learnt in the ethnographic work mentioned above, local terms and practices were also brought into play.

It soon became clear that there was a need to go far beyond improving the skills of first-level personnel if a significant impact was to be achieved. A broader strategy for the integrated management of childhood illness has been outlined, aiming to bring about more extensive changes in health systems, dealing, for example, with drug supply and the organization of work. Research continues into the improvement of integrated case management and the

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Fig. 3
Implementation of Integrated Management of Childhood Illness, September 1997

Status of implementation
- Introduction (15 countries)
- Early implementation (22 countries)
- Expansion (2 countries)
identification of more comprehensive disease prevention activities, including the development and adoption of new vaccines. Communities are becoming more involved as a result of improved counselling, education and activities designed to make families aware when children need medical attention. The state of implementation of integrated management of childhood illness globally is indicated in Fig. 3. In addition to UNICEF, the World Bank and the governments concerned, certain bilateral cooperative agencies and nongovernmental organizations have joined WHO in promoting the strategy.

In 1996 the mandate of WHO’s Division of Diarrhoeal and Acute Respiratory Disease Control was modified and expanded, leading to the creation of the Division of Child Health and Development. Work continues on many fronts. Although the current formula for oral rehydration salts is satisfactory, there may be an even better one. The process for detecting and managing pneumonia may need to be reviewed; it may be possible to target antibiotics more effectively to only those children who will really benefit from them. Current efforts in the integrated management of childhood illness are aimed at first-level health facilities but it is also essential to convince communities of the need for urgent attention when children are sick. What should people do before they go to a health facility? What should be done to improve the care of seriously ill children at referral facilities? To complement the care of ill children, what is the best way to promote healthy development? What potential health problems should we begin to tackle now? How can the widespread support for the concept of children’s rights be most effectively applied in the health field? These are some of the questions facing the new Division as it takes up its role in the global partnership working to improve the health, growth and development of children.

Acknowledgement

The following article provided a clear perspective on the evolution of the Programme for the Control of Diarrhoeal Diseases: