IMCI INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS

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IMCI ADAPTATION GUIDE

A guide to identifying necessary adaptations of clinical policies and guidelines, and to adapting the charts and modules for the WHO/UNICEF course

PART 2

C. Technical Basis for Adapting the Clinical Guidelines, Feeding Recommendations, and Local Terms

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DEPARTMENT OF CHILD
AND ADOLESCENT HEALTH
AND DEVELOPMENT

WORLD HEALTH ORGANIZATION

unicef

For further information please contact:

Department of Child and Adolescent Health and Development
World Health Organization

20 Avenue Appia
1211 Geneva 27
Switzerland

Tel: 41 22 791 26 32
Fax: 41 22 791 48 53
Email: chd@who.int
Website: http://www.who.int/child-adolescet-health

The 2002 working draft of the IMCI Adaptation Guide consists of the following sections:

Section A. The Adaptation Process

Section B. Procedures for Adapting the Charts and Modules

Section C. Technical Basis for Adapting the Clinical Guidelines, Feeding Recommendations and Local Terms

Section D. Protocol for Adapting the Feeding Recommendations

Section E. Protocol for Identifying and Validating Local Terms

Section F. Protocol for Designing and Pretesting an Adapted Mother's Card

Section H. Modifying the Generic Chart Booklet: Using Microsoft Publisher®

Please provide comments and further input to WHO/CAH, Geneva, Switzerland.

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C. Technical Basis for Adapting Clinical Guidelines, Feeding Recommendations, and Local Terms

The guidelines for Integrated Management of Childhood Illness (IMCI) help health workers to assess, classify, and treat sick children. Use of the guidelines leads to more accurate identification of illnesses in outpatient settings. It ensures treatment of the most serious conditions pneumonia, diarrhoea, malaria, measles, and malnutrition and speeds up the referral of severely ill children.

For those children who can be treated at home, caretakers are taught how to provide treatment and when to seek care for their children. The guidelines also identify actions to prevent illness through the immunization of sick children, supplementation of micronutrients, promotion of breastfeeding, and counselling of mothers to solve feeding problems. This approach, which combines steps to manage and prevent several different conditions, is comprehensive and systematic.

The WHO Department of Child and Adolescent Health and Development (CAH) collaborated with eleven other WHO programmes[a], UNAIDS, UNICEF, and other technical experts in child health to develop the IMCI guidelines, and continues this collaboration on materials for countries to use in adapting the guidelines. What has been learned from disease-specific control programmes, as well as from the results of recent research, has been used in making decisions on the IMCI guidelines, and the materials developed for the WHO/UNICEF course for first-level health workers. This information also can contribute to the national review of possible adaptations to the generic guidelines.

Using the information on the technical basis of the IMCI guidelines for making adaptation decisions

[a] WHO divisions and programmes that collaborated with the Division of Child Health and Development (CHD) on the IMCI guidelines are: Office of HIV/AIDS an Sexually Transmitted Diseases (ASD), Division of Control of Tropical Diseases (CTD), Action Programme on Essential Drugs (DAP), Division of Emerging, and other Communicable Diseases Surveillance and Control (EMC), Global Programme for Vaccines and Immunization (GPV), Global Tuberculosis Programme (GTB), Maternal Health and Safe Motherhood (MSM), Programme of Nutrition (NUT), Oral Health (ORH), Programme for the Prevention of Blindness and Deafness (PBD), and Special Programme for Research and Training in Tropical Diseases (TDR).

This section of the *IMCI Adaptation Guide* is not intended to be a textbook or to provide comprehensive clinical information on managing childhood illness. The persons using this information, therefore, should have a clinical background that includes some paediatrics and access to standard paediatric texts.

Contents. This section presents the technical basis for decisions made during the development of the generic guidelines, and information for use in adapting the guidelines:

- Each subsection on a particular technical issue begins with a description of the ***generic guidelines***, as they appear in the training materials for the IMCI course for first-level health workers, followed by their ***technical basis***.

- Each subsection identifies ***adaptations*** with an explanation of their technical basis, where appropriate. The adaptations are presented as ***ESSENTIAL***, ***RECOMMENDED***, and ***POSSIBLE ADAPTATIONS.*** Those adaptations which some countries might be considering, but which would not be encouraged by WHO, are presented as ***POSSIBLE (discouraged) ADAPTATIONS***.

- Information which might be relevant, but which does not provide sufficient basis for an adaptation, is discussed under ***OTHER CONSIDERATIONS***.

Also included in this section is the technical basis for national or regional adaptations of feeding recommendations and local terms used in communicating with caretakers about signs of illness (Research protocols designed to obtain information for adapting feeding recommendations and identifying local terms can be found in Section *D*, *Study Protocols*).

The level of technical detail varies by topic, and more details are provided where necessary to cover:

- New or recently updated guidelines.
- Less familiar treatments (for example, the basis for rectal administration of a drug is presented whereas the basis for intramuscular or oral administration is not).
- Topics that clinicians are often unfamiliar with, such as breastfeeding counselling or the use of local terms to improve communication with mothers.
- New data to support or explain the guidelines which may not be readily available to the consultant or the focal person carrying out adaptation in country. These include unpublished data and data that have only very recently been published.
- Useful information not commonly found in standard paediatric textbooks.
- The public health basis for recommendations in the generic course, which clinicians may not be familiar with.

The first topic, on page 5, identifies the adaptations to be considered when modifying the Introductory Lecture and the module, *Introduction,* for the IMCI course for first-level health workers. The remaining topics cover the major technical issues that may be considered during the adaptation process.

References to support the technical information. Where possible, the text cites WHO technical reviews or guidelines, which should be used for additional information when considering a particular adaptation. The WHO reviews and guidelines usually provide a list of the original published references, which are not repeated here. Original publications are cited, however, when there are new references or when no relevant WHO technical review exists.

Several references are also made to the 1997 Supplement 1 of the *Bulletin of the World Health Organization* (volume 75). The articles in this supplement present data to support the IMCI guidelines. They include an overview of the generic guidelines, evaluations of various components of the guidelines under different epidemiological circumstances, a review of the WHO/UNICEF training course for first-level health workers, and an assessment of health worker performance after training.

Changes in IMCI materials, based on adaptation decisions. When national programme staff and other technical experts reach consensus on needed adaptations, their decisions are incorporated into the IMCI generic materials. Sections *E, F,* and *G* of the *IMCI Adaptation Guide* provide detailed guidance on how to make the necessary changes in the charts, modules, recording forms, and facilitator guides for all of the recommended adaptations and some of the possible adaptations. These sections may be requested from WHO, if they do not accompany this text.

Updating the guidance on making adaptation decisions. New research and revised policies, as well as experiences with adaptation and the use of the IMCI course, will require the updating of information presented in this section. WHO will periodically add to or modify parts of the technical basis for the generic guidelines and will update the recommendations. Countries may request the latest information from WHO.

Additional information on the following subjects can be found in

Supplement Number 1 to Volume 75, 1997, of the *Bulletin of the World Health Organization*:

- Integrated management of childhood illness by outpatient health workers: technical basis and overview
- Evaluation of an algorithm for the integrated management of childhood illness in an area with seasonal malaria in the Gambia
- Evaluation of an algorithm for integrated management of childhood illness in an area of Kenya with high malaria transmission
- Performance of health workers after training in integrated management of childhood illness in Gondar, Ethiopia
- Integrated management of childhood illness: field test of the WHO/UNICEF training course in Arusha, United Republic of Tanzania
- Identifying sick children requiring referral to hospital in Bangladesh
- The integrated management of childhood illness in western Uganda
- Assessment of potential indicators for protein-energy malnutrition in the algorithm for integrated management of childhood illness
- Clinical signs for the recognition of children with moderate or severe anaemia in western Kenya
- Evaluation of clinical signs to diagnose anaemia in Uganda and Bangladesh, in areas with and without malaria
- Pallor as a clinical sign of severe anaemia in children: an investigation in the Gambia
- Integrated management of childhood illness: conclusions

1. INTRODUCTORY LECTURE AND MODULE

1.1 Introductory lecture

The generic introductory lecture (with overhead transparencies) can be found in the *Course Director Guide* for the IMCI course for first-level health workers. The lecture presents data on the causes of mortality and morbidity in children under 5 years of age in developing countries.

The introductory lecture should remain relatively brief and should avoid going into specific details about guidelines. The guidelines are taught in the course and any policy differences can be discussed as they arise.

POSSIBLE ADAPTATION: **Modify the introductory lecture.**

The introductory lecture can be modified to:

- Add country-specific data on the causes of death in children under age 5 years.
- Use slides or photographs illustrating the main causes of mortality and morbidity that are covered by the course, preferably from the country where the course is being conducted.
- Explain the relationship between this training course and other training activities for health workers in the country.
- Present Ministry endorsement of the guideline changes.
- Present information about Ministry plans to provide the needed supports to integrated case management, including the supply of required drugs. This is especially important if the drugs used in IMCI are unfamiliar to participating health workers and/or are currently not available in first-level facilities.

1.2 *Introduction* module

The *Introduction* module states that pneumonia, diarrhoea, malaria, measles, and malnutrition cause more than 70% of mortality in children under 5 years of age and presents the logic of integrating the management of the leading killers of children.

The rest of the module describes the case management approach presented in the course, followed by a glossary.

***POSSIBLE ADAPTATION*: Substitute country-specific data on the leading killers of children and their contribution to under 5 mortality.**

Country-specific data could be substituted in the first sentence of the module.

***POSSIBLE ADAPTATION*: Describe briefly how IMCI fits into the Ministry's efforts to improve child survival.**

***POSSIBLE ADAPTATION*: Expand the glossary to include words from the adapted course materials which may be unfamiliar to course participants.**

2. COUGH OR DIFFICULT BREATHING

Generic guidelines

The child presenting with cough or difficult breathing is assessed by counting the breathing rate, looking for chest indrawing and listening for stridor, and asking about the duration of the cough.

Chest indrawing, stridor when calm, or a general danger sign indicate SEVERE PNEUMONIA OR VERY SEVERE DISEASE, requiring referral.

Children with fast breathing but no chest indrawing, stridor, or general danger sign are classified as having PNEUMONIA.

Children with none of these signs have a simple cough or cold, are classified as having NO PNEUMONIA: COUGH OR COLD, and can be managed at home with a remedy to soothe the throat and relieve the cough. The generic guidelines recommend using a safe, locally appropriate soothing remedy for children and infants who are not exclusively breastfed. Children who have been coughing for more than 30 days are referred for further assessment, to consider the possibility of tuberculosis and other conditions.

The generic guidelines assume that the health worker measures the breathing rate using a watch with a second hand or digital display of seconds. The health worker either asks another health worker to tell her when 60 seconds has passed or positions the watch so that she can glance at it while watching the child's chest or abdomen.

Two antibiotics are presented in the box "Give an appropriate oral antibiotic" and blanks are left where the first-line and second-line antibiotic for PNEUMONIA and for VERY SEVERE DISEASE can be filled in. The same antibiotics are recommended for ear infection and, before referral, for children with VERY SEVERE DISEASE who can take an oral antibiotic.

These guidelines are identical to the WHO/ARI case management guidelines[1,2] with the exception of not including the outpatient management of wheezing. Children with severe bronchospasm would be referred to hospital for management on the basis of chest indrawing.

2.1 Detecting pneumonia based on fast breathing

The clinical guidelines which appear on the *Assess and Classify* chart are based on WHO guidelines for ARI case management developed over the past decade.[1,2] These guidelines divide children presenting with cough or difficult breathing into three groups:

- Those who require admission for severe pneumonia;

- Those who require antibiotics as outpatients because they are likely to have pneumonia; and

- Those who simply have a cough or cold and do not require antibiotics.

This approach to assessment uses two key clinical signs: *respiratory rate*, which distinguishes children who have pneumonia from those who do not, and *lower chest wall indrawing*, which indicates those with severe pneumonia who require admission. The approach is based on national guidelines developed and evaluated in Papua New Guinea during the 1970s.[3] The study of 200 consecutive paediatric outpatients and 50 consecutive admissions looked at the clinical signs which predicted crepitations on auscultation in outpatients and the clinical signs found more frequently in children who were admitted. The study found that 72% of children with crepitations had a respiratory rate of more than 50 breaths per minute, while only 19% of children without crepitations breathed at this fast rate (sensitivity of 72% and specificity of 81%). All 50 children who were admitted had both indrawing of any form (intercostal and lower chest wall) and crepitations.

Subsequent studies using different definitions of pneumonia have shown that the sensitivity of fast breathing defined as a respiratory rate greater than 50 is 60% to 75%.[4,5,6] WHO, therefore, initially recommended the use of a respiratory rate threshold of 50 breaths per minute, above which a child with cough was regarded as having pneumonia. However, concerns were raised about the relatively low sensitivity of this threshold which would leave 25-40% of cases untreated. Two studies, in the Philippines and Swaziland, showed that if the threshold used for children over 12 months of age was lowered to 40 breaths per minute, the sensitivity improved from 62% to 79% (Philippines) and from 65% to 77% (Swaziland), and at the same time, the specificity fell from 92% to 77% (Philippines) and 92% to 80% (Swaziland).[6] Based on these and other data, it was decided to use a respiratory rate cut-off of 50 breaths per minute for children aged 2-12 months, and 40 for children aged 12 months to 5 years (see table on page 7).

There is, however, no uniform agreement about how to define the group of children with ARI who actually need antibiotics. While studies in the late 1930's and early 1940's[7,9] and clinical experience show that antibiotics prevent children with pneumonia from dying, the majority of children with ARI will recover well without antibiotics. The difficulty is how to distinguish those with potentially life-threatening disease from the rest by using simple signs. Radiology is helpful, but many children with relatively minor disease have marked radiological signs, while many who die from pneumonia have minimal radiological signs.[8,9] Whether radiology is used alone or in combination with clinical signs, the sensitivity of fast breathing to detect children with pneumonia is fairly similar.

Sensitivity and specificity of fast breathing for identifying children with cough or difficult breathing who have pneumonia

Study	Age 2-11 mo		Age 1-4 yr		Age 2 mo-4 yr		
	RR ≥ 50	RR ≥ 40	RR ≥ 50	RR ≥ 40	RR ≥ 50	RR ≥ 40	50/40[a]
PNG - Goroka[3]	80/81		67/90	74/72	72/81		78/73
Gambia- Basse[8]	85/98	100/55	64/98	87/82			
India- Vellore[10]	89/93	96/62	57/96	71/87	75/96	86/78	82/89
Lesotho [11] Pediatrician Nurse	79/59 59/72	100/25 84/44	19/91 35/94	54/69 69/77			
Philippines[6]	77/90	90/51	52/85	78/75	62/92	83/68	79/78
Swaziland[6]					65/92	77/69	77/83
Gambia* - Banjul[12]							81/89[b]
Ethiopia*- Gondar[13]							88/87[b]
Kenya*- Siaya[14]							97/49[b]
Uganda*[15]							76/60[b]

[a] Respiratory rate ≥ 50 in age 2-11 months; ≥ 40 in age 1-4 years.
[b] Fast breathing or chest indrawing.
* Performance evaluated in context of the full IMCI assessment and classification process in these studies.

Fast breathing, as defined by WHO, detects about 80% of children with pneumonia who need antibiotic treatment; and using fast breathing to detect pneumonia has been shown to reduce mortality.[16] It is likely that the remaining 20% of children with radiological or clinical pneumonia have less severe disease, although this has not been formally tested. Thus, although the measured sensitivity of fast breathing in children with cough is about 80%, it is probable that more than 80% of children with potentially fatal pneumonia are successfully treated with this approach. No clinical sign provides a better combination of sensitivity and specificity to detect this group than fast breathing. Even expert auscultation is less sensitive as a single sign, although when combined with fast breathing or crepitations the two signs together will be more sensitive than either one alone. If both fast breathing and crepitations are required to be present, the two signs together will be more specific but will lose sensitivity.

The main problem with the use of fast breathing as a simplified approach to identifying the need to treat ARI with antibiotics is specificity: 20% to 30% of children who do not need antibiotics will receive them, although this will vary according to the level of facility providing care. This may seem a high proportion, but it is very low when compared to similar figures from western countries. It is likely that many of those 20-30% of children actually do need antibiotics, but would have been missed if assessment relied on radiological examination and auscultation alone, rather than the presence of fast breathing. Thus, for primary care workers for whom it is only practical to learn one sign, fast breathing is clearly the most useful sign. Moreover, the clinical assessments of physicians who are skilled in the use of the stethoscope could also be greatly improved by the addition of respiratory rate to the signs they already use.

***POSSIBLE ADAPTATION*: Include wall mounted clocks.**

In some settings, it may be possible to put a clock with a second hand on the wall of the clinic. Health workers can use this to count the breathing rate in a similar way as they would use a watch.

***OTHER CONSIDERATIONS*: Use sounding timers.**

Usually literate health workers able to learn from the modules are also able to use a watch. But a national ARI programme may decide to introduce sounding timers if health workers have trouble using a watch, or they do not have one (and if it is not acceptable or affordable to provide inexpensive watches to the clinic). The following issues should be taken into consideration when making this decision:

- Health workers need to be trained to use sounding timers. A demonstration and practice session must be inserted in the *Assess and Classify* module, before the video is introduced. It is essential that health workers:
    - learn to count the breathing rather than the 60 ticks per minute of the timer;
    - wait for the second, 60 second sound (rather than the 30 second beep); and
    - are adept at stopping and restarting the timer if the child becomes upset during the count.
- Sounding timers cost $4 each and the battery must be replaced every 10,000 uses.
- As the battery can be removed and used to power other devices, such as watches, maintaining a functioning timer may be difficult.

***OTHER CONSIDERATIONS*: Use 30 second measurements for measuring the breathing rate of children age 2 months up to 5 years.**

The thresholds are based on measuring breathing rate for 60 seconds. Thirty second readings are sufficiently accurate in children age 2 months up to 5 years, take less time, and result in a lower rate of repeated counts due to the child becoming agitated during the count. This may lessen health worker frustration and make it more likely that they continue to actually count the breathing rate to assess children with cough. However, a 30 second reading for children age 2 months up to 5 years requires using a different counting interval than the one used for infants up to 2 months of age, for whom a 60 second reading is still recommended; and this could cause confusion. Using a 30 second measurement might also lead to errors if 60 second measurements were used previously.

2.2 Detecting severe pneumonia based on chest indrawing

The utility of lower chest wall indrawing as an indicator of the need for hospitalization is more difficult to evaluate. All clinicians at some point probably admit to hospital children who could be adequately managed at home. At one extreme is the view that only children who need oxygen should be admitted, whilst at the other some feel that all pneumonia cases should be admitted.

In practice, children with pneumonia are admitted for a wide variety of reasons, including: the need for parenteral antibiotics; difficulty feeding; possible need for oxygen over the coming one to two days; or the mother cannot be relied upon to administer medication. Each of these may be more or less valid in different settings. Most clinicians would feel more comfortable if a child with severe pneumonia were given parenteral antibiotics because of the higher levels of penicillin which can be achieved and concerns about the absorption of oral drugs (particularly chloramphenicol) in acutely ill children.

The original protocol for the Papua New Guinea study in the 1970's used retractions as the main indicator of severity.[3,17] But studies from different parts of the world showed large differences in the rates of retractions because of variable and imprecise definitions. Restriction of the term to lower chest wall indrawing, defined as inward movement of the bony structures of the chest wall with inspiration, has provided a useful indicator of severity of pneumonia which can be taught to health workers. It is more specific than intercostal indrawing, and results in the classification of fewer children as having indrawing.[6]

Lower chest wall indrawing is sometimes referred to as subcostal retraction (or subcostal recession or subcostal indrawing). Subcostal indrawing, however, is physiologically impossible since indrawing results from a negative pressure relative to the exterior; such negative pressure can only occur *above* the diaphragm.[18] Lower chest wall indrawing, the

more accurate term, is due to indrawing of the *lower* rib cage. This is a result of increased tension on the anterior insertion of the diaphragm on the xihphoid process and the internal surfaces of the cartilages and adjacent parts of the lower six ribs, in overcoming respiratory obstruction. Lower chest wall indrawing is more apparent in infants because of their more flexible rib cage. Some lower chest wall indrawing is normal in neonates, which is why the abnormal sign in young infants is defined as "severe lower chest wall indrawing."

Clarification of the sign for severe pneumonia came when WHO ARI guidelines were revised in 1989 to specify lower chest wall indrawing as the clinical sign of severe pneumonia. The use of this sign excluded children with intercostal indrawing only. The decision was based on concern that too high a proportion of pneumonia cases have intercostal indrawing, and as a result would be classified as having severe pneumonia and would be referred, as was found in a study in the Gambia. In a community-based study in Basse, the Gambia[8], a cohort of 500 children age 0-4 years were followed up through weekly home visits for one year. All children with signs of lower respiratory infection (fast breathing, any chest indrawing, nasal flaring, wheeze, stridor, or danger sign) were referred to the clinic. During the study 222 episodes were classified by the clinic as lower respiratory infection (pneumonia, or wheeze, or stridor). Chest indrawing was present in 62% of these cases, an annual incidence of 29% of children under 5 years of age; many of these children had intercostal indrawing only. If all children with any chest indrawing were to be hospitalized, there would not be sufficient paediatric inpatient facilities to cope with the number referred. In addition, in this study, chest indrawing used in the broadest sense did not reliably identify children with lobar consolidation.

These findings led to studies in the Philippines and Swaziland which found that lower chest wall indrawing, defined as inward movement of the bony structures of the lower chest wall during inspiration, was more specific than intercostal indrawing for a paediatrician□s diagnosis of severe pneumonia requiring admission.[6] Further analysis of a study in Vellore, India showed that lower chest wall indrawing was 89% sensitive, was 89% specific, and had a positive predictive value of 79% compared to a paediatrician□s decision to admit a child with an acute lower respiratory infection. Of the children with lower chest wall indrawing, 92% also had definite intercostal indrawing; requiring both signs did not change the sensitivity and caused a small decrease in specificity and positive predictive value.[19]

Variations in the clinical definition of severe chest indrawing in young infants or of definite chest indrawing in older infants and young children can have substantial impact on the performance of the algorithm. In a Bangladesh study, 44% of young infants were considered by the paediatricians to have severe chest indrawing; 28% of sick children age 2 months up to 5 years were considered to have definite chest indrawing.[20] In contrast, in a study on the clinical signs of serious bacterial infection in young infants less than 3 months old in the Gambia, Papua New Guinea, the Philippines, and Ethiopia 11% were judged to have definite and 2% severe chest indrawing.[21] In the Gondar, Ethiopia pretest,

paediatricians observed definite chest indrawing in 4% of sick children age 2 months up to 5 years.[13] In an earlier study in Swaziland, 11% of children presenting to the outpatient department had definite lower chest wall indrawing.[19] All of these studies were conducted in the outpatient department of large hospitals, with the exception of the Ethiopia study. The differences could be due either to different clinical definitions or to different rates of severe pneumonia.[13]

In several studies of the performance of the IMCI guidelines, health workers missed chest indrawing in some children.[12,13,22] Other children referred by health workers based on chest indrawing were considered by the expert paediatrician to be well enough to be managed at home. These findings highlight several problems with chest indrawing as an indicator of severe pneumonia.

Chest indrawing is one of the more difficult clinical signs to teach, requiring repeated practice in an inpatient setting in identifying the presence and absence of the sign. Substantial efforts have gone into providing a standardized description of the sign in the training materials, supported by clinical practice and video case presentations. These emphasize the importance of only considering chest indrawing to be present if it is *consistently* present in a calm child, since agitation, a blocked nose, or breastfeeding can all cause temporary chest indrawing.

Chest indrawing will always refer more children than would be admitted by a paediatric expert, because the sign is also present in children with bronchiolitis and asthma. In settings where asthma is common and drugs are available to manage it, course adaptation to include the management of wheezing might reduce referrals due to asthma. The chart would be modified to suggest that children with chest indrawing plus wheezing not be referred if the indrawing improves after treatment. Use of bronchodilators, however, would be unlikely to change the physical signs in a child with bronchiolitis.

It may be advisable in settings where referral is difficult to only refer children with chest indrawing if they also have clear respiratory distress or another sign of severity. Some children with severe pneumonia with chest indrawing can be successfully treated with oral amoxycillin if compliance can be assured. A study in Pakistan[23] successfully treated children with severe pneumonia (on the basis of chest indrawing but without danger signs, malnutrition, or anaemia) with oral amoxycillin as inpatients at first-level facilities. However, indications for referral of children with severe pneumonia, and the ability to treat certain children with severe illness at first-level health facilities, remain important research questions.

2.3 Referral of children with stridor when calm

Stridor with a substantial risk of obstruction can only be reliably assessed when the child is calm. Some children with mild croup will have stridor only when crying or agitated; this should not be the basis for referral.

2.4 Antibiotic treatment for pneumonia

2.4.1 Antibiotic options for oral treatment of pneumonia

Three formulations of cotrimoxazole (trimethoprim-sulfamethoxazole) are presented: adult tablets, paediatric tablets, and syrup. Two formulations of amoxycillin are presented: 250 mg tablet and syrup. Amoxycillin is much preferred to ampicillin, which has erratic absorption and is more expensive than amoxycillin. If the child is not able to drink, intramuscular chloramphenicol is injected prior to referral.

The choice of antibiotic is based on the well-established finding that most childhood pneumonia of bacterial origin is due to *Streptococcus pneumoniae* or *Haemophilus influenzae*.[24] Amoxycillin, ampicillin, cotrimoxazole, injectable penicillin G (but not penicillin V which is poor against *H. influenzae*), and chloramphenicol are usually effective treatments for these two bacteria. A single injection of benzathine penicillin, although long lasting, does not provide adequate levels of penicillin to treat *H. influenzae* and is likely to encourage the selection of resistant strains. Tetracycline is *not* adequate treatment.[25]

Cost per five days treatment (US dollars) of the regimens currently recommended for outpatient treatment of pneumonia
(Cotrimoxazole 4 mg/kg bid and Amoxycillin 15 mg/kg tid)[a]

REGIMEN	<2 months or <5 kg	2-12 months or 5-9 kg	12-59 months or 10-19 kg
Cotrimoxazole Tablet 20 mg	$ 0.054	$ 0.10	$ 0.20
Amoxycillin Tablets 250 mg	$ 0.10	$ 0.18	$ 0.37
Syrup 25 mg/ml	$ 0.32	$ 0.56	$ 1.15

[a] The costs have been calculated using the median weight for each group (4 kg, 7 kg and 14.5 kg), and the prices from the UNICEF Supply Division, Essential drugs - Price list, Copenhagen, January-June 1994, as follows: Amoxycillin: tablets 250 mg, pack 1000 = $27.96, oral susp 25 mg/ml, bottle 60 ml = $0.53; Cotrimoxazole: tablets 20 mg, pack 100 = $0.67

Most countries have chosen cotrimoxazole because of its low cost and twice daily dosage schedule.

2.4.2 Adverse reactions to cotrimoxazole

Severe and sometimes fatal adverse reactions to cotrimoxazole have been reported, particularly in people with AIDS who receive high doses for pneumocystis pneumonia. However, the available evidence suggests that the risk of serious side effects is very low, particularly when the drug is used in children (without HIV) and for short periods of time, such as those recommended for treating childhood pneumonia. Minor haematological disturbances related to the anti-folate properties of cotrimoxazole are of no clinical significance for children taking the drug for a few days.

The serious side effects of cotrimoxazole are mostly due to the toxicity of sulphamethoxazole. They include a variety of severe cutaneous reactions such as Stevens-Johnson syndrome, toxic epidermal necrolysis and exfoliative dermatitis, sensitivity reactions, bone-marrow suppression, and hepatitis.

In 1988, a group which reviewed the emergence of resistance and the safety of cotrimoxazole[26] concluded that the incidence of serious adverse reactions is small. The frequency of deaths associated with the drug in the United Kingdom between 1972 and 1984 was 1.42 per million prescriptions, and rates of adverse reactions and deaths reported in Australia between 1972 and 1986 were 70.2 and 0.96 per million packs sold, respectively. The evidence from these and other countries shows that the frequency of severe reactions is higher in older patients and lower in children. On the other hand, the data suggest that serious adverse reactions to cotrimoxazole are more frequent than with other commonly-used antimicrobial agents. For example, the rates of adverse

reactions and death associated with amoxycillin between 1972 and 1986 in Australia were 34.0 and 0.34 per million packs sold, respectively.

National adverse drug reaction registers in Sweden and the United Kingdom provide data on the type, severity, and frequency of reported adverse reactions to 10 sulfa drugs, including cotrimoxazole, observed during the 1970s and the 1980s.[27] There were 142 fatalities and 5,624 reactions reported, attributed to cotrimoxazole, the drug most commonly used. Of these reactions, 50% were skin lesions, 12% were blood dyscrasias, 7.7% involved the gastrointestinal tract, and 5.4% the liver. A total of 2,171 reactions (38.6%) to the drug were qualified as severe (defined as debilitating or life-threatening), with 9.6% of skin disorders, 48.5% of gastrointestinal disorders, and 71.3% of hepatic disorders considered severe. The availability of total sales figures during the same period in Sweden allowed adverse reaction rates to be estimated as 63 per 100,000 users for any reaction (including non-serious effects), 33 per 100,000 users for serious disorders, and 1.4 deaths per 100,000 users. Only 7% of doses were sold as syrup, and only 4% of reports of adverse reaction were in the age group 0-9 years. Given that the risk of adverse reactions increases with the length of therapy, it is important to highlight that the mean duration of use of cotrimoxazole in this study was 2 weeks. Finally, several other commonly used sulpha drugs were found to have higher frequencies of reactions than cotrimoxazole. For example, the combination of sulfadoxine and pyrimethamine (Fansidar□) had rates of 90 per 100,000 users for any reaction, 78 per 100,000 users for serious disorders, and 2.8 deaths per 100,000 users.

Reports from Japan and the United Kingdom have also highlighted that cotrimoxazole is much safer in children than in adults, and that serious forms of adverse reactions are very rare among children.[28] The Boston Collaborative Drug Surveillance Programme, which monitored adverse reactions in children in detail, was unable to show any serious reactions that required admission to hospital.[29] Most frequent but less serious side-effects are nausea, vomiting and diarrhoea, minor dermal reactions, and mild laboratory test abnormalities found in 1-3% of children in developed countries.

It appears that the frequency of these minor effects is much lower in children in developing countries who are treated with standard doses for acute bacterial infections. However, on the basis of available evidence about adverse reactions, *cotrimoxazole should not be given to neonates who are premature or jaundiced.* If alternative treatment is available, it is best to refer infants aged less than 2 months with suspected pneumonia for inpatient treatment with penicillin and gentamicin.

2.4.3 Antimicrobial resistance

Of more concern is the issue of antimicrobial resistance amongst *Streptococcus pneumoniae* and *Haemophilus influenzae*.[30] In some settings over 50% of these respiratory isolates are resistant to cotrimoxazole, while penicillin resistance amongst pneumococci is a growing problem worldwide. In cases of pneumonia, unlike meningitis, *in vitro* resistance of the pathogen to the antibiotic used does not always translate into treatment failure.[31]

Case reports from Spain and South Africa suggest that pneumonia due to penicillin resistant pneumococci can be successfully treated with penicillin, presumably in high enough doses to achieve serum levels greater than the minimum inhibitory concentration (MIC), but whether this will hold as resistance becomes more complete is unknown. The situation with cotrimoxazole is less clear. A recent study from Pakistan[23], found that the MIC to cotrimoxazole does not predict failure in children treated with the drug, suggesting that *in vitro* resistance is not clinically relevant. The same study found that, in a setting of high cotrimoxazole resistance, amoxycillin was superior to cotrimoxazole for the treatment of pneumonia, although this difference was only seen in the 50% of children with severe pneumonia. It is difficult to determine the clinical and programmatic implications for antibiotic choice of laboratory evidence of resistance to cotrimoxazole. Further research is being pursued to clarify this.

WHO technical documents provide guidance to help assess the relevant factors in selecting first- and second-line antibiotics[1] and provide information for a comparison of the four recommended antibiotics in terms of efficacy, toxicity, and activity.[25]

ESSENTIAL ADAPTATION: **Choose a first-line and second-line oral antibiotic for pneumonia.**

All health facilities should be supplied with a standard antibiotic for the case management of pneumonia. The generic dosing chart includes cotrimoxazole and amoxycillin. Both antibiotics are available in powder for oral suspension or syrup form, although these are more expensive than tablets.

Procaine penicillin is still used in some countries, but is not on the generic chart because of concerns about transmission of HIV and hepatitis B, if the supply of disposable needles or sterilization is not adequate.

Also, procaine penicillin requires daily clinic visits. The difficulty of use for the mother is an important consideration since having to return

to the clinic will affect the likelihood of compliance with the recommended treatment.

If a first-line antibiotic other than cotrimoxazole is chosen, see Section *E, 6.1 Oral antibiotic for pneumonia and ear infection: Substitute a first-line oral antibiotic other than cotrimoxazole.* If an additional second-line antibiotic is added, see Section *E, 6.2 Oral antibiotic for pneumonia and ear infection: Add an additional second-line antibiotic.*

2.5 Pre-referral intramuscular antibiotic

The generic guidelines recommend that the first dose of intramuscular (IM) chloramphenicol (half the daily dose) be given before urgent referral.

The adequacy of intramuscular administration of chloramphenicol is often questioned. Although early studies of chloramphenicol pharmacokinetics suggested adult blood levels produced after IM administration were significantly less than those produced by IV administration,[32] the intramuscular form gained wide acceptance and clinical reports have confirmed its efficacy.[25] The few studies showing poor blood levels following intramuscular administration were all done in adult patients.[33,34] The only two studies of intramuscular chloramphenicol succinate in children[35,36] both found adequate levels, using 100 mg/kg/day in 2 or 4 times daily dosage regimens. There is no evidence that IM chloramphenicol succinate is more likely to produce side effects than when chloramphenicol is given in other ways. Local complications of intramuscular chloramphenicol succinate are extremely rare, unlike the older intramuscular preparations. Although concerns are commonly expressed about aplastic anaemia following chloramphenicol, this complication is rare in young children.

***POSSIBLE ADAPTATION*: Substitute an alternative pre-referral IM antibiotic.**

Options for an intramuscular antibiotic for pre-referral use include benzylpenicillin and ceftriaxone.[37] Because of the risk of inadequate treatment of meningitis, which is likely to be fatal, Benzylpenicillin alone is not sufficient treatment if referral is distant or not possible, or if the pneumococcus is partially penicillin resistant.

2.6 Wheezing

The generic guidelines do not include the outpatient management of wheezing for several reasons. The prevalence of asthma varies considerably between and within countries.[38] Although reliable data from developing countries are extremely difficult to find, some generalizations are possible. In many countries, asthma is more of a problem in humid

coastal areas than drier inland areas. City dwellers are more likely to get asthma than those in rural areas. Increasing urbanization, particularly in Asia, appears to be associated with an increase in the prevalence of asthma. Thus the upward trend in levels of asthma, which is well described in industrialized countries, is also affecting developing countries. However, even where asthma rates are high, mortality from asthma is relatively uncommon.

ARI training materials for first-level facility health workers include the management of wheezing with oral salbutamol and a rapid-acting bronchodilator, as well as the option of deleting it (presented in the *Policy* module of the ARI Programme Manager's Course).[39] The IMCI training course, however, does not include the management of wheezing. The reasons for this are to simplify training, to concentrate on the conditions contributing substantially to mortality, and because experience to date with ARI implementation suggests that wheezing management has not played an important role in reducing mortality.

In settings where asthma is common, the management of wheezing at first-level health facilities can potentially reduce unnecessary referral of children with recurrent episodes of wheezing, by treating acute episodes with rapid-acting bronchodilators followed by further administration of a bronchodilator (oral or inhaled) at home. It is unlikely, however, that provision of rapid-acting bronchodilators would reduce the need for referral of infants wheezing from bronchiolitis, given the very mixed evidence of efficacy of inhaled bronchodilators in this age group.

Whether first-level facility workers will routinely manage wheezing is an important decision. This has major implications for clinical guidelines, training of health workers, and the supply of drugs and equipment to facilities. The decision to add the management of wheezing should be influenced by the answers to the following questions:

- How common is wheezing in young children?
- What is the previous medical training of first-level facility health workers?
- What is currently done at health facilities for wheezing?
- How available are the appropriate drugs and equipment to manage a wheezing child?

To justify adapting the course to include wheezing management, several factors should be seriously considered:

- For wheezing guidelines to be effective, it is necessary for clinics and other first-level outpatient facilities to maintain a supply of rapid-acting bronchodilators for use in the clinic and a bronchodilator that can be administered at home. Increasing evidence and clinical experience support the use of metered-dose inhalors with spacer devices as the most effective and safe method of rapid bronchodilation, and by this method salbutamol can be administered to young children. Salbutamol metered-dose inhalers containing 200 doses, 0.1mg per dose, are on the UNICEF Essential Drugs Price List

(the cost is US$ 1.50 each[a]). Although commercially produced spacer devices are expensive, limited experience in developing countries suggests that plastic intravenous infusion bottles or other plastic containers can be converted into effective spacer devices.

- Given that asthma is a chronic problem that is also common in school-age children and adults, a strategy for its clinical management with metered-dose inhalers needs to be broader than introduction through the IMCI training course for first-level facility health workers. It is possible (even likely) in many settings that the provision of a limited number of metered dose inhalers would result in predominantly adult use.

- There is concern about the safety of promoting broad outpatient use of epinephrine, particularly when supplied in multidose vials (permitting substantial overdose).

- There is also growing concern that children with asthma are better treated with both a bronchodilator and inhaled steroids. This would entail further expense and in many settings would argue for these children to be handled through referral to a hospital.

[a] July-December 1995 catalogue.

Wheezing[39]

Policy options	Advantages	Disadvantages
1. Train and supply health workers at first level facilities to manage wheezing.	Reduces referral of children who can be adequately managed at home on bronchodilator therapy. Improves the health workers' credibility in managing difficult breathing. Relieves suffering in child with significant wheezing.	Managing wheezing children requires somewhat more complex training and special supplies. Wheezing management will not substantially reduce mortality.
2. Do not train health workers to manage wheezing. Children with respiratory distress from wheezing are referred on the basis of chest indrawing.	Training is less complex. Special supplies are not needed. Training does not detract from emphasis on pneumonia.	Needless referral of some children. Confusion of pneumonia and wheezing disorders.

In some settings, however, wheezing is a common problem and it is already common practice to manage childhood wheezing with both oral and rapid-acting bronchodilators. Work is under way to develop more specific guidelines for the management of wheeze. Interested countries should request the latest information from WHO.

2.7 Recommendation of a soothing remedy and caution against harmful remedies for cough

There is no evidence that commercial cough and cold remedies which are safe are any more effective than simple home remedies in relieving a cough or soothing a sore throat. Suppression of a cough is not desirable because cough is a physiological reflex to eliminate lower respiratory tract secretion. Breastmilk alone is a good soothing remedy and no additional remedy should be given to an exclusively breastfed child who has cough or sore throat.

ESSENTIAL ADAPTATION: **Choose a safe remedy to soothe the throat and relieve the cough, and identify harmful remedies to discourage.**

The blanks left in the generic TREATMENT box for Soothe the Throat, Relieve the Cough with a Safe Remedy need to be completed with at least one name of a locally available, safe remedy. The following table lists some considerations in deciding whether to recommend a safe home remedy or give a safe remedy to mothers who come to the facility with a child with cough. Known harmful remedies to discourage, including those to suppress the cough, should also be added to the generic box.

Remedies to recommend or provide[39]

Policy options	Advantages	Disadvantages
1. Recommend a safe remedy mothers mix at home.	Encourages self-reliance of mother Is inexpensive Discourages clinic visits for cold, cough alone Is helpful, soothing	Most mothers who bring a child to clinic with ARI will leave empty handed and may be discouraged from using clinic. Mothers may mix a remedy that is not safe. Remedy may not be valued. This requires training health workers to teach mothers the task they often do poorly.
2. Give mothers a safe remedy which is prepared or mixed at the health centre or purchased commercially by the Ministry of Health.	Mothers are pleased to get something from health centre. Safety is assured. It is inexpensive Remedy is helpful, soothing	If prepared at the health centre, this requires ingredients, bottles, and time to mix it. This promotes dependency on the health centre.

2.8 Referral of chronic cough

Most children classified with cough or cold get better in about 2 weeks. Some children may continue to cough for a longer time. If a child has had a cough for more than 30 days, he or she is classified as having chronic cough and referred to a hospital for assessment. These children may have tuberculosis, asthma, pertussis or another problem. In children with pertussis, cough will usually wane gradually over a period of 6-10 weeks. Tuberculosis is a serious condition, however, which if not treated may lead to death. A child with possible tuberculosis will be referred for assessment and treatment according to national tuberculosis guidelines[40] either because there is cough for more than 30 days, or there is fever daily for 7 days or more.

Children who have had cough for less than 30 days should not be referred. This would lead to referral of large numbers of children, most of whom may have asthma. A well child with a history of chronic cough at night probably has asthma, even if there is no wheeze.

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3. DIARRHOEA

Generic guidelines

The IMCI guidelines for managing diarrhoea have already proved through CDD programmes to be both practical and effective in the global effort to reduce mortality and serious morbidity from diarrhoea in young children.

Health workers are taught how to manage acute watery diarrhoea (including cholera), dysentery (bloody diarrhoea), and persistent diarrhoea (diarrhoea that lasts 14 days or more). The assessment and classification of dehydration[1] has been simplified, drawing on years of clinical experience with the CDD case management chart. This is now based on the child's general condition, how fast the skin pinch returns, the presence or absence of sunken eyes, and how the child drinks. Rehydration therapy is provided to treat clinically apparent dehydration, classified as SOME DEHYDRATION or SEVERE DEHYDRATION (Plans B and C), or to prevent its developing when there is NO DEHYDRATION (Plan A).

DYSENTERY is recognized based on maternal report of blood in the stool; the health worker does not examine the stool or perform laboratory tests. A child with dysentery is treated with an oral antibiotic effective for *Shigella* and is seen in follow-up after 2 days. Antibiotics are also recommended for children older than 2 years with severe dehydration due to suspected cholera.

Nutritional management is provided for PERSISTENT DIARRHOEA, as well as treatment of extra-intestinal infections which may be contributing to the persistent diarrhoea. The mother is advised to increase the frequency and duration of breastfeeding. Animal milk should be replaced with: increased breastfeeding; fermented milk products such as yoghurt; or half the milk is replaced with nutrient-rich semisolid (complementary) foods. If the diarrhoea does not stop on this diet after 5 days, the child is referred to hospital. Children who present with persistent diarrhoea and dehydration (SEVERE PERSISTENT DIARRHOEA) are referred to hospital after rehydration unless another severe classification is present. If another severe classification is present, the child is referred urgently to hospital with the mother giving frequent sips of ORS on the way.

Health workers are advised against the use of anti-diarrhoeal drugs in any child with diarrhoea.

3.1 Dehydration

3.1.1 Assessment and classification of dehydration[1]

Children with SEVERE DEHYDRATION have a fluid deficit equalling more than 10% of their body weight. They are usually lethargic, in a stupor, or even comatose. The eyes are deeply sunken and without tears; the mouth and tongue are very dry; and breathing is rapid and deep. Those who are awake are very thirsty; however, when there is stupor, the child may drink poorly. A skin pinch retracts very slowly (more than 2 seconds). The femoral pulse is very rapid and the radial pulse is either very rapid and feeble or undetectable. The fontanelle in infants is very sunken. The child may have passed no urine for six hours, or longer. When there is hypovolemic shock, the systolic blood pressure taken in the arm is low or undetectable, the arms and legs are cool and moist, and the nail beds may be cyanosed. Although there are many clinical signs, however, almost all children with SEVERE DEHYDRATION will be correctly classified by simply requiring that two of the following signs be present: lethargic or unconscious; sunken eyes; not able to drink or drinking poorly; or skin pinch goes back very slowly.

Patients with SOME DEHYDRATION have a fluid deficit equalling 5-10% of their body weight. This category includes both "mild" and "moderate" dehydration, which are descriptive terms used in many textbooks:

- "Mild" dehydration (5-6% loss of body weight) is manifested mostly by increased thirst and restlessness. Other signs associated with dehydration are not usually present.

- "Moderate" dehydration (7-10% loss of body weight) causes children to be restless, "fussy," or irritable. The eyes are somewhat sunken and the mouth and tongue are dry. There is increased thirst: older patients ask for water and young children drink eagerly when offered fluid from a cup or spoon. A skin pinch flattens slowly. The radial pulse is detectable, but rapid, and the fontanelle in infants is somewhat sunken. Almost all children with SOME DEHYDRATION will be correctly classified by simply requiring that two of the following signs be present: restless, irritable; sunken eyes; drinks eagerly, thirsty; or skin pinch goes back slowly. These are the signs used in the IMCI guidelines.

If neither SEVERE DEHYDRATION nor SOME DEHYDRATION is present, health workers are taught to conclude that the patient has no visible signs of dehydration, which is therefore classified as NO DEHYDRATION.

Patients with diarrhoea but no signs of dehydration usually have a fluid deficit, but it equals less than 5% of their body weight. Although they lack distinct

signs of dehydration, they should be given more fluid than usual to prevent dehydration from developing.

One sign, which is present in the assessment of the older child, has not been included as part of the assessment of dehydration in the young infant chart: "drinks poorly, or not able to drink." This is difficult to assess in a young infant who should be exclusively breastfeeding. "Drinks poorly, or not able to drink" appears as one of the classifications (NOT ABLE TO FEED - POSSIBLE SERIOUS BACTERIAL INFECTION) for urgent referral to hospital, given the importance of this sign alone in a young infant.

See Section 3.6 for an explanation of changes in the sick child guidelines compared to earlier CDD case management charts and training materials.

3.1.2 Home therapy for diarrhoea (Plan A)

The critical actions for home therapy of diarrhoea (NO DEHYDRATION) are to give the child more fluids than usual and to continue feeding. Fluids should be given as soon as diarrhoea starts and the child should take as much as he or she wants. Some fluids and foods are especially effective, and thus should be promoted; a few should be avoided. Correct home therapy can prevent dehydration in many cases.

The main points to remember are that a home fluid should be:

- *Safe when given in large volumes.* Very sweet tea, soft drinks, and sweetened fruit drinks should be avoided. These are often hyperosmolar owing to their high sugar content (above 300 m Osm/l). They can cause osmotic diarrhoea, worsening dehydration and hypernatraemia. Also to be avoided are fluids with purgative action and stimulants (such as coffee).

- *Easy to prepare.* The recipe should be familiar and its preparation should not require much work or time. The required ingredients and measuring utensils should be readily available and inexpensive.

- *Acceptable.* The fluid should be one that the mother is willing to give in sufficient quantity to a child with diarrhoea, and that the child will readily accept.

- *Effective.* Fluids that are safe are also effective. However, some are more effective than others, depending on their composition. Most effective are fluids that contain carbohydrate, protein, and some salt. However, nearly the same benefit may be obtained when water and other salt-free fluids are given freely along with weaning foods that contain salt.

***ESSENTIAL ADAPTATION:* Choose fluids for home therapy for diarrhoea.**

One of the decisions required for the adaptation of the training materials is what fluids and foods to recommend in a country or region for home therapy for diarrhoea. It is likely that the national CDD programme has already selected several fluids and foods by carefully considering technical questions including safety, efficacy, and other issues such as ease of fluid preparation and use by mothers. However, this decision could be made or re-examined at any stage by using the methodology described in the document entitled *The selection of fluids and food for the home management of dehydration due to diarrhoea*.[2]

3.2 Dysentery[3,4,5]

3.2.1 Assessment and classification of dysentery

DYSENTERY is defined as diarrhoea with visible blood in the stools. Clinical texts often use the term dysentery to describe the syndrome of bloody diarrhoea with fever, abdominal cramps, rectal pain, and mucoid stools. These features, however, do not always accompany bloody diarrhoea, nor do they necessarily suggest its etiology or determine appropriate treatment. Bloody diarrhoea in young children is usually a sign of invasive enteric infection that carries a substantial risk of serious morbidity and death.

About 10% of all diarrhoeal episodes in children under 5 years are dysenteric, but these episodes cause up to 15% of all diarrhoeal deaths. Dysentery is especially severe in infants and in children who are undernourished, those who develop clinically evident dehydration during their illness, or those who are not breastfed. It also has a more harmful effect on nutritional status than acute watery diarrhoea. Dysentery occurs with increased frequency and severity in children who have measles or have had measles in the preceding month. Diarrhoeal episodes that begin as dysentery are more likely to become persistent than those that start with watery stools.

The most important and most frequent cause of acute dysentery is *Shigella*, especially *S. flexneri* and *S. dysenteriae* type 1. It is estimated that *Shigella* cause 50% of all episodes of bloody diarrhoea in young children, and a much higher proportion of episodes that are clinically severe. Other causes include *Campylobacter jejuni*, especially in infants, and, less frequently, *Salmonella*; dysentery caused by these latter agents is usually not severe. Enteroinvasive *Escherichia coli* are closely related to *Shigella* and may cause severe dysentery. Infection with this agent, however, is uncommon. *Entamoeba histolytica* cause dysentery in older children and adults, but rarely in children under 5 years of age.

A number of severe and potentially fatal complications can occur during dysentery, especially when the cause is *Shigella*. They include: intestinal perforation, toxic megacolon, rectal prolapse, convulsions (with or without a high fever), septicemia, haemolytic-uraemic syndrome, and prolonged hyponatraemia. A major complication of dysentery is weight loss and rapid worsening of nutritional status. This is caused by anorexia, which may be marked, the body's increased need for nutrients to fight infection and repair damaged tissue, and the loss of serum protein from the damaged intestine (protein-losing enteropathy). Death from dysentery is usually caused by extensive damage to the ileum and colon, complications of sepsis, secondary infection (for example, pneumonia), or severe undernutrition. Children convalescing from dysentery are also at increased risk of death from other infections, owing perhaps to their poor nutritional state or impaired immunity.

The clinical diagnosis of dysentery is based *solely* on the presence of visible blood in the diarrhoeal stool, as reported by the mother. The cause of an episode of dysentery usually goes undetermined; it is not possible to determine the etiology of bloody diarrhoea based only on clinical features of the illness. Stool culture, to detect pathogenic bacteria, is not feasible in most settings. Moreover, at least 2 days are required before results of a culture are available, whereas a decision on antimicrobial therapy must be made immediately. Stool microscopy to detect protozoa may also be unavailable or unreliable. Amoebiasis can only be diagnosed with certainty when trophozoites of *E. histolytica* containing red blood cells are seen in fresh stools. The detection of cysts alone is *not* sufficient for a diagnosis of amoebiasis.

3.2.2 Treatment of dysentery

Technical basis

The four key components of the treatment of dysentery are:

- Antibiotics
- Fluids
- Feeding
- Follow-up

Early treatment of shigellosis with an appropriate antibiotic shortens the duration of the illness and reduces the risk of serious complications and death. However, such treatment is effective only when the *Shigella* are sensitive to the antibiotic that is given. If treatment is delayed or an antibiotic is given to which the *Shigella* are not sensitive, the bacteria may cause extensive damage to the bowel and enter the general circulation causing septicaemia, prostration, and sometimes septic shock. These complications occur more frequently in

children who are undernourished and in infants, and may be fatal.

As the antibiotic sensitivity of the infecting strain of *Shigella* is not known for each case, it is important to use an oral antibiotic to which most *Shigella* in the area are known to be sensitive. Resistance to ampicillin and cotrimoxazole, formerly the drugs of choice, is now widespread, particularly among *S. dysenteriae* type 1, but also in many areas among *S. flexneri*. Nalidixic acid, formerly used as a backup drug to treat resistant shigellosis, is now the drug of choice in many areas, but resistance to this drug is also appearing. Although treatment is recommended for 5 days, there should be a *substantial* improvement after 2 days of treatment with the first-line antibiotic (less fever, less pain, less faecal blood, and fewer loose motions). If this improvement does not occur, the antibiotic should be stopped and a different one used (the second-line antibiotic).

In summary, all children with bloody diarrhoea should be treated promptly with an antimicrobial effective against *Shigella* because:

- Bloody diarrhoea in this age group is caused much more frequently by *Shigella* than by any other pathogen.

- Shigellosis is more likely than other causes of diarrhoea to result in complications and death if effective antimicrobial therapy is not begun promptly.

- Early treatment of shigellosis with an *effective* antibiotic substantially reduces the risk of severe morbidity or death.

  ESSENTIAL ADAPTATION: **Choose a first-line and second-line oral antibiotic for home treatment of dysentery.**

  The first-line and second-line oral antibiotic for home treatment of dysentery need to be identified and inserted in the blanks in the dosing box "Give an appropriate oral antibiotic." The table on the next page gives the current options for antimicrobial therapy of shigellosis. Selection of an antibiotic should be based on sensitivity patterns of strains of *Shigella* isolated in the area. If you need to add additional antibiotic, see *Section G, 6.3 Oral antibiotic for Shigella: add a second-line antibiotic which is not currently on the chart (example shown is ciprofloxacin).*

  Antibiotics should be selected:

  - To which most strains are susceptible.
  - That are effective when given by mouth.

- That are affordable.
- That are readily available, or can be rapidly obtained.

Antimicrobials that are *not* effective for shigellosis are:

• Metronidazole • Streptomycin • Tetracyclines • Chloramphenicol • Sulfonamides • Nitrofurans (nitrofurantoin, furazolidone) • Aminoglycosides (gentamicin, kanamycin) • First and second generation cephalosporins (cephalexin) • Amoxycillin	*Shigella* are usually resistant to these antimicrobials *in vitro.* These should not be used. *Shigella* are usually sensitive to these antimicrobials in vitro but they are clinically ineffective because they penetrate poorly the intestinal mucosa where invasive *Shigella* must be killed. These should not be used.

Current options for antimicrobial therapy of Shigellosis in developing countries [a]

Drug	Cost [b]	Availability	Resistant Organisms
Ampicillin	Inexpensive	Wide	Most *S. dysenteriae* type 1; many other *Shigella* species
Trimethoprim-Sulfamethoxazole (TMP-SMX, also called cotrimoxazole)	Inexpensive	Wide	Many *S. dysenteriae* type 1; variable among other *Shigella* species
Nalidixic acid	Inexpensive	Variable	Increasing among *S. dysenteriae* type 1; uncommon among other *Shigella* species
Pivmecillinam	Expensive	Limited	Rare among all *Shigella* species
Ciprofloxacin [c,d]	Inexpensive	Variable	Rare among all *Shigella* species
Other quinolones [c,e]	Expensive	Variable	Rare among all *Shigella* species
Ceftriaxone	Expensive	Limited	Rare among all *Shigella* species

a Adapted from Salam & Bennish.[6]

b In Bangladesh, for example, the retail cost of a 5 day course of therapy for a 10 kg child is as follows: Ampicillin suspension,US$1.00; TMP-SMX suspension, $0.56; nalidixic acid tablets, $0.75, and pivmecillinam capsules, $5.63, and ciprofloxacin tablets, $0.95.

c The newer quinolones are not yet approved for use in children because they cause arthropathy when given to certain species of immature mammals.

d Ciprofloxacin has also been shown to be effective in a single dose, although less so for *S. dysenteriae* type 1 than other *Shigella.*

e Controlled trials conducted in adults have found that enoxacin and norfloxacin are effective for treatment of shigellosis.

RECOMMENDED ADAPTATION: **Refer *all* young infants (age less than 2 months) with blood in stool.**

Refer *all* young infants with blood in stool because:

- Dysentery is uncommon in young infants and blood in the stool is more likely to be the sign of a problem needing surgery.
- In this age group, treatment of shigellosis may require daily injection of ceftriaxone. Nalidixic acid and ciprofloxacin should not be used in infants below 2 months of age.

For these reasons, WHO strongly recommends that these young infants be referred for hospital assessment and treatment. This change represents an update to the generic guidelines.

To make the necessary changes, see Section *G, 2.0 Add referring to hospital young infants with blood in the stool.* This section shows the specific changes to make in the chart, recording form, and modules.

3.2.3 Management of dysentery after the first treatment failure

As noted above, although treatment with the first-line antibiotic is recommended for 5 days, there should be a *substantial* improvement after 2 days of treatment (less fever, less pain, less faecal blood, and fewer loose stools). If this does not occur, the antibiotic should be stopped and a different one used (the second-line antibiotic).

3.2.4 Management of dysentery after the second treatment failure

Amoebiasis can only be diagnosed with certainty when trophozoites of *E. histolytica* containing red blood cells are seen in a fresh stool sample. Young children with dysentery should *not* be treated routinely for amoebiasis. Treatment should only be given when *E. histolytica* trophozoites containing red blood cells are identified in faeces *or* when bloody stools persist after consecutive treatment with two antibiotics that are usually effective for *Shigella*.

If there is no improvement after 2 days of treatment with the second-line antibiotic, it should be stopped. The patient may be either referred to hospital for further evaluation or, if this is not possible, treated for possible amoebiasis. The preferred treatment for amoebic dysentery is metronidazole. If dysentery is caused by *E. histolytica* an improvement will occur within 2-3 days of starting treatment.

OTHER CONSIDERATIONS: **Use microscopic examination to identify appropriate treatment after the second treatment failure.**

In rare instances, microscopic examination of the stool may be *readily available* and *reliably performed.* Where these standards can be met, it may be useful to use microscopic examination, particularly after the second treatment failure. If trophozoites of *E. histolytica* containing erythrocytes are seen, anti-amoebic therapy should be given. These standards of availability and reliability, however, are seldom met in first level facilities and this adaptation should, therefore, not be encouraged.

3.2.5 Follow-up recommendations for dysentery

The generic guidelines recommend that all sick children with dysentery return in 2 days for follow-up. This was done to simplify the guidelines and to avoid requiring the health worker to decide whether the child is at high risk when recommending referral.

POSSIBLE ADAPTATION: **Concentrate follow-up efforts on high risk children.**

While follow-up in 2 days may be feasible when few dysentery cases are occurring, follow-up in 2 days is not essential for children who are treated with an antibiotic expected to be effective and who are not at high risk. The *Facilitator Guide for Modules* indicates that if there are many cases of dysentery and/or if follow-up is difficult, follow-up should be focused on those at highest risk:

- Infants aged less than 12 months.
- Those dehydrated at the initial visit.
- Those with measles within the last 3 months.

3.3 Treatment of cholera

Antibiotic treatment is recommended for children with suspected cholera.[7] This is because an effective antibiotic can reduce the volume of diarrhoea in patients with severe cholera and shorten the period during which *Vibrio cholerae* is excreted. In addition, it will usually stop the diarrhoea within 48 hours, thus reducing the period of hospitalization.

ESSENTIAL ADAPTATION: **Choose a first-line and second-line antibiotic for cholera.**

Selection of an antibiotic should be based on the sensitivity pattern of strains of *V. cholerae* O1 isolated in the area. The first-line and second-line antibiotic for cholera should be inserted in the blanks in the dosing box "Give an appropriate oral antibiotic." Note that furazolidone is no longer considered effective to treat cholera, and therefore has been removed from the list of second-line microbials.[8,9,10]

Antimicrobials used to treat cholera

	ADULTS	CHILDREN
Antimicrobials of choice		
Doxycycline or Tetracycline or Trimethoprime (TMP) Sulfamethoxazole (SMX)	300 mg once 500 mg 4 times a day x 3 days TMP 160mg + SMX 800mg twice a day x 3 days	 12.5mg/kg 4 times a day x 3 days TMP 5mg/kg + SMX 25mg/kg twice a day x 3 days
Second-line antimicrobials		
Erythromycin	250 mg 4 times a day x 3 days	12.5mg/kg 4 times a day x 3 days

3.4 Persistent diarrhoea

Treatment of PERSISTENT DIARRHOEA consists of giving:

- Appropriate fluids to prevent or treat dehydration.
- Antimicrobial(s) to treat diagnosed infections, especially non-intestinal infections.
- A nutritious diet that does not cause diarrhoea to worsen.
- Supplementary vitamins and minerals.

The most important aspect of treatment for most children with persistent diarrhoea is proper nutrition. Special feeding recommendations are given for children with persistent diarrhoea (see Section 3.4.2 below). These are tried at home for 5 days. Children who present with persistent diarrhoea and dehydration are classified as having SEVERE PERSISTENT DIARRHOEA, and should be referred to hospital after rehydration (unless another severe classification is present). Very high purging rates can occur in persistent diarrhoea.

3.4.1 Definition, etiology, and importance[1,5,11]

Persistent diarrhoea is an episode of diarrhoea, with or without blood in the stool, that begins acutely and lasts 14 days or longer. It usually accounts for up to 15% of all episodes of diarrhoea but is associated with 30-50% of diarrhoeal deaths. It is usually associated with weight loss and, often, with serious non-intestinal infections. Many children who develop persistent diarrhoea are malnourished before the diarrhoea starts and this greatly increases the risk of

death. Persistent diarrhoea almost never occurs in infants who are exclusively breastfed.

The studies available to date suggest that acute and persistent episodes can each be initiated by a wide array of enteric pathogens, even if some organisms, such as enteroadherent *E. coli* or *Cryptosporidium* have an association with persistent diarrhoea in some settings. The frequency of enteric infections and the likelihood of simultaneous or sequential infections in a short time period may contribute to the incidence of persistent diarrhoea. Nevertheless, it is likely that there are other host or environmental factors that are important determinants of the duration of specific episodes.

Irrespective of its cause, persistent diarrhoea is associated with extensive changes in the bowel mucosa, especially flattening of the villi and reduced production of disaccharidase enzymes. These cause reduced absorption of nutrients and weight loss and may perpetuate the illness after the original infectious cause has been eliminated. Other contributing factors include poor food intake, owing to anorexia or withholding of food, or substituting dilute, low-energy foods. Patients are also likely to become deficient in various vitamins and minerals. Those of special importance, because of their role in the renewal and repair of the intestinal mucosa and/or their role in normal immunological responses, include folate, vitamin B12, vitamin A and zinc.

3.4.2 Nutritional therapy

Proper feeding is the most important aspect of treatment for most children with persistent diarrhoea.[5] Many can be treated as outpatients with food available in the home; however, some require specialized care in hospital. The goals of nutritional therapy are to:

- Temporarily reduce the amount of animal milk (or lactose) in the diet;
- Provide a sufficient intake of energy, protein, vitamins, and minerals to facilitate the repair process in the damaged gut mucosa and improve nutritional status;
- Avoid giving foods or drinks that may aggravate the diarrhoea; and
- Ensure that the child's food intake during convalescence is adequate to correct any undernutrition and prevent its recurrence.

The general guidelines for feeding during and after diarrhoea given in Treatment Plan A should be followed. Some especially important or additional guidelines for children with persistent diarrhoea are given below:

- Young infants, under 2 months of age, classified with SEVERE PERSISTENT DIARRHOEA or with evidence of dehydration should be rehydrated (unless the child is malnourished) and referred to hospital for further management. They may require special efforts to maintain hydration. If the young infant is still breastfeeding, the mother should be advised to give more frequent, longer breastfeeds, day and night. If the young infant is taking animal milk, it should be replaced with lactose-free or artificial milk formula.

- For other children, the mother should be instructed to:

    - If still breastfeeding, increase the amount of breastmilk by giving more frequent, longer breastfeeds, day and night.

    - If the child is taking other milk, replace the milk with: increased breastfeeding, fermented milk produces, such as yoghurt, or replace half the milk with nutrient-rich semisolid food.

    - If yoghurt is available, it can be given in place of any animal milk usually taken by the child; yoghurt contains less lactose and is better tolerated.

    - If increased breastfeeding or fermented milk products cannot be used to replace the animal milk entirely, then half of the milk can be replaced with a nutrient-rich semisolid food. This will limit the amount of animal milk (hopefully to less than 50ml/kg/day); greater amounts may aggravate the diarrhoea.

    - The energy- and nutrient-rich complementary foods recommended on the Food box are appropriate semisolid foods to recommend. Their use will ensure a full energy intake for the child (i.e. about 110 kcal/kg/day). Examples of these foods are thick cereal with added vegetable oil. Mix this with other foods, such as well-cooked and mashed pulses, vegetables, and if possible, meat or fish. Avoid low energy foods that are dilute or bulky. At least half of the child's energy intake should come from foods other than milk or milk products.

      POSSIBLE ADAPTATION: Add more specific feeding instructions for children with persistent diarrhoea. These would be added to page 10 of the *Counsel the Mother* module to clarify that:

The first choice for replacing animal milk is increased breastmilk; the second choice is replacing the milk with a fermented milk product; the third choice is replacing only half of the milk with a semi-solid food.

It is particularly important to replace all animal milk with increased breastmilk in infants less than 6 months of age, if this is feasible.

- Clarify that this nutritious semisolid food is the same as the porridges and other non-milk complementary foods described in the Food box.

- Add the following suggestions to the module:

- If some animal milk must still be given, mix the milk with the child's cereal.

- Remind mothers not to dilute the milk.

- Avoid foods that are hyperosmolar (these are usually foods or drinks made very sweet by the addition of sucrose, such as soft drinks or commercial fruit drinks); these can make the diarrhoea worse.

- Give food in frequent small meals, at least six times a day.

3.4.3 Treatment of specific infections

Routine treatment of persistent diarrhoea with antimicrobials is not effective and should not be given. Giardia infection is not more frequent in children with persistent diarrhoea and should not be routinely treated unless a massive infection is present. No relationship has been proven between small bowel overgrowth and persistent diarrhoea. Some children, however, have non-intestinal (or intestinal) infections that require specific antimicrobial therapy. The persistent diarrhoea of such children will not improve until these infections are diagnosed and treated correctly.

Every child with persistent diarrhoea should be examined for non-intestinal infections, such as pneumonia, sepsis, urinary tract infection and otitis media. Treatment of these infections should follow standard guidelines.

Persistent diarrhoea with blood in the stool should be treated with an oral antimicrobial effective against *Shigella* as described in Section 3.2.2. Treatment for amoebiasis should only be given if the diagnostic criteria are

met (see Section 3.2.4). Treatment for giardiasis should be given only if cysts or trophozoites of *G. duodenalis* are seen in the faeces.

3.4.4 Supplementary multivitamins and minerals

Micronutrient deficiencies are common in malnourished children and are exacerbated by losses from diarrhoea. This is why micronutrient supplementation plays an important role in therapy of persistent diarrhoea. In the recent multicentre study, compliance with multivitamin/mineral supplements was significantly associated with resolution of the persistent diarrhoea.[12] All children with persistent diarrhoea should receive supplementary multivitamins and minerals each day for 2 weeks. Locally available commercial preparations are often suitable. Tablets that can be crushed and given with food are least costly. These should provide as broad a range of vitamins and minerals as possible, including at least 2 recommended daily allowances (2 RDAs) of folate, vitamin A, iron, zinc, magnesium and copper. (See the worksheet table on page 43.)

RECOMMENDED ADAPTATION: **Identify an adequate, locally available, vitamin and mineral supplement to give daily for 2 weeks to children with persistent diarrhoea.**

Due to the new information on the role of micronutrients in the therapy for persistent diarrhoea, WHO strongly recommends making this adaptation in order to update the generic guidelines. Identifying a locally available mixture can be done by following the three steps outlined below:

1. Identify all locally available (commercial) vitamin and mineral mixtures.

2. In the appropriate column of the worksheet on the next page, list the concentrations per tablet (or per 5 ml in case of syrup) of all the relevant ingredients.

3. Compare these concentrations with the recommended doses for children (2 RDAs). The relative concentrations of two ingredients in the locally available mixture, may be widely different from the recommendations, making it impossible to provide enough of one ingredient without providing excessive amounts of another. This is especially true when the mixture is primarily intended for adults. As a general guide, for children, the concentration of the key ingredients (marked * in the worksheet table) provided by the vitamin and mineral mixture

should not be less than 1 RDA and should preferably be close to 2 RDAs, but may exceed this amount.

To make this adaptation, see Section *G, 3.0 Add giving multivitamins/minerals for 2 weeks to all children with persistent diarrhoea.*

Worksheet:

Identify composition of the multivitamin and mineral mixture for use in the treatment of persistent diarrhoea

Ingredient	1 RDA	2 RDA	Available mixtures			Comments
			Centrum[a]	Dash Drogue[a]		
Vitamin A* (:gRE)	400	800	1500	800		
Vitamin D (:g)	10	20	10	5		
Vitamin E (:g)	5	10	30	10		
Vitamin K (:g)	15	30	25			
Vitamin C (mg)	40	80	60	60		
Thiamin (mg)	.7	1.4	15	14		
Riboflavin (mg)	.8	1.6	17	16		
Niacin (mg)	9	18	20	18		
Vitamin B6 (mg)	1	2	2	2		
Folic acid* (:g)	50	100	400	100		
Vitamin B12 (:g)	.7	1.4	6	1		
Biotin (:g)	20	40	30			
Calcium (mg)	800	1600				
Phosphorus (mg)	800	1600	125			
Magnesium* (mg)	80	160	100	100		
Iron (mg)	10	20	18	14		
Zinc* (mg)	10	20	15	15		
Copper* (mg)	1	2	2	2		
Iodine (:g)	70	140	150	150		
Selenium (:g)	20	40	25	50		
Manganese(mg)	1.75	2.5	2.5			
Fluor (mg)	1	2				
Cobalt (:g)	50	100	25			
Molybdenium (:g)	37.5	75	25			

*** Key ingredients**: mixture should contain not less than IRDA of these ingredients.

Note: Most commercially available "vitamin and mineral mixtures" are designed for adults and the amounts of some ingredients per tablet may greatly exceed the recommended (2 RDAs) dose for young children.

3.4.5 Use of laboratory examination

[a] WHO does not recommend these two specific brands. These are only commonly available examples.

OTHER CONSIDERATIONS: **Use laboratory examinations if these are available and reliable.**

It should be emphasized that studies have shown laboratory evaluations to be of little benefit in guiding the successful treatment of persistent diarrhoea.[6] Evaluations for enteric pathogens and determination of serum chemical analyses, as well as testing for red blood cells or reducing substances, add nothing to the care of the majority of cases. For all patients, it is more important to ask the mother (or observe) whether the stool is bloody. Persistent diarrhoea patients with bloody stool or a stool culture positive for *Shigella* should receive an antibiotic for shigellosis. The use of laboratory examinations, if available and reliable, should be limited to the identification of cysts or trophozoites of *G. duodenalis*, and/or trophozoites of *E. histolytica* containing red blood cells, which suggest they play a role and should be treated.

However, "blind" therapy with antibiotics or antiprotozoal agents is not beneficial and should *not* be given. Similarly, no "antidiarrhoeal" drug (including antimotility drugs, antisecretory drugs and adsorbents) has any proven value in patients with persistent diarrhoea. Such drugs should *not* be given.

3.5 Use of antidiarrhoeal and other drugs

No antidiarrhoeal drugs should be given to children with diarrhoea.

A wide variety of drugs or combination of drugs is sold for the treatment of acute diarrhoea and vomiting. These "antidiarrhoeal" drugs include: antimotility agents (e.g. loperamide, diphenoxylate, codeine, tincture of opium), adsorbents (e.g. kaolin, attapulgite, smectite), live bacterial cultures (e.g. *Lactobacillus, Streptococcus faecium*), and charcoal. Antiemetics include phenergan and chlorpromazine. *None* of these has proved to have practical benefits for children with acute diarrhoea, and some may have dangerous side effects. *These drugs should* ***never*** *be given to children below 5 years of age.*

Antibiotics also should not be used routinely. Antibiotics or other antimicrobials given "blindly" are not effective treatment for diarrhoea in young children. This is because most diarrhoeal episodes are caused by agents for which antimicrobials are not effective, such as viruses, or by bacteria that must first be cultured to determine their sensitivity to antimicrobials. Culture, however, is costly and requires several days. Moreover, most laboratories are unable to detect many of the important bacterial causes of diarrhoea. In practice, antimicrobials should only be given for bloody diarrhoea (suspected shigellosis) and suspected cholera.

Antiparasitic drugs are rarely indicated.

The overuse of antidiarrhoeal and antiemetic drugs, antibiotics and antiparasitic agents often delays the initiation of ORT or a visit to the health facility to seek help. Their use also unnecessarily consumes a family's precious financial resources.

In summary, antidiarrhoeal drugs are not useful in the treatment of childhood diarrhoea. These drugs increase the cost of treatment and some are associated with adverse reactions. The WHO publication *The rational use of drugs in the management of acute diarrhoea in children*[13] provides additional information.

3.6 Changes in the diarrhoea management guidelines

The following sections highlight and explain the differences between the recommendations described in the IMCI course guidelines and those that have been promoted by previous CDD materials.

3.6.1 Changes in the assessment of dehydration

- The term "floppy" no longer figures among the description of the child's condition. The decision reflects its highly variable interpretation and limited contribution to the description of the child's condition in addition to the more specific words lethargic or unconscious.

- "Tears" and "dryness of mouth and tongue" have been excluded from the assessment, because experience has shown that the signs add little in sensitivity or specificity to the classification of dehydration.

- The categories for the characterization of the eyes have been reduced. This reflects difficulties experienced in the field in differentiating between "very sunken" and "sunken" eyes, resulting in a significant inter-observer variation in relation to this sign.

- "Skin pinch" has been further qualified, to indicate that it should be measured in the abdomen and to give a time parameter for the classification "goes back very slowly." This responds to observed problems in the field in the assessment of this sign.

3.6.2 Changes in the classification of dehydration

- The stars *, which marked essential items for a child's classification, have been excluded. Given the greater specificity of the reduced number of signs remaining in the chart, the presence of any two signs listed in a box preceding a classification are sufficient to classify the child as having SOME DEHYDRATION or SEVERE DEHYDRATION. This also ensures that the previous criteria of at least one * sign will still be met.

- A category of SEVERE PERSISTENT DIARRHOEA has been created to identify children who, having persistent diarrhoea, were also dehydrated. This reflects the recognition of the higher risk of mortality among these patients and their need for rehydration and treatment in hospital.

3.6.3 Changes in treatment

- The most significant changes relate to the treatment of children who have a severe classification (including POSSIBLE SERIOUS BACTERIAL INFECTION in young infants) in addition to SEVERE DEHYDRATION, SOME DEHYDRATION, or SEVERE PERSISTENT DIARRHOEA.

  These children, who represent a wider group than those considered in CDD's recommendations (children severely malnourished), are urgently referred to hospital with the recommendation of frequent sips of ORS and continued breastfeeding. This reflects the broader range of health problems considered in an integrated manner in the chart and highlights the difficult management and high risk of mortality among children with severe classifications. It means, however, that in this instance SEVERE DEHYDRATION would not be treated in the urgent, aggressive approach of the CDD chart. Children with severe dehydration and another severe classification are, fortunately, rare.

- PLAN A - Plan A has been rewritten to clarify the key points which need to be taught to the mother. The generic Plan A now recommends giving all mothers 2 packets of ORS, eliminating the phrase "if this is national policy." The adjustment of these recommendations to follow national policy should happen during the adaptation of the chart, not when the health worker reads the chart.

- WHEN TO RETURN - There have been significant changes to the recommendations on when the mother should return immediately to the health facility. Of the six signs present in CDD's recommendations, three remained unaltered (developing fever, blood in stool and drinking poorly) and three (many watery stools, repeated vomiting and marked thirst) have been replaced by "becomes sicker" and "not able to drink or breastfeed." The changes reflect the need for a limited number of signs for the range of illnesses covered by the treatment charts that can be remembered by the

caretaker. It was felt that the changes above would not reduce the sensitivity of the assessment by the mother of children who should return to the facility.

The return for follow-up for children who did not get better has been extended from 3 to 5 days, to bring it in line with follow-up for other health problems. This is intended to reduce the instances of the caretaker having different timing for follow-up visits if the child had more than one problem, and to make it easier for the health worker to recall when to recommend follow-up visits. No evidence was available to indicate that this change would be detrimental to children. Additional protection is provided by the signs concerning when a child should return immediately to the health facility.

- PLAN B - The only significant change is the removal of the instructions from the chart on how to manage the child whose eyelids become puffy during treatment. These instructions are still present in the "Treat the Child" module.

- PLAN C - The recommendation to treat children 2 years or older for cholera, if they are severely dehydrated and there is cholera in the area, has been transferred from a "note" under Plan C to the treatment box in the chart.

- TREATMENT OF PERSISTENT DIARRHOEA - The age criteria for referral to hospital for infants, is changed from young infants less than 4 months to less than 2 months. Infants of this age are more likely to receive a milk-only diet, making the transition to a reduced lactose diet difficult. They are also at increased risk for a poor outcome.

- TREATMENT OF DYSENTERY - The significant change is that follow-up in 2 days is recommended for all children with dysentery, reflecting the high risk of mortality in children with dysentery and the increasing problem of infections with resistant strains.

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4. MALARIA

Generic guidelines

Children with fever and a stiff neck or a general danger sign may have severe malaria, meningitis, or another cause of VERY SEVERE FEBRILE DISEASE, and are referred urgently to hospital. Management of febrile children without these severe signs depends on whether the risk of malaria in the area is high or low. The decision on the level of risk for a particular child must be made by the health worker, using knowledge of the local seasonality of malaria and the possibility of the child being exposed through travel to endemic areas. The health worker must be guided in this by information from the health authorities on the levels of risk in different places and at different seasons.

In an area or season of high malaria risk, all children with fever or a history of fever are classified as having malaria and are treated with the first-line antimalarial drug. In a low malaria risk area or season, children with fever or a history of fever are only given an antimalarial if they have no runny nose (a sign of an acute upper respiratory infection), no measles, and no other apparent cause of fever. If the fever is 38.5^{o} C or above (axillary temperature) a single dose of paracetamol is given in clinic. Any child who has had fever every day for more than 7 days is referred for assessment for other causes of fever.

In all areas, whether high or low malaria risk settings, children with VERY SEVERE FEBRILE DISEASE receive a first dose of intramuscular quinine before referral. If there is a low risk of malaria, quinine is not given to children less than 4 months of age. Quinine is not included in the treatment of POSSIBLE SERIOUS BACTERIAL INFECTION in young infants.

In areas with high malaria risk, all children with ANAEMIA are treated for malaria, whether or not there has been fever during the current illness.

Cotrimoxazole (trimethoprim and sulphamethoxazole) twice daily for 5 days has been shown to be an effective antimalarial in young children. If compliance with a 5-day course can be ensured, treatment with cotrimoxazole eliminates the need to use both an antibiotic and an antimalarial for children classified as MALARIA who also have cough and fast breathing. In these circumstances it would be appropriate to recommend cotrimoxazole alone in order to reduce the number of different drugs to be given. However, due to concern that a full 5-day course cannot be ensured, WHO no longer recommends the use of cotrimoxazole alone for the treatment of children with both malaria and pneumonia (See Section 4.4.2).

4.1 Definition of high, low, and no risk malaria settings

Malaria is usually a febrile disease accompanied by asexual parasitaemia. Malaria can mimic a whole variety of disease syndromes. But, despite its non-specific clinical presentation, malaria must be treated as a matter of urgency; a child seen in the outpatient facility in the morning, afebrile and complaining only of headache and history of fever on the previous night, may, if not treated, be in a coma by the afternoon.

In malaria endemic areas, fever, either measured or reported by history, is a characteristic sign of malaria, and every child with fever should be considered to have malaria unless proved otherwise. However, many diseases can cause fever, and the probability that malaria is the underlying cause of fever in a sick child depends on the child's risk of exposure to malaria.

A simplified protocol to assess malaria risk has been proposed. Assessment of risk is based on the proportion of children aged 2-59 months brought to a health care facility with febrile disease with evidence of parasitaemia in different seasons.[1] A microscopist and a clinician must be available throughout the study. A defined sample of the patient population is selected, for example those attending on a particular day of the week with fever or recent history of fever. At least 50 children per month should be examined for parasitaemia when the incidence of malaria is believed to be high and 100 children per month when low malaria incidence is suspected. For the sake of uniformity and simplicity this protocol considers any level of asexual parasitaemia in a child with febrile disease to be diagnostic of malaria disease.

Based on this protocol, a high malaria risk setting is defined as one where more than 5% of cases of febrile disease in children aged 2-59 months have parasitaemia on microscopical examination. A low malaria risk setting is one where 5% or less of cases of febrile disease in children aged 2-59 months are parasitaemic, but where the risk is not negligible. A setting is considered as having no malaria risk if malaria transmission does not normally occur and imported malaria is uncommon.

High and low malaria risk settings are subject to seasonal and cyclical fluctuations. A locality may be a high malaria risk setting throughout the year, or a high risk setting during the wet season and a low risk setting during the dry season. Another area might normally have no malaria risk, but become a high-risk setting if a malaria epidemic breaks out. Malaria risk must, therefore, be delimited both by area and time.

National malaria control programmes are responsible for delimiting high and low risk settings, based on their knowledge of malaria distribution and endemicity in the country, and for informing general health services. This stratification of malaria is the basis for planning control interventions. The simplified protocol to assess malaria risk

described above should preferably be carried out by district health teams with guidance, support, and coordination from the malaria control programme.

Since this kind of assessment is not done in most countries, the slide positivity rate of children less than 5 years from health facilities with microscopy can be used to assess malaria risk instead. It is routine practice in many clinics to send for slide examination only those febrile children where malaria is suspected based on clinical signs, not those with respiratory infections or other causes of fever. The slide positive rate from routine clinic work will, therefore, usually be higher than the proportion of parasitaemic children obtained from a random sample of all febrile children. This will tend to classify more settings as high malaria risk, thus erring on the safe side.

Although the methodology used may vary from country to country, most national malaria programmes do have estimates of the level of endemicity in different areas and seasons. Stratification is important to effective care of children with malaria, and these estimates should be used in the initial adaptation. As the results of local investigations become available, it will become possible to delimit low risk settings with greater precision. It can be assumed that results obtained at a health facility in a district will be representative for that district, but more investigation may be required in districts with considerable variability. Extrapolation from one district to neighbouring areas will depend on the judgement of the national malaria control programme.

If precise information is not available and malaria is known to exist in the area, it is better to assume that there is a high malaria risk and to treat all children with fever for malaria. This applies to many countries in tropical Africa as well as certain areas of South-east Asia and Oceania, where national programmes may advise health services to manage all cases of fever on the assumption of high malaria risk. Exceptions should be made where and when it is already known that malaria risk is low, for example in certain highland areas in east Africa and in the dry season in parts of the Sahel.

National malaria programmes should advise health service staff about high, low, and no risk malaria settings (based on available data), and coordinate research required to improve stratification. Where there is insufficient information, it is better to err on the side of caution and assume a higher risk category.

> ***POSSIBLE ADAPTATION*: Consider the whole country to be high malaria risk.**
>
> This would entail deleting the explanations of malaria risk and the low malaria risk sections. If you will make this adaptation, refer to *Section G, 7.0 Delete low malaria risk, so that the risk of malaria is always considered to be high.* This section shows the exact changes to make in the chart, recording form, and modules.

***POSSIBLE ADAPTATION*: Add a category "no malaria risk" if this is appropriate for some parts of the country.**

The adaptation also requires adding a travel history, to ensure detection and treatment of children who become febrile after visiting a high-risk area. A history of travel is of particular relevance in relation to P. falciparum infection. In general, the child should be considered to be at risk of malaria if the interval between the last time the child was in the endemic area and the onset of fever was no more than one month. If you will make this adaptation, refer to *Section G, 8.0 Add a category for no malaria risk and add questions to assess travel to malarious areas.*

***POSSIBLE ADAPTATION*: If malaria is not transmitted anywhere in the country, delete all references to malaria.**

If this adaptation is made, the main function of the fever box becomes to ensure the management of SEVERE FEBRILE DISEASE, which will cover meningitis and septicaemia, and measles. The measles box may remain unchanged from the generic. The box for the classification of FEVER becomes mainly a reminder to the health worker to treat causes of fever not included in the algorithm. Some countries may have formulated standard case management guidelines for such conditions, including urinary tract infections, osteomyelitis and abscesses. The box may be adapted to include a locally appropriate list of causes of fever which may refer to the existing standard case management guidelines for the details of treatment.

WHO is planning to study clinical and laboratory options for the practical assessment, classification and management of fever at the first level health facility (including indications for timely referral) in areas where there is no malaria. The results will be used in the preparation of a guideline for adaptation in non-malaria areas.

4.2 Assessment, classification, and treatment if the risk of malaria is high

Although fever is a characteristic feature, malaria produces intermittent or irregular fever, so children with malaria may be afebrile when they are examined at the health facility. This is why it is important to ask the mother if the child has had fever recently. In most cases considered to have fever, the assessment is based on the mother's report. If the mother reports that the child has no fever and has not had fever recently, this is probably the situation; it is unlikely that she would not have detected fever if it were present.

In highly endemic areas, if laboratory diagnosis is not available, all children with fever or a history of recent fever should be treated with antimalarial therapy. This recommendation is intended to maximise sensitivity, ensuring that as many true cases as possible receive proper antimalarial treatment.[2] However, because fever alone has a very low specificity for the diagnosis of malaria, using this approach to the management of fever may limit the investigation into other causes of fever, especially in busy clinics, leaving other diseases undiagnosed and untreated. To avoid this problem, the IMCI guidelines emphasize that a full assessment of the child be carried out, including Assessment for Other Problems.

The costs of treating some cases without malaria in addition to true cases of malaria need to be weighed against the risks of not treating true cases. The costs of unnecessary treatment with chloroquine are low, as chloroquine is a relatively inexpensive drug with limited side effects, and it is effective against some local strains of *P. falciparum.* In a highly malarious area, therefore, the benefits of ensuring that all children with true malaria are treated largely outweigh the costs of treating some children with fever who do not have malaria. Diagnostic criteria which provide maximum sensitivity should be applied to the most vulnerable groups, including children under the age of 5, especially during periods or in areas of intense malaria transmission.

In many areas of high malaria transmission severe anaemia is the major cause of death associated with malaria in children less than two years old and it may be the commonest clinical manifestation of *P. falciparum* malaria in children in this age group. Anaemia is also an important cause of morbidity and is detrimental to development. It is associated with even low-density parasitaemia in children under two years of age.

Although antimalarial treatment is recommended as a part of the management of anaemia in the IMCI algorithm, there are concerns that children with anaemia may not receive appropriate treatment. Studies have shown that only drugs which achieve full parasitological clearance of the infection can produce haematological recovery.[3] It is essential that children with anaemia and fever be given the most effective available antimalarial therapy, using the second line therapy if necessary.

> ***POSSIBLE ADAPTATION*: Treat children with clinical anaemia with the second-line antimalarial.**
>
> For the reasons mentioned above, in areas of high endemicity it is safest to assume that a child presenting with severe anaemia has a *P. falciparum* infection. Children with SEVERE ANAEMIA will be referred urgently, and the guidance on their treatment may be adapted to include a pre-referral dose of intramuscular quinine or other suitably effective antimalarial.

***POSSIBLE ADAPTATION*: Add intramuscular quinine or other suitable antimalarial to the pre-referral treatment for SEVERE ANAEMIA.**

4.3 Assessment, classification, and treatment if the risk of malaria is low

In areas with low malaria risk and during the low transmission period in areas where malaria is seasonal, malaria accounts for only a small proportion of febrile disease. More restrictive criteria should be applied when prescribing antimalarial treatment, even among children. The presumptive treatment of cases with uncomplicated fever with antimalarial drugs may result in a high proportion of misdiagnoses and resulting mistreatments.

Therefore, in settings with low malaria risk, a child with fever or a history of recent fever should be treated for malaria only if no other major causes of fever are found. The child with fever who has a runny nose, or measles, or another cause of fever is managed as FEVER - MALARIA UNLIKELY. The presence of another cause of the fever reduces the likelihood of malaria. Measles[4] and upper respiratory tract infections are two common causes of fever which have been found to have a negative association with *P. falciparum* malaria.

A febrile child with a runny nose who does not have measles is most likely to have a benign viral infection. The fever will usually disappear spontaneously or lessen considerably after 2 days. If the fever persists, the child should be brought back to the clinic for reassessment and, if no obvious cause of the fever is found, should be treated with an antimalarial (see "When to return" and "Follow-up" boxes).

In low malaria risk settings, where the disease is always rare, children are not likely to develop any malaria immunity. Since the risk of malaria leading to complications in non-immune children is relatively high[2], children with very severe febrile disease must be treated and referred as a matter of urgency. Febrile children with a danger sign or stiff neck may have cerebral malaria, which can evolve rapidly to coma and death. In a low malaria risk setting, children age 4 months or older must receive the first dose of intramuscular quinine before referral. Children under age 4 months in a low malaria risk setting, however, should not be given intramuscular quinine before referral.

An effective approach to reduce the use of antimalarials in low risk settings without the use of laboratory testing has not yet been identified and the current guidelines have very low specificity. Comparison of published clinical data from a wide range of countries shows that there is little or no prospect of a universally useful clinical algorithm to differentiate malaria from other causes of fever in areas of high malaria risk[5].

In low malaria risk settings where blood smears are not available, many clinicians do not treat presumptively if other causes of fever are present, since the presence of another explanation for the fever reduces the probability that malaria is the cause.

Based on this and preliminary results from the study in the Gambia [6], the guidelines exclude malaria treatment if a fever in clinic is accompanied by a runny nose (the simplest indicator of a viral upper respiratory infection), or measles, or another apparent cause of the fever.

Research is underway to improve the performance of the guidelines in low malaria risk settings. The improvement of diagnostic criteria, including the use of dipsticks, could safely reduce over-treatment and is a high priority. WHO will make available a revised guideline when the necessary information is available.

***OTHER CONSIDERATIONS*: Modify the follow-up guidelines in areas with many measles cases.**

In a child with measles, the fever is likely to continue for 3-4 days. So, in an area with many measles cases, the follow-up guidelines may need to be adapted so that the mother brings the child back to the clinic if the fever is still present after 5 days (not 2 days, as for other causes of fever). This will not only reduce the unnecessary use of antimalarials at follow-up visit but also reduce the burden for the mother of making a possibly unnecessary follow-up visit to the clinic.

4.4 Choice of antimalarials where *P. falciparum* malaria is the predominant species

4.4.1 Choice of first- and second-line antimalarials

***ESSENTIAL ADAPTATION*: Choice of first- and second-line oral antimalarial.**

The selection of first-line and second-line treatment for *P. falciparum* malaria in endemic countries is an important decision to be made by Ministries of Health, based on information and technical advice provided by malaria control programmes. WHO guidelines are available on this decision-making process[7,8], and include simplified protocols for determining the level of antimalarial resistance. Specific information on antimalarial drugs and their use in different settings is available from WHO. Decisions on the selection of antimalarials should be made in consultation with WHO. Persons responsible for adaptation should be familiar with the country's antimalarial drug policy and well informed about the outcome of any recent national reviews and any plans to update the drug policy in the near future.

The generic module explanations and exercises assume that chloroquine is the first-line antimalarial and sulfadoxine-pyrimethamine is the second-line antimalarial. If chloroquine is no longer the first-line antimalarial, see *Section G, 9.2 Substitute a first-line oral antimalarial other than chloroquine*. If an additional second-line antimalarial is available at first-level facilities, see *Section G, 9.3 Add an additional second-line oral antimalarial (the example shown is sulfalene-pyrimethamine).*

4.4.2 Treatment for children classified as both MALARIA and PNEUMONIA

Children with pneumonia often have fever and may have co-existing malaria. Children with malaria may present with a clinical picture similar to that of pneumonia: cough or difficult breathing with increased respiratory rate. Studies from the Gambia, Malawi, and Mozambique have shown significant overlap in the clinical presentation of pneumonia and malaria, defined according to the WHO guidelines[9,10,11]. This overlap results from the recommended classifications of malaria and pneumonia, which are based on a limited number of signs with high sensitivity, but with only moderate specificity.[12] A study in Kenya indicates that the overlap in clinical presentation of pneumonia and malaria also applies to severe pneumonia and severe malaria.[13,14] The study found that dyspnoea, nasal flaring, and chest indrawing were common in children with severe malaria, and many children admitted as severe pneumonia were found to have severe malaria.

WHO recommendations emphasize that those children who satisfy the criteria for classification as both MALARIA and PNEUMONIA need treatment for both diseases. Studies in Malawi[12] and the Gambia[13] have shown that a course of 5 days of twice daily cotrimoxazole is effective against *P. falciparum* in children less than 5 years of age. However, data on the efficacy of a 5-day course of cotrimoxazole in young children are limited to these two studies, and there are no data on the efficacy of shorter regimens against *P. falciparum.* There are compliance problems with all regimens lasting more than 3 days because, with effective treatment, malaria symptoms are likely to subside by the third day.

In addition, *P. falciparum* is resistant to sulfadoxine-pyrimethamine in extensive areas of the Amazon region and in many areas of South-east Asia. In these areas cotrimoxazole alone is not adequate treatment for children with both malaria and pneumonia, even if compliance can be assured. Sulfadoxine-pyrimethamine and cotrimoxazole are relatively inactive against vivax infections. Therefore, cotrimoxazole should not be recommended for treating children with both pneumonia and malaria if a substantial proportion of cases involve *P. vivax*.

For these reasons, WHO does not recommend cotrimoxazole as a first- or second-line oral drug for malaria.

RECOMMENDED ADAPTATION: **Select an appropriate treatment for children classified as both MALARIA and PNEUMONIA.**

For the reasons described above, WHO's recommendation is that both conditions should be treated with specific drugs. The following table shows the recommendations to be followed when cotrimoxazole is the first line drug for the treatment of pneumonia.

If amoxycillin or another antibiotic is selected as the first line treatment for pneumonia (adaptation will be required), the child should also receive appropriate antimalarial therapy.

Recommended options for treatment of children classified as PNEUMONIA and MALARIA when cotrimoxazole is the first line antibiotic for pneumonia

First line antimalarial drug	Options for treatment of children classified as both PNEUMONIA and MALARIA
Chloroquine	Use both (adaptation will be needed)
Sulphadoxine-pyrimethamine	Switch to amoxycillin as first line antibiotic for pneumonia (adaptation will be needed) *Note: Further information on safety is needed before co-administration of sulfadoxine-pyrimethamine and cotrimoxazole can be recommended.* [a,10];
Other antimalarials	Use both (adaptation will be needed)

It is important to consider the management of pneumonia and malaria together. If a child with fever, cough, and fast breathing who is treated with cotrimoxazole and chloroquine fails to improve after 2 days, the antibiotic will be changed to amoxycillin. In areas where there is chloroquine resistance, the antimalarial will be changed to sulfadoxine-pyrimethamine.

In situations of low malaria risk, the guidelines indicate that malaria treatment should be given only in the absence of other obvious causes of fever. Pneumonia, however, should not be included as a cause for exclusion of malaria, since its clinical signs can be caused by malaria. In this situation, both conditions will need to be treated, unless there is another obvious cause of fever.

4.4.3 Antimalarial treatment of severe *P. falciparum* malaria before referral

Intramuscular quinine is recommended as the pre-referral treatment of severe *P. falciparum* malaria for several reasons. First, severe malaria, classified as VERY SEVERE FEBRILE DISEASE, is a medical emergency requiring immediate administration of a quick acting effective antimalarial drug by the parenteral route. Second, quinine is the treatment of choice for severe malaria in an area with known chloroquine resistance or where sensitivity is unknown. With a few exceptions in Central American, practically no country with predominant *P. falciparum* malaria has been spared from chloroquine resistance. The provision of intramuscular quinine at first-level facilities for pre-referral treatment has been shown to reduce the case fatality rate of severe malaria.[15]

[a] If cotrimoxazole is the first-line antibiotic and sulfadoxine-pyrimethamine is the first-line antimalarial, adapting the guidelines, without changing the first-line antibiotic, would result in the use of both cotrimoxazole and sulfadoxine-pyrimethamine for cases of pneumonia and malaria. There is little experience with this combination, and the expert reviews in 1991[14] and 1995[10] cautioned against co-administration on the basis of theoretical possibilities of increased toxicity. Further data on the safety of co-administration are needed, therefore, before this can be considered an option.

Although the use of intramuscular quinine has been controversial for many years, recent studies provide evidence of adequate bio-availability when compared with intravenous administration, even in children with severe malaria. Quinine should not be given subcutaneously as this can result in skin necrosis.

Some complications of intramuscular administration, such as crippling due to injury of the sciatic nerve or even death from tetanus contamination of poorly sterilized needles, are related to poor injection technique. The causes of other complications, such as muscle necrosis and sterile abscess formation, are less clear.

POSSIBLE ADAPTATION: **Add instructions to dilute quinine.**

Concentrated acidic solutions of quinine are painful when given by the intramuscular route whereas quinine dihydrochloride, at the dilutions given in the table below, appears to be well tolerated. Quinine solutions diluted in normal saline to a concentration of 60 mg/ml are less painful and better tolerated than undiluted solutions (300 mg/ml).[16]

See *Section C, 9.4 Add dilution of quinine before administration.*

Instructions for the dilution and administration of quinine

AGE or WEIGHT	**Step 1.** *Draw up* the following dose of undiluted quinine (quinine 300 mg/ml in 2 ml ampoules) in the syringe:	**Step 2.** *Add* the following dose of normal saline to the quinine:	**Step 3.** *Administer* the following amount of diluted quinine solution (60 mg/ml):
2 mo up to 4 mo (4-<6 kg)	0.2 ml	0.8 ml	1.0 ml
4 mo up to 12 mo (6-<10 kg)	0.3 ml	1.2 ml	1.5 ml
12 mo up to 2 yr (10-<12 kg)	0.4 ml	1.6 ml	2.0 ml
2 yr up to 3 yr (12-<14 kg)	0.5 ml	2.0 ml	2.5 ml
3 yr up to 5 yr (14-19 kg)	0.6 ml	2.4 ml	3.0 ml

Intravenous quinine is not recommended for first-level health facilities because of the danger of too rapid administration. It should never be given by bolus intravenous injection. Intravenous administration requires careful regulation of the rate of infusion. The optimal rate of infusion is 15 mg quinine dihydrochloride *salt*/kg (loading dose) diluted in 10 ml/kg isotonic fluid by intravenous infusion over 2 hours. This is followed 12 hours after the start of the loading dose by a maintenance dose of 10 mg/kg diluted in 10

ml/kg isotonic fluid over 2 hours. The maintenance dose should be repeated every 12 hours, calculated from the beginning of the previous infusion until the patient can swallow. Then oral treatment should be given[18]. These modalities are possible in some hospital settings but are not feasible at the peripheral level of health care.

Studies in Niger have shown that intrarectal quinine can be safe and effective in severely ill children. WHO has not yet made a recommendation on this route of administration[17].

Quinine-induced hypoglycaemia may develop after several days' treatment, after the patient has recovered consciousness[19]. However, lethargic or unconscious children may have severe malaria with concomitant hypoglycaemia. In the absence of methods to determine blood glucose level, such children should be treated on a presumptive basis (see instructions to prevent low blood sugar in *Treat the child*, page 49). Although there is uncertainty about the long-term efficacy of glucose therapy in children with severe malaria, all children who need referral for VERY SEVERE FEBRILE DISEASE must be treated to prevent hypoglycaemia, which may occur during transfer to the referral hospital.

The generic guidelines recommend giving a first dose of 10 mg quinine salt/kg by intramuscular route at 4 and 8 hours (and further doses every 12 hours if referral is not possible). This recommendation is based on a study in Blantyre Hospital in Malawi[20,18], where this regimen rapidly achieved an adequate plasma quinine concentration while reducing the risk of quinine-induced hypoglycaemia. The loading dose, administered 4 hours after the start of treatment, should not be given if the patient received quinine, quinidine or mefloquine within the previous 12 hours, in order to avoid additive cardiac toxicity. On the basis of a study carried out in Kenya[19], WHO recommendations suggest that in areas with adequate quinine sensitivity (as is the case in most of Africa) the loading dose can be reduced to 15 mg/kg and given as a single dose if there has been no quinine, quinidine or mefloquine given in the previous 12 hours.

Current WHO guidelines[20] on parenteral administration of quinine recommend a maintenance dose of 10 mg *salt*/kg of body weight given at intervals of 12 hours after the last administration, the generic guidelines on the chart recommend 12-hourly dosing if referral is not possible. Regimens based on both the 8- and 12-hour dosing schedules are described in Annex E "Where referral is not possible" in the module *Treat the Child.* However, the 8-hour regimens are no longer considered necessary. In areas with adequate quinine sensitivity of *P. falciparu*m (for example in most of Africa), a 12-hourly regimen can give good therapeutic and pharmacological results. It is also a lot

easier to deliver from an outpatient facility, if referral is not possible, as well as being less expensive.

The quinine maintenance dose should be reduced to 5-7 mg/kg in children requiring more than 48 hours of parenteral therapy. As soon as the patient is able to swallow, switch to full oral treatment. The treatment should be continued to complete 7 days' treatment with quinine tablets (8 mg base/kg 3 times daily) or, more simply, give a single dose of 25 mg/kg sulfadoxine and 1.25 mg/kg pyrimethamine (or sulfalene-pyrimethamine), if the parasites are sensitive to a sulfa-pyrimethamine combination and compliance may be a problem.[10] Mefloquine should not be given within 12 hours of the last dose of quinine.

Intramuscular chloroquine is not recommended due to the extent to which chloroquine-resistant malaria has spread. In addition, there are reports of sudden death following intramuscular chloroquine given to children with severe malaria, probably due to cardiovascular toxicity. Intramuscular and subcutaneous chloroquine doses of 5 mg base/kg or larger may result in transiently high (500-3500 μg/litre) and potentially toxic blood concentrations, one consequence of which is hypotension, since parenteral chloroquine is a potent vasodilator. Fatal hypotension would be most likely if severely ill, febrile, dehydrated children were inadvertently given a large intramuscular dose (without adjusting for weight, for example) or if the injection was given intravenously by mistake and/or the child was nursed upright.

> ***POSSIBLE ADAPTATION*: Switch to a 20 mg/kg loading dose of quinine (without any dose at 4 hours).**
>
> This should be considered in areas with lower sensitivity to quinine such as parts of Southeast Asia and South America. The loading dose should be given intramuscularly, divided in two, with half the dose in each anterior thigh.
>
> ***POSSIBLE ADAPTATION*: In very high transmission areas, consider antimalarial treatment for young infants.**
>
> In the generic guidelines, quinine is not given to young infants (under the age of 2 months) in either low or high malaria risk settings, or to any child aged less than 4 months in a low malaria risk area. The risk of malaria is generally low because of the protection by maternal antibodies, the high haemoglobin F content of infants' erythrocytes, (which retards parasite development), and protective factors in breast milk.

However, in areas with very intense transmission of falciparum malaria, even young infants may suffer from cerebral malaria, and when it occurs the mortality rate is very high. Pre-referral treatment with quinine of young infants with POSSIBLE SERIOUS BACTERIAL INFECTION can be considered in areas with very intense transmission, if there is evidence that severe malaria infections are occurring in this age group. Some indication of the extent of the problem can be provided by analysing the age distribution of children admitted to the referral hospital with severe falciparum malaria. On the basis of this analysis, the national malaria control programme should provide guidance on the need to give a first dose of intramuscular quinine to young infants with POSSIBLE SERIOUS BACTERIAL INFECTION before urgent referral to hospital. It is very important to ensure accurate dosing in this age group.

***POSSIBLE ADAPTATION*: Substitute artemesinin derivative if *P. falciparum* with multi-drug resistance is a problem.**

In Southeast Asia there has been some reduction in quinine efficacy against falciparum malaria over recent years, and countries with multi-drug resistance in this region have considered the use of artemisinin derivatives for the treatment of severe malaria. Adaptation of the charts in these countries may include the use of artemisinin derivatives for the pre-referral treatment of children with VERY SEVERE FEBRILE DISEASE.

The following schedules are recommended by WHO (1998) for the treatment of severe malaria.

- Intramuscular artemether: 3.2 mg/kg on the first day, followed by 1.6 mg/kg daily for 6 days or until an appropriate oral treatment can be given.
- Intravenous artesunate: 2.4 mg/kg on the first day, followed by 1.2 mg/kg daily for 6 days or until an appropriate oral treatment can be given.

Intramuscular artemether will be the choice for pre-referral treatment of children with severe malaria in areas of multi-drug resistance. Limited data are available, however, on the use of these drugs in children below 6 months of age.

WHO-supported studies on the use of rectal artesunate have showed that it is easily applied and can be as effective as intramuscular quinine in reducing parasitaemia. WHO will recommend the use of this preparation for the emergency management of acute malaria in patients

for whom parenteral treatment is indicated but not available. The present guidelines exclude children weighing less than 10kgs. One country, Cambodia, has included the use of artesunate suppositories for pre-referral treatment of children with VERY SEVERE FEBRILE DISEASE.

4.5 Choice of antimalarials in areas with only *P. vivax*

Vivax malaria is rarely a direct cause of death, but may cause considerable prostration and anaemia in young children, thereby acting as a contributory cause of death.

The acute attack is normally easily cured by chloroquine 25 mg/kg. Chloroquine resistant *P. vivax* occurs in New Guinea and is treated with mefloquine or quinine. Sulfadoxine-pyrimethamine and also cotrimoxazole are relatively ineffective in vivax infections.

True relapses caused by hypnozoites are common and can be prevented by primaquine treatment, although in high malaria risk areas this has little clinical importance as patients are exposed to reinfection anyway. The use of primaquine as a gametocytocide should be reserved for areas with low levels of transmission where efforts to reduce or eliminate transmission are under way.

In young children, primaquine is not recommended because of the increased risk of side effects and because it may reduce compliance with life-saving drugs. It is unlikely that primaquine treatment in the management of sick children using the IMCI guidelines would impact transmission.

In areas endemic for only vivax malaria, parenteral antimalarial treatment for VERY SEVERE FEBRILE DISEASE is only indicated in cases with repeated vomiting or febrile convulsions. The latter are characterised by the fact that the child recovers quickly from the convulsions and does not appear to be sick, apart from having a high fever. Unless *P. vivax* is chloroquine-resistant, the parenteral treatment should be intramuscular chloroquine (3.5 mg/kg every 6 hours in the exterior thigh); oral treatment, to complete the total of 25 mg/kg dose, should begin as soon as the patient can swallow.

Overlap between vivax malaria and pneumonia has not been documented. If the child has cough and fast breathing with fever, only the antibiotic recommended for pneumonia should be given. If the fever has not lessened after 2 days, chloroquine should be given. Microscopy or RDT dipsticks should be used, if available. If the fever persists after the chloroquine treatment, the child must be reassessed, and referred if an explanation for the fever is not found.

4.6 Choice of antimalarials where both *P. falciparum* and *P. vivax* malaria are common and microscopy or Rapid Diagnostic Tests dipsticks are not available

If the first-line treatment for *P. falciparum* and *P. vivax* malaria is the same (in general this is the case when chloroquine is still effective for falciparum malaria), adaptation should not be necessary.

Where the first-line treatments are different, there is a problem if the first-line treatment for falciparum malaria is sulfadoxine-pyrimethamine because this is only partially effective for vivax malaria. In this situation, the first-line drug for falciparum malaria should be the standard treatment for the sick child with fever. Since sulfadoxine-pyrimethamine is partially effective this will at least alleviate any vivax infection. Giving chloroquine for vivax malaria at this stage could cause the child to vomit the sulfadoxine-pyrimethamine. If, however, the fever persists and no other cause is found, the child should receive chloroquine.

Where there is a considerable risk of *P. falciparum* resistance to sulfadoxine-pyrimethamine, the second-line drug for *P. falciparum* should be given. Other standard treatments for falciparum malaria such as mefloquine, quinine, artemisinin and its derivatives are also effective against vivax.

4.6.1 Treatment of children with both malaria and pneumonia

The use of cotrimoxazole alone for treatment of children with both malaria and pneumonia is not recommended. While cotrimoxazole has been shown to be useful in *P. falciparum* malaria, it is poor against *P. vivax*.

If the first-line treatment for *P. falciparum* is chloroquine, use both chloroquine and cotrimoxazole for a child with malaria and pneumonia. If the first-line treatment for *P. falciparum* is sulfadoxine-pyrimethamine, then use sulfadoxine-pyrimethamine and amoxycillin for a child with malaria and pneumonia (see Section C4.4.2).

4.7 *P. malariae* and *P. ovale*

In sub-Saharan Africa, *P. malariae* may be prevalent in certain areas. However, most cases of *P. malariae* and *P. ovale* are usually clinically cured by the treatments used for *P. falciparum*. In other parts of the world, these infections are rarely of importance. *P. malariae* is generally found in mixed infections with *P. falciparum.*

4.8 Role of microscopy or Rapid Diagnostic Tests

The generic IMCI algorithm does not advocate laboratory testing for malaria. In principle microscopy has an important role to play in the management of low-risk malaria. In practice, microscopy often suffers because equipment is poorly maintained, reagents are not available, technicians are inadequately trained and there is little attention to quality assurance.

Rapid Diagnostic Tests with a sensitivity in excess of 90% and a high specificity are available. Although still expensive, they are becoming more widely affordable. WHO has some concerns over the quality control of these tests. They have the potential to reduce overuse of expensive and potentially toxic antimalarials, particularly in areas of low risk malaria. Testing can also greatly increase the confidence of the community in the treatments being offered by the health facility.

If microscopy or Rapid Diagnostic Tests (RDT) are available, they should be used for investigation of the following conditions, which are listed according to priority: treatment failures, VERY SEVERE FEBRILE DISEASE, and uncomplicated malaria.

4.8.1 Treatment failures

Treatment failures are cases treated for malaria where the child returns with fever within a given period (generally 2 weeks) after the treatment. There are several possible reasons for treatment failure including non-compliance with treatment, drug-resistant malaria or, more simply, misdiagnosis when the fever is caused by a disease other than malaria. Cases which have received an adequate dose of antimalarial from other sources before coming to the health facility, but where fever persists, should also be considered as treatment failures.

If microscopy does not show asexual parasites or the dipstick test is negative, it is advised not to give antimalarial treatment, but look for other causes. If no other cause is found, microscopic examinations should be repeated every 12-24 hours. If microscopy does show asexual forms of *P. falciparum* or the dipstick is positive, the second-line antimalarial treatment should be given. The health worker should consider as treatment failures also patients with persistent fever, who have received an adequate dose of antimalarials outside the health facility.

4.8.2 Very severe febrile disease

In most circumstances, the child classified as having VERY SEVERE FEBRILE DISEASE will be referred as quickly as possible after being given pre-referral antimalarial and antibiotic therapy. No laboratory investigation would normally be required to guide the treatment at the first level health facility. However, a blood film or an RDT dipstick test taken at the first level

health facility before treatment is started can provide useful information for the management of the child at the referral facility (the blood slide can accompany the child to the hospital). In the event that the child has to be managed at the first level health facility the information can be used to guide this treatment.

4.8.3 Uncomplicated malaria

In the absence of generally useable clinical criteria for malaria, other than fever, and faced with difficulties in confirming other causes of fever on clinical grounds, the algorithm for the management of non-severe malaria in low risk areas can only be improved if other criteria can be found.

The cost and potential risks from the single or multi-drug antimalarial regimens needed in South East Asia and elsewhere make it essential to increase the specificity of the algorithm. Microscopy and/or rapid diagnostic tests will be an essential part of future malaria control strategies, particularly in lower risk areas, with special emphasis being put on quality control.

Some countries (e.g. Cambodia) have already adapted the fever chart to include the use of dipsticks in the assessment and classification. WHO will make available a guideline for this adaptation as soon as possible.

4.8.4 Where borreliosis is common

Borrelia are easily detected in Giemsa-stained blood films, so a high incidence of borreliosis places a high priority on microscopy. If Borrelia is found, procaine penicillin should be given (see Section C7).

5. FEVER - DETECTING FEVER AND CHOICE OF ANTIPYRETIC

Generic guidelines

A child is classified as having FEVER if the child either has an axillary temperature of 37.5^{o}C or above, or feels hot, or there is a history of fever reported by the mother. A child with fever should receive a further assessment for malaria and measles. Paracetamol is recommended only for the treatment of high fever, defined as axillary temperature of 38.5^{o}C or above or rectal temperature of 39.0^{o}C or above. In outpatient settings it is recommended that fever management be based on measurement of axillary temperature. All temperatures on the chart are expressed as axillary measurements. Children with high fever are given a single dose of paracetamol only in clinic. Additional doses of paracetamol are not dispensed for continued use at home.

5.1 Detecting fever

In the IMCI guidelines, a child is considered to have the main symptom of fever in three circumstances: the mother reports a fever during the child's current illness, an elevated temperature is measured by thermometer, or the child feels hot to the touch.

Although rectal temperature provides a close approximation to core body temperature (temperatures above 38.0° C indicate "abnormality," i.e. fever or hyperthermia), recommended practice in outpatient settings is to base fever management on measurement of axillary temperature. This is because it is more difficult to measure rectal temperature in outpatient settings, and it requires that the thermometer can be cleaned and sterilised. Oral and axillary temperatures are generally lower than rectal temperatures, by approximately 0.5°C and 0.8° C respectively, provided that the thermometer is left in place for at least one minute[1,2].

Contrary to prevailing wisdom, most mothers are able to subjectively determine fever in their children.[3] Moreover, mothers' assessments are usually sensitive enough to detect high fever. Several studies have shown that a recent history of fever, provided by the mother using local terms, is a better predictor of clinical malaria than assessment based on temperature measurement alone, especially in highly endemic areas.[4]

Studies have also shown good correlation between a child who feels hot and an elevated temperature[5,6]. Although use of a thermometer is recommended, the guidelines can be applied in the absence of a functioning thermometer.

> ***POSSIBLE (discouraged) ADAPTATION:*** **Substitute rectal for axillary measurement of the temperature**
>
> If rectal temperatures are routinely used in first-level (outpatient) health facilities, the temperatures given on the charts and throughout the modules could be changed to rectal measurements by adding 0.5°C. However, there is no advantage to rectal measurements in this setting. It is more difficult to obtain a rectal temperature in outpatient facilities and this approach requires available methods for cleaning and sterilizing thermometers.

5.2 Limiting antipyretic treatment to children with high fever

Fever is an elevation of the body temperature, defined as an axillary temperature of 37.5°C or above, or rectal temperature of 38°C or above. Fever is a manifestation of many infectious diseases, including meningitis, malaria, pneumonia, measles, influenza, typhoid, and otitis media. It can also be a symptom of non-infectious conditions, such as injuries, burns, abscess, septic wound, hypersensitivity reactions and, more rarely, neoplastic diseases or vascular accidents. The most obvious

common factors in these conditions are tissue injury and associated inflammation.

The body regulates its normal central or "core" temperature through heat-producing and heat-dissipating mechanisms. These mechanisms are coordinated by the thermoregulation centre situated in the hypothalamus. The main source of body heat is the internal metabolism, especially of the abdominal viscera during rest and the muscles during physical work. Heat loss is achieved principally through cutaneous vasodilatation and sweating.

Under certain specific circumstances, such as during heavy physical activity or overdressing in a hot, humid environment, these thermoregulation mechanisms are insufficient to compensate for heat gain. The core temperature rises above the normal "thermostatic set-point" (usually 37°C) and this condition is called hyperthermia. Temperatures may rise above 41°C, which can lead to heat stroke.

During fever, however, the brain changes regulation of body temperature so that the normal thermostatic set point is shifted upward and temperature is then regulated and maintained around this new level. During fever, unlike hyperthermia, thermoregulation still functions, but at a body temperature threshold that is higher than normal. This shift in the thermostatic set point is caused by molecules, called endogenous pyrogens, released by monocytes during the inflammatory response to various types of tissue injuries. These molecules act on the hypothalamus through the mediation of arachidonic acid derivatives[7]. The hypothalamus carefully controls the rise in the thermostatic set-point so that body temperature rarely exceeds 41°C, even in children[8,9].

Few clinical studies have looked at the clinical consequences of fever or of antipyretic treatment in children. Data from laboratory immunological studies and a limited number of animal studies suggest, however, that a moderate rise in body temperature may improve immune defence against infection and may therefore be desirable. Harmful effects of fever alone are rare and are found mainly in children who are very ill and compromised (for example, those with very severe pneumonia) or with very high fever (above 42° C). For all these reasons, antipyretic treatment is not indicated for fever alone (axillary temperature below 38.5° C or rectal temperature below 39°C).

A WHO review published in 1997 provides a more in-depth technical basis for the generic guidelines.[10]

OTHER CONSIDERATIONS: **Lower the threshold for fever treatment.**

Doctors may propose that the threshold for treatment for fever be lowered from 38.5°C axillary to 37.5°C or 38°C, based on the belief this will prevent the occurrence of febrile convulsions or hasten recovery from illness. As explained above, these beliefs have no foundation[10]. Lowering the threshold

for the treatment of fever in clinic will only result in a substantial increase in the amount of antipyretic dispensed, consuming precious health service and family resources.

5.3 Antipyretic treatment

Administering a single oral dose of paracetamol in clinic, rather than dispensing several tablets for use at home, avoids the possibility of confusion between paracetamol and other drugs of similar appearance, such as chloroquine, which are of greater importance in treating the child. If the child is receiving chloroquine to treat malaria, this will help to lower the fever, as chloroquine has antipyretic properties.

POSSIBLE ADAPTATION: **Substitute aspirin for paracetamol.**

Paracetamol is safer than aspirin, which carries the very small risk of Reyes syndrome, but it is more expensive. Aspirin can be substituted if paracetamol cannot be afforded.

POSSIBLE ADAPTATION: **Dispense several doses of antipyretic rather than giving a single dose in clinic.**

Mothers may be used to chloroquine treatment for malaria which lowers fever very quickly. They may therefore be dissatisfied with the slower action of cotrimoxazole (sulfadoxine-pyrimethamine) in reducing fever, and may unnecessarily seek treatment elsewhere. This may justify dispensing several tablets of paracetamol rather than giving a single dose in the clinic when cotrimoxazole is used for the treatment of both pneumonia and malaria. Reducing fever with several doses of paracetamol may also improve the child's appetite and lessen the nutritional impact of the illness, but this is an area where further research is required.

OTHER CONSIDERATIONS: **Use tepid sponging in children with malaria and diarrhoea, but not in children with pneumonia.**

The only circumstance in which sponging may be warranted is when the temperature is above 41^{o}C. Tepid (never cold) water sponging or bathing can be used to rapidly lower body temperature. An antipyretic should be given at the same time in order to maintain the lower temperature once sponging or bathing is stopped.

Used alone, sponging febrile children with tepid or cold water is not very effective. It produces discomfort (peripheral vasoconstriction, shivering) as the body tries to maintain the high temperature regulated by hypothalamic control, and the temperature quickly returns to the previous level after sponging is

discontinued.

Tepid sponging is not recommended in children with pneumonia. The discomfort, shivering, and struggle associated with sponging can greatly increase oxygen consumption and may precipitate respiratory failure in children with severe pneumonia.[11]

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6. MEASLES

Generic guidelines

For IMCI, fever is the starting point for the classification of MEASLES. Acute measles is diagnosed if a child has fever with a generalized rash plus cough or runny nose or red eyes. Because the damaging effects of measles can last for some time after the rash and fever have disappeared, the mother is also asked about the occurrence of measles in the child within the last 3 months.

All cases of measles are given vitamin A; a dose in clinic followed by a second dose administered the next day by the mother. Severe classifications may be associated with measles and may require the child to be referred for hospital care. These include particularly SEVERE PNEUMONIA, VERY SEVERE FEBRILE DISEASE and SEVERE MALNUTRITION. Children with signs of measles plus any general danger sign or clouding of the cornea or deep or extensive mouth ulcers have SEVERE COMPLICATED MEASLES. These children are given a first dose of an appropriate antibiotic as well as vitamin A before urgent referral to hospital.

Mothers are taught to treat mouth ulcers using gentian violet and to treat conjunctivitis with tetracycline eye ointment.

Diarrhoea, pneumonia, and ear infection are common complications of measles. They should be managed in the same way as in a child without measles. Many of the complications of measles (pneumonia, stridor, diarrhoea, and malnutrition) are dealt with in other classification tables of the chart.

6.1 Measles mortality and the rationale for improving measles case management

The case management of measles is included in the *Integrated Management of Childhood Illness* for several important reasons:

- Despite substantial success in improving immunization coverage in many developing countries, many measles cases and deaths continue to occur. The WHO Expanded Programme on Immunization (EPI) estimated that 30 to 40 million cases and 800,000 deaths due to measles occurred in the year 2000 in developing countries due to measles.

- Even with universal immunization coverage efforts, some countries have low or even declining measles immunization coverage.

- The measles vaccine has less than 100% efficacy. The current vaccine is recommended to be given at 9 months of age. However, immunization is often delayed. In addition, many measles cases are seen in infants aged 6, 7 and 8

months, especially in populations living in densely crowded conditions.

- To reduce mortality and morbidity due to measles to the lowest possible level, it is necessary to improve the case management of measles

Death is caused by measles alone or measles complicated by, most commonly, pneumonia, laryngotracheitis, or diarrhoea. Other, usually non-fatal, complications of measles include conjunctivitis, otitis media, and mouth ulcers. Measles can also result in significant disability, including blindness, chronic lung disease (bronchiectasis and recurrent infection), and neurological dysfunction.

Measles also has other longer-term effects. It increases the risk of pneumonia, persistent diarrhoea, failure to thrive, and malnutrition for several months after the acute infection. Studies in children in India have shown slower weight gain and higher rates of infection and of hospitalization in the 6 months following measles.

Early complications from measles (during the first week) are usually due to the measles virus itself or to severely reduced circulating levels of vitamin A. Later complications are often caused by secondary viral and bacterial infections. Measles damages the epithelial surfaces and the immune system (this damage persists for many weeks). It also reduces vitamin A levels, increasing susceptibility to infections caused by the pneumococcus, gram-negative bacteria, and adenovirus.

6.2 Detecting measles

For acute measles, the case definition has been simplified to fever plus generalized rash plus one of: cough, runny nose or red eyes. This is not a highly specific definition; rubella, erythema infectiosum (Fifth disease), scarlet fever, and dengue fever can also present with the same symptoms. The case definition for measles can be made more specific if two of the following are required to be present: cough, runny nose, red eyes, or sore mouth. However, this is more complicated to teach and requires an adequate functional definition of sore mouth. WHO is reviewing this case definition.

A history is taken from the mother to check whether a child has had measles within the last 3 months. This is because assessment which focus only on detecting current cases of measles may miss children who are vitamin A deficient and who are experiencing complications. Many complications of measles will thus be detected during clinic visits for illness, following the mother's reporting a history of measles.

6.3 Treatment for measles

The case-fatality rate and negative longer-term effects of measles can be reduced by giving vitamin A and ensuring good case management of common complications.

Measles infection also increases the likelihood of recurrence of herpes virus, candida, and malaria. This is why, in high malaria risk settings, malaria treatment is given to children who have measles with fever.

Other than the administration of vitamin A, the management of pneumonia, diarrhoea, and ear infection in a child with measles is basically the same as in children without measles. An important exception is that if a child with measles and pneumonia fails to improve by the follow-up visit on day 2, he or she is referred to hospital.

Stomatitis is a common problem caused by the measles virus itself, or by the herpes virus or candida. In most children, this is limited to the early onset of a sore mouth without ulcers, which does not require specific treatment. Stomatitis with mouth ulcers that are not deep or extensive can be treated by cleaning with saline followed by the application of gentian violet. A half-strength formulation of gentian violet, with a concentration of 0.25%, should be used for mouth ulcers, not the full-strength concentration of 0.5%, which is suitable for application to the skin. This is recommended because of concern that application of full strength gentian violet may actually cause mouth ulcers[1]. A child with severe stomatitis, with deep or extensive mouth ulcers, should be referred to hospital and may require nasogastric feeding. (These children may also be referred based on the general danger sign "not able to drink.") The variation in the rate of severe stomatitis complicating measles may be due in part to variations in the rate of herpes infection in children.

Because children with measles may have persistent diarrhoea, may have sore mouths and may be unwell for prolonged periods they may lose weight rapidly and become malnourished. Caretakers must be advised and supported in making sure that these children are encouraged to eat and are given extra feeds during their recovery.

Additional detail about the technical basis for the measles case management guidelines is provided in two technical reviews.[2,3]

> ***POSSIBLE ADAPTATION:*** **Refer all children with measles plus pneumonia to hospital.**
>
> This is only feasible if few cases are occurring and there is adequate inpatient capacity,
>
> ***POSSIBLE ADAPTATION:*** **Add feeding assessment and counselling to the treatment for all children with measles or a history of measles in the past three months**
>
> The generic guidelines prescribe a feeding assessment for all children who are aged less than two years or who are low weight for age. It may be useful

to assess the feeding of all children with measles, irrespective of their age or weight for age, to provide a basis for counselling the caretaker on feeding

***POSSIBLE ADAPTATION:* If measles is close to being eliminated, remove measles case management from the course.**

This decision should not be based on measles immunisation coverage estimates. The advantages of leaving measles in the algorithm are that it reminds the health worker that measles does still exist and that it provides an opportunity for the health worker to alert the health authorities in the event of cases being seen. In countries that are pursuing measles elimination notification of cases could be added to the management of cases taught in the course, and possibly included in the treatment box in the chart.

The problem that arises with retaining measles in the guidelines when the incidence has become very low is that it is difficult to train health workers in the absence of cases for demonstration.

***POSSIBLE ADAPTATION:* If measles is close to being eliminated and there is an active case surveillance system, including laboratory confirmation, use the assessment and classification of measles as an indicator to also send blood for confirmation of the diagnosis of a case of measles.**

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7. OTHER CAUSES OF FEVER

Generic guidelines

Children with typhoid, tuberculosis, osteomyelitis, and other causes of prolonged fever should be referred to hospital if they have had a fever for 7 days or more.

For other possible causes of fever, children with severe pharyngitis or tonsillitis who are not able to swallow are referred to hospital based on the general danger sign, "not able to drink." The generic guidelines do not specifically address the assessment of sore throat in order to identify suspected streptococcal pharyngitis and to provide antibiotic treatment. Pharyngitis and cellulitis might be assessed and treated as an "other problem," however, if the health worker has been prepared to do so. Many health workers would refer a child with osteomyelitis or septic arthritis, recognizing them as conditions that they cannot treat in their facility.

7.1 Typhoid and paratyphoid fever

Children are referred if they have had fever every day for more than 7 days. This should allow the diagnosis and treatment of children with typhoid, paratyphoid, non-respiratory tuberculosis, abscess, urinary tract infection, osteomyelitis, and other infections.

If referral is not feasible or is delayed, and typhoid is a possible diagnosis, the guidelines could be adapted to start treatment with cotrimoxazole. If there is known drug resistance in the area the guidelines may be adapted to give a fluoroquinolone antibiotic for *5* days (such as ofloxacin at 10 mg/kg/day)[5,6,7].

7.2 Bacterial meningitis in the African cerebrospinal meningitis (CSM) belt

Children are susceptible to meningococcal infection after losing their protective antimeningococcal antibodies. When epidemics occur, young children with suspected meningococcal infection should be treated with intramuscular oily chloramphenicol, according to national guidelines for epidemic control,

Meningitis risk is high in the CSM belt during the dry season. The CSM belt covers an area of Africa which also has seasonal malaria. Where there is a malaria transmission season every year, children benefit in the dry season from malaria immunity acquired during the rainy season. Therefore, during low malaria risk season, the generic guidelines do not recommend an antimalarial treatment for children presenting with neck stiffness.

7.3 Relapsing fever

7.3.1 Aetiology and diagnosis

Characterised by recurrent fever attacks, relapsing fever is caused by the spirochaete *Borrelia,* which is transmitted to humans by lice or soft-bodied ticks.

Relapsing fever occurs in most parts of the world where there is inadequate sanitation and personal hygiene. It is associated with catastrophic situations, such as war, famine, and large influxes of refugees. Louse-borne relapsing fever mainly occurs in epidemic or endemic forms in the Sudan and Ethiopia,[3,9] while tick-borne relapsing fever occurs worldwide.

Regardless of vector, parasite or the immune status of the host, most episodes of relapsing fever have a similar clinical picture: sudden fever (>= 40^{o}C) with chills, prostration, headache, severe myalgia and arthralgia. Other common signs include: tachypnoea, tachycardia, splenomegaly, hepatomegaly, abdominal tenderness, petechial rash, epistaxis, stiff neck with Kernig sign, and jaundice.

Children with relapsing fever who are under 5 years of age are less likely to have these clinical signs. Only about 50% of children in this age group, for example, have hepatomegaly and splenomegaly. This makes it difficult to diagnose relapsing fevers in children under 5 in malaria endemic areas without a blood smear.

After three to six days the fever subsides, accompanied by profuse sweating, and the patient remains afebrile and asymptomatic for the following three to six days. This afebrile period coincides with the retreat of the spirochaetes into the visceral tissues such as the spleen, liver, and renal tubules. Soon after the afebrile period, most untreated patients experience up to five to six relapses. During each relapse an antigenically distinct variant of *Borrelia* is released into the bloodstream.

Isolated relapsing fever cases can resemble many infections, such as malaria, pneumonia, dengue fever, leptospirosis, typhus, meningitis, typhoid fever, and influenza. But, in areas where relapsing fever is endemic, clinical recognition of relapsing fever is straightforward. Specific diagnosis is based on identifying the spirochaete in peripheral venous blood using dark field microscopy, or Giemsa or Wright stain methods.

7.3.2 Treatment of relapsing fever and management of Jarisch-Herxheimer reaction (JHR)

The case fatality rate for relapsing fever can reach 70% in untreated cases, but is usually 5% or less in patients treated with antibiotics. Most deaths in patients who have received treatment are due to Jarisch-Herxheimer reaction (JHR), which can happen one to two hours after the first antibiotic dose. JHR is thought to be caused by endotoxins which result from the lysis of the spirochaete[10].

JHR is characterised by:

- Fever accompanied by chills, distress, and fall of temperature by sweating.
- Aggravation of existing symptoms, for example headache, stiff neck, or abdominal tenderness.
- Tachypnoea, vasoconstriction and high blood pressure, later followed by low blood pressure, vasodilatation, and low peripheral resistance.

Because of the risk of death from JHR, patients treated for relapsing fever must be kept under observation for several hours after being given the first dose of antibiotic. Alternatively, the caretaker should be carefully advised about signs which mean she should bring the child back to the health facility immediately.

There are several effective antimicrobial regimens for relapsing fever. These include 250 mg tetracycline intravenously plus 500 mg orally; a single oral dose of 100 mg of doxycycline; a single dose of 500 mg of erythromycin or chloramphenicol; and a single low dose of intramuscular procaine penicillin.

The regimen of choice should be consistent with an important objective of treatment in the generic guidelines: to reduce the rate and severity of JHR, and hence of death, and prevent relapses[11].

In a reported clinical trial[12], a single low dose of procaine penicillin was found to reduce the rate of JHR to 5%, compared with 45% in patients treated with tetracycline and 30% in those treated with a higher procaine penicillin dose (400,000 IU). None of the patients treated with low dose procaine penicillin died, whereas the fatality rate in those treated with either tetracycline or higher doses of procaine penicillin reached 5 %. Relapses were very frequent (>45%) among the group given low dose procaine penicillin, but the severity of relapses following procaine penicillin was low. Although tetracycline is more effective in preventing relapses (almost 0% relapse), rates of JHR (about 50%)

and case fatality (5 %) are higher with a tetracycline regimen.

Antimicrobial treatment alone is not enough to control relapsing fever cases. It should be combined with an effective delousing programme[13] which includes the following measures:

- Targeting all household members of a case.
- Boiling all personal cloths, burning blankets, and head shaving, if this is acceptable.
- Provision of soap and adequate water for daily bathing.
- Spraying dwellings in endemic areas and personal belongings with one of: 3 % benzene hexachloride or pyrethrum; 1 % aldrin; 0.5% malathion; or 2% propoxur (Baygon). All cracks, joints, and surfaces should be sprayed thoroughly.

POSSIBLE ADAPTATION: **Add management of relapsing fever.**

In endemic areas relapsing fever should be suspected in all children with persistent fever.

In areas with no malaria or a low risk of malaria, children with fever who are confirmed not to have travelled to highly malarious areas should also be suspected of having relapsing fever. It is, however, important that health workers establish the occurrence of other cases in the area before deciding to treat a sick child for relapsing fever.

A single low dose of procaine penicillin is the antimicrobial regimen selected for the treatment of relapsing fever cases. Health workers are advised to counsel mothers about personal hygiene as well as about delousing themselves, the child, and the whole family.

To add relapsing fever, see *Section G, 10.0 Add case management of relapsing fever.*

7.4 Dengue Haemorrhagic Fever (DHF)

Adaptations for the inclusion of dengue haemorrhagic fever have been made in several countries in South East Asia with high seasonal incidence of the disease in children, but the experience is still being evaluated. WHO will issue a guideline for adaptation as soon as possible.

7.5 Sore throat

The WHO ARI guidelines and training materials include management of sore throat. In the generic IMCI course, however, sore throat would be treated as an "other problem." The following should be considered in deciding whether to adapt the course to add specific management of sore throat in children less than *5* years of age.

Epidemiology of rheumatic fever

- The main justification for treating streptococcal sore throat with penicillin is to prevent rheumatic fever and thereby contribute to the prevention of rheumatic heart disease. Streptococcal sore throat and rheumatic fever are predominantly a problem in school age children *(*5-15 year olds), with a small percentage of cases of rheumatic fever occurring in children under 5 years of age. The table below summarizes the age distribution of the onset of rheumatic fever in seven developing countries in the early 1970s; 4.6% were less than 5 years of age with almost all cases in 3-4 year olds (only 0.6% were in children less than 3 years of age)[14]. However, since rheumatic fever and rheumatic heart disease are based on an immunological reaction, the likelihood of subsequent rheumatic fever might be influenced by treatment of streptococcal pharyngitis in children under 5 years of age.

Distribution of patients by age of onset of rheumatic fever (Cairo, Cyprus, Kingston, Lagos, New Delhi, Tehran, Ulaanbaatar)		
Age – years	**Percentage**	**Number of cases**
<1	**0.1**	**2**
1	**0.1**	**2**
2	**0.4**	**7**
3	**1.2**	**23**
4	**2.8**	**54**
5	**4.6**	**88**
6	**8.5**	**163**
7	**7.4**	**142**
8	**7.4**	**142**
9	**8.4**	**162**
10	**8.8**	**170**
>10	**0.4**	**972**

The main contribution of streptococcal pharyngitis to mortality or disability is via rheumatic fever leading to chronic rheumatic heart disease in older children and adults. In the Global Burden of Disease study, rheumatic heart disease accounted for 1.1 % of deaths and 0.5% of DALYs in developing countries[15]. In an earlier study in Ghana comparing healthy days of life lost, rheumatic heart disease ranked 32, accounting for 1% of healthy days of life lost. Three other conditions included in IMCI, malaria, measles, and pneumonia, ranked first, second, and third, accounting for 10.2%, 7.3%, and

5.8% of healthy days of life lost respectively.[16]

Prevention of rheumatic fever and heart disease

Regular use of benzathine penicillin in children who have had rheumatic fever can successfully prevent progressive heart disease. This is called secondary prevention or prophylaxis. Because of the difficulties and expense of primary prevention, secondary prevention has become the main approach used in community-based programmes to prevent rheumatic fever and heart disease. It has been shown to be feasible and cost-effective in several developing countries[14], and is the main strategy advocated by WHO to control rheumatic heart disease.

Treatment of streptococcal sore throats is another strategy to prevent rheumatic fever - primary prevention - and should concentrate on school age children. However, in younger children, primary prevention of rheumatic fever through the treatment of pharyngitis has limitations.

Clinical signs alone, without throat culture, discriminate poorly between viral pharyngitis and streptococcal pharyngitis in young children. Of all pharyngitis episodes, only *15-20%* are due to streptococci. Although exudate is common in children under 3 years of age[17], it is usually not due to infection with Group A streptococci. One study found that only 1 of 27 children under 3 years of age had a rise in ASOT titre with exudative pharyngitis[18]. In infants, the clinical presentation of streptococcal infection can be non-specific with fever and crusted lesions around the nose, rather than pharyngitis.

In addition, 30-50% of rheumatic fever cases follow clinically inapparent streptococcal throat infection. There is also some evidence that streptococcal skin infection may be a significant contributor to acute rheumatic fever in some settings[19,20].

Because of the poor performance of clinical signs in discriminating streptococcal pharyngitis and the low incidence of rheumatic fever following streptococcal pharyngitis, a very large number of cases of pharyngitis need to be treated in order to prevent a case of rheumatic fever, and even more to prevent a case of severe chronic rheumatic heart disease. Many cases of rheumatic fever will continue to occur despite primary treatment of sore throat.

Nevertheless, if the Ministry of Health has implemented this approach in school age children, it may make sense to also advise antibiotic treatment of streptococcal sore throat in children less than 5 years of age. However, this approach requires the availability of benzathine penicillin since the goal of treatment is eradication of group A streptococci from the pharynx. Eradication cannot be reliably achieved with oral treatment unless compliance with 10

days of penicillin VK or amoxycillin can be assured. Use of benzathine penicillin also requires precautions to ensure sterile syringes and needles, given the risk of HIV and Hepatitis B.

Although studies in developed countries indicate streptococcal pharyngitis is usually a self-limited illness, treatment of streptococcal pharyngitis can reduce the duration of illness by a few days and prevent some suppurative complications. Treatment shortens the duration of sore throat and cervical nodes by an average of 36 hours: similar reductions are achieved in the duration of anorexia. One would not expect major nutritional effects from uncomplicated streptococcal pharyngitis. The nutritional consequences, however, may be more significant in a child who is already malnourished.

A study by Steinhof et al showed that basing the classification of streptococcal sore throat on a tender, enlarged cervical node and a throat exudate was 94% specific, but only 12% sensitive. Requiring only one of these clinical signs (enlarged cervical node or throat exudate) raised the sensitivity to 84% with a significant reduction in specificity to 40%. Although this study included children between 2 and 13 years of age, the sensitivity and specificity of the clinical features were not significantly different between children older or younger than 5 years of age.

Further work remains to be done to identify a guideline with better sensitivity, while retaining adequate specificity. A guideline with low specificity may be more appropriate for identifying school-age children for penicillin treatment, for the reasons given above. However, the high rate of antibiotic use that could result from the proposed guideline, which has only 40% specificity, would not be appropriate for children under *5* years of age. Guidelines with low specificity for the management of sore throat could result in a high rate of use of penicillin which would promote penicillin resistance in the pneumococcus, given the substantial rate of nasopharyngeal carriage in young children. In countries where most children with pharyngitis are currently treated with an antibiotic, use of an adequately specific guideline to identify children with streptococcal infection might reduce unnecessary antibiotic treatment of viral pharyngitis.

Provision of any guideline must be accompanied by a regular supply of benzathine penicillin both for primary and secondary prevention in order for the prevention of rheumatic fever and heart disease to be effective.

The Ministry of Health needs to decide whether preventing rheumatic fever is a priority and whether this is to be attempted by primary or secondary prevention or both. WHO Cardiovascular Diseases (CVD) reports that currently 23 countries have secondary prevention programmes; in seven of these countries some form of primary prevention aimed at school age children

is now included.

POSSIBLE ADAPTATION: **Add the management of sore throat.**

If a decision is made to add sore throat to the guidelines and to provide an adequate supply of benzathine penicillin, the adaptations required in the charts and modules can be based on the *WHO/ARI* guidelines and the training materials in the module *Management of the Child with an Acute Respiratory Infection*[22]. Limiting the management of sore throat to children 2 years or older may be useful.

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5. FEVER - DETECTING FEVER AND CHOICE OF ANTIPYRETIC

Generic guidelines

A child is classified as having FEVER if the child has either an axillary temperature of 37.5° C or above, or feels hot, or a history of fever reported by the mother. A child with fever should receive a further assessment for malaria and measles. Paracetamol is recommended only for the treatment of high fever, defined as axillary temperature of 38.5° C or above or rectal temperature of 39° C or above. In outpatient settings it is recommended that fever management be based on measurement of axillary temperature. All temperatures on the chart are expressed as axillary measurements. Children with high fever are given a single dose of paracetamol only in clinic. Additional doses of paracetamol are not dispensed for continued use at home.

5.1 Detecting fever

In the IMCI guidelines, a child is considered to have the main symptom of fever in three ways: the mother reports a fever during the child's current illness, an elevated temperature is measured by thermometer, or the child feels hot to touch.

Although rectal temperature provides a close approximation to core body temperature (temperatures above 38° C indicate "abnormality," i.e. fever or hyperthermia), recommended practice in outpatient settings is to base fever management on measurement of axillary temperature. This is because it is more difficult to measure rectal temperature in outpatient settings, and it requires cleaning and sterilising thermometers. Oral and axillary temperatures are generally lower than rectal temperatures, by approximately 0.5° C and 0.8° C respectively, provided that the thermometer is left in place for at least one minute.[1,2]

Despite prevailing wisdom to the contrary, most mothers are able to subjectively determine fever in their children.[3] Moreover, mothers' assessments are usually sensitive enough to detect high fever. Several studies have shown that a recent history of fever, provided by the mother using local terms, is a better predictor of clinical malaria than assessment based on temperature measurement alone, especially in highly endemic areas.[4]

Studies have also shown good correlation between a child who feels hot and an elevated temperature.[5,6] Although use of a thermometer is recommended, the guidelines can be applied in the absence of a functioning thermometer.

***POSSIBLE (discouraged) ADAPTATION*: Substitute rectal for axillary measurement of the temperature.**

If rectal temperatures are routinely used in first-level (outpatient) health facilities, the temperatures given on the charts and throughout the modules could be changed to rectal measurements by adding 0.5° C. However, there is no advantage to rectal measurements in this setting. It is more difficult to obtain a rectal temperature in outpatient facilities and this approach requires available methods for cleaning and sterilising thermometers.

5.2 Limiting antipyretic treatment to children with high fever

Fever is an elevation of the body temperature, defined as axillary temperature of 37.5° C or above, or rectal temperature of 38° C or above. Fever is a manifestation of many infectious diseases, including meningitis, malaria, pneumonia, measles, influenza, typhoid, and otitis media. It can also be a symptom of non-infectious conditions, such as injuries, burns, abscess, septic wound, hypersensitivity reactions, and, more rarely, neoplastic diseases or vascular accidents. The most obvious common factors in these conditions are tissue injury and associated inflammation.

The human body regulates its normal central or "core" temperature through heat-producing and heat-dissipating mechanisms. These mechanisms are coordinated by the thermoregulation centre (TRC) situated in the hypothalamus. The main source of body heat is the internal metabolism, especially the abdominal viscera during rest and the muscles during physical work. Heat loss is achieved principally through cutaneous vasodilation and sweating.

Under certain specific circumstances, such as during heavy physical activity or overdressing in a hot, humid environment, these thermoregulation mechanisms are insufficient to compensate for heat gain. The core temperature rises above the normal "thermostatic set-point" (usually 37° C) and this condition is called hyperthermia. Temperatures may rise above 41° C which can lead to heat stroke.

During fever, however, the brain changes regulation of body temperature so that the normal thermostatic set-point is shifted upward and temperature is then regulated and maintained around this new level. During fever, unlike hyperthermia, thermoregulation still functions, but at a body temperature threshold that is higher than normal. This shift in the thermostatic set-point is caused by molecules, called endogenous pyrogen, released by monocytes during the inflammatory response to various types of tissue injuries. These molecules act on the hypothalamus through the mediation of arachidonic acid derivatives.[7] The hypothalamus carefully controls the rise in the thermostatic set-point so that body temperature rarely exceeds 41° C, even in children.[8,9]

Few clinical studies have looked at the clinical consequences of fever or of antipyretic treatment in children. Data from laboratory immunological studies and a limited

number of animal studies suggest, however, that a moderate rise in body temperature may improve immune defence against infection and may therefore be desirable. Harmful effects of fever alone are rare and are found mainly in children who are very ill and compromised (for example, those with very severe pneumonia) or with very high fever (above 42° C). For all these reasons, antipyretic treatment is not indicated for fever alone (axillary temperature below 38.5° C or rectal temperature below 39° C).

A recently published review provides a more in-depth technical basis for the generic guidelines.[10]

***OTHER CONSIDERATIONS*: Lower the threshold for fever treatment.**

Doctors may propose that the threshold for fever treatment be lowered from 38.5° C axillary to 37.5° C or 38° C based on the belief this will prevent the occurrence of febrile convulsions or hasten recovery from illness. As explained above, these beliefs have no foundation.[10] Lowering the threshold for the treatment of fever in clinic will only result in a substantial increase in the amount of antipyretic dispensed, consuming precious health service and family resources.

5.3 Antipyretic treatment

Administering a single oral dose of paracetamol in clinic, rather than dispensing several tablets for use at home, avoids the possibility of confusion between paracetamol and other drugs of similar appearance, such as chloroquine, which are of greater importance in treating the child. If the child is receiving chloroquine to treat malaria, this will help to lower the fever as chloroquine has antipyretic properties.

***POSSIBLE ADAPTATION*: Substitute aspirin for paracetamol.**

Paracetamol is safer than aspirin, which carries the very small risk of Reyes syndrome, but it is more expensive. Aspirin can be substituted if paracetamol cannot be afforded.

***POSSIBLE ADAPTATION*: Dispense several doses of antipyretic rather than giving a single dose in clinic.**

Mothers may be used to chloroquine treatment for malaria which lowers fever very quickly. They may therefore be dissatisfied with the slower action of cotrimoxazole (sulfadoxine-pyrimethamine) in reducing fever. This may justify dispensing several tablets of paracetamol rather than giving a single dose in the clinic when cotrimoxazole is used for the treatment of both pneumonia and malaria. Reducing fever with several doses of paracetamol may also improve the child's appetite and lessen the nutritional impact of the illness, but this is an area where further research is required.

However, this strategy will increase the cost of treatment to health services, since antipyretics are commonly purchased by families. There is also the risk that families will prioritise giving the antipyretic, or confuse it with other pills of similar appearance, resulting in neglect or misdosage of specific, potentially life-saving treatment with an antimalarial or an antibiotic.

***OTHER CONSIDERATIONS*: Use tepid sponging in children with malaria and diarrhoea, but not in children with pneumonia.**

The only circumstance in which sponging may be warranted is when the temperature is above 41^{o} C. Tepid (never cold) water sponging or bathing can be used to rapidly lower body temperature. An antipyretic should be given at the same time in order to maintain the lower temperature once sponging or bathing is stopped.

Used alone, sponging febrile children with tepid or cold water is not very effective. It produces discomfort (peripheral vasoconstriction, shivering) as the body tries to maintain the high temperature regulated by hypothalamic control, and the temperature quickly returns to the previous level after sponging is discontinued.

Tepid sponging is not recommended in children with pneumonia. The discomfort, shivering, and struggle associated with sponging can greatly increase oxygen consumption and may precipitate respiratory failure in children with severe pneumonia.[11]

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6. MEASLES

Generic guidelines

For IMCI, fever is the starting point for the classification of MEASLES. Acute measles is diagnosed if a child has fever with a generalized rash plus cough or runny nose or red eyes. Because the damaging effects of measles can last for some time after the rash and fever have disappeared, the mother is also asked about the occurrence of measles in the child within the last 3 months.

All cases of measles are given vitamin A: a dose in clinic followed by a second dose administered the next day by the mother. Urgent referral to hospital is recommended for measles cases with SEVERE PNEUMONIA, stridor when calm (which may indicate life-threatening laryngotracheitis), corneal clouding, severe malnutrition, deep or extensive mouth ulcers or general danger signs. Children with signs of measles plus any general danger sign or clouding of the cornea or deep or extensive mouth ulcers have SEVERE COMPLICATED MEASLES. These children are given a first dose of an appropriate antibiotic as well as vitamin A before urgent referral to hospital.

Mothers are taught to treat mouth ulcers using gentian violet and to treat conjunctivitis with tetracycline eye ointment.

Diarrhoea, pneumonia, and ear infection are common complications of measles. They should be managed in the same way as in a child without measles. Many of the complications of measles (pneumonia, stridor, diarrhoea, and malnutrition) are dealt with in other classification tables of the chart.

6.1 Measles mortality and the rationale for improving measles case management

The case management of measles is included in the *Integrated Management of Childhood Illness* for several important reasons.

- Despite substantial success in improving immunization coverage in many developing countries, many measles cases and deaths continue to occur. In 1994, the WHO Expanded Programme on Immunization (EPI) estimated that 45 million cases and 1.3 million deaths occurred in developing countries due to measles.

- Even with universal immunization coverage (UCI) efforts, some countries have low measles immunization coverage. In some areas, coverage has declined since the UCI achievements.
- The measles vaccine has incomplete efficacy. The current vaccine is recommended to be given at 9 months of age. However, immunization is often

delayed. In addition, many measles cases are seen in infants aged 6, 7 and 8 months, especially in urban and refugee populations.

- To reduce mortality and morbidity due to measles to the lowest possible level, it is necessary to improve the case management of measles, reducing the case-fatality rates to less than 1%.

Death occurs from measles alone or measles complicated by, most commonly, pneumonia, laryngotracheitis, or diarrhoea. Other, usually non-fatal, complications of measles include conjunctivitis, otitis media, and mouth ulcers. Measles can also result in significant disability, including blindness, chronic lung disease (bronchiectasis and recurrent infection), and neurological dysfunction.

Measles also has other longer term effects. It increases the risk of pneumonia, persistent diarrhoea, failure to thrive, and malnutrition for months after the acute infection. Studies in children in India have shown slower weight gain and higher rates of infection and of hospitalization in the 6 months following measles. Studies in West Africa and Kenya suggest that the increased risk of death after measles may persist for a full year; this has not been documented elsewhere.

Early complications from measles (during the first week) are usually due to the measles virus itself or to severely decreased circulating levels of vitamin A. Later complications are often caused by secondary viral and bacterial infections. Measles damages the epithelial surfaces and the immune system (this damage persists for many weeks); and it lowers vitamin A levels, increasing susceptibility to infections caused by the pneumococcus, gram negative bacteria, and adenovirus.

6.2 Detecting measles

For acute measles, the case definition has been simplified to fever plus generalized rash plus one of: cough, runny nose, or red eyes. This is not a highly specific definition: rubella, erythema infectiousum (Fifth's disease), scarlet fever, and dengue fever can also present with the same symptoms. (The case definition for measles can be made more specific if two of the following are required to be present: cough, runny nose, red eyes, or sore mouth. However, this is more complicated to teach and requires an adequate functional definition of sore mouth.)
A history is taken from the mother to check whether a child has had measles within the last 3 months. This is because assessment which focused only on detecting current cases of measles might miss many children who are vitamin A deficient and who are experiencing complications. Many complications of measles will thus be detected during clinic visits for illness, following the mother's reporting a history of measles.

Mothers of children with measles are given clear instructions about returning to the clinic if the child shows specific danger signs of complications. This is a more

effective approach than scheduling regular follow-up visits, which would overburden the family and clinic, and would only detect a fraction of complications.

6.3 Treatment for measles

The case-fatality rate and negative longer term effects of measles can be reduced by giving vitamin A and good case management of common complications.

Measles infection also increases the likelihood of recurrence of herpes virus, candida, and malaria. This is why, in high malaria risk settings, malaria treatment is given to children who have measles with fever.

Other than vitamin A administration, the management of pneumonia, diarrhoea, and ear infection in a child with measles is basically the same as in children without measles. If a child with measles and pneumonia fails to improve by the follow-up visit on day 2, he or she is referred to hospital.

Stomatitis is a common problem caused by the measles virus itself, or by the herpes virus or candida. In most children, this is limited to the early onset of a sore mouth without ulcers, which does not require specific treatment. Stomatitis with mouth ulcers that are not deep or extensive can be treated by cleaning with saline followed by the application of gentian violet. A half-strength formulation of gentian violet, with a concentration of 0.25%, should be used for mouth ulcers, not the full-strength concentration of 0.5% which can be applied to the skin. This is recommended because of concern that application of full strength gentian violet actually causes mouth ulcers.[1] A child with severe stomatitis, with deep or extensive mouth ulcers, should be referred to hospital and may require nasogastric feeding. (These children may also be referred based on the general danger sign "not able to drink.") The variation in the rate of severe stomatitis complicating measles may be due in part to variations in the rate of herpes infection in children.

Additional detail about the technical basis for the measles case management guidelines is provided in two technical reviews.[2,3]

> ***POSSIBLE ADAPTATION*: Refer all children with measles plus pneumonia to hospital.**
>
> This is only feasible if few cases are occurring and there is adequate inpatient capacity.
>
> ***POSSIBLE ADAPTATION*: If measles is close to being eliminated, remove measles case management from the course.**

This decision should not be based on measles immunisation coverage estimates. Not including measles case management in the course is only an option if few cases of measles have occurred for several years and this situation is expected to continue. Case management of measles cases would then be included under "other problems."

POSSIBLE ADAPTATION: **If measles is close to being eliminated and there is an active case surveillance system, including laboratory confirmation, use the assessment and classification of measles as an indicator to also send blood for confirmation of the diagnosis of a case of measles.**

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7. OTHER CAUSES OF FEVER

Generic guidelines

Children with typhoid, tuberculosis, osteomyelitis, and other causes of prolonged fever would be referred to hospital if they have had a fever for 7 days or more.

For other possible causes of fever, children with severe pharyngitis or tonsillitis who are not able to swallow are referred to hospital based on the general danger sign, "not able to drink." The generic guidelines do not specifically address the assessment of sore throat in order to identify suspected streptococcal pharyngitis and to provide antibiotic treatment. Pharyngitis and cellulitis might be assessed and treated as an "other problem," however, if the health worker has been prepared to do so. Many health workers would refer a child with osteomyelitis or septic arthritis, recognizing them as conditions that they cannot treat in their facility.

7.1 Typhoid and paratyphoid fever

Children are referred if they have had fever every day for more than 7 days. This should allow the diagnosis and treatment of children with typhoid, non-respiratory tuberculosis, abscess, urinary tract infection, osteomyelitis, and other infections.

If referral is not feasible or is delayed, and typhoid is possible, the guidelines could be adapted to start treatment with cotrimoxazole. If there is known drug resistance in the area (such as in India[1,2], Pakistan[3,4], and the Mekong Delta), the guidelines could be adapted to give a fluoroquinolone antibiotic for 5 days (such as ofloxacin at 10 mg/kg/day).[5,6,7]

7.2 Bacterial meningitis in the African cerebrospinal meningitis (CSM) belt

Children are susceptible to meningococcal infection after losing their protective antimeningococcal antibodies. When epidemics occur, young children with suspected meningococcal infection should be treated with intramuscular oily chloramphenicol, according to national guidelines for epidemic control.

Meningitis risk is high in the CSM belt during the dry season. The CSM belt covers an area of Africa which also has seasonal malaria. Where there is a malaria transmission season every year, children benefit in the dry season from malaria immunity acquired during the rainy season. Therefore, during low malaria risk season, the generic guidelines do not recommend an antimalarial treatment for children presenting with neck stiffness.

7.3 Relapsing fever

7.3.1 Etiology and diagnosis

Characterised by recurrent fever attacks, relapsing fever is caused by the spirochaete, *Borrelia*, which is transmitted to humans by lice or soft-bodied ticks.

Relapsing fever occurs in most parts of the world where there is inadequate sanitation and personal hygiene. It is associated with catastrophic situations, such as war, famine, and large influxes of refugees. Louse-borne relapsing fever mainly occurs in epidemic or endemic forms in the Sudan and Ethiopia,[8,9] while tick-borne relapsing fever occurs worldwide.

Regardless of vector, parasite or the immune status of the host, most episodes of relapsing fever have a similar clinical picture: sudden fever (>= 40^{o} C) with chills, prostration, headache, severe myalgia and arthralgia. Other common signs include: tachypnea, tachycardia, splenomegaly, hepatomegaly, abdominal tenderness, petechial rash, epistaxis, stiff neck with Kernig sign, and jaundice.

Children with relapsing fever who are under 5 years of age are less likely to have these clinical signs. Only about 50% of children in this age group, for example, have hepatomegaly and splenomegaly. This makes it difficult to diagnose relapsing fevers in children under 5 in malaria endemic areas without a blood smear.

After three to six days the fever subsides accompanied by profuse sweating, and the patient remains afebrile and asymptomatic for the following three to six days. This afebrile period coincides with the retreat of the spirochaetes in the visceral tissues such as the spleen, liver, and renal tubules. Soon after the afebrile period, most untreated patients experience up to five to six relapses. During each relapse an antigenically distinct variant of *borrelia* is released into the bloodstream.

Isolated relapsing fever cases can resemble many infections, such as malaria, pneumonia, dengue fever, leptospirosis, typhus, meningitis, typhoid fever, and influenza. But, in areas where relapsing fever is endemic, clinical recognition of relapsing fever is straightforward. Specific diagnosis is based on identifying the spirochaete in peripheral venous blood using dark field microscopy, or Giemsa or Wright stain methods.

7.3.2 Treatment of relapsing fever and management of Jarisch-Herxheimer reaction (JHR)

The case fatality rate for relapsing fever can reach 70% in untreated cases, but is usually 5% or less in patients treated with antibiotics. Most deaths in patients who have received treatment are due to Jarisch-Herxheimer reaction (JHR), which can happen one to two hours after the first antibiotic dose. JHR is thought to be caused by endotoxins which result from the lysis of the spirochaete.[10]

JHR is characterised by:

- Fever accompanied by chills, distress, and fall of temperature by sweating.
- Aggravation of existing symptoms, for example headache, stiff neck, or abdominal tenderness.
- Tachypnea, vasoconstriction and high blood pressure, later followed by low blood pressure, vasodilation, and low peripheral resistance.

Because of the risk of death from JHR, patients treated for relapsing fever must be kept under observation for several hours after being given the first dose of antibiotic. Alternatively, the mother should be carefully advised about signs which mean she should bring the child back to the health facility immediately.

There are several effective antimicrobial regimens for relapsing fever. These include 250 mg tetracycline intravenously plus 500 mg orally; 100 mg doxycycline single dose orally; single dose 500 mg of erythromycin or chloramphenicol; and single low dose of intramuscular procaine penicillin.

The regimen of choice should be consistent with an important objective of treatment in the generic guidelines: to reduce the rate and severity of JHR, and hence of death, and prevent relapses.[11]

In a recent clinical trial[12], a single low dose of procaine penicillin was found to reduce the rate of JHR to 5%, compared with 45% in patients treated with tetracycline and 30% in those treated with a higher procaine penicillin dose (400000 IU). None of the patients treated with low dose procaine penicillin died, whereas the fatality rate in those treated with either tetracycline or higher doses of procaine penicillin reached 5%. Relapses were very frequent (>45%) among the group given low dose procaine penicillin, but the severity of relapses following procaine penicillin is low. Although tetracycline is more effective in preventing relapses (almost 0% relapse), rates of JHR (about 50%) and case fatality (5%) are higher with a tetracycline regimen.

Antimicrobial treatment alone is not enough to control relapsing fever cases, and should be combined with an effective delousing programme[13] which includes the following measures:

- Targeting all household members of a case.
- Boiling all personal cloths, burning blankets, and head shaving, if this is acceptable.
- Provision of soap and adequate water for daily bathing.
- Spraying dwellings in endemic areas and personal belongings with one of: 3% benzene hexachloride or pyrethrum; 1% alrin; 0.5% malathion; or 2% propoxur (Baygon). All cracks, joints, and surfaces should be sprayed thoroughly.

***POSSIBLE ADAPTATION*: Add management of relapsing fever.**

In endemic areas relapsing fever should be suspected in all children with persistent fever.

In areas with no malaria or low risk of malaria, children with fever who are confirmed not to have travelled to high malarious areas should also be suspected of having relapsing fever. It is, however, important that health workers establish the occurrence of other cases in the area before deciding to treat a sick child for relapsing fever.

A single low dose of procaine penicillin is the antimicrobial regimen selected for the treatment of relapsing fever cases. Health workers are advised to counsel mothers about personal hygiene as well as about delousing themselves, the child, and the whole family.

To add relapsing fever, see *Section G, 10.0 Add case management of relapsing fever.*

7.4 Dengue haemorrhagic fever (DHF)

The technical review and possible adaptations are still in development. Contact WHO/CHD to request available materials, if you need them.

7.5 Sore throat

The WHO ARI guidelines and training materials include management of sore throat. In the generic IMCI course, however, sore throat would be treated as an "other problem." The following should be considered in deciding whether to adapt the course to add specific management of sore throat in children under 5 years of age.

Epidemiology of rheumatic fever

- The main justification for treating streptococcal sore throat with penicillin is to prevent rheumatic fever and thereby contribute to the prevention of rheumatic heart disease. Streptococcal sore throat and rheumatic fever are predominantly a problem in school age children (5-15 year olds), with a small percentage of cases of rheumatic fever occurring in children under 5 years of age. The table below summarizes the age distribution of the onset of rheumatic fever in seven developing countries in the early 1970s; 4.6% were less than 5 years of age with almost all cases in 3-4 year olds (only 0.6% were in children less than 3 years of age).[14] However, since rheumatic fever and rheumatic heart disease are based on an immunological reaction, the likelihood of subsequent rheumatic fever might be influenced by treatment of streptococcal pharyngitis in children under 5 years of age.

Distribution of patient by age of onset of rheumatic fever (Cairo, Cyprus, Kingston, Lagos, New Delhi, Tehran, Ulaanbaatar)

	Percentage	Number of cases
<1 year	0.1%	2
1 year	0.1%	2
2 years	0.4%	7
3 years	1.2%	23
4 years	2.8%	54
5 years	4.6%	88
6 years	8.5%	163
7 years	7.4%	142
8 years	7.4%	142
9 years	8.4%	162
10 years	8.8%	170
> 10 years	0.4%	972

- The main contribution of streptococcal pharyngitis to mortality or disability is via rheumatic fever leading to chronic rheumatic heart disease in older children and adults. In the Global Burden of Disease study, rheumatic heart disease accounted for 1.1% of deaths and 0.5% of DALYs in developing countries.[15] In an earlier study in Ghana comparing healthy days of life lost, rheumatic heart disease ranked 32, accounting for 1% of healthy days of life lost; three other conditions included

in IMCI, malaria, measles, and pneumonia, ranked first, second, and third, accounting for 10.2%, 7.3%, and 5.8% of healthy days of life lost respectively.[16]

Prevention of rheumatic fever and heart disease

- Regular use of benzathine penicillin in children who have had rheumatic fever can successfully prevent progressive heart disease; this is called secondary prevention or prophylaxis. Because of the difficulties and expense of primary prevention, secondary prevention has become the main recommendation in community-based programmes to prevent rheumatic fever and heart disease. It has been shown to be feasible and cost-effective in several developing countries,[14] and is the main strategy advocated by WHO to control rheumatic heart disease.

- Treatment of streptococcal sore throats is another strategy to prevent rheumatic fever - primary prevention - and should concentrate on school age children. However, in younger children, primary prevention of rheumatic fever through the treatment of pharyngitis has limitations.

  Clinical signs alone, without throat culture, discriminate poorly between viral pharyngitis and streptococcal pharyngitis in young children. Of all pharyngitis episodes, only 15-20% are due to streptococci. Although exudate is common in children under 3 years of age[17], it is usually not due to infection with Group A streptococci. One study found that only 1 of 27 children under 3 years of age had a rise in ASOT titer with exudative pharyngitis.[18] In infants, the clinical presentation of streptococcal infection can be non-specific with fever and crusted lesions around the nose, rather than pharyngitis.

  In addition, 30-50% of rheumatic fever cases follow clinically inapparent streptococcal throat infection. There is also some evidence that streptococcal skin infection may be a significant contributor to acute rheumatic fever in some settings.[19,20]

  Because of the poor performance of clinical signs in discriminating streptococcal pharyngitis and the low incidence of rheumatic fever following streptococcal pharyngitis, a very large number of cases of pharyngitis need to be treated in order to prevent a case of rheumatic fever, and even more to prevent a case of severe chronic rheumatic heart disease. Many cases of rheumatic fever will continue to occur despite primary treatment of sore throat.

  Nevertheless, if the Ministry of Health has implemented this approach in school age children, it may make sense to also advise antibiotic treatment of streptococcal sore throat in children less than 5 years of age. However, this approach requires the availability of benzathine penicillin since the goal of treatment is eradication of group A streptococci from the pharynx. Eradication cannot be reliably achieved with oral treatment unless compliance with 10 days of penicillin VK or

amoxycillin can be assured. Use of benzathine penicillin also requires precautions to assure sterile syringes and needles, given the risk of HIV and Hepatitis B.

Although studies in developed countries indicate streptococcal pharyngitis is usually a self-limited illness, treatment of streptococcal pharyngitis can reduce the duration of illness by a few days and prevent some suppurative complications. Treatment shortens the duration of sore throat and cervical nodes by an average of 36 hours; similar reductions are achieved in the duration of anorexia. One would not expect major nutritional effects from uncomplicated streptococcal pharyngitis. The nutritional consequences, however, may be more significant in a child who is already malnourished.

A recent study by Steinhof et al.[21] should be helpful in making adaptation decisions. This study showed that basing the classification of streptococcal sore throat on a tender, enlarged cervical node and a throat exudate was 94% specific, but only 12% sensitive. Requiring only one of these clinical signs (enlarged cervical node or throat exudate) raised the sensitivity to 84% with a significant reduction in specificity to 40%. Although this study included children between 2 and 13 years of age, the sensitivity and specificity of the clinical features were not significantly different between children older or younger than 5 years of age.

Therefore, further work remains to be done to identify a guideline with better sensitivity, while retaining adequate specificity. A low specificity guideline may be more appropriate for identifying school-age children for penicillin treatment, for the reasons given above. However, the high rate of antibiotic use that could result from the proposed guideline which has only 40% specificity would not be appropriate in children under 5 years of age. Low specificity guidelines for the management of sore throat could result in a high rate of use of penicillin which would promote penicillin resistance in the pneumococcus, given the substantial rate of nasopharyngeal carriage in young children. In countries where most children with pharyngitis are currently treated with an antibiotic, use of an adequately specific guideline to identify children with streptococcal infection might reduce unnecessary antibiotic treatment of viral pharyngitis. Provision of any guideline must be accompanied by a regular supply of benzathine penicillin both for primary and secondary prevention in order for the prevention of rheumatic fever and heart disease to be effective.

- The Ministry of Health needs to decide whether preventing rheumatic fever is a priority and whether this is to be attempted by primary or secondary prevention or both. WHO Cardiovascular Diseases (CVD) reports that currently 23 countries have secondary prevention programmes; in seven of these countries some form of primary prevention aimed at school age children is now included.

POSSIBLE ADAPTATION: **Add the management of sore throat.**

If a decision is made to add sore throat to the guidelines and to provide an adequate supply of benzathine penicillin, the adaptations required in the charts and modules can be based on the WHO/ARI guidelines and the training materials in the module *Management of the Child with an Acute Respiratory Infection.*[22] Limiting the management of sore throat to children 2 years or older may be useful.

- Add a fifth main symptom "Does the child have a sore throat?" or "Does the child 2 years or older have a sore throat?"

- Add these two signs to the assessment, under LOOK AND FEEL:

    - Feel the front of the neck for nodes.
    - Look for exudate on the throat.

- Connect the assessment with the following classification table with an arrow which says "Classify SORE THROAT".

• Not able to drink.	**THROAT ABSCESS**	➢ Give benzathine penicillin. ➢ Refer urgently to hospital.
• Tender, enlarged lymph node on neck **and** • White exudate on throat.	**STREPTOCOCCAL SORE THROAT**	➢ Give benzathine penicillin. ➢ Soothe throat with a safe remedy. ➢ Give paracetamol for pain or if fever 38.5° C or more.
Only one or none of the signs in the yellow row present.	**NON-STREPTOCOCCAL SORE THROAT**	➢ Soothe throat with a safe remedy. ➢ Give paracetamol for pain or if fever 38.5° C or more.

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8. EAR INFECTION

Generic guidelines

Detection of ACUTE EAR INFECTION (acute otitis media) is based on the mother recognizing an ear problem, plus her reporting that the child has ear pain or has had pus draining from the ear for less than 14 days (confirmed by seeing pus on examination). Acute ear infection is treated for 5 days with the same first-line antibiotic as pneumonia. Paracetamol is given for pain. The child is then seen in follow-up on day 5. If ear pain persists, the antibiotic is continued for another 5 days. If there is tender swelling behind the ear (or above the ear in infants), suggesting mastoiditis, the child is referred.

The infection is classified as CHRONIC EAR INFECTION if pus has been draining from the ear for 14 days or more. Chronic ear infections are treated by wicking the ear dry. Tenderness and swelling of the mastoid bone suggest mastoiditis. Children with these symptoms are referred to hospital for treatment, after being given the first dose of an antibiotic (the same as used for pneumonia if the child can take an oral drug, otherwise intramuscular chloramphenicol) and paracetamol for pain.

8.1 Acute ear infection

Acute ear infections are very common, although not in all countries, affecting many children under 5 once a year or more. Antibiotics can effectively treat acute ear infections including those that have been draining for less than 14 days.

8.1.1 Detecting acute ear infection

A recent clinical study indicated the most useful symptoms for identifying acute otitis media as earache (RR 5.4), rubbing of the ear (RR 5.0), and feeling of blocked ear (RR 4.5).[1] In an earlier nine-country study, pain in the ear occurred in 46% of children up to 12 months of age, 60% of those aged 13-30 months, and 88% of those aged over 31 months of age with acute otitis media.[2]

Although pus draining from the ear is a very specific sign of otitis media, it is not common in acute ear infection, affecting only 10-15% of children under 5 with acute otitis media.[3]

In the initial studies to test the IMCI guidelines, health workers encountered problems detecting ear infection without otoscopy, when compared with a paediatrician's classification using otoscopy (see table below).

Detection of ear infection in clinic by health workers using IMCI guidelines

compared to paediatricians using otoscopy

Study site	% sick children with acute ear infection	% sick children with chronic ear infection	Health worker's IMCI classification compared to paediatrician's classification using otoscopy	
			Acute ear infection	Chronic ear infection
Gambia[4]	Acute or chronic: 12%		Acute or chronic ear infection: Sensitivity 30% Specificity 97%	
Kenya[5]	2%	0.5%	Sensitivity 98% Specificity 2%	Sensitivity 97% Specificity 95%
Ethiopia[6]	4%	7%	Sensitivity 65% Specificity 75%	Sensitivity 56% Specificity 85%
Uganda[7]			Sensitivity 77% Specificity 99% PPV 63%	

These variable results reflect not only problems with applying the IMCI guidelines, but also problems with the reliability of otoscopic diagnosis by the paediatrician. Pneumatic otoscopy, which improves the reliability of the otoscopic diagnosis, was not used in any of the studies.

Non-specific symptoms such as fever, irritability, vomiting, diarrhoea, decreased feeding, and poor sleeping are also common in viral infections unrelated to otitis media, and are therefore not useful in detecting acute ear infection. The same clinical study showed that these symptoms were as common in children with acute otitis media as in children without acute otitis media, and that fever occurred in 40% of children with otitis media and 52% of controls.[8]

POSSIBLE (discouraged) ADAPTATION: **Change the assessment and classification of ear infection to incorporate results of otoscopy.**

Acute ear infection can be detected earlier (before the eardrum perforates and the ear drains) if health workers can be provided with and trained to use pneumatic otoscope. Pneumatic otoscopy is more accurate than otoscopy which does not have the ability to determine whether the ear drum is red and immobile. However, it seems unlikely at present that provision of pneumatic otoscope and appropriate training will be feasible in all health facilities.

POSSIBLE ADAPTATION: **Do not include the management of ear infection in the course.**

Treatment of ear infections with antibiotics can prevent deafness but has little impact on mortality.[9,10] Some countries will want to treat primarily the leading killers of children and not give antibiotics for ear infections at first-level facilities.

If this adaptation is selected, it is advisable to remove the ear section completely. This is an extensive adaptation, which involves removing the assessment and classification of ear problems, all mention of ear infection within measles case management, and the instructions on drying the ear by wicking; and it would leave the management of a child with measles incomplete.

8.1.2 Treatment of acute ear infection

The customary duration of antibiotic treatment of acute otitis media, included in standard textbooks and used in most recent trials, is 10 days. The basis for this, however, is not clear, and some experts have recommended reducing the duration of treatment to 5 days.[11] It is unlikely that most mothers give the full 10 days of treatment. A number of studies have shown that treatment for 7 days produces satisfactory results.[3,12,13,14] A more recent study reported no significant differences between patients randomized to receive penicillin for 2 or 7 days.[15] A small trial has shown that cefaclor given for 5 days is comparable to amoxicillin given for 10 days.[16] A recent double blind study of 175 patients comparing 10 and 5 days of cefaclor demonstrated no significant differences between the two groups in treatment failure rate, reinfection rate, and persistent middle ear effusion for up to three months.[17]

The major rationale for treating acute otitis media with antibiotics is not to resolve symptoms but to prevent mastoiditis and other complications. This is based on extrapolating data from studies in developed countries in the 1940s and 1950s to developing countries, because there are no studies demonstrating that treatment of acute otitis media in developing countries results in a reduction in mastoiditis. The rate of mastoiditis as a complication of otitis media in Europe in the pre-antibiotic era was 6.5%[18] compared to 10.9% in West Africa in 1980.[19] Numerous developed country studies compared the outcomes of mastoiditis/chronic suppurative otitis media (CSOM) in patients with acute otitis media (AOM) treated with sulfonamides or penicillin to patients given no therapy. In a study in Sweden, the frequency of mastoiditis in children not treated with antibiotics was 17.3% versus 1.5% in children receiving sulfonamides and 0% in those given penicillin or a combination of penicillin and sulfonamides.[3] In other studies the rates of mastoiditis/CSOM in patients with AOM receiving no antibiotic therapy compared to those treated with sulfonamides were 69.5% versus 7.9%[20], 22.7% versus 4.5%[21], 21%

versus 3.7%[22], 39.8% versus 11.5%[23], and 21.1% versus 8.9%[24] respectively. Other studies that compared no therapy against penicillin showed reductions that were equally dramatic: 29.8% versus 2.2%[25], 11% versus 0%[26], 30.3 % versus 3.5%[27], and 13.7% versus 1.5%[28] respectively.

Pain usually continues for 8-24 hours after initiating antibiotic treatment. Analgesics such as paracetamol are often effective for the treatment of ear pain.[29] Other options, such as topical eardrops and analgesics containing codeine or tympanocentesis, have not been well studied; and these methods of pain management are not recommended.

8.2 Chronic ear infection

In some populations, rates of chronic ear infection are high, causing problems with hearing and development. Chronic ear infection is the most common, preventable cause of deafness. If the ear has been draining for more than 14 days, the generic guidelines do not recommend antibiotic treatment, but drying out the ear, which allows it to heal and prevents secondary bacterial infection.

In developing countries, children with otitis media often present late with chronic pus discharge from one or both ears. *Pseudomonas aeruginosa*, gram negative enteric organisms, and *Staphylococcus aureus* account for 80% of isolates in chronic otitis media with prolonged discharge.[30] The presence of these organisms or the development of a cholesteatoma limits the efficacy of standard oral antibiotics. Daily suctioning of the ear plus intravenous ceftazidime have been shown to be effective treatment.[31,32] In recent studies oral antibiotics active against anaerobic organisms, such as clindamycin or amoxycillin-clavulanate, have proved superior to other oral therapies.[33] In developing countries, however, where up to 20% of children may have chronic pus discharge from the ears, such therapies are often too expensive and are not available. In these circumstances, periodic suctioning using an ear bulb[34], aural toilet[35], and/or ear wicking[36] have been used successfully. Ear wicking is a reasonable option where more expensive methods are not possible. The ears are dried with a thin wick of cotton cloth, or strong tissue paper, several times a day. Persistent ear discharge, despite drying the ear, may indicate the presence of cholesteatoma (inflammatory tumour of the middle ear), which requires surgical intervention.

In the United Kingdom, a controlled trial of treatment of chronic otitis media[37] demonstrated no difference in outcome between patients treated by aural toilet, systemic antibiotics, or topical antibiotics. In another trial, in the Solomon Islands[35], there was again no difference in outcome between patients treated with aural toilet alone or with borate or clindamycin. And a study in Zaire found topical aluminium acetate on an ear wick of cotton placed against the ear drum and changed daily to be as effective a measure of mass control as topical gentamicin solution.[36]

However, a recent randomised trial in Kenya suggests that treatment of chronic ear infection with antibiotics may be effective.[38] The study compared the outcome between three groups of school children: 201 allocated to treatment with dry wicking alone for one month; 221 with a combination of wicking, topical framycetin/gramicidin/dexamethasone for one month, and 10 days of oral amoxycillin; and 102 control children who received no therapy. Topical steroids and oral antibiotics were shown to produce better outcomes than dry wicking alone. At the 16 week follow-up otorrhoea had resolved in 51% of the group that had received dry wicking, topical steroids, and oral amoxycillin compared to 22% in the wicking alone group and 22% of the controls. There was, however, no difference in healing of the tympanic membranes: 15% versus 15% versus 13% respectively in the three groups. Hearing thresholds were significantly better for children with no otorrhoea at 16 weeks compared to those with otorrhoea.

Since most chronic ear infections are caused by *Pseudomonas aeruginosa* and *Staphylococcus aureus*, and these organisms are not susceptible to amoxycillin, it is not clear whether the differences found in the study can be ascribed to the amoxycillin or to the combination of topical antibiotics/steroids, to which the organisms may have been susceptible.

> ***POSSIBLE ADAPTATION:*** **Treat chronic ear infection with a course of antibiotics and topical steroids. If there is no response to treatment, refer for suctioning and/or parenteral antibiotics.**

Chronic ear infection[39]

POLICY OPTIONS	ADVANTAGES	DISADVANTAGES
1. Instruction only in wicking a draining ear at health facilities (no antibiotics), as recommended in the generic guidelines.	Promotes appropriate emphasis on local care for chronic ear infection. May help reduce chronic ear infection and its associated problems.	Deafness, development problems, and a few deaths may occur in children who might have benefitted from a course of antibiotics. Mothers who bring children to clinic with chronic ear infection may be dissatisfied.
2. One course of antibiotics for chronic ear infection (based on ear draining more than 14 days) plus instruction at the facility in wicking a draining ear.	May help reduce chronic ear infection and its complications. Responds to suffering of child with ear infection. Mothers more likely to be satisfied if child receives antibiotics.	Antibiotic may not be effective. This diverts attention from management of pneumonia. This results in higher antibiotic use. Child may get multiple courses of antibiotics by seeing different providers.

8.3 Mastoiditis

A history and simple examination can distinguish mastoiditis from acute and chronic ear infections. Health workers learn to refer mastoiditis, give antibiotics for acute ear infection, and teach mothers how to dry a draining ear by wicking.

The key sign for diagnosing acute mastoiditis is painful retroauricular swelling. Typically the *pinna* (broad upper part of the external ear) is pushed downward and forward.[40,41] In young infants, the swelling occurs primarily above the ear concerned, and this pushes the *pinna* out and down. Hence, in the young infant it is important to feel above the ear in addition to behind it.[42]

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9. NUTRITIONAL STATUS: CLASSIFICATION OF CHILDREN AS SEVERELY MALNOURISHED, VERY LOW WEIGHT, OR NOT VERY LOW WEIGHT

Generic guidelines

After looking for the presence of danger signs and assessing the four main symptoms (cough or difficult breathing, diarrhoea, fever, and ear problems), the nutritional status of all children should be assessed. Visible severe wasting (marasmus) and oedema of both feet (kwashiorkor[a]) identify children with SEVERE MALNUTRITION who need urgent referral to hospital where they can be observed, treated, and fed day and night. VERY LOW WEIGHT (weight-for-age) identifies a group of children who have moderate malnutrition and can be managed at home rather than in a hospital. Their feeding needs careful assessment and any feeding problems should be remedied by nutritional counselling. These very low weight-for-age children should have their weight monitored carefully in follow-up visits.

9.1 Acute versus chronic malnutrition[1,2]

Among children in developing countries, repeated episodes of infection, along with mild but continued deficits in dietary intake, result in a process of suboptimal growth. The usual outcome of this process is that height, and consequently weight, are both below that of adequately nourished children of the same age. This is called stunting. Stunting generally begins in infancy and develops in the first 2 years of life. After this age, stunting reflects past malnutrition. Stunted children are usually considered to have a mild, chronic form of malnutrition. Their condition can rapidly worsen, however, with the onset of complications such as diarrhoea, respiratory infections, or measles. Stunted children may be satisfactorily managed in the community, rather than in hospital.[3]

In contrast, acute severe food deprivation and infections, such as dysentery or persistent diarrhoea, generally result in wasting, a condition some authors call acute malnutrition. This form of malnutrition has a closer parallel with the other conditions dealt with in the IMCI chart as it is an acute disease, which develops relatively rapidly. Severe acute malnutrition is a medical emergency as the immediate mortality can be very high if children are not properly managed.[4]

9.2 Detection of severe malnutrition: visible severe wasting and bipedal oedema

[a] In this document the term "kwashiorkor" corresponds to the definition of "kwashiorkor" and "marasmic kwashiorkor" in older classifications. However, elsewhere the term "oedematous malnutrition" is now commonly used to avoid confusion with the clinical syndrome of kwashiorkor, which includes other features.

Only clinical signs are required for the classification of SEVERE MALNUTRITION:

- Visible severe wasting, to diagnose marasmus.

- Oedema of both feet, to diagnose kwashiorkor (oedematous malnutrition).

The diagnosis of severe malnutrition (marasmus and kwashiorkor) is classically a clinical one. However, the conventional assessment of nutritional status depends upon the interpretation of several indicators (usually weight-for-age, height-for-age, and weight-for-height).

Because length boards are not generally available, the IMCI charts use an indicator for the assessment of marasmus, which does not require the measurement of length or height and which a trained health worker can detect by observation. In the studies of the IMCI guidelines, visible severe wasting or oedema of both feet performed adequately for the identification of severely malnourished children.[5,6,7,8,9] Further research is needed on the ability of health workers to identify children with marasmus by visible inspection and to improve training materials for recognition of visible wasting.

Bipedal oedema is the cardinal clinical sign of kwashiorkor (or oedematous malnutrition). Other signs, such as oedema of the lower and upper extremities and face, and skin and hair changes, are later and less sensitive findings.[10] Because oedema raises the body weight, children with kwashiorkor may not have low weight-for-height or low weight-for-age.[11]

In preliminary evaluations, these indicators - visible wasting and bipedal oedema - have been shown to be associated with an increased short-term risk of death[9] (see table below).

Indicators for the severe malnutrition classification, associated with short-term risk of mortality for 1202 children hospitalized at Siaya District Hospital, Kenya[9]

Indicator[a]	No. identified	No. of deaths[b]	Relative risk of death	95% confidence intervals
Oedema	71 (6%)	8 (11%)	3.1	1.5-6.4
WFH Z-score of <-3	42 (3%)	6 (15%)	3.9	1.8-8.6
Visible severe wasting	28 (2%)	4 (14%)	3.7	1.4-9.6
WFA Z-score of <4.4	28 (2%)	2 (7%)	1.8	0.5-6.9
Oedema or visible severe wasting	91 (8%)	11 (12%)	3.5	1.9-6.7
Oedema or WFH Z-score of <-3 or visible severe wasting	110 (9%)	13 (12%)	3.5	1.9-6.4

[a] WFH = weight-for-height; WFA = weight-for-age.
[b] Values include children who died in hospital or were discharged near death; a total of 49 children (4%) met these criteria.

9.3 Very low weight

For moderate malnutrition, the usual indicators are low weight-for-height or height-for-age. Because it is not possible to measure height or length measurements in most settings, very low weight-for-age is proposed as the indicator of moderate malnutrition. In the IMCI chart, this classification is called VERY LOW WEIGHT.

The purpose of the VERY LOW WEIGHT classification in the IMCI chart differs from that of population-based nutrition surveys. For this reason, the recommended thresholds for classification in the IMCI chart are different from the conventional weight-for-age threshold of Z-score < -2 [b] used in surveys. In the chart, very low weight-for-age is being used as a proxy indicator for low weight-for-height, which is the most accepted anthropometric indicator for wasting. It is proposed that the threshold for defining VERY LOW WEIGHT be set by each country, with a recommended threshold in the range of weight-for-age Z-score < -3. This recommended threshold has been shown in a number of studies to detect most children with severe wasting who require clinical intervention, but at the same time not to identify so many children as malnourished that first-level health facilities cannot handle the workload. This is illustrated in the following table.

[b] Percentage of the median NCHS and Z-scores. For weight-for-age and weight-for-height, one Z-score unit is about 10% of the median NCHS, except in children less than 6 months of age. For height-for-age, one Z-score unit is about 5% of the median NCHS.

Effect of changing threshold on performance of weight-for-age (WFA) as a screening indicator to identify children with low and very low weight-for-height (WFH), among 1785 children seen in the Siaya District Hospital outpatient department, Kenya[9]

Age group and WFA Z-score threshold	No. of children identified	To detect low WFH:[a] Sensitivity (%)	Specificity (%)	Positive predictive value (%)	To detect very low WFH:[a] Sensitivity (%)	Specificity (%)	Positive predictive value (%)
0-23 months:							
-2.0	302 (24%)	84	85	45	100	78	12
-2.5	184 (14%)	70	94	62	91	88	17
-3.0	108 (9%)	48	97	72	89	94	29
-3.5	59 (5%)	30	99	83	74	97	45
-4.0	26 (2%)	14	99	92	46	99	64
-4.5	13 (1%)	7	100	100	26	99	75
24-59 months:							
-2.0	137 (27%)	84	78	23	100	74	4
-2.5	76 (15%)	70	90	35	100	86	8
-3.0	43 (8%)	51	95	45	100	93	14
-3.5	22 (4%)	38	99	67	100	97	29
-4.0	16 (3%)	27	99	67	100	98	40
-4.5	7 (1%)	11	99	67	33	99	33

[a] Low WFH defined as weight-for-height Z-score of < -2; very low WFH defined as weight-for-height Z-score of < -3.

In the outpatient setting in Kenya, a weight-for-age threshold of -2 Z-score would identify 27% of children 2 years or older as requiring nutritional assessment and follow-up, yet many of these children would be stunted rather than wasted. By raising the weight-for-age threshold to -3 Z-score, only 8% of children 2 years or older are identified as requiring nutritional assessment and follow-up. The positive predictive value for a low weight-for-height (less than -2 Z-score) is raised from 23 to 45% while 100% of children with very low weight-for-height (less than -3 Z-score) are identified as requiring special attention. Greater focus on the more wasted children is also achieved in children under 2 years of age.

Nutritional survey data from the country can be used to estimate both the likely performance, in terms of sensitivity and specificity, of various weight-for-age thresholds to detect children with low weight-for-height, and the burden that would be placed on the health care facility by the use of various thresholds (see Annex C-9 and reference 9).

Equipment and training requirements

The indicators for severe malnutrition on the generic sick child chart require only that health workers be trained to inspect the child for wasting and oedema.

Assessing weight-for-age requires a functioning scale, and training in its maintenance and use and in use of the growth chart. The IMCI course assumes that health workers are familiar with using a scale. Testing scales for accurate reading is included in the clinical practice sessions. The course also teaches the use of a weight-for-age chart.

***POSSIBLE ADAPTATION*: Do not screen children by weight-for-age.**

In some countries in Latin America, where the prevalence of stunting is high but that of wasting is very low, weight-for-age at any threshold detects very few children with wasting. In these settings, weighing does not contribute significantly to identifying children who require nutritional counselling and follow-up. The generic IMCI recommendations are that all children under 2 years of age be assessed for feeding problems and be given nutritional counselling, if indicated. This is intended as a preventive or early intervention to minimize the risk for development of stunting, at the age when this risk is greatest. Weighing would still be important, however, to follow up the response to nutritional counselling.

In countries, such as those of the Horn of Africa and South Asia, where the prevalences of both stunting and wasting are very high, the majority of children may experience suboptimal growth. In this case, it may be better to concentrate efforts on children younger than 2 years, rather than giving health workers the additional task of weighing and identifying children over 2 years with very low weight (many of whom will have low weight-for-age on the basis of stunting). One study suggests that concentrating efforts on nutritional education produced better or equivalent results to growth monitoring plus education.[12]

In these settings, however, use of visible severe wasting and bipedal oedema to diagnose severe malnutrition will continue to be important.

9.4 Using other indicators to identify children in need of follow-up and whose mothers are in need of nutrition counselling.

***POSSIBLE ADAPTATION*: Include growth monitoring in follow-up visits for specific diseases and/or link the IMCI guidelines to an active growth monitoring programme.**

Because children grow more quickly in the first year of life, significant weight gain over a short period of time is expected in an infant. Failure to gain weight

in an infant should, therefore, alert the health worker to a potential health problem. For older children, growth is slower, so the period of time over which weight gain or faltering can be seen is somewhat longer.

Growth monitoring consists of regular (usually monthly) weighing of children and plotting the weights on a growth curve, such as that included on the "Road to Health" card. While a single low measurement of weight-for-age may reflect either present or past malnutrition, two or more measurements over a period of time can provide valuable information about a child's current growth.

There is, however, no consensus in the literature on the definition of growth faltering. Most expert clinicians make a qualitative clinical judgement based on the appearance of the growth curve. In practice, most growth monitoring programmes use definitions such as:

- Weight loss between any two monthly measurements.
- Three monthly measurements with no gain.
- Weights going from one percentile line to the next lowest line (one commonly used chart has lines at 75th, 50th, 25th, 5th percentiles) over two or three monthly measurements ("falling off the curve").

A more important issue is that growth monitoring programmes have not been demonstrated to have a beneficial effect on the nutritional status of children. One well-controlled study in India demonstrated no effect of growth monitoring on children's nutritional status.[12] In addition, growth monitoring may draw resources and attention away from more effective interventions. Other studies suggest that health workers have difficulty recognizing growth faltering and that, even when it is recognized, an appropriate intervention is unlikely to follow.[13]

There are two circumstances in which growth monitoring may be considered within the context of the chart. The first is short-term, focused growth monitoring during follow-up visits for diseases known to have a substantial negative impact on growth, in particular, measles, pertussis, malaria, and persistent diarrhoea. For these conditions, the health worker should weigh the child monthly over a period of several months (or every 2 weeks for infants younger than 6 months) until it is clear that the child is gaining weight between successive measurements.

The second circumstance is when there is already an active growth monitoring programme in place in a country. Where this is the case, the current programme should be evaluated to assess health workers' knowledge about plotting weights and interpreting growth faltering. In addition, a standardized definition of growth faltering should be agreed upon. The IMCI chart could then be adapted so that either very low weight (for children with only one

measurement) or growth faltering (for those with more than one measurement) would classify the child as VERY LOW WEIGHT. However, growth monitoring should not be included if training and the time involved in interpretation will detract from other components of the IMCI chart which have been shown to be more efficacious.

If the growth monitoring programme functions separately from the primary health care facility, linkage or cooperation between the IMCI guidelines and the growth monitoring guidelines may need to be discussed (for example, to agree whether weights taken during consultation for illness will be plotted on the same growth chart as those from the growth monitoring visits).

***POSSIBLE ADAPTATION*: Add measured weight-for-height.**

As discussed above, for a one-time measurement, low weight-for-height is considered to be the most sensitive and specific anthropometric indicator for acute changes in nutritional status. It is the best method to identify children who are most likely to benefit from nutrition interventions. If length boards are widely available and in good repair, and if personnel are already trained to use them, weight-for-height would be a useful addition to the nutritional status classification of the "Assess/Classify" chart.

If weight-for-height Z score < -3 is used as a criteria for severe malnutrition, it should be in addition to, not instead of, visible severe malnutrition, because the two indicators identify somewhat different groups of children, all at high risk of mortality.[1,9]

Weight-for-height Z score < -3 should be added to visible severe malnutrition and oedema of both feet for the classification SEVERE MALNUTRITION. Weight-for-height Z score <-2 could replace weight-for-age in the yellow row. This would result in fewer children only with stunting having their feeding assessed and returning for follow-up of their weight. This would also require changing the classification from VERY LOW WEIGHT to MALNUTRITION OR ANAEMIA.

It is uncommon for outpatient clinics to have available length boards which provide accurate measurements. Training health workers in accurate measurement of height is more demanding than training them to obtain an accurate weight. The training requires substantial supervised practice and consistent supervision is also needed to make sure that height measurements continue to be accurate. Significant changes in the calculated weight-for-height can result from deficiencies in technique or equipment. If health workers have already been trained to accurately measure height, review and reinforcement of their skills are essential.

Length boards can be made inexpensively in most locations, following standard instructions, although some models do not last very long. For reliability and longevity of the instrument, it is advantageous to use metal

tapes. In humid climates, the wood with which length boards are made may warp, and the instruments will need to be replaced at intervals.

Using simple wall charts for height measurements has not proven to be sufficiently accurate for measuring weight-for-height.

***POSSIBLE ADAPTATION*: Use mid-upper-arm circumference.**

Mid-upper-arm circumference (MUAC) varies with the age of the child. So, when a fixed cut-off for MUAC is used, it is more likely to identify younger children than older ones as malnourished. Age-specific cut-offs can be used to decrease this age bias.[14] However, even with age-specific cut-offs, MUAC identifies different children as malnourished compared to weight-for-height. In addition, the margin for error in MUAC measurement is high, and MUAC cannot be followed over time to monitor improvement. Although there may be a limited role for the use of MUAC for screening in emergency situations, it is not recommended for use in the primary health care setting, where more accurate measures such as weight can be obtained and are often required for follow-up.

The equipment needed for MUAC is minimal, just a short measuring tape. However, the apparent simplicity is somewhat misleading, first because the actual technique - measuring the arm at the midpoint and pulling the tape to right degree of snugness but not too tight - requires careful training. Second, even a small error, of half a centimetre for example, which would be fairly negligible for height, can easily make the difference between falling below or above the cut-off for MUAC.

ANNEX C-9

How to determine thresholds based on existing data

The threshold recommended in the generic IMCI guidelines for defining VERY LOW WEIGHT is weight-for-age Z-score < -3. However, a specific threshold can be set by each country. To do this, it is important to gather the most currently available anthropometric survey data for the country or locality. This provides the basis for projecting both performance of very low weight-for-age as an indicator, and the likely demand on health facilities in terms of the number of children needing nutritional assessment and counselling. (These are amongst the most time-consuming parts of the case management process.)

Compared to a representative sample of children under 5 years (generally chosen for a nutrition survey), an outpatient population of sick children is usually younger, with a higher proportion under 2 years, and has a higher prevalence of wasting due to the effects of acute illness. This means that if the sensitivity and specificity of weight-for-age at any given threshold is calculated from survey data, the positive predictive value will be higher. The proportion of children identified as having VERY LOW WEIGHT in the outpatient population, indicating facility demand, will be 1.5 to 2 times higher than in the general population.

Data from nutritional surveys, useful to determine thresholds, are sometimes not included in standard reports; and it may, therefore, be necessary to work with the nutrition programme or with the group who carried out the survey to obtain them (see below for the data needed).

Data needed to determine the threshold for VERY LOW WEIGHT

Age group	Percentage of children with:
< 24 months	Weight-for-age, height-for-age, weight-for-height Z-score < -2 and < -3
24-59 months	Weight-for-age, height-for-age, weight-for-height Z-score < -2 and < -3

If other thresholds are considered, for example, weight-for-age Z score < -3.5, the corresponding data should be requested as well.

Using these data it is possible to estimate the proportion of children identified as VERY LOW WEIGHT, that is the percentage of children with weight-for-age below the threshold chosen for use in the chart (eg. Z-score < -3 multiplied by 1.5 to 2). Only VERY LOW WEIGHT children older than 24 months add to the burden of time needed for the initial visit of ill children, as all children younger than 24 months, independent of their nutritional status, will systematically receive nutritional assessment (and counselling, if indicated).

An estimate of how well weight-for-age will function as a proxy indicator in a given setting may also be made. The nutritional status of a population can be characterized as in the following table.[15]

Percentage of children with Z-score < -2

Prevalence	Weight-for-age	Height-for-age	Weight-for-height
Low	< 10	< 20	< 4
Moderate	10-19	20-29	-
High	20-29	30-39	4-7
Very high	≥ 30	≥ 40	≥ 8

A high or very high prevalence of low height-for-age (stunting) implies that many of the children who have low weight-for-age are not wasted but stunted, and that the demand on health facilities (of children identified as having very low weight) is likely to be high.

The higher the prevalence of low weight-for-height in a population, the better weight-for-age will function as a proxy indicator. This means that, in a situation with moderate stunting and high wasting (most of Africa and Southeast Asia), a threshold of weight-for-age Z-score < -3 is adequate and that the burden on the facility can be projected to be acceptable. However, the burden on the facility may be projected to be very high in the Horn of Africa and South Asia, where the prevalence of both stunting and wasting is very high. In this situation, a more restrictive cut-off point such as Z-score < -3.5 might be considered.

In many countries of Latin America, where stunting rates are high to very high and wasting rates are low, the performance of weight-for-age at any threshold will be poor. Most children identified as malnourished will be stunted rather than wasted. In this case, use of weight-for-height as the screening indicator should be considered. Another possible option would be not to use a weight-for-age cut-off point at all, but to concentrate efforts on feeding assessment and counselling for children aged less than 24 months, because this is the period of life during which stunting develops and an intervention, in theory, may be effective.

For more detailed discussion of how to set the threshold see the article *Assessment of potential indicators for protein-energy malnutrition in the algorithm for integrated management of childhood illness,* in supplement 1 to volume 75, 1997, of the Bulletin of the World Health Organization.[9]

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10. ANAEMIA

Generic guidelines

Children with SEVERE ANAEMIA are referred urgently to hospital primarily on the basis of severe palmar pallor. Children with some palmar pallor are classified as having ANAEMIA and treated with oral iron for 2 months: the child is seen every 2 weeks and given 14 day's iron tablets at each visit. She is advised to give the child one dose daily, to expect the child being treated to produce black stools, and to keep the tablets out of the reach of children. If there is no improvement in pallor after 2 months, the child is referred to hospital for further assessment.

Children with anaemia are also treated with mebendazole and, if the malaria risk is high, with an antimalarial. However, iron treatment is delayed until a follow-up visit if the iron is combined with folate and the child is being treated with sulfadoxine-pyrimethamine for malaria. Alternatively, iron syrup without folate can be given to a child with malaria.

Iron is not given to children with SEVERE MALNUTRITION who are being referred to hospital.

10.1 Causes and significance of childhood anaemia

Iron deficiency is common in many developing countries, particularly where the diet mainly consists of grains and does not include meat. Deficiency is often worsened by infections with hookworm and/or whipworm, which cause blood loss from the gut.

In many African countries, anaemia is a significant health problem, contributing both to morbidity and mortality. Although iron deficiency, sickle cell anaemia, and other etiologies of anaemia are important, in Africa most cases of anaemia are related to malaria.

Plasmodium falciparum malaria infection can cause both a chronic mild to moderate anaemia related to persistent parasitaemia or a severe, acute anaemia related to haemolysis during an acute infection. Malarial anaemia can develop very rapidly when it is caused by haemolysis associated with an acute infection, and can be fatal. A significant proportion of malaria deaths in young children are associated with severe anaemia. Mortality can be reduced by effective antimalarial treatment[1] and by transfusion.[2]

In Africa, malaria results in many cases of severe anaemia which require hospitalization and transfusion. Malarial anaemia can also develop secondary to persistent parasitaemia (often of low grade) leading to dyserythropoiesis and

sometimes chronic bone marrow suppression. The problem of severe malarial anaemia is increasing with the growing problem of chloroquine resistance.

Iron supplementation has recently been shown, in the Gambia[3], to promote haematological recovery after an attack of acute malaria, without any evidence of exacerbation of the malaria infection. The same study suggested that folic acid can compromise the antimalarial activity of sulfadoxine-pyrimethamine.

Children with some but not severe anaemia need iron treatment and an effective antimalarial in malaria risk areas. In some settings, specific treatment is also required, for example, single-dose mebendazole treatment if hookworm is a significant problem (see Section C11).

Transfusion is generally available only in hospital. Children with severe anaemia who have cardio-pulmonary decompensation, or are at high risk from any further decrease in haemoglobin, need to be referred to hospital for possible transfusion.

> ***RECOMMENDED ADAPTATION*: Do not give iron to children with known sickle cell anaemia.**
>
> In areas with a high rate of sickle cell anaemia, do not treat children who are known to have sickle cell anaemia. This is important if they regularly receive transfusions. Mothers will usually know if their child has sickle cell anaemia.
>
> If you will make this adaptation, see *Section G. 11.0 Add instructions not to give iron if a child has sickle cell anaemia.*

10.2 Clinical signs for detection of anaemia

It is usually not possible to measure the haematocrit or haemoglobin level in most first-level health facilities. Decisions, therefore, need to be based on a clinical assessment of anaemia.

The clinical signs for the detection of severe anaemia requiring referral to hospital for possible transfusion should be as sensitive and specific as possible, because of the difficulties of referral and the mortality risk from severe anaemia. Low sensitivity risks missing referral to hospital for potentially life-saving treatment. Low specificity will result in unnecessary referrals, placing a burden on families and referral facilities.

Children with some but not severe anaemia usually need iron treatment. Detecting anaemia based on clinical signs will identify children with moderate or severe anaemia but not those with mild anaemia. It is acceptable for the clinical detection of some anaemia to be less specific, because iron treatment is usually not harmful and many children have underlying iron deficiency without clinical signs of anaemia. It is

also acceptable for clinical detection of some anaemia to have lower sensitivity, since malarial anaemia will recover even without iron replacement, although more slowly[3], and in some countries nutrition counselling may result in improved iron intake.

The choice of palmar pallor for the generic guidelines was based on the results of studies in Malawi[4] and Kenya[5], which showed somewhat better performance of palmar pallor as a single sign; a study in The Gambia[6], which showed a similar performance of palmar and conjunctival pallor as single signs; and the need to avoid combinations of signs wherever possible, because this complicates the algorithm (see table on page 110). In addition to its slightly better performance as a single sign in detecting anaemia, palmar pallor was chosen in preference to conjunctival pallor which can be obscured by hyperaemia of the conjunctiva (secondary to trachoma), or when a child is screaming.

Whether palmar or conjunctival pallor performs better depends in part on other conditions. In Bangladesh, for example, greater palmar pigmentation was associated with very low sensitivity of palmar pallor as a single sign[7], whereas high rates of belepharo-conjunctivitis in Gondar, Ethiopia obscured conjunctival pallor and led to an adaptation of the guidelines to require either conjunctival or palmar pallor.[8]

Clinical signs to identify severe anaemia requiring referral

Clinical Signs	Gambia: outpatient[9]	Gambia: inpatient[6]	Kenya: outpatient[5]	Bangladesh: outpatient[7]	Uganda: outpatient[7]
*Sensitivity and specificity compared to **standard of haemoglobin < 5 grams** (or PCV < 15% in the Gambia):*					
Severe **palmar** pallor alone	Sensitivity 72 Specificity 84	Sensitivity 63 Specificity 89	Sensitivity 60 Specificity 98	Sensitivity 10 Specificity 99	Sensitivity 21 Specificity 99
Severe **conjunctival** pallor alone	Sensitivity 66 Specificity 84	Sensitivity 55 Specificity 91	Sensitivity 31 Specificity 99	Sensitivity 50 Specificity 99	Sensitivity 21 Specificity 99
Any IMCI referral classifi-cation				Sensitivity 100	Sensitivity 68
*Sensitivity and specificity compared to **standard of haemoglobin < 5 grams and signs of cardiopulmonary decompensation**:*					
Severe palmar pallor alone			Sensitivity 78 Specificity 97		
Severe palmar pallor or classifica-tion SEVERE PNEU-MONIA OR VERY SEVERE DISEASE			Sensitivity 84 Specificity 92		

Not all children with severe anaemia have severe palmar pallor, but the IMCI guidelines will result in the identification of a high proportion of them for referral. In both Bangladesh and Uganda, for example, while individual clinical signs performed poorly, almost all children with severe anaemia were referred to hospital based on one or more severe classifications, identified by following the IMCI guidelines. The Gambia study of children admitted to hospital suggested that a combination of severe pallor of both the palms and conjunctiva gave a better sensitivity (49%), specificity (94%), and positive predictive value (75%) than requiring severe pallor of a single site or combination of sites.[6] Severe palmar pallor alone had a sensitivity of 63%, specificity of 89%, and positive predictive value of 68%; and severe conjunctival pallor alone had a sensitivity of 55%, specificity of 91%, and positive predictive value

of 71%. The addition of respiratory signs did not improve the prediction of severe anaemia.

> ***POSSIBLE (discouraged) ADAPTATION*: Substitute or add conjunctival pallor in locations where palmar pigmentation is common or where, for other reasons, using palmar pallor causes significant problems.**
>
> Course adaptation to add or substitute conjunctival pallor could be considered in areas where palmar pigmentation is substantial. However, this is difficult, requiring adaptation of both the video and the photograph booklet. Substitution should only be considered if there is evidence of a real problem with the use of palmar pallor, and should not be considered in areas where trachoma is common because this can cause conjunctival hyperaemia which disguises pallor.

In the studies overall, the performance of palmar pallor alone was better than: a) the combination of two signs, which reduced sensitivity, or b) allowing either sign, which substantially reduced specificity and would have resulted in over-referral. The high prevalence of anaemia in several of the study sites, access to feedback on the child's haemoglobin in some, and use of research workers make it difficult to predict how well pallor signs will perform when used by trained health workers, particularly in settings with a lower prevalence of anaemia. Studies are required to assess the performance of trained health workers in detecting anaemia in first-level facilities.

10.3 Criteria for deciding when clinic measurement of haemoglobin is indicated

The IMCI course assumes that no laboratory tests are available at first-level health facilities. A simple test to determine haemoglobin would be very useful, to make sure that severe anaemia is neither missed nor overdiagnosed, resulting in under- or over-referral. The test could be used only in children with some or severe palmar pallor. Methods, such as copper sulfate, that indicate only whether the haemoglobin is below a certain level are sufficient; the threshold for referral should be set at 4 or 5 g.

> ***POSSIBLE ADAPTATION*: Determine haemoglobin level in children with some or severe palmar pallor.**
>
> This might be considered in facilities where anaemia is common and referral of severe anaemia is difficult. In some facilities, the haemoglobin level of pregnant women is measured. To conserve resources and staff time, haemoglobin measurement of children should be limited to those with some pallor.

10.4 When to give an antimalarial

***POSSIBLE ADAPTATION*: Treat children with clinical anaemia with the second-line antimalarial.**

A very effective antimalarial is needed to achieve the parasitological clearance required for a good bone marrow response. For this reason, a second-line antimalarial may be used for anaemia in areas with resistance to the first-line antimalarial. In areas with substantial chloroquine resistance and where chloroquine remains the first-line oral antimalarial and sulfadoxine-pyrimethamine is the second-line oral antimalarial, children with anaemia should receive the second-line antimalarial (see Section C4).

10.5 Choice of formulation of iron

***POSSIBLE ADAPTATION*: Substitute other iron formulations.**

The availability of tablets in a lower dose, or of iron syrup, would allow more children to be treated. In areas where sulfadoxine-pyrimethamine is the first-line oral antimalarial, it is important to provide iron formulations without folate.

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11. MEBENDAZOLE

Generic guidelines

A 500 mg dose of mebendazole is recommended for all children with anaemia age 2 years or older who live in an area with hookworm (*Ancylostoma* and *Necator*) or whipworm (*Trichuris*) and who have not been treated with mebendazole in the last 6 months. Mebendazole is also a very effective treatment of infection by roundworm (*Ascaris*), which contributes to malnutrition. Mebendazole is given without microscopic examination of the stool.

11.1 How to decide whether hookworm and/or whipworm are significant public health problems

The global distribution of infections due to soil transmitted helminths is more widespread than malaria. As a general rule, where malaria is endemic, soil-transmitted helminths are highly prevalent. However, there are large areas free of malaria where helminths are a major public health problem.[a] The pattern of infection by hookworm and whipworm (as well as roundworm) is complex and varies from area to area. There is no simple way to determine the pattern of infections in any given area, unless data are available from parasitological surveys in cohorts of the population.

POSSIBLE ADAPTATION: **If hookworm and/or whipworm are a problem throughout the country, delete the bullet "if hookworm/whipworm are a problem in children in your area" from the "Give Mebendazole" box.**

This simplifies the guidelines and provides mebendazole to all children with anaemia who are sent home.

POSSIBLE ADAPTATION: **If hookworm and/or whipworm are <u>not</u> a problem in any areas of the country, delete the instructions to give mebendazole to children with anaemia.**

This would be uncommon. Do not make this adaptation if there is insufficient data and malaria is endemic, or if hookworm and/or whipworm are known to be a problem in neighbouring countries.

[a] Examples include non-malarious areas of China, highlands of Ethiopia, Kenya, Tanzania, Seychelles, Dhofar Governorate of Oman, Maldives, and Mauritius.

11.2 Mebendazole in the treatment of anaemia

Hookworm and whipworm are significant contributors to anaemia, mainly due to gut leakage of blood, especially in heavily infected children. The understanding of the role of hookworm as a significant contributor to anaemia comes from a recent study showing that a single course of mebendazole, plus iron supplementation, given to pregnant women after the first trimester of pregnancy markedly increased haemoglobin concentration. Treatment with mebendazole also significantly improved the iron status of these women, when compared to pregnant women receiving iron supplementation alone.[1]

Whipworm may be more important than hookworm in causing anaemia in preschool children. The intensity of hookworm infection tends to increase with age, reaching a peak in young adults, while whipworm (and roundworm) infection peak at about 10 years of age. In areas of high transmission, however, even preschool children may reach high infection intensities.

The generic guidelines represent conservative use of mebendazole only in anaemic children in areas where hookworm and/or whipworm are a problem. The age limit of 2 years or older is based on the time until the child is likely to acquire a significant worm load.

11.3 Mebendazole in the treatment or prevention of malnutrition

There is evidence from clinical studies that hookworm, whipworm, and roundworm infections are important co-factors in the etiology and persistence of malnutrition, and that treatment with antihelminthics (levamisole, mebendazole, and albendazole) improves macronutrient and micronutrient intake, as well as anthropometric indicators.[2,3,4,5,6,7]

Community studies, however, have shown varying results. Several studies, mainly from eastern Africa, found very significant weight gain for school age children after antihelminthic chemotherapy.[8,9,10] A recent study from India also showed improved growth after antihelminthic treatment in children under 5 years of age.[6] On the other hand, studies conducted in other areas, including the Caribbean basin, found that the effect on growth was not anywhere as significant. This differential effect is most probably due to the severity of the infections and possibly to interaction with other local environmental factors.

Heavily infected children are more prone to be malnourished or anaemic, are more likely to seek health care, and will definitely benefit from treatment. However, there are no adequately sensitive and specific signs or symptoms for helminth infection, that can be used to indicate the need for individual antihelminthic treatment. The incidence

of symptoms generally increases with the intensity of infection, and the impact of treatment is related to infection intensity. Limiting treatment to children who are already malnourished or anaemic might not reduce malnutrition as a public health problem in a given area.

There are several adaptations which can be considered in countries where there is a significant problem with hookworm, whipworm, or roundworm; and where helminth infection is thought to be contributing to malnutrition.

***POSSIBLE ADAPTATION*: Treat all children 2 years or older who are very low weight-for-age or anaemic with mebendazole every 6 months.**

This strategy will attempt to deworm malnourished children in order to promote growth.

If mebendazole is recommended every 6 months for malnourished children aged 2 years and older, it is advisable to include boxes in the immunization card to keep track of when the child is due for mebendazole treatment. The dose should also be recorded in the child's chart or on the "multivisit" card, depending on what type of records are used in the clinic. Keeping a record will reduce unnecessary doses of mebendazole and save resources. However, this is much less important than keeping track of vitamin A supplementation because repeated doses of mebendazole are not toxic.

***POSSIBLE ADAPTATION*: Treat all children 2 years or older who have not been treated in the previous 4-6 months with a single dose of 500 mg of mebendazole.**

This should be considered in areas where the prevalence of infection is 60% or over. There is evidence that this is the case in all countries with endemic malaria. A large scale study conducted in Zanzibar[11,12], evaluated the nutritional impact of a programme of deworming with a 4 or 6 month regimen of mebendazole 500 mg. Malnutrition and anaemia were major health problems in the study area, and helminths and malaria infections were endemic. A single dose of 500 mg mebendazole, given 3 times yearly, was shown to significantly improve the nutritional status of school-age children, despite intense transmission, reinfection, and incomplete deworming. It was estimated that this treatment, at a cost of about 15 cents, saved the loss of almost a quarter of a litre of blood per child annually.

The strategy in this possible adaptation of treating children aged 2 years and older will only be effective if, at the same time, periodic deworming of school-age children is carried out. Treatment with 500 mg mebendazole every fourth month is considered to be an easy, efficient, and cost-effective helminth

control strategy. Longer intervals between doses may be used in low transmission areas.

11.4 Mebendazole and other antihelminthic drugs

The recommended dose of mebendazole has until recently been 100 mg, twice daily, for 3 days, but recent studies have shown that a single 500 mg dose of mebendazole is efficient, inexpensive[b], and safe. The same dose (500 mg), as recommended in the generic IMCI guidelines, can be given to all children aged 2 years and older.

***POSSIBLE ADAPTATION*: Substitute albendazole, levamisole, or pyrantel for mebendazole.**

Four anthelmintic drugs may be considered for treatment of intestinal parasitic infections. All four are well tolerated and have only minor side effects. Mebendazole and albendazole are substituted benzimidazoles. Levamisole is a laevorotatory enantiomer of tetramisole, and pyrantel is tetrahydropyrimidine.

Of the benzimidazoles, albendazole has the widest range of therapeutic activity and, in a single dose, appears to be more effective against hookworm infections than mebendazole. The WHO recommended single dose is 400 mg. Mebendazole is, however, generally less expensive than albendazole.

Levamisole is mainly used for treatment of infections with roundworm and hookworm. It is less effective as a single dose than the benzimidazoles in hookworm infections. The WHO recommended dose for levamisole is 2.5 mg/kg body weight.

Pyrantel is an effective drug against hookworm, roundworm, *Enterobius*, and *Trichostrongylus* spp. It is mainly used in hookworm infections as well as in ascariasis and enterobiasis. Dosage over 2-3 days has consistently proved superior to a single dose regimen. The WHO recommended dose for pyrantel is 10 mg/kg body weight.

[b] In 1995, a 500 mg tablet of mebendazole cost $0.04-0.05.

References

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12. VITAMIN A SUPPLEMENTATION

Generic guidelines

Vitamin A can be given to children for curative or preventive purposes. It is given to all children with MEASLES and with SEVERE MALNUTRITION. This includes those children with measles now or within the last 3 months who have clouding of the cornea. Children with corneal clouding and children with severe malnutrition are referred urgently to hospital. They are given two doses of vitamin A (on days 1 and 2); the first dose is administered in clinic before referral, and the second is given to the mother who is instructed how to give it the next day.

It is essential that a dosage record be kept if routine vitamin A supplementation is recommended or vitamin A delivery is linked with specific childhood diseases such as diarrhoea or pneumonia. This can be added to existing record systems.

12.1 Use of vitamin A for curative purposes

The highest priority is to give vitamin A treatment to children with current xerophthalmia (eye signs of vitamin A deficiency)[1], current measles[2,3], and children with severe malnutrition. Vitamin A has proven benefits in the management of these health problems. Some cases of xerophthalmia will be detected when children with measles are examined for corneal clouding. Recent reports suggest that vitamin A may play a role in reducing the severity of diarrhoea.[4,5,6] Studies to date have found no effect of vitamin A in the management of pneumonia episodes except those associated with measles, or in reducing pneumonia incidence or mortality.[7]

12.1.1 Treatment of active xerophthalmia

The treatment schedules for eye signs of clinical vitamin A deficiency (active xerophthalmia), recommended by a Task Force convened by WHO's Nutrition Unit, UNICEF, and the International Vitamin A Consultative Group (IVACG)[8] in 1995, are presented in the table on page 121. These schedules apply to all stages of clinical vitamin A deficiency, including night blindness, conjunctival xerosis with Bitot's spots, corneal xerosis, ulceration, and keratomalacia.

Large doses of vitamin A should be administered orally. The first dose should be given *immediately* after xerophthalmia is diagnosed. As soon as the first dose of vitamin A has been given, children with acute clouding of the cornea should be referred urgently to a hospital for treatment of the general condition and their eyes. Corneal xerophthalmia is a medical emergency. The treatment schedules for xerophthalmia provide the same dose as indicated in the IMCI

vitamin A dosing schedule. Since children with corneal clouding are referred to hospital, however, only the initial dose would be given by the outpatient health worker.

To treat or reduce the risk of secondary bacterial infection of the eye, which would compound the damage to the cornea, topical application of an antibiotic eye ointment, preferably tetracycline ointment, is also recommended before referral. Ophthalmic ointments containing steroids should never be used in these circumstances.

If ulceration is observed, the eye should be protected by an eye shield in order to prevent trauma to a cornea already weakened by ulceration.

Treatment of xerophthalmia[a]

Timing of dose	Children aged 0B5 months	Children aged 6B12 months	Children over 12 months
Immediately on diagnosis	50 000 IU	100 000 IU	200 000 IU
The following day (give to mother to administer at home the next day if need be)	50 000 IU	100 000 IU	200 000 IU
At a subsequent contact (at least 2 weeks later)	50 000 IU	100 000 IU	200 000 IU

[a] All vitamin A to be given orally (preferably as oily preparation if available) from capsule or dispenser.

POSSIBLE (discouraged) ADAPTATION: **Add assessment for eye signs of vitamin A deficiency in the nutritional assessment of all children.**

Currently only children with measles have their eyes checked for corneal clouding. In areas where vitamin A deficiency is a public health problem and signs of xerophthalmia are common, the course could be adapted to include an assessment for problems seeing in the dark, Bitot spots, and corneal clouding, as part of checking for malnutrition and anaemia in all children.

Although this adaptation may seem attractive, it is discouraged for several reasons. It is preferable to use sick child visits to update vitamin A supplementation in all children, rather than to screen hundreds of children to find a child with Bitot spots or corneal clouding for vitamin A treatment. In areas where these signs are uncommon, health workers will become discouraged checking every child's eyes for these signs and the examination is likely to either be omitted or to not be done well over time. An additional

problem is that eye examinations are time-consuming to perform well in young children. In some children it is necessary to hold the eye open.

The adaptation is also discouraged because of its implications in relation to the course materials. It requires modifications in the photograph booklet and video, and it is unlikely that clinical cases will be available to demonstrate the signs. It can add considerable complexity to the guidelines if attempts are made to avoid repeated treatment since corneal clouding can be due to chronic scarring and Bitot spots do not disappear rapidly on treatment.

The problems with this adaptation are illustrated by the fact that the two countries that have so far adopted it removed it from the guidelines following the first training course, when the practical difficulties became clear.

12.1.2 Treatment of measles

Case fatality can be significantly reduced in children with measles by immediate vitamin A therapy (see Section C6). WHO, UNICEF, and IVACG[8] recommend treatment during measles with high-dose vitamin A. All published trials to date suggest optimal therapy is the same as that for the immediate (i.e. the first 2 days) treatment of xerophthalmia, as shown in the table on page 121.

> ***POSSIBLE ADAPTATION*: Give a third dose of vitamin A to children with measles.**
>
> A third dose of vitamin A, 2-4 weeks after the first two doses, is considered beneficial and is often recommended. However, as this third dose is not an essential part of the treatment and may be difficult to operationalize, it is not included in the generic treatment recommendations. If it is feasible for mothers to return to clinic after a month for a third dose of vitamin A, this might be considered.

12.1.3 Treatment of severely malnourished children

Children with severe protein-energy malnutrition are likely to be seriously vitamin A deficient. This is the basis for the recommendation that children with severe malnutrition be treated with vitamin A.

Xerophthalmic children with severe protein-energy malnutrition need to be carefully monitored because their vitamin A status is unstable and may rapidly worsen, even when they are treated with the recommended doses, as they may be unable to mobilise vitamin A stores. Additional doses may be required. For this reason, these children should be referred for treatment and monitoring in hospital.

***RECOMMENDED ADAPTATION*: Use vitamin A as part of a multivitamin/mineral supplement in children with persistent diarrhoea.**

Most children with persistent diarrhoea are malnourished and likely to have subclinical vitamin and mineral deficiencies. Some vitamins (such as vitamin A, folic acid) and some minerals (such as zinc) may be critical to achieving catch-up growth (weight and height) and in intestinal recovery. It would, therefore, seem reasonable to give all children with persistent diarrhoea and associated malnutrition daily supplements of vitamins and minerals for 2 weeks, in generous but safe amounts. Section C3 provides detailed instructions on how to identify an adequate, locally available, vitamin and mineral supplement. Children with diarrhoea may absorb less vitamin A than other children, but if the recommended doses are used they will still absorb enough to treat their deficiency.

12.2 Use of vitamin A for preventive purposes

The generic guidelines recommend that all sick children with corneal clouding, measles, or severe malnutrition receive treatment with vitamin A, and that the caretakers of all such children receive nutritional counselling, whether or not vitamin A deficiency is considered a public health problem in the area. Broader use of vitamin A supplementation as a preventive measure is recommended in areas where vitamin A deficiency is a public health problem. Information about the world distribution of vitamin A deficiency is available through the WHO/UNICEF/IVACG publication, *Vitamin A supplements: A guide to their use in the treatment and prevention of vitamin A deficiency and xerophthalmia*[8], or from the WHO Nutrition Unit (WHO/NUT).

In countries where vitamin A deficiency is a public health problem, vitamin A supplementation is effective in reducing the risk of deficiency and xerophthalmia, preventing blinding malnutrition and reducing the severity and case fatality of some infections among deficient populations. Studies conducted in the past decade have confirmed that vitamin A supplementation reduces the risk of mortality in children 6 months and older, particularly from measles and diarrhoea.[5,9]

Vitamin A (retinol) is a fat-soluble substance that is stored in body organs, principally in the liver. It is released as needed from storage sites into the bloodstream, from which it is drawn and utilized by cells throughout the body, including those of the eye.

Periodic supplementation with large doses of vitamin A is intended to protect against deficiency and its consequences, by building up a buffer supply of the vitamin to carry

the child through periods of reduced dietary intake or increased need. For children age 12 months and over, administration of 200 000 IU of vitamin A will provide protection for 4-6 months, depending upon the vitamin A content of the diet and the rate at which it is utilized by the body. Similar protection is achieved by giving smaller doses more frequently, for example
10 000 IU once a week, or 50 000 IU once a month.

When vitamin A is administered in the doses recommended, there are rarely any serious or permanent adverse effects. Such side-effects as may occasionally occur (for instance, tense or bulging fontanelle, headache, or vomiting) are minor and transitory and do not require specific treatment.

As populations and individuals develop adequate vitamin A status through improved dietary intake, supplementation becomes less necessary, even if its continuation is not harmful. However, continued supplementation may be necessary to ensure adequate vitamin A status among those population groups with a persistent dietary deficiency.

Where significant vitamin A deficiency is present in a country, the contact of children with health facilities represents an opportunity for the delivery of interventions to improve their vitamin A status, including either universal distribution or targeted supplementation of vitamin A.

12.2.1 Universal distribution

Universal distribution involves the periodic administration of supplemental doses of vitamin A to all preschool children, with priority given to those in regions and age groups (usually 6 months to 3 years) where the risk of blinding and other consequences of vitamin A deficiency are greatest. The timing of the distribution of vitamin A supplements depends upon a variety of factors including size of dose, seasonality, logistics (particularly opportunities for contact with the child), and available resources. For example, some countries have chosen to start supplementation at 9 months, which corresponds with the contact for measles immunization. It should be noted, however, that starting supplementation at 9 months misses the children who fall into the high risk age of 6-9 months.

Universal distribution schemes should make vitamin A available before the onset of a season in which there is a special risk of vitamin A deficiency, for instance, when diarrhoea or measles are most frequent or when foods rich in vitamin A are most scarce.

The Task Force recommendations for universal distribution for children 6 months of age and older are presented in following table.

Universal distribution schedule to prevent clinical complications due to vitamin A deficiency

Infants 6-12 months of age	100 000 IU of vitamin A orally every 4-6 months
Children over 12 months of age	200 000 IU of vitamin A orally every 4-6 months

POSSIBLE ADAPTATION: **Give vitamin A supplementation at sick child visits, as part of universal distribution.**

If vitamin A deficiency is a problem and the country has decided to provide universal vitamin A supplementation, sick child visits can be used as one opportunity to deliver these supplements. The child's vitamin A status can be checked ("Has he/she received vitamin A in the last 4-6 months?") and vitamin A given, if indicated, and then recorded.

If you make this adaptation, see *Section G, 12.2 Add vitamin A supplementation for children 6 months or older.* This section shows the exact changes to make in the charts, recording form and modules. You will note that the dosage recommendations for universal distribution are consistent with the generic treatment chart for children 6 months of age and older.

POSSIBLE ADAPTATION: **Give single dose 50 000 IU vitamin A to infants in endemic areas who are younger than 6 months and are not breastfed.**

The Task Force recommends that, in endemic areas, infants younger than 6 months who are not breastfed should be given one 50 000 IU dose of vitamin A. This will prevent risk of blindness and may also contribute to reduced severity of future illness. The Task Force recommendations are presented in the table on page 127.

There remains some uncertainty about the benefits for breastfed infants of supplementation before 6 months of age. Research to clarify issues of safety and benefits is currently underway, particularly in relation to supplementation delivered with immunizations in early infancy, and results will be available in late 1997. Nevertheless, breastfed infants whose mothers receive a post-partum supplement are not in need of further supplementation.

***POSSIBLE ADAPTATION*: Give vitamin A with measles immunization.**

Vitamin A supplements can be safely given with measles immunization, whether administered in a single dose at 9 months of age or in a 6 and 9 months schedule as recommended for refugees and certain other high risk populations (see Section C15). A recent trial in Guinea-Bissau has provided reassuring evidence that vitamin A delivered at 9 months does not reduce the high seroresponse rate and may actually enhance the antibody levels, although this was observed only in boys.[10] Administration of vitamin A with measles vaccination should be encouraged[11] in countries where vitamin A deficiency is prevalent.

***OTHER CONSIDERATIONS:* Identify other opportunities to deliver vitamin A supplementation.**

If periodic vitamin A supplementation has not been included in the national plans of countries with a clinical or severe subclinical public health problem of vitamin A deficiency, national authorities should be encouraged to examine opportunities to do so. Possibilities include linking the delivery of vitamin A to measles immunization at 9 months, and to national immunization days and special micronutrient or vitamin A days thereafter. Visits to a health facility for the care of sick children might provide the necessary contact points for such an intervention.

12.2.2 Targeted distribution to high risk children

In areas where vitamin A deficiency is a public health problem, infants and children with severe protein-energy malnutrition or infections such as diarrhoea, respiratory disease, and chicken pox are at particular risk. Siblings and children living in the same home or community as children with xerophthalmia are also at increased risk: evidence from numerous studies indicates that vitamin A deficiency occurs in clusters within households and communities, probably because they share common dietary patterns and infection risks.

In populations where vitamin A deficiency is a clinical or severe subclinical public health problem, disease-targeted supplementation should not replace routine supplementation but should complement it. Children who are brought to a health facility with diseases such as diarrhoea and pneumonia would benefit from receiving vitamin A supplementation, to replace vitamin A losses due to the disease. Although supplementation may not influence the outcome of a current

episode of diarrhoea or respiratory infection, it does help to re-establish vitamin A body stores depleted by chronic or repeated infectious disease and protects the child from future deficiency and its consequences, including the severity of subsequent infections.

The Task Force prevention schedule for targeted distribution to the high risk child is given in the table below.

Prevention schedule for targeted distribution to the high-risk child

Non-breastfed infants less than 6 months of age	50 000 IU of vitamin A orally once[a]
Infants 6-12 months of age	100 000 IU of vitamin A orally[a]
Children over 12 months of age	200 000 IU of vitamin A orally[a]

[a] This additional dose should not be given to children who are known to have already received a high-dose vitamin A supplement within the preceding month.

In populations where vitamin A deficiency is a public health problem, it is recommended that the course be adapted so that the status of vitamin A supplementation of a child brought to a health facility is checked. If no vitamin A was given in the past month, a high dose should be given to improve vitamin A status. Where records show that a child has received regularly scheduled supplements every 4-6 months, this additional dosing will not be necessary, although it would not be harmful. In contrast, a child who has received a routine high dose within the past month should not receive an additional targeted high dose.

12.3 Formulation of vitamin A

Oil-based preparations are the preferred formulation for oral administration of vitamin A, but water-miscible preparations may be used if the oily solution is not available. If large-dose capsules or concentrated syrup are not available, other forms of vitamin A, for example fish-liver oil, may be given in a similar dosage. Oil-based preparations are normally well absorbed by the body when they are administered orally, but they should never be injected since oil-based vitamin A is liberated extremely slowly from the injection site. The only preparation suitable for intramuscular injection is water-miscible vitamin A, but this should rarely be required. It is preferable to administer any and all preparations orally than to inject them intramuscularly, except in rare instances of severe malabsorption such as in patients with severe cystic fibrosis. Vitamin A supplements available from UNICEF are presented in Annex 12-A.

POSSIBLE ADAPTATION: Add instructions on how to administer vitamin A using a pump dispenser.

It may be preferable to give vitamin A to infants with a pump dispenser, if available. This method is more accurate than giving a portion of a capsule. For a list of changes to make in the chart and modules for this adaptation, see *Section G, 12.1 Add vitamin A syrup as a possible formulation.*

Annex 12-A
Vitamin A supplement supplies available from UNICEF

Short description (for ordering)	Detailed description	UNICEF Stock No.	Price (in US$) per pack[a]
Retinol (vit. A) tabs. 3 mg (10 000 IU)	Solid vitamin A "low-dose" tablets, white, may be available in multi-dose strip or pack.	UNICEF Supply Division will supply to specific order, delivery time approximately 10 weeks from date of order. Depending on demand these tablets may be stocked as a standard item.	Not yet available
Retinyl palmitate (vit. A) soft caps. 15 mg (50 000 IU)	White-coloured opaque soft gel capsules with nipple (pack of 500 capsules)	Standard item available since January 1996	$7.00
Retinyl palmitate (vit. A) soft caps. 30 mg (100 000 IU)	Blue-coloured opaque soft gel capsules with nipple (pack of 500 capsules)	Standard item available since January 1996	$8.00
Retinyl palmitate (vit. A) soft caps. 60 mg (200 000 IU)	Red-coloured opaque soft gel capsules with nipple (pack of 500 capsules)	15 830 05	$10.12
Retinyl palmitate (vit. A) soft caps. 60 mg (200 000 IU)	As above but pack of 100 capsules	15 830 00	$2.12
Retinyl palmitate (vit. A) solution in veg. oil 100 000 IU per ml.	Sealed bottle containing 100 ml vitamin A solution for use with multi-dose dispenser.	Standard item available since January 1996	$2.05 each
Dispenser for vitamin A oily solution (0.5 ml per stroke)	Re-usable heavy duty plastic dispenser for use with 100 ml bottles.	Standard item available since January 1996	$1.80 each

[a] Approximate UNICEF prices as of January 1996. Prices vary according to exchange rates and quantities purchased. Request current price and ordering information from UNICEF.

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13. NUTRITION COUNSELLING

Generic guidelines

Children who are less than 2 years of age or who are classified as malnourished, based on very low weight-for-age, have their feeding assessed and compared with age-specific feeding recommendations. The purpose is to identify children with specific, remediable feeding problems, and then to counsel their mothers on appropriate feeding practices. These children are then seen at follow-up to check on their weight gain and, if necessary, to provide further help in resolving feeding problems. Local adaptation of feeding recommendations and identification of common feeding problems, which can potentially be modified, are important steps in adapting the course to each country (or large region). To maximize impact on child nutrition, nutrition counselling focuses on helping to solve the most important remediable local feeding problems, rather than providing general nutritional advice.

Clinic visits by the mother bringing a sick child provide the health worker with an opportunity to give advice about the nutrition of the young child both during and after illness. Sound advice promoting breastfeeding, improved weaning practices with locally appropriate energy- and nutrient-rich foods, and giving nutritious snacks to children 2 years or older can have a significant impact on the adverse effect of infections on nutritional status. Specific and appropriate complementary foods are recommended and the frequency of feeding by age is clearly explained. Exclusive breastfeeding is encouraged for the first 4 and if possible up to 6 months; use of bottles is discouraged for children of any age; and guidance is provided to solve important problems with breastfeeding. The latter includes assessing the adequacy of attachment and suckling (see Section C14).

Specific feeding recommendations are provided for children with persistent diarrhoea (see Section C3).

13.1 Assess the child's feeding

Selection of questions to assess the child's feeding were based on the following:

13.1.1 Assessment of breastfeeding frequency and night feeds

Low frequency of breastfeeding (less than 6-8 feeds per day) often indicates problems, as it may be associated with insufficient intake by the infant and is associated with a high probability of early termination of breastfeeding.[1] As well as increasing frequency, night feeds may have additional benefits in terms of milk production (see Section C14).

13.1.2 Assessment of complementary foods or fluids

Types of foods and fluids given to the child are assessed for adequacy in terms of nutrients and energy density. The frequency of feeding is checked to assess its adequacy to meet the child's nutritional requirements. The method of feeding is also checked to assess its safety (feeding bottles, for example, are associated with increased risk of diarrhoea). If the child's weight is low for his or her age, additional information is sought to ascertain causes of low food intake: the size of the servings, whether the child receives his or her own serving or shares food with others, and who feeds the child and how; in case a passive approach to feeding by the caretaker may be the cause of low intake.

13.1.3 Assessment of changes in the diet during illness

Changes in feeding during illness are explored to identify problems that may have developed due to the mother's management of illness and that require specific counselling.

13.2 Feeding recommendations

The module covers practical feeding recommendations likely to lead to good nutrition for 5 age groups.

13.2.1 Up to 4 months of age

Exclusive breastfeeding is recommended for these infants. This is based on evidence from several epidemiological studies[2] indicating that infants in this age group who are exclusively breastfed achieve adequate growth and have lower rates of morbidity. Except when they have diarrhoea, no other foods or fluids are required by exclusively breastfed infants, even in hot and dry climates.[3]

13.2.2 4 months up to 6 months

Most infants in this age group will have adequate growth and less morbidity if they are exclusively breastfed.[4] Some infants, however, will need supplements in order to maintain adequate growth and are identified as those who are gaining insufficient weight, who are still hungry after breastfeeding, or who reach for food. These infants should be offered the same complementary foods as the child aged 6 months up to 12 months, once or twice a day, after breastfeeding.

13.2.3 6 months up to 12 months

Breastfeeding is still a major source of nutrients for children in this age group and should still be promoted, particularly for the sick child who tends to reject other types of food.[5] Mothers should be encouraged to breastfeed as often as the child wants. A normal child breastfed on demand will take 8-12 breastfeeds or more in 24 hours. In addition to continued breastfeeding on demand, the chart recommends locally available and affordable nutrient- and energy-rich complementary foods for these children. These foods should be given at least 3 times per day if the child is breastfed and 5 times per day if he or she is not. Complementary foods are considered to be energy-rich when their energy density is equal or greater than 100kcal/100g. This is greater than the energy density of breastmilk (just less than 70kcal/100g) and of most soups and liquids offered to young children. In a Nigerian study, for example, the average energy density of watery cereal paps offered to young children was less than 30kcal/100g.[4] Thick porridges, particularly if they contain oils or fats, are energy dense. If foods from animal sources, such as chicken liver, fish, meat, milk or eggs are added to the porridge, its nutrient density will be improved.

The recommended frequencies reflect research in Peru[6] which indicates that, if size of the portion offered is not limited, 5 meals per day of food with at least 70 kcal/100g would satisfy the energy needs of children in this age range (assuming that breastfed children would have at least 2 breastfeeds per day).

13.2.4 12 months up to 2 years

Breastmilk can still make a significant contribution to the diet of children in this age group, particularly during illness. Breastmilk also reduces the risk of morbidity, for example from *Shigella* infection and cholera.[7,8] In addition to the complementary feeds recommended for children aged 6 months up to 12 months, children aged 12 months up to 2 years should be introduced to family foods, which are usually energy-dense and adequate in nutrients. Animal milk can be given as a complementary food.

13.2.5 2 years and older

Recommendations for these children are intended to provide them with adequate energy and nutrient intakes, while recognizing that the mother may have limited time and other resources for active feeding or the preparation of special foods. Snacks, such as biscuits and bread, commonly given in many settings (for example in Guatemala, Peru[4], and the Philippines), tend to be energy- and nutrient-rich foods. They are acceptable to children and caretakers and are a useful solution when time available for food preparation is limited. It is recommended that such nutritious snacks be given twice per day in addition to the 3 daily meals of family foods recommended for this age group.

Characteristics of a good daily diet are described at the bottom of the feeding recommendations. A good daily diet is adequate in quantity and combines foods which are rich in energy with those which are good sources of protein and micronutrients such as iron, zinc, and vitamins. This reflects the observation in some settings, Mexico for example,[9] that diets which are adequate in energy may be lacking in micronutrients. Inadequate micronutrient intake may lead to stunted growth or to more specific signs of deficiency, such as xerophthalmia due to lack of vitamin A.

> ***ESSENTIAL ADAPTATION:*** **National or regional adaptation of age-specific feeding recommendations.**
>
> Section D provides guidance on how to adapt the feeding recommendations. This adaptation process may identify feeding recommendations which are applicable throughout a country or which are specific to a region, requiring several sets of age-specific feeding recommendations for various regions. Different sets of recommendations can be accommodated in the course by having several versions of the mother's counselling cards but only one adaptation of the module *Counsel the Mother*, which refers health workers and facilitators to the appropriate regional counselling card. In Uganda, the initial mother's counselling card was developed for the central region (see Annex A-6) with the intention of developing several other sets of feeding recommendations and cards for other major regions with significant differences in feeding practices. In some countries, limited regional variation in foods added to a basic porridge can be accommodated on a single counselling card. This approach has been taken in Tanzania (see Annex A-6).

13.3 Counsel the mother about feeding problems

Five generic feeding problems are identified in the chart, with recommendations on their management.

13.3.1 Reported difficulty with breastfeeding

Assessment of breastfeeding and, if required, assistance with positioning and attachment are recommended (see Section C14).

13.3.2 Premature complementary feeding

The most common reason given by mothers for introducing complementary feeds to an infant age less than 4 months is the perception that breastmilk is inadequate in quality or quantity. Studies have shown, however, that in the majority of cases mothers' perceptions about not producing enough milk do

not reflect reality, provided that frequency of breastfeeding is sufficient (see Section C14). There is little variation in the quality of breastmilk, unless the mother is severely nutritionally deprived. The experience of lactation clinics is that with correct positioning and attachment and frequent breastfeeding, in addition to building up the confidence of the mother, adequate exclusive breastfeeding can be re-established.

If exclusive breastfeeding cannot be re-established, complementary foods are required. The recommendations specify measures to ensure the correct preparation, safety, and quantity of complementary foods.

13.3.3 Use of feeding bottles

Various studies, in Jamaica[10], Nigeria[11], and Peru[12] for example, have shown that feeding bottles are highly contaminated and difficult to clean. Cup feeding is safer, and experience in several countries indicates that even very young infants can be successfully fed with cups, if complementary food is required.

13.3.4 Passive feeding

In some settings, low food intakes and malnutrition have been attributed to a passive approach to child feeding by the mother or another caretaker.[4] This is often because the caretaker believes that the child will know how much he or she should eat. The chart recommends ways in which the mother can take a more active role in feeding the child. These suggestions should be complemented with local examples.

13.3.5 Problems feeding the sick child

Anorexia accompanies many illnesses, particularly diarrhoea and those associated with fever. Breastmilk intake, as indicated above, is usually well maintained during illness and the child should be breastfed more frequently than usual. Refusal to eat and low food intake at each meal can be partially compensated by increasing the frequency of meals, and by offering foods that are likely to be better accepted by the sick child as well as being nutritious. Reassuring the mother that the child's appetite will improve with the end of illness is important in helping her to sustain her efforts. A blocked nose can interfere with adequate feeding, particularly in infants, and the mother should be advised how to clear the nose.

> ***POSSIBLE ADAPTATION*: Add common local feeding problems which can be modified.**

The adaptation process may lead to changes in this list of feeding problems based on locally common problems that are identified as being modifiable. It is important both to identify common problems and to suggest practical solutions which are acceptable.

13.4 Feeding recommendations for a child with persistent diarrhoea

These recommendations reflect recent studies[13] which indicate the benefits of reducing the lactose content of the diet of children with persistent diarrhoea (see Section C3).

13.5 Follow-up of children with feeding problems

Follow-up is recommended within 5 days to check that the mother is able to put into practice the feeding recommendations. Limited or no weight gain can be expected within this period. It is recommended, therefore, that very low weight-for-age children return again in 30 days to have their weight checked.

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14. BREASTFEEDING COUNSELLING

Generic guidelines

The IMCI course addresses the most common breastfeeding difficulties by teaching the health worker basic breastfeeding support skills. The interventions routinely recommended in the course are:

For young infants (age 1 week up to 2 months)

- A feeding problem exists if the mother reports difficulty with feeding, breastfeeding fewer than 8 times in 24 hours, giving any other foods or drinks, or if the young infant is low weight-for-age.

- If a feeding problem exists (and the young infant is not being urgently referred to hospital), the health worker assesses breastfeeding by looking for good attachment and effective suckling. The infant's mouth is also examined for thrush.

- If attachment is poor or the infant is not suckling effectively, the health worker helps the mother to improve her technique by better positioning of the infant.

- If technique is satisfactory, the mother is advised about pattern of feeds (feed for as long as infant wants, as often as infant wants, at least 8 times a day).

- The health worker supports the mother to give her confidence that her breastmilk is sufficient.

- The mother is counselled about reducing other foods and drinks and about breastfeeding more often. The young infant is then seen in follow-up 2 days later when further reduction or discontinuation of the other foods and drinks is recommended, with further follow-up.

- If other feeds are necessary, the mother is advised to give them by cup not bottle.[1] She is also advised about correctly preparing breastmilk substitutes.

For infants 2 months or older and young children

- The mother is asked whether she is breastfeeding, how often, and whether she breastfeeds at night.

- If the mother reports difficulty with breastfeeding, the health worker assesses breastfeeding in the same way as for the young infant.

- If the child is less than 4 months old and is taking other milk or foods, the health worker builds the mother's confidence that she can produce enough breastmilk to meet all the child's needs and suggests giving more frequent, longer breastfeeds, both day and night, and gradually reducing other milks or foods.

- If other milk needs to be continued, the mother is counselled to breastfeed as much as possible (including at night), she is also counselled to make sure that other milk given is a locally appropriate breastmilk substitute, is correctly and hygienically prepared, and is given in adequate amounts; and that the prepared milk is finished within an hour.

- If the mother is using a bottle to feed the child, the health worker recommends substituting a cup and shows the mother how to feed with a cup.

- Any feeding problems are followed up in 5 days.

The same skills and approach can in fact solve a number of other less common breastfeeding difficulties. For some difficulties, however, more complex skills may be needed (such as expression of breastmilk, or relactation) for which referral may be necessary to someone with more experience in breastfeeding counselling. These interventions should now become a routine part of health care delivery.

14.1 Assessment and correction of breastfeeding technique

14.1.1 Adequacy of breastmilk supply

Many studies, from a wide variety of countries, show that the most common difficulties experienced by breastfeeding mothers are perceived insufficiency of milk and complications resulting from inappropriate early introduction of other feeds and drinks. These two situations are clearly related, as each may cause the other.

Giving other drinks, even plain water, has been shown to replace and displace breastmilk[2], and does not increase fluid or nutrient intake up to 4 months of age and, for the majority of infants, up to 6 months of age. Early introduction of food or fluid results in decreased breastmilk supply and an increased risk of diarrhoea. Thus exclusive breastfeeding is recommended for at least 4 and if possible 6 months.

Perceived insufficiency of milk is often the result of the mother's lack of confidence and suboptimal breastfeeding technique or pattern. Mothers can often be helped by guidance about simple improvements in technique and pattern, and reassurance about the quality and quantity of their breastmilk.

As the consequences of these simple breastfeeding difficulties can lead to an infant's death, it is appropriate for basic level health workers to be able to manage them. No drugs or other supplies are needed for this potentially life saving intervention. A study in Bangladesh has shown that mothers can be helped to return to exclusive breastfeeding by counselling and help with their breastfeeding technique.[3]

14.1.2 Importance of attachment for breastfeeding

Based on clinical observation over a number of years, it is recognised that breastfeeding is most likely to be successful and trouble free if the infant opens his or her mouth wide, takes the nipple and much of the areola and underlying tissues into its mouth, and if the infant's chin is close to the breast.[4] An infant allowed to find its own way to the breast in the first hour after birth naturally takes the breast into its mouth in this way.[5]

The oral mechanics that explain this clinical observation were demonstrated first by radiographic studies,[6] though these were ignored for 20 years, and then by ultrasound.[7] It is now clear that the milk passes from the breast to the infant as a result of two processes:

- The oxytocin reflex increases the pressure of milk in the breast and makes it flow towards the lactiferous sinuses (collecting ducts), which lie beneath the areola, and sometimes through the nipple to the exterior.

- The infant's tongue protrudes over its lower gum and reaches under the lactiferous sinuses. A peristaltic wave passes along the tongue, pressing the milk from the lactiferous sinuses into the infant's mouth, from where he swallows it.

Thus, milk is not removed from the breast by suction. Suction helps to protract the breast tissue into the baby's mouth and hold it there, but is not responsible for removal of the milk.

For milk to flow efficiently into a baby's mouth - that is for suckling to be effective - the baby needs to draw enough breast tissue into its mouth for the nipple to touch the soft palate and stimulate the sucking reflex, and for the tongue to reach under the breast and press on the lactiferous sinuses.

To achieve this the baby needs to take the breast from below the nipple, with the nipple pointing towards the roof of his or her mouth. More of the lower part of the areola goes into the mouth, and more areola shows above the baby's upper lip than below the lower lip. This is easiest for the baby to achieve if its

chin is near the breast. If he or she takes the breast in this way, the mouth will be open and the lower lip will be turned out. A lower lip that is turned in interferes with the action of the tongue. The upper lip may or may not be turned outwards, and the infant's nose is usually away from the breast, but sometimes touches it. There is almost always ample room for breathing, however, and it is not necessary for the mother to hold the breast back from her baby's nose.

The four main signs of good attachment, therefore, are: baby's chin touching breast, mouth wide open, lower lip turned outwards, and more areola visible above than below the mouth. The position of the upper lip and the nose are not so critical.

More information on the anatomy of the breast and the physiology of suckling can be found in the WHO/CHD *Breastfeeding counselling: A training course*.[8]

Poor attachment

If any of the four signs are not satisfactory, then the baby is not well attached to the breast.

The health worker cannot always see the lower lip and it can be difficult to be sure if it is turned out or not. However, if the baby is close to the breast, and the other signs are satisfactory, then the lower lip almost certainly is turned out. If the lower lip is turned in, it is usually obvious, and often the baby's mouth is not well open.

If a baby is poorly attached, he or she does not get the milk efficiently. If he or she fails to remove the milk, this can result in the breasts becoming engorged. The infant may also not get enough milk to satisfy his or her appetite, and the mother may believe that she is not producing enough milk. However, the amount of milk that a baby gets also depends partly on the oxytocin reflex. If the oxytocin reflex is working strongly, the baby may get enough milk if he suckles often or for a long time, even if he is not well attached.

If a baby is poorly attached, the suckling may be painful for the mother, and if the suckling continues this may damage the nipple skin, causing fissures. Many of the common problems experienced by mothers, especially in the first two to three months of breastfeeding, can be caused by poor attachment.

Effective suckling

The anatomical signs of attachment can sometimes appear to be satisfactory, even if the milk is not flowing well and the baby is not getting milk as

efficiently as he might. Sometimes a baby appears to be well attached, but is not in fact suckling well. To confirm that a baby is getting milk, watch the suckling action.

If milk is flowing into the baby's mouth, he or she drinks and swallows. The baby takes several slow deeps sucks, one to two per second, swallowing between sucks and then pauses, waiting for the oxytocin reflex to refill the lactiferous sinuses with milk. The baby may then suck quickly a few times without swallowing, to start the milk flow, then takes more slow deep sucks. These slow deep sucks and swallows show that breastmilk is definitely flowing into the baby's mouth.

Therefore, in the case of any breastfeeding difficulty, the health worker assesses a breastfeed for 4 minutes, looking for signs of attachment and effective suckling. If these are not satisfactory, the health worker helps the mother to improve attachment.

Effect of feeding from a bottle

A baby who becomes accustomed to sucking from a bottle may not open his mouth wide enough to attach well and may take only the nipple into his mouth. A bottle-fed baby may show a preference for a rubber teat over his mother's breast and may refuse the breast, or fail to suckle effectively, or may damage the nipples. Also, when a mother becomes accustomed to bottle feeding she tends to hold her baby further from her, with its body turned away.

14.1.3 Importance of positioning for breastfeeding

The term positioning is sometimes used rather loosely to mean what is described above as attachment. In WHO and UNICEF materials, the word positioning is used to describe the infant's body position, not the position of the mouth in relation to the breast, for which the term attachment is used.

If a baby is well attached and suckling effectively, it may not be necessary to worry about adjusting the body position. However, if a baby is poorly attached, or if breastfeeding is not going well, then it is helpful to check and adjust the body position if necessary. One of the ways to help an infant to attach better to the breast and suckle more effectively, without damaging the nipples, is to ensure that the body position of the infant is optimal.

Sound evidence exists for the benefits of correct positioning and of correcting breastfeeding technique for ensuring successful breastfeeding.[9,10] Reports from lactation clinics in Brazil, Pakistan, and Bangladesh[11], and India[12] as well as verbal reports from Nigeria, Kenya, Indonesia, and the Philippines confirm that helping mothers with breastfeeding difficulties - such as perceived

insufficiency of milk - to improve their baby's positioning and attachment is a useful intervention. These simple interventions are effective for perhaps 50% or more of mothers with these difficulties. In the United Kingdom, it has been demonstrated that poor weight gain in an otherwise healthy infant can be fully corrected by the sole intervention of improving the quality of breastfeeds.

Technique for positioning a baby

The technique for positioning a baby is described in detail in the Royal College of Midwives' handbook *Successful Breastfeeding*[13], in the book *Helping Mothers to Breastfeed*[14], and in WHO/CHD materials *Breastfeeding counselling: A training course*.[8]

A mother can position and attach her baby well by ensuring that:

- *The baby's head and neck are straight on its body so that the infant does not have to bend its neck or twist its head to the side.* A bent or twisted neck makes suckling and swallowing more difficult. The baby's neck can, however, be slightly extended, as this helps to put the chin close to the breast and keeps the nose clear of the breast. (Mothers sometimes think they need to hold the breast back from the baby's nose, but this should not be necessary).

- *The baby's body is close to her body.* This ensures that its chin is close to her breast and helps the baby to take a large mouthful of breast in a wide open mouth, instead of reaching forward and pointing its mouth.

- *The baby's whole body is supported, not just its head and neck.* The mother can support the baby's body with her arm on the same side as the breast, or with her opposite hand, or with cloths or pillows if these are available. She should avoid gripping the infant's bottom, as this can pull the infant too far out to the side. A common cause of poor attachment in young infants is the mother holding the baby in the crook of her arm. In this position the baby is too far out to reach the breast easily and has to bend his neck forward in order to take the breast into his mouth. This results in the baby coming on to the nipple from above, rather than from below, making it more difficult to put his chin to the breast and get his tongue under the lactiferous sinuses.

- *The baby faces the breast.* As most nipples point slightly downwards and outwards, the baby should face slightly upwards, so that he is also looking at his mother's face. To start with, his nose should be opposite his mother's nipple. Then, when he opens his mouth to take the breast, and reaches towards the nipple, he extends his neck slightly and moves his chin in

towards the breast. This helps to ensure that the nipple points towards the roof of the baby's mouth, and it also helps him to take in more of the areola below the nipple than above it.

Technique for attaching a baby to the breast

When a baby is in a good position the mother can help the infant to attach to the breast. She needs to understand and use her infant's natural reflexes to get the child to open its mouth wide to take a large mouthful of breast.

The mother touches the infant's lips with her nipple, to stimulate the rooting reflex. The most important part of this reflex is opening the mouth wide and putting the tongue down and forwards to take the breast. The mother should wait until the baby has opened its mouth really wide, and then move the infant quickly onto her breast. She aims the baby's lower lip well below her nipple, and the nipple towards the roof of the infant's mouth. This helps to ensure that the infant's tongue reaches the lactiferous sinuses.

The way that an infant opens its mouth to take the breast is different from crying. When an infant cries, it holds its tongue back. If a mother tries to put the infant to her breast when he or she is crying, it may not attach well.

A baby may not attach well the first time that the mother tries, even with skilled help. It is often necessary to try several times before the attachment is good. The health worker should make sure that the mother understands what he or she is trying to do, so that the mother can practise at later feeds. The health worker should then see her in a few days, and help her again.

14.1.4 Frequency of feeds

There are many and varied studies which show that more frequent breastfeeding results in a greater intake of breastmilk. However, there is a gradation and much variation, so there is no absolute cut-off point or optimal frequency for breastfeeding. Numerous studies have shown that mothers who demand feed put their infants to the breast from 10-20 times a day. (A minimum of 6 feeds a day is required to suppress ovulation.)

Research suggests that at least 8 feeds a day are required to reliably achieve the average daily milk output (about 750g) of breastfeeding women.[15,16] Other data indicate that feeding less than 8 times a day is more often associated with early supplementation and early termination of breastfeeding.[17] So while some women with babies who suckle effectively are able to satisfy their infant's needs with only 6-8 breastfeeds a day, a mother who experiences any difficulty or who perceives that her milk supply is inadequate, should be advised to feed

more often than 8 times a day before she considers introducing any complementary feeds.

Because prolactin levels are higher at night than by day, breastfeeding at night is particularly important for increasing and maintaining satisfactory breastmilk output. Women who stop to breastfeed at night may be at risk of apparent milk insufficiency.

Studies of feeding frequency have often failed to demonstrate a consistent link between total time spent at the breast, or length of individual feeds, and milk intake. These studies have been conducted among women who are demand feeding and satisfying their infants. Clinical and field observations suggest, however, that mothers with perceived insufficiency of milk are often giving their infants abbreviated feeds. For example, they take the infant off the breast when it pauses, instead of allowing it to continue until it releases the breast spontaneously. Advising a mother to let her baby continue suckling as long as he wants can be a helpful intervention which leads to a more satisfied baby who demands to breastfeed less frequently.

The mother's nutritional state has not been shown to be a limiting factor for breastmilk production, unless she is severely malnourished and near starvation.[18] Nutritional support of a mother on a poor diet is desirable to maintain her own health and strength, and to prevent depletion of her nutritional reserves.

> ***POSSIBLE ADAPTATION*: Include in the module discussions about particular practices influencing the continuation of breastfeeding**.
>
> The practices to include will depend on local circumstances. Examples include the sudden discontinuation of breastfeeding when a mother becomes pregnant and the tendency to inappropriately attribute infant symptoms to breastmilk characteristics. The review of infant feeding information (Section D) may result in suggestions. However, these should be limited to a few practical observations that will help the health worker counsel a mother on breastfeeding.
>
> Culturally-appropriate suggestions for what a working mother should do to continue breastfeeding could be added. These might include sleeping with the baby at night to allow more breastfeeds, and using a cup rather than a bottle for feeds when the mother is at work to avoid nipple preference. If most health workers and mothers already know how to express breastmilk, expressed breastmilk could be recommended. See *Breastfeeding counselling: A training course* for further suggestions.[8]

***POSSIBLE ADAPTATION*: Provide more specific information on referral to a breastfeeding counsellor for breastfeeding problems.**

If the mother has stopped breastfeeding an infant less than 4 months of age and is interested in relactation, or if the health worker and mother are unable to solve breastfeeding problems, referral to a trained breastfeeding counsellor is recommended on the chart and in the *Young Infant* module (page 50). It may be possible to specify in the module the title and type of facility where such a trained counsellor would be located.

***POSSIBLE ADAPTATION*: Revise the feeding recommendations box to include advice on when to provide complementary foods to a 4 or 5 month old infant in a single column with advice for infants up to 6 months of age.**

In Uganda, concerns were expressed that the promotion of exclusive breastfeeding to age 6 months might be undermined by having separate recommendations for infants aged 4 months up to 6 months. This was solved by reformatting but retaining the recommendations as follows:

Up to 6 Months of Age

- Breastfeed as often as the child wants, day and night, at least 8 times in 24 hours.
- Do not give other foods or fluids.
- Only if the child aged 4-6 months:
  - appears hungry after breastfeeding, or
  - is not gaining weight adequately,

  add complementary foods (listed under 6 months up to 12 months).

  Give these foods 1 or 2 times per day after breastfeeding.

14.2 Breastmilk substitute recommendations

The only breastmilk substitute mentioned specifically in the modules is cow's milk. The recommendation for the dilution of cow's milk for infants under 3 months of age is consistent with the recipe recommended in the breastfeeding counselling course.[8]

***POSSIBLE ADAPTATION*: Specify locally appropriate breastmilk substitutes.**

Although it would be inappropriate to include information for breastmilk substitutes on the chart, it may be useful in the module text to include information for health workers about which breastmilk substitutes available to mothers are acceptable and which are not, and about dilution. In one area, for example, it was found that cow's milk available in the market was already

diluted. This led to an adaptation on page 20 of the *Counsel* module to recommend full-strength cow's milk, even in infants under 3 months of age.

14.3 Areas with a high prevalence of HIV infection

Various studies indicate that 25-35% of children born to HIV positive mothers acquire HIV infection.[19,20,21,22,23] In most cases transmission occurs in utero or during delivery, but in about a third, HIV is transmitted through breastmilk.[24,25]

In view of the importance of breastfeeding for maternal and child health and the increasing prevalence of HIV infection, UNAIDS has recently revised the consensus statement based on a 1992 WHO/UNICEF consultation on HIV transmission and breastfeeding. This revised statement[26] emphasizes that, as a general principle, in all populations, irrespective of HIV infection rates, breastfeeding should continue to be promoted, protected, and supported. Access to voluntary and confidential HIV counselling and testing should be facilitated for all women and men of reproductive age. The statement emphasises that parents, in particular the mother, should be empowered to make a fully informed decision about infant feeding and be suitably supported to implement their decision. The following section describes possible adaptations to the guidelines and modules.

Transmission by breastmilk is higher in recently infected mothers or those who have recently seroconverted. The risk of breastmilk transmission may also be increased by maternal vitamin A deficiency,[27] mastitis, nipple cracks, and oral thrush in the child.[28,29] In addition, the risk of transmission appears to be greater in mothers with advanced HIV disease or with a low CD4 cell count.

There is now evidence that HIV infection can be transmitted through breastfeeding at an older infant age than previously thought.[30,31,32,33,34,35] Some mothers develop AIDS later, after months of breastfeeding, which can increase the risk of late postnatal transmission. The policy implications of this substantial risk of late (>6 months) postnatal transmission of HIV-1 are still being explored.

> ***POSSIBLE ADAPTATION*: In areas with a high prevalence of HIV infection (see Section C20) where HIV testing is available and where some families can have uninterrupted access to a nutritionally adequate and affordable breastmilk substitute, train health workers to determine the mother's HIV status, to counsel HIV-positive mothers on the comparative advantages and risks of breastfeeding and the use of breastmilk substitutes, and to teach the safe use of breastmilk substitutes.**
>
> If infants born to women living with HIV can be ensured uninterrupted access to nutritionally adequate breastmilk substitutes that are prepared and given safely, the infants are at less risk of illness and death if they are not breastfed. However, when these conditions are not fulfilled, in particular in an

environment where infectious diseases and malnutrition are the primary causes of death during infancy, artificial feeding substantially increases a child's risk of illness and death.

If HIV testing is available and families have uninterrupted access to a nutritionally adequate and affordable breastmilk substitute, course adaptation could be considered to prepare the health worker to adequately manage the following situations.

1. *An infant whose mother is known to be HIV positive and has already chosen to use breastmilk substitutes, based on counselling during pregnancy about the comparative advantages and risks of breastfeeding and the use of breastmilk substitutes*

   The health worker should be able to decide if the mother is preparing the breastmilk substitutes safely and in adequate quantity, and if necessary, help her to do so. If the mother is unable to provide breastmilk substitutes safely and in sufficient quantity, particularly if the infant has become ill or malnourished as a result, referral for relactation might be considered if the infant is less than 4 months of age. Early introduction of energy- and nutrient-rich complementary feeds should be emphasized for older infants.

2. *A child who is being breastfed whose mother is known to be HIV positive*

   The health worker should find out if the mother has been adequately counselled about the risks and advantages of breastfeeding and artificial feeding, and if she has actively decided to breastfeed. If so, she should support the mother to breastfeed. If the mother has not been counselled, the health worker should inform her about the risks and advantages of breastfeeding and artificial feeding in her situation. She should be informed about the potential hazards of artificial feeding (increased risk of diarrhoeal disease) and the requirements for adequate artificial feeding. She should also be given clear information on the risks of transmission of HIV through breastfeeding, including reassurance that the majority of mothers do not transmit HIV this way. This will include finding out if the mother has access to an uninterrupted supply of nutritionally adequate breastmilk substitute, and if the family can afford it.

   If the mother chooses to continue breastfeeding, the health worker should support her in her decision.

3. *A child who is being breastfeed whose mother is HIV negative*

The mother should be counselled to breastfeed normally.

It is also important to help the uninfected woman reduce her risk of acquiring HIV infection, not only for her protection, but because this would risk infecting the breastfeeding child.

4. *A child who is being breastfeed whose mother's HIV status is not known*

If HIV testing is not available, the mother should be counselled to breastfeed normally.

If HIV testing is available, the health worker should counsel the mother about HIV testing and, if she is found to be positive, advise her on the risks and advantages of breastfeeding and artificial feeding.

Given the requirements that HIV testing is available; that health workers are able to determine the mother's HIV status and/or counsel her to obtain testing; and that at least some families have uninterrupted access to an affordable supply of nutritionally adequate breastmilk substitute, the conditions for this adaptation will usually not be met. If these requirements are met, course adaptations would be needed to guide the health worker to:

- Understand the comparative advantages and risks of breastfeeding and the use of breastmilk substitutes.

- Determine the mother's HIV status.

- Counsel the mother on obtaining an HIV test, if her HIV status is not known.

- Determine the family's ability to afford a nutritionally adequate breastmilk substitute. The following are resources required to artificially feed a baby adequately:
  - easy access to shops to buy formula (cow's milk may not be adequate for full artificial feeding),
  - money to buy at least 2x500 gram cans of formula per week for at least 6 months,
  - possibility of giving enough other good quality food after 6 months,
  - clean water, fuel, and pan to sterilize cups, and
  - knowledge and skill to prepare feeds adequately.

- Determine the mother's ability to safely use an adequate breastmilk substitute.

- Understand that over- or under-dilution of breastmilk substitutes are common problems.

- Counsel the mother to help her decide whether to breastfeed or use a breastmilk substitute, including explaining the comparative advantages and risks of breastfeeding and breastmilk substitutes.

- Teach the mother to safely prepare a breastmilk substitute. This should include introducing health workers to locally available breastmilk substitutes and training them to check whether the mother is correctly following the instructions for dilution. If the mother chooses to use a breastmilk substitute, the health worker should be able to teach her how to prepare and use it safely. All mothers who choose to artificially feed should be supported in their choice and advised how to do so adequately. The advice should include:

    - quantity of milk,
    - how to prepare it,
    - how to clean equipment, and
    - how to cup feed rather than bottle feed.

- Follow up to make sure that the breastmilk substitute is used safely.

- Ensure that the mother knows about home treatment for diarrhoea and when to return if her child develops diarrhoea.

All mothers should be given assurance of full support in whatever way they decide to feed their baby.

All mothers who choose to breastfeed (HIV-, HIV+, unknown) should be supported in their choice, and advised:

- To breastfeed exclusively, up to age 4-6 months,

- To take extra precautions to avoid HIV infection while breastfeeding (for example, to use condoms), especially if HIV- or status unknown,

- How to avoid cracked nipples or breast infection,

- To eat plenty of vitamin A containing foods, and

- If known to be HIV+, to stop breastfeeding as soon as they can adequately feed their baby with other milk/foods.

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15. IMMUNIZATION

Generic guidelines

The immunization status of the sick child is checked and vaccines are given as needed. The modules reinforce the importance of immunizing sick children who are not being referred to hospital. They also emphasize that it is safe to immunize a sick child and that this results in fewer missed opportunities for immunization.

The standard EPI immunization schedule is recommended. OPV-0 is not given after 14 days of age. If a child has diarrhoea and is due for a dose of OPV, OPV is given but not recorded on the immunization card. The mother is asked to bring the child back in 4 weeks for an extra dose of OPV, which is recorded on the card.

The only contraindications to immunization taught are:

- No immunization for a child who is being referred urgently to hospital. (There is no medical contraindication, but if the child dies, the vaccine may incorrectly be blamed for the death.)
- No BCG to a child symptomatic for AIDS.
- No DPT-2 or DPT-3 to a child who has had convulsions or shock within 3 days of a previous dose of DPT. (DT should be administered instead of DPT.)
- No DPT to a child with recurrent convulsions or another active neurological disease of the central nervous system. (DT should be administered instead of DPT.)

In addition, one exercise makes the point that it is not necessary to give measles vaccine to a child with measles.

Health workers are advised to check whether the mother needs tetanus toxoid and to give it if indicated.

15.1 Immunization schedule

The standard EPI immunization schedule is recommended.[1]

Infants in countries where polio is a threat need protection as early in life as possible. A dose of OPV-0 is given at birth because it begins to provide that protection immediately. If it is not given at birth, OPV-0 can be given up to 14 days of age but

not later. After 14 days the vaccination may interfere with the next OPV dose given at 6 weeks of age.

If a child has diarrhoea when a dose of OPV is given, the vaccine may provide the desired protection. But since this is uncertain, it is recommended that an additional dose be given 4 weeks later, after the diarrhoea has stopped. For this reason, the dose given during the episode of diarrhoea is not recorded on the immunization card, reminding the health worker that the extra dose needs to be given.

POSSIBLE ADAPTATION: **Make small modifications in the generic immunization schedule so that it matches the national schedule.**

Some national immunization schedules are slightly different from the generic immunization schedule presented on the chart but are technically sound and well established. For example, sometimes the timing of DPT/OPV doses is at 4, 8, and 12 weeks rather than 6, 10, and 14 weeks. In such circumstances, it is preferable to adapt the IMCI immunization schedule so that it is identical with the existing national schedule.

In Latin America, with many fewer measles cases which tend to occur in older children, some countries delay measles vaccine until 12 months of age (as in Europe or the USA). This would be inappropriate in Africa or other regions where many cases occur during infancy.

Some countries have chosen to give a second dose of measles vaccine at 15 months, to catch those who have not seroconverted or where immunization has been missed. This would be inappropriate in Africa or other regions where the priority remains to reach immunization coverage over 90% for all infants in all geopolitical units of a country.

If the national immunization schedule is not technically sound, encourage discussion of the schedule. Contact the WHO EPI in the region or in Geneva for advice.

POSSIBLE ADAPTATION: **Add to the module that the child needing an immunization should be scheduled to return on the day vaccines are available.**

Every effort should be made to make vaccination available in clinic on a daily basis. This should be strongly encouraged as part of a national policy on immunization. If for any reason vaccination is not available, either due to a different national policy or due to a breakdown in the system, the mother should be advised when to return with the child for the required immunization. Returning to the clinic should be coordinated with other plans for the child's follow-up visit.

***POSSIBLE ADAPTATION:* Add *Haemophilus influenzae* type b (Hib) immunization.**

Where national programmes have included Hib conjugate vaccines in routine infant immunization programmes, Hib vaccine should also be added to the generic immunization schedule. This recommendation is made in view of the demonstrated safety and efficacy of the Hib conjugate vaccines.[2,3,4]

***POSSIBLE ADAPTATION*: Give an extra dose of measles vaccine at 6 months of age in exceptional circumstances.**

In exceptional situations, where measles morbidity and mortality before 9 months of age represent a significant problem (>15% of measles cases and deaths), an extra dose of measles vaccine is given at 6 months of age. This is in addition to the scheduled dose given as soon as possible after 9 months of age. (There should be a minimum of 4 weeks between the two doses.) Such a schedule is also recommended during measles outbreaks and for infants at high risk of measles death: those known to be HIV positive; in refugee camps and affected by disasters; and those admitted to hospital.[5]

Younger infants are more severely affected by measles. Those younger than 9 months of age who contract measles are at particular risk of death or complications. Therefore it is important to offer protection to infants aged 6-9 months at high risk for the reasons mentioned above. However, a dose given before the age of 9 months may not result in protection against measles, especially if there are still maternal antibodies present in the infant's blood, and is not counted as a dose in the regular schedule. Another dose is given as soon after 9 months as possible to ensure protection.

***POSSIBLE ADAPTATION*: Add yellow fever immunization.**

In countries where yellow fever poses a risk, infants should be given yellow fever vaccine at 9 months of age (at the same time as measles vaccine). This should be added to the immunization schedule.

***POSSIBLE ADAPTATION*: Add hepatitis B immunization.**

Hepatitis B vaccine should be integrated into national immunization programmes in all countries. Target groups and strategies may vary depending on the local epidemiology of the disease. The most effective strategy is to incorporate the vaccine into routine infant immunization schedules. Countries with lower prevalence rates may consider immunization of all adolescents as an addition or alternative to infant immunization.

There are two alternative schemes (see table below) for the addition of hepatitis B vaccine.[1] In countries where perinatal transmission of hepatitis B virus is important (for example in Southeast Asia), scheme A is recommended. In countries where perinatal transmission is less important (for example in sub-Saharan Africa), scheme B is recommended.

Hepatitis B vaccine schedules

Age	Hepatitis B vaccine (two alternative schemes)	
	Alternative A	Alternative B
Birth	HB-1	
6 weeks	HB-2	HB-1
10 weeks		HB-2
14 weeks	HB-3	HB-3
9 months		

15.2 Contraindications to immunization

Being sick is not a contraindication to immunization. Sick children may be in even more need of the protection provided by immunization than well children. The ability of EPI vaccines to protect is not diminished in sick children. However, in some cases there are contraindications to immunization.[6]

- Live vaccines (BCG, measles, polio, yellow fever) should not be given to children with immune deficiency diseases (other than AIDS), or to children who are immunosuppressed due to malignant disease, therapy with immunosuppressive agents, or irradiation.

- Children with symptomatic HIV infection (including AIDS) should be given measles and oral poliomyelitis vaccines as well as non-live vaccines (DPT, hepatitis B).

- Children with symptomatic HIV infection (including AIDS) should not be immunized with BCG and yellow fever vaccines because of the risk of a severe reaction.

- Children who have or are suspected to have HIV infection but are not yet symptomatic should be given all vaccines, including BCG and yellow fever.[7,8]

- In countries where *Haemophilus influenzae* type b, polyvalent pneumococcal, or hepatitis B vaccine are included in routine childhood immunization schedules, these vaccines should be given regardless of the HIV status of the child.

The following table summarizes the immunization recommendations in HIV positive children and for tetanus toxoid in HIV positive women.

WHO/UNICEF recommendations for immunization of HIV-infected children and women

Vaccine	Asymptomatic HIV infection	Symptomatic HIV infection
BCG	Yes	No
DPT	Yes	Yes
OPV	Yes	Yes
Measles	Yes	Yes
Hepatitis B	Yes	Yes
Yellow fever	Yes	No*
Mother: tetanus toxoid	Yes	Yes

* Pending further studies

Severe adverse reactions are uncommon. However, a history of a severe reaction following a dose of vaccines (anaphylaxis, collapse or shock, encephalitis/encephalopathy, or non-febrile convulsions) is a contraindication to receiving another dose of the same antigen. The pertussis component of DPT is thought to be responsible for some adverse reactions. A second or third dose of DPT should not be administered if one of the above mentioned severe adverse reactions followed a previous dose and the vaccination schedule can be completed with DT vaccine.

DPT vaccines containing whole cell pertussis component should not be given to children with an evolving neurological disease such as uncontrolled epilepsy or

progressive brain disease. Such children may react strongly to the pertussis component of DPT and, if available, DT should be given.

***RECOMMENDED CORRECTION* in the 1996 printing of the generic modules: Modify the instructions on when to give an extra dose of OPV to a child given OPV during an episode of diarrhoea.**

The generic *Assess/Classify* module (page 127) printed before May 1997 indicates that the child with diarrhoea should "return when the next dose of OPV is due for an extra dose of OPV". This should be changed to indicate that the child should return for an extra dose of OPV in 4 weeks, to match the instructions on page 80 of the *Treat* module. (*This is included in the corrections listed in Section G13 and has been corrected in the current generic version.)*

***POSSIBLE ADAPTATION:* Add other specific contraindications to immunization.**

1. **Broaden the contraindications to DPT-2 or DPT-3 to include children who have had any severe reaction within three days of a previous dose of DPT.**

   Currently the listed contraindications include only convulsions and shock.

2. **Broaden the contraindications to immunization to include children with a *high* fever.**

   Immunization can be safely given to most children with fever, and it is important to immunize febrile children in order to reduce missed opportunities for immunization. The EPI policy document[1], however, lists fever > 38.5" C as a contraindication to immunization. This fever threshold or a higher one might be included as a contraindication to immunization. Any lower threshold should be strongly discouraged.

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16. YOUNG INFANT

Generic guidelines

A similar process - assess, classify, identify treatment, treat, and counsel the mother - is presented for the young infant (age 1 week up to 2 months) as for the sick child (age 2 months up to 5 years). Every young infant is assessed for a set of signs and, because the signs of pneumonia and other serious bacterial infections cannot be easily distinguished in this age group, is classified as having a POSSIBLE SERIOUS BACTERIAL INFECTION if any one sign is present. These infants are referred urgently after initial treatment which includes two intramuscular antibiotics (benzylpenicillin and gentamicin), and breastmilk, breastmilk substitute or sugar-water to prevent low blood sugar. Young infants with diarrhoea are assessed and classified in the same way as older infants, except that how eagerly they drink is not included as a sign. Keeping young infants warm is given special emphasis.

Breastfeeding technique is observed for 4 minutes for any young infant with difficulty feeding, low weight-for-age, or who is not breastfeeding exclusively or often enough. This assessment determines whether attachment is good and whether the infant is suckling effectively. If not, the health worker helps the mother to improve the infant's position and attachment (see Section C14). Infants with breastfeeding problems are also checked for oral thrush.

16.1 Age definition for the sick young infant: age 1 week up to 2 months

Sick newborns less than 1 week of age were not included as "young infants" in the IMCI generic algorithm for several reasons:

- Certain conditions are more likely to occur in the first week of life and demand special management, such as ophthalmia neonatorum and various conditions presenting with jaundice, such a haemolytic anaemia. Jaundice can be a significant problem in the first two weeks of life, requiring identification of infants with very high bilirubin and referral for phototherapy. This is particularly the case in countries with G6PD deficiency.

- Health workers managing newborns during the first day of life also need skills in resuscitation, interventions to prevent hypothermia, and recognition of congenital malformations and birth injuries. These are best taught in conjunction with delivery skills. The target audience for these skills is different, although overlapping, with the target audience for IMCI training. In some small facilities, a health worker might care for sick children as well as conduct deliveries and

manage the newborn. In larger facilities, sick newborns may be managed by nurses, midwives and doctors who care for pregnant women, manage labour and delivery, but do not routinely see sick young infants or children on an outpatient basis. In many settings, it is uncommon for outpatient health workers to see sick newborns.

- If possible, health workers managing newborns need to be familiar both with delivery practices and with maternal risk factors which indicate an immediate risk of infection, such as maternal fever or prolonged ruptured membranes, and hence the need for prophylactic treatment with antibiotics, in the absence of clinical signs suggesting infection.

- In the first few days of life, premature infants with immature lungs (hyaline membrane disease) may present with signs of respiratory distress and be misclassified as POSSIBLE SERIOUS BACTERIAL INFECTION. Empiric treatment for infection is usually indicated in these newborns, who are at high risk of mortality, because it is impossible to exclude infection as a contributor to illness. Urgent referral to a hospital without specialized capacity for intensive care of hyaline membrane disease is, however, of questionable benefit for newborns of very low gestational age or size. The chances of survival of infants with more advanced gestational age (32 weeks or older) may be improved in facilities which do not have an intensive care unit but which can provide oxygen, parenteral antibiotics and good nursing care.

***POSSIBLE ADAPTATION*: In settings where health workers trained with the IMCI course do not manage labour and delivery but do care for sick newborns brought to clinic from home in the first week of life, adapt the young infant guidelines to make them more applicable to all sick young infants age less than 2 months.**

As part of the Mother-Baby package[1], an initiative aimed at reducing maternal and neonatal mortality, the WHO MSM Programme is collaborating with WHO CHD to produce an adapted sick young infant chart and module for the young infant which includes the management of sick newborns in the first week[2]. These materials are intended only for sick newborns identified by their mothers as sick and brought to an outpatient facility. This adaptation is currently being fieldtested. After fieldtesting, an adapted module and chart booklet can be obtained from WHO. Guidelines for the immediate management of the newborn after delivery and guidelines for identifying sick newborns from amongst the many normal newborns in an institutional delivery setting are still in development. These will be included in a practice guide and training materials for health centres with labour and delivery beds. It is important that the guidelines for the sick young infant not be applied for institutional screening of newborns who have delivered in a facility.

Different guidelines are required for a screening mostly normal newborns, rather than managing newborns already identified as sick by their caregiver.

At least 40% of babies in developing countries are born at home. In some settings, they may be taken to first-level health facilities for care when they are ill. This adaptation broadens the young infant guidelines to cover jaundice and gonococcal conjunctivitis in the newborn. Its use should be limited to settings where first-level facility workers are unlikely to also receive training in management of the sick newborn as part of training in labour and delivery.

The addition of several conditions will make sure that appropriate referral or treatment are provided for potentially serious conditions which are common in the first week of life. But, guidance on management of conditions related to labour and delivery, such as prolonged ruptured membranes, birth injuries, syphilis or visible malformations, is not included. These could be added as adaptations of this adaptation.

This adaptation adds:

1. Detecting significant jaundice in the first two weeks of life. These young infants are referred for phototherapy. Jaundice extending to the hands and feet indicates severe jaundice and usually reflect a bilirubin higher than 15 mg/dl (250 micromol/l). Phototherapy can reduce the rate of complications.

2. Detecting young infants with possible gonococcal eye infection is important in the first two weeks of life. Bacterial conjunctivitis of the newborn (ophthalmia neonatorum) can be an important, treatable serious infection, particularly in areas where the prevalence of sexually transmitted diseases is high.

Given the spread of gonococcal resistance, this infection should be reated with an intramuscular antibiotic, usually ceftriaxone. The second choice is often kanamycin. If neither are available, the infant must be referred to hospital. The mother should be taught to clean the eyes. The mother and her partner need to be assessed and treated for gonorrhoea infection. This may require referral to another facility. If referral is not feasible, they should be treated empirically.

At the follow-up visit in 2 days, persistence of pus may indicate a chlamydial infection. Treatment with 14 days of cotrimoxazole is recommended, to treat a possible infection with *Chlamydia trachomatis*. Although this is not the first-line treatment, it is less expensive then erythromycin and is usually already included in the essential drugs required for IMCI.

Possible adaptations of this adaptation of the sick young infant chart and module to include the first week of life:

In areas with a high prevalence of syphilis, the guidelines may require further adaptation to include signs for the detection of congenital syphilis and its specific treatment.[3] These should be applicable to all sick young infants.

In settings where surgical correction of particular obvious, severe congenital malformation and birth injuries is available, the identification and referral of these conditions could be added.

16.2 Case management of serious bacterial infection in young infants

Young infants suffer higher mortality than those aged 2 months or more, often associated with serious bacterial infection. Much, but not all, of this mortality can be averted by prompt antibiotic treatment. A meta-analysis of ARI case management intervention studies carried out in 7 countries has shown that a protocol which identifies pneumonia or sepsis based on simple clinical signs (cough with fast breathing or chest indrawing), can have an impact on mortality in infants under 2 months which is as substantial as in older infants and young children.[4]

16.2.1 Clinical predictors of serious bacterial infection

The clinical presentation of disease in young infants is often non-specific, and pneumonia, sepsis and meningitis are difficult to distinguish. Fortunately, these diseases can be treated empirically as a group.
The WHO/ARI Multicentre Young Infant study[a] showed that strong predictors of serious bacterial infection include age, temperature, respiratory rate, weight-for-age Z score, signs of increased respiratory effort (lower chest indrawing, grunting, nasal flaring or central cyanosis), crepitations, problems feeding (by history or observed difficulty sucking), signs of agitation (difficult to console,

[a] The WHO/ARI Multicentre Study on the Clinical Signs and Etiological Agents of Pneumonia, Sepsis and Meningitis in Young Infants study forms part of the technical basis for the young infant case management recommendations in the IMCI course. In this study, a total of 8 418 young infants brought for primary care were triaged in 4 sites in the Gambia, the Philippines, Papua New Guinea and Ethiopia.
After exclusions, 4 552 with symptoms reported by the mother or observed by the health worker were enrolled in the study and received a full physical examination by an expert clinician and pulse oximetry. Of these, 2 398 were found to have a suggestive clinical sign or were considered by the clinicians to have pneumonia, sepsis or meningitis. These infants received full laboratory screening. In those infants from whom a blood culture was successfully obtained, the rate of positive blood cultures was 7.2%. 245 of the 2 398 infants died: a case-fatality rate of 10%. The case-fatality rate was substantially higher in those with a positive blood culture, in the first weeks of life, and in those with a clinical diagnosis of sepsis, meningitis or tetanus. Almost half the deaths occurred within 2 days of admission. The results of these studies are being prepared for publication.

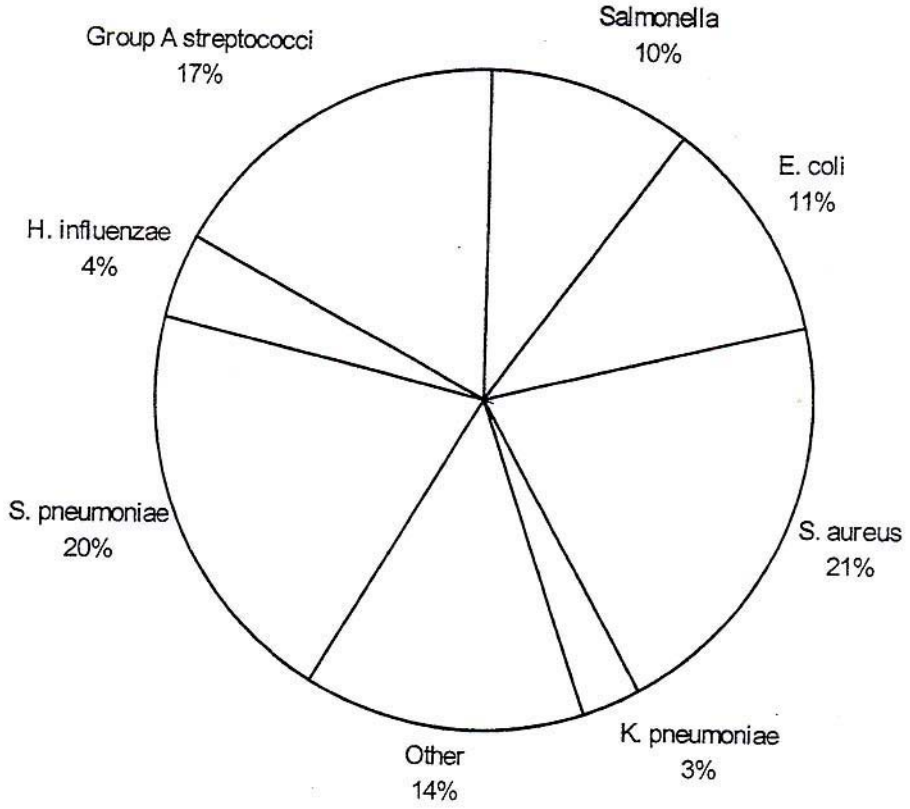
agitated appearance, or history of crying more or sleeping less), and a cluster of signs related to drowsiness (decreased movements, appears drowsy, weak cry, history of low levels of activity or difficulty waking the infant). A full multivariate analysis using these signs is highly predictive of an ordinal outcome scale which expresses the risk of serious bacterial infection.

A much simpler system is presented on the young infant chart in the IMCI course, based on a simple combination of a list of signs, whereby any positive sign in the pink row results in the classification POSSIBLE SERIOUS BACTERIAL INFECTION. When this simple predictive model was analyzed using the multicentre data, it gave a sensitivity of 82% and a specificity of 59% for predicting infants with a positive blood or CSF culture, or a SaO2 of less than 95%, or a positive chest X-ray. This level of performance could result in a substantial rate of referral and other scoring systems are being devised which will improve the predictive use of clinical signs. These, however, require adding scores based on clinical signs and will be more appropriate for senior health workers deciding on inpatient admission at the first referral level.

16.2.2 Treatment of serious bacterial infection in young infants

The most common isolates were gram positive cocci, especially streptococci and *S. aureus*, followed by gram negative rods. During the first month of life, group A streptococci, *S. aureus* and *E. coli* were the most common organisms isolated from blood. *S. pneumoniae* was the most common organism in both the second and third month of life, accounting for 36% of blood isolates (see figure), and an important pathogen in the first month of life.

WHO/ARI Young Infant Multicentre Study
Etiology Serious Bacterial Infection
167 Positive Blood Cultures



Group A streptococci were common isolates in neonatal and puerperal sepsis in developed countries earlier this century, and their frequent isolation in this recent multicentre study may relate to the global resurgence of invasive streptococcal sepsis; whereas group B beta-hemolytic streptococci, which are still common neonatal pathogens in developed countries, were rarely isolated.

Based on these results, the guidelines recommend referral of young infants to hospital after pre-referral treatment with an antibiotic combination which will cover this range of organisms. An initial dose of benzylpenicillin plus gentamicin is adequate in most settings, with attention to the availability of cloxacillin or other anti-staphylococcal drugs in hospital to treat infants who fail treatment with this initial combination.

***POSSIBLE ADAPTATION*: Change the pre-referral intramuscular antibiotic from benzylpenicillin plus gentamicin to ceftriaxone or cefotaxime for young infants classified as POSSIBLE SERIOUS BACTERIAL INFECTION.**

This should be considered if there is evidence of partial penicillin resistance of *S. pneumoniae*, or if gentamicin is not available in first level health facilities resulting in use of benzylpenicillin alone.

***RECOMMENDED ADAPTATION*: Refer young infants with blood in the stool.**

See Section C3.2.1.

***POSSIBLE ADAPTATION*: Treat convulsing young infants with phenobarbitone.**

See Section C19. This is a more appropriate treatment than diazepam or paraldehyde.

16.3 Breastfeeding and the young infant

See Section C14 for the technical basis for the breastfeeding interventions included in the course and possible adaptations.

References

1. Maternal Health and Safe Motherhood Programme: Mother-Baby Package: Implementing safe motherhood in countries. WHO/FHE/MSM/94.11, 1996.

2. WHO MSM. *Management of the sick newborn.* Document WHO/FRH/MSM/96.12(1996).

3. WHO Global Programme on Aids. *Management of sexually transmitted diseases.* Document WHO/GPA/TEM/94.1,(1994).

4. Sazawal S. ARI case management interventions study group. Personal communication.

5. See breastfeeding references in section C14.

17. PREVENTION AND TREATMENT OF HYPOTHERMIA

Generic guidelines

All sick young infants (age 1 week up to 2 months) are assessed for a possible bacterial infection. This assessment includes checking for low body temperature by measuring with a thermometer or feeling the stomach or axilla of the infant if no thermometer is available. A young infant who has an axillary temperature of less than 35.5E C or who feels cold is considered to have a POSSIBLE SERIOUS BACTERIAL INFECTION.

All young infants with POSSIBLE SERIOUS BACTERIAL INFECTION and those who are NOT ABLE TO FEED are referred to hospital. To prevent hypothermia, mothers are advised how to keep a young infant warm on the way to the hospital. Mothers who are used to wrapping infants next to their body are advised by the health worker that this a good way to keep them warm.

Mothers of young infants who do not need to be referred are advised to ensure that the young infant is kept warm at all times. In cool weather, the mother is advised to cover the infant's head and feet and to dress the infant with extra clothing.

17.1 Preventing hypothermia during referral to hospital

Hypothermia is a significant contributor to illness and death in normal and low-birth-weight neonates, in both cold and tropical climates. Young infants are highly susceptible to hypothermia, because they cannot regulate body temperature as well as adults.[1] Thermal stability gradually improves as the infant increases in weight.

***RECOMMENDED ADAPTATION*: Add advice to the mother on keeping children with SEVERE PNEUMONIA OR OTHER VERY SEVERE DISEASE and SEVERE MALNUTRITION OR SEVERE ANAEMIA warm on the way to the hospital.**

Children with severe malnutrition[2], large areas of weeping skin, or serious systemic infection are also very vulnerable to hypothermia. In severely malnourished children, basal metabolism is often reduced, and the energy expenditure due to activity is very low. The body's functions of heat generation in the cold and sweating when hot are impaired: the child becomes hypothermic in a cold environment and feverish in a hot one.

***POSSIBLE ADAPTATION*: Add instructions on keeping a young infant warm using skin-to-skin contact.**

Skin-to-skin contact with the mother is the simplest and safest way to transport most young infants to hospital. (This is similar to the kangaroo-mother care method used with preterm or low birth-weight neonates.) The skin-to-skin method should only be used if the infant's breathing is stable and it is able to breastfeed. The infant can be lightly dressed. Wearing some clothes will prevent cooling if the infant needs to be removed from the mother for any reason. The infant should be held in position snugly by the mother's clothes, covered with a blanket if necessary, and wear a cap.

17.2 Treating hypothermia before referral to hospital

The generic guidelines provide recommendations for the prevention of hypothermia during referral, not for its treatment before referral.

***POSSIBLE ADAPTATION*: Add treatment instructions for active treatment of hypothermia before referral in cold climates where hypothermia is a common problem and/or where the referral facility is far away.**

An infant has hypothermia when axillary temperature is lower than 35.5E C (<95.9E F) or rectal temperature is lower than 36E C. It is not necessary to have a low-reading thermometer in an outpatient facility to be able to detect or treat hypothermia. A regular thermometer reads down to 35E C. If the body temperature measures 35E C, this indicates moderate or severe hypothermia and measures should be taken to warm the child.

The best way to warm the infant is with the mother's body heat, using the kangaroo method. The infant is placed on the mother's chest against her skin, and covered with the mother's clothes and blankets. Both the room and the mother must be warm. The mother must be comfortable; often it is helpful to let her walk around.

If the mother or another willing adult is not available, warm the infant by wrapping it in blankets and placing an incandescent lamp over (but not touching) its body.[1] There should be adequate distance between the warming lamp and the infant's body. Hot water bottles and heated stones are dangerous (they can cause hyperthermia or burns) and should be removed before a sick young child or infant is placed in a cot. During rewarming with a lamp, rectal temperature must be measured every 30 minutes as the infant may rapidly become hyperthermic. Measuring axillary temperature is not an accurate guide to body temperature during rewarming.

In the absence of a low-reading thermometer, rewarming can be guided by the colour and coldness of the skin, feeding behaviour, and other signs.[1]

All hypothermic children must be fed or receive other treatment to prevent hypoglycaemia.

References

1. *Thermal protection of the newborn: a practical guide.* Geneva, World Health Organization, 1997 (unpublished document WHO/RHT/MSM/97.2; available on request from the Maternal and Newborn Health/Safe Motherhood Unit (MSM).

2. *Management of severe malnutrition - A manual for physicians and other senior health workers.* Geneva, World Health Organization (in press 1997).

18. PREVENTION OF HYPOGLYCAEMIA

Generic guidelines

Hypoglycaemia can occur in any sick child who has not been fed for 4-6 hours, as often happens during travel to the health centre. Children with VERY SEVERE FEBRILE DISEASE and young infants with POSSIBLE SERIOUS BACTERIAL INFECTION are also at risk of hypoglycaemia. To prevent hypoglycaemia, these children should be given either breastmilk, a breastmilk substitute, or sugar-water before referral; if necessary by nasogastric tube. Mothers are advised to continue breastfeeding during referral to hospital.

Administration of food or sugar to prevent hypoglycaemia is explained in the instructions in the box "Treat the Child to Prevent Low Blood Sugar." The preferred food is breastmilk suckled from the breast. If breastfeeding is not possible, expressed breastmilk or a breastmilk substitute should be given by cup and spoon. Only when none of these are possible should sugar-water be given, either by cup and spoon or through a nasogastric tube.

Feeding advice for sick children who are sent home emphasizes frequent feeding and day and night breastfeeding of infants, during and after sickness. Frequent feeding and breastfeeding are the best ways to prevent hypoglycaemia, especially in malnourished children.

Young infants with a bacterial infection and children with a severe systemic infection such as severe malaria or meningitis are particularly prone to hypoglycaemia.[1,2] The reason for the occurrence of hypoglycaemia in children with serious systemic infection remains largely unexplained. The risk of hypoglycaemia is further increased if their nutritional status is compromised and if they have not been fed for 4 to 6 hours, as often happens when a child is brought to the health centre. In all these children, the best way to prevent hypoglycaemia is to give frequent feeds, including breastfeeds, throughout the day and night.

When laboratory tests are available, hypoglycaemia is defined as blood glucose of less than 3mmol/l or less than 54mg/dl. Any child with low blood glucose, with or without clinical signs, should be treated for hypoglycaemia. However, no laboratory tests for hypoglycaemia are recommended for the outpatient setting.

Clinical signs of hypoglycaemia include low body temperature, lethargy, limpness, sweating, and pallor. Severely malnourished children with hypoglycaemia do not always show signs such as sweating or pallor, and often the only sign before death is drowsiness.
In the IMCI guidelines, the decision to give treatment is based on the classifications of the child's illness, not on clinical signs of hypoglycaemia or laboratory results. In many cases, the treatment will help prevent hypoglycaemia, rather than treat hypoglycaemia that is already

present. Treatment should be given immediately without laboratory confirmation; the treatment cannot do any harm, even if hypoglycaemia is not present.

Breastmilk is preferred over breastmilk substitutes because it promotes ketogenesis more vigorously than formula (ketones are alternative fuels). If breastmilk cannot be given, formula is preferable to sugar-water because it has greater energy density and contains fat which promotes ketogenesis and reduces glucose oxidation.

The sugar-water formula described on the chart (4 level teaspoons or 20 grams of sugar in a 200 ml cup of clean water) can be used to prevent or treat hypoglycaemia. It is designed to provide a D10 (10% dextrose) solution. Fifty ml of this solution (5 grams of glucose) should be administered either orally or through a nasogastric tube. This should be followed by frequent oral feeds as soon as the child is fully alert, to prevent recurrence of hypoglycaemia. If the child does not become alert, continue to give feeds by nasogastric tube.

Feeding and/or administration of milk or a sugar-water formula should be started in the health centre, before referral, and should continue during transport to hospital. This is particularly important as referral and travel often take some time.

For sick children who are sent home, the feeding recommendations, if followed, are sufficient to prevent hypoglycaemia.

> ***RECOMMENDED ADAPTATION*: Add the recommendation to treat to prevent low blood sugar to the classifications SEVERE PNEUMONIA OR VERY SEVERE DISEASE and SEVERE MALNUTRITION OR SEVERE ANAEMIA.**
>
> Children with severe malnutrition are also at risk of developing hypoglycaemia, which is an important cause of death during the first two days of treatment of severe malnutrition. Frequent feeds, including breastfeeds, throughout the day and night, are particularly important if the child is malnourished.[3]
>
> Children with SEVERE PNEUMONIA OR VERY SEVERE DISEASE may have a systemic infection and are at increased risk of hypoglycaemia. Children with MASTOIDITIS without another severe classification often have a localized infection and therefore may not need pre-referral treatment to prevent hypoglycaemia.
>
> See *Section G, 4.0 Extend hypoglycaemia prevention to include children with SEVERE MALNUTRITION and SEVERE PNEUMONIA OR VERY SEVERE DISEASE* for the exact changes in the charts and modules required by this adaptation.
>
> > ***POSSIBLE ADAPTATION*: Administer D10 or D50 by intravenous infusion if available and if the child is not able to drink.**
> >
> > See Annex E "Where Referral Is Not Possible" in the *Treat* module.

References

1. Klein JO, Marcy SM. Bacterial sepsis and meningitis. In: Remington JS and Klein JO, eds. *Infectious diseases of the fetus and newborn infant*, 3rd ed. Philadelphia, WB Saunders Company, 1990: 601-656.

2. *Hypoglycaemia of the Newborn - Review of the Literature*. Geneva, World Health Organization, 1997 (unpublished document WHO/CHD/97.1 and WHO/MSM/97.1; available on request from the Division of Child Health and Development (CHD)).

3. *Management of severe malnutrition - A manual for physicians and other senior health workers.* Geneva, World Health Organization, (in press 1997).

19. MANAGEMENT OF ACUTE CONVULSIONS

Generic guidelines

> The mother is asked about convulsions during the child's illness. History of convulsions is a general danger sign which requires urgent referral of the child to hospital. A child who convulses in clinic is also referred urgently to hospital. Health workers are not taught to treat convulsions before referral. Guidelines for the essential care for a child with convulsions when referral is not possible, however, are included in Annex E in the module *Treat the Child*.

Adapting the guidelines to include the management of acute convulsions in the first-level facility increases the complexity of training health workers. The management of convulsions requires more than the skills to administer diazepam. It involves positioning the child who is convulsing and making sure that the airway is clear. Health workers need skills in airway management because diazepam can result in respiratory depression. Even with the adaptations to include the management of acute convulsions which are provided in Section G, 5.0, course participants would still require supervised practice to fully prepare them for managing a convulsing child. Emergency treatment skills such as airway management, positioning an unconscious or convulsing child, and rectal administration of diazepam also require different teaching methods, such as skill stations with simulated cases, and would be better taught in a dedicated course. The course would need major adaptation to train health workers in all these aspects of management of acute convulsions and to provide them with sufficient opportunity to practice these skills. For these reasons, the adaptations, described below, to include the management of acute convulsions are discouraged.

> ***POSSIBLE (discouraged) ADAPTATION*: Add the management of acute convulsions with rectal diazepam to the charts and modules.**
>
> Intravenous diazepam is often included on essential drug lists, but many health workers are not familiar with its intrarectal use to control convulsions in children. Some countries have therefore emphasized the need to train outpatient health workers to control convulsions before a child is referred to hospital.
>
> In a convulsing child, rectal administration of diazepam results in good blood levels and anticonvulsant activity within four minutes.[1] Rectal diazepam acts more quickly than intravenous administration because the drug is systemically absorbed via the inferior haemorrhoidal veins.
>
> Diazepam can be delivered rectally, via a 5F feeding tube attached to a syringe that is inserted 5 cm into the rectum, which is followed by a flush of water or saline. A study (in the USA) compared paramedic administration using a tuberculin syringe alone

with a administration using a 3-ml syringe and attached feeding tube. The feeding tube was found to be far more cumbersome and required the added step of flushing the drug volume from the tube into the rectum. This second step increases the possibility of dosing errors. Another concern with using a feeding tube is the possibility of higher rectal delivery. This could increase absorption by the superior haemorrhoidal vein which drains into the portal venous system: "First-pass metabolism in the liver may rapidly decrease serum diazepam levels."[2] Other studies on the control of convulsions have recommended a lubricated tuberculin syringe inserted 4-5 cm into the rectum, in preference to a syringe with attached feeding tube.[3]

Dose miscalculations are a common problem with either method of delivery. To minimise these problems, health workers need detailed dosage charts to avoid having to calculate doses during an emergency.

Experts disagree on the recommended dose of rectal diazepam, ranging from 0.2 to 0.6 mg/kg. The table in Annex E of the *Treat the Child* module (page 139) gives a dosage of 0.2 to 0.4 mg/kg, but some clinicians feel this is too low, requiring several doses before most seizures are controlled. In the adaptation materials in Section G, 5.0, the dosage table provides a higher dosage schedule of approximately 0.5 mg/kg.[4,5] This alternative schedule (see table on the next page) may be considered if the management of acute convulsions is to be included in the adapted chart booklet and training materials (not just in Annex E). It should be noted that rectal diazepam is recommended only for children over age 1 month. Below 1 month of age (neonates), many clinicians recommend phenobarbitone at 20 mg/kg IM.

In addition to these technical issues, adaptation of the course to include management of acute convulsions with rectal diazepam should be discouraged for a number of practical reasons. To add the management of acute convulsions would involve extensive changes in the case management process. It would be necessary to add convulsions to the danger signs and to then refer to a special treatment box for their management. Changes would be needed in the guides for the clinical instructor and for outpatient clinical practice.

See *Section G, 5.0 Add management of acute convulsions* for the exact changes in the charts, modules, and recording form required by this adaptation.

Dosing schedule for rectal diazepam for acute convulsions

	Annex E,[a] **When Referral is Not Possible**		**POSSIBLE ADAPTATION (Section G, 5.0)**	
Age or weight	Diazepam dose (10 mg/ 2 ml solution) Dose: 0.2-0.4 mg/kg (Give rectally)	Resulting dose for the weight range	Diazepam dose (10 mg/ 2 ml solution) Dose: 0.5 mg/kg (Give rectally)	Resulting dose for the weight range
1 mo up to 4 mo (3- <6 kg)	0.25 ml (1.25 mg)	0.42 - 0.21 mg/kg	0.50 ml (2.5 mg)	0.83 - 0.42 mg/kg
4 mo up to 12 mo (6-10 kg)	0.5 ml (2.5 mg)	0.42 - 0.25 mg/kg	1.0 ml (5.0 mg)	0.83 - 0.5 mg/kg
12 mo up to 3 yr (10- <14 kg)	0.5 ml (2.5 mg)	0.25 - 0.19 mg/kg	1.25 ml (6.25 mg)	0.62 -0.45 mg/kg
3 yr up to 5 yr (14-19 kg)	0.75 ml (3.75 mg)	0.27 - 0.2 mg/kg	1.5 ml (7.5 mg)	0.54 -0.39 mg/kg

a Annex E "Where Referral Is Not Possible" in the module *Treat the Child, Management of Childhood Illness*.

***POSSIBLE (discouraged) ADAPTATION*: Add the management of acute convulsions with rectal paraldehyde.**

Paraldehyde is less expensive than diazepam and, unlike diazepam, it does not depress breathing. Repeated doses can be given.

Although rectal administration of paraldehyde can cause irritation to the rectum and large intestine, it is preferred to intramuscular administration because there are fewer complications, while absorption is still rapid. The table in Annex E of the module *Treat the Child* provides the doses for intrarectal use.

Nevertheless, absorption is faster after intramuscular administration, and some clinicians still prefer intramuscular use. The same dose as for rectal use can be administered intramuscularly. But, intramuscular paraldehyde is very painful and has also been associated with fat necrosis, skin sloughing, muscle irritation, and nerve damage.

Paraldehyde must not be used if it is out of date or if the container has been opened for more than 24 hours. After 24 hours of exposure to air paraldehyde decomposes to acetaldehyde then to acetic acid. Paraldehyde also dissolves rubber and some plastics. Perforation of the large intestine has been reported when decomposed paraldehyde was used.[6]

A paraldehyde dose of 0.4 ml/kg is used by many clinicians, while others prefer a lower dose 0.15-0.3 ml/kg, as shown in Annex E of the *Treat the Child* module. These doses should be made compatible.

***POSSIBLE (discouraged) ADAPTATION*: Add the management of acute convulsions with diazepam followed by rectal paraldehyde.**

If the convulsions are not controlled by two doses of diazepam, it would be preferable to manage them with diazepam followed by rectal paraldehyde. Although referenced in Annex E, this would further complicate course adaptation and so it is not included in Section G, 5.0.

References

1. Knudsen FU. Plasma diazepam in infants after rectal administration in solution and by suppository. *Acta Paediatrica Scandinavica*, 1977, 66:563-567.

2. Dieckmann RA. Rectal diazepam for prehospital pediatric status epilepticus. *Annals of Emergency Medicine,* 1994, 23(2):216-224.

3. Segeleon JE, Haun SE. Status epilepticus in children. *Pediatric Annals,* 1996, 25(7):380-386.

4. Hoppu K, Santavuori P. Diazepam rectal solution for home treatment of acute seizures in children. *Acta Paediatrica Scandinavica,* 1981, 70(3):369-372.

5. Kalra A et al. Per rectal diazepam therapy in convulsive disorders. *Indian Pediatrics,* 1992, 8:975- 978.

6. Choonara IA. Giving drugs per rectum for systemic effect. *Archives of Disease in Childhood*, 1987, 62(8):771-772.

20. WHERE HIV INFECTION IS HIGHLY PREVALENT

Generic guidelines

The case management process presented in the course will provide appropriate initial treatment for a sick child with HIV infection. The guidelines refer children with infections which do not respond to standard treatment or who have persistent cough (more than 30 days), fever (7 days or more), severe malnutrition, very low weight-for-age which does not respond to nutritional counselling, persistent diarrhoea which does not respond to nutritional management, or a condition that the health worker does not know how to manage. This would result in the eventual referral of most children whose illness is related to HIV infection (and/or tuberculosis). No attempt is made to differentiate these children from HIV-negative children who require referral for severe illness or poor response to treatment.

20.1 Technical basis for using the IMCI guidelines for initial management in HIV positive children

The IMCI guidelines are unchanged for the initial management of illness in HIV positive children. The technical basis of the guidelines for treatment of a sick child with HIV infection is presented below.

Many HIV-positive children die from common childhood illnesses, rather than from AIDS. Most of these deaths can be prevented by correct management of the illnesses included in the IMCI course. Effective management can also contribute to improved quality of life of HIV-positive children.

The guidelines on pneumonia in children with HIV infection are based on the following:

- The most common bacterial causes of community-acquired pneumonia in HIV-infected children in developing countries are *S.pneumoniae* and *H.influenzae*.[1,2,3]

- The incidence of bacterial pneumonia is increased in children with HIV infection and recurrent pneumonia is frequent.[4,5,6] The severity of bacterial pneumonia is also increased in children with HIV. Bacteraemia is more frequent in these patients.[1,7]

- The standard outpatient case management of children with cough or difficult breathing recommended by the WHO ARI Programme is also valid for the assessment and classification of HIV-infected children with cough or difficult

breathing. The outpatient guidelines recommend referral of children who fail to respond to treatment and those with cough for more than 30 days. Thus children with severe symptomatic HIV infection and opportunistic infections would be referred.

- The ARI and IMCI inpatient guidelines take into consideration the possibility of *Pneumocystis carinii* pneumonia for which more prolonged, higher dose treatment with cotrimoxazole is indicated.[8,9]

The guidelines on the management of diarrhoea in HIV-infected children are based on the following:

- The incidence of both acute and persistent diarrhoea is increased in HIV-infected children.[10,11]

- The organisms causing acute watery diarrhoea are unchanged in HIV-infected children.[10]

- The treatment of dehydration is unchanged in HIV-infected children.[12]

- Antibiotic treatment for acute watery diarrhoea or dysentery, should be limited to cases with blood in the stool or cholera, for children with or without HIV infection.

- The pathophysiology of persistent diarrhoea is the same in children with HIV infection and in children without HIV infection-unrepaired mucosal damage with related intolerance to certain nutrients and/or intestinal dysfunction.

- The treatment of persistent diarrhoea is unchanged in HIV-infected children.

Like HIV positive adults, children with HIV infection do not appear to be at higher risk of malaria infection or disease.[5] Malaria in children should be treated in the same way as in children with or without HIV infection.

Symptomatic HIV infection can cause marasmus. Using the IMCI guidelines, these children would be referred to hospital on the basis of visible severe wasting with the classification SEVERE MALNUTRITION. In areas with a high prevalence of HIV infection, symptomatic HIV infection can become the most important cause of marasmus referred to an intensive feeding programme, as was recently found in Malawi.[13]

Acute and chronic ear infections are more common in children with symptomatic HIV infection.[3,14,15] The management of acute and chronic ear infection is unchanged in HIV-infected children.

The young infant with HIV infection should be treated like any other young infant. Where the mother is known or suspected to have HIV infection, counselling should include issues related to HIV diagnosis and follow-up (see Section C14), breastfeeding (see Section C14), and immunization (see Section C15).

Whereas initial outpatient management of children with HIV infection is unchanged, follow-up care and management of treatment failures, recurrent infections, and some severe illnesses at the referral level may need to be different in areas with a high HIV prevalence. Possible adaptations to address this are presented in the next section.

Management of children referred to hospital needs to take account of their HIV status although the management of most specific conditions in HIV-infected children is similar to that for non-infected children. Guidelines and training materials for inpatient management at first-referral hospitals are in development.[16]

20.2 Adaptations for areas with high HIV prevalence

20.2.1 Definition of high HIV prevalence

In areas with high HIV prevalence, various adaptations of the guidelines are possible. However, defining high HIV prevalence is difficult because it is not only a scientific definition but also a political issue. If HIV prevalence in adults (aged 15-49) of 5% were to be defined as high HIV prevalence, in 1997 15 African countries would be included. Using a prevalence of 2% or above, 36 countries (31 from Africa, 1 from Asia, 3 from the Caribbean, 1 from Latin America) would be considered to have high HIV prevalence. UNAIDS suggests considering adaptations for high HIV prevalence when prevalence is 2% or above.

In general, surveys of HIV seroprevalence of pregnant women in developing countries are not based on national representative samples. However, using recent surveys made on large samples it can be estimated that the HIV prevalence among pregnant women in Africa is between 3% and 20% in large towns, and between 1% and 10% in small towns and rural areas.[17] The prevalence is usually lower in Asia and Latin America. The lowest rates are reported by countries of the Eastern Mediterranean Region.

In some of these places, the rates of HIV seroprevalence in pregnant women are well above the mentioned upper range values. For instance, rates higher than 30% are found in large urban areas of Botswana, Malawi, and Zimbabwe and rates above 10% in rural areas of countries such as Malawi, Tanzania, and Zaire. A significant percentage of children presenting to first level health facilities will have HIV infection. HIV testing and laboratory facilities are not

widely available in most of these settings at first referral levels. Therefore, most children born to HIV-positive mothers and at risk of being HIV infected are not tested and may go unrecognized.

20.2.2 Referral for HIV counselling, testing, and special care

Preparing first level facility health workers to counsel families and to deal with the psychological implications of HIV on the family, child, and other family members would require substantial training.

Health workers who provide counselling need sufficient skill, for example, to handle possible unintended consequences of HIV testing and counselling for the mother. In some communities, there have been reports of an increase in violence against women, abandonment, stigmatization, and blame as the result of the knowledge that someone was HIV positive. The persons providing counselling should be trained to review with the woman her social and family situation and the consequences of knowing her HIV status, before she decides to consent to HIV testing. Preparing first-level health workers in these counselling skills is beyond the scope of an adaptation of the IMCI course.

HIV counselling at first level health facilities, therefore, is usually not possible. If a child is known to be HIV positive, the child should be referred with the appropriate family member for counselling to a first level referral hospital or, if available, to a community-based home care programme, a community-based social support programme, or community- or institution-based voluntary counselling programme.

If the child's HIV status is not known, but there are reasons to suspect HIV infection (based either on the child's clinical signs or diagnoses in the family), both the child and the mother should be referred for testing, if available, and the mother for counselling. This recommendation includes the child below 15 months of age, even though transplacental maternal antibodies interfere with conventional serological testing of the child at this age. It may be still be helpful to know the HIV status of the mother[a], and this referral will also provide a clinical assessment to rule out other HIV-associated and potentially treatable clinical problems such as tuberculosis.

The specifics of referral need to be adapted to match what is available at the referral facility. Circumstances vary greatly in terms of the availability of HIV testing, counselling, and special care for the child with HIV or AIDS.

[a] If it is known that the mother became infected after delivery, the presence of antibodies in the first year of life are indicative of HIV infection also in the infant.

Several possible adaptations for areas with high HIV prevalence, and where services for testing and counselling are available, are presented below. The possible adaptations have been devised to minimize the number of changes in the materials and minimize the additional training required for a health worker at a first-level facility. It is important that country adaptations are consistent with the current availability of referral care, HIV testing, counselling, and special care for children with AIDS.[18]

Tuberculosis is an important HIV-associated illness in children, although less so than in adults.[5] Family history and weight loss provide the strongest clues to possible tuberculosis. Children are also referred for tuberculosis evaluation if they have painless swelling in the neck or armpit or persistent diarrhoea. The generic IMCI guidelines will also refer some other children with HIV and tuberculosis based on SEVERE MALNUTRITION, a cough for more than 30 days, or fever for 7 days or more. In children, cough is not a predominant symptom of tuberculosis.

Oral thrush is a common infection in children with symptomatic HIV infection. Herpes zoster is also common in some settings but appears to be uncommon in some African countries. In the adaptations which follow, treatment with gentian violet is recommended for these infections.

If the child is not yet known to be HIV-positive, the presence of these conditions should result in referral for HIV counselling and testing, if available. Children whose HIV status is unknown should also be referred for counselling and testing based on a history of repeated infections or epidemiological risk factors (history of a blood transfusion, or if a mother, father or sibling is known to be HIV positive or to have tuberculosis). Repeated infection has been defined as more than two severe episodes of a bacterial and/or viral infection (pneumonia, meningitis, sepsis, cellulitis) within 12 months.

> ***POSSIBLE ADAPTATION:*** **Adapt guidelines where counselling and HIV testing are available at the first referral hospital and where first level outpatient health workers may be aware of the child's HIV status but will usually not have been trained in HIV counselling.**
> In this adaptation, most children who have symptomatic HIV infection will be referred. HIV infection will be suspected and the child referred for testing, based on clinical signs and/or epidemiological risk factors.
>
> The guidelines which might be used for adaptation are presented here. Countries need to consider whether these adapted guidelines are appropriate for national circumstances.

1. Add the following 2 boxes to the *Treat* chart. It may be advisable for efficiency of training to combine the instructions for treatment of these conditions with those for thrush and skin pustules or umbilical infection in young infants.

Treat oral thrush

Treat with half-strength gentian violet for 7 days.
Advise the mother to return for follow-up in 7 days.

Refer to hospital if the child has problems swallowing or cries when swallowing, repeated vomiting, very poor feeding or severe oral thrush.

Treat herpes zoster

Refer to hospital if the child has general danger signs or fever.

Treat with gentian violet.

Advise the mother to return for follow up in 7 days.

2. Add the following 3 boxes to the follow-up section of the *Treat* chart and modify the follow-up box for children who are very low weight-for-age.

HIV screening and treatment

Screen all children seen in follow-up, especially those who fail to respond to treatment or who have more than one infection in a month:

ASK	LOOK, FEEL
Has the child had an HIV test?	Feel for painless swelling in neck and
If no:	armpit.
Has the child had a blood transfusion?	Look for ulcers or white patches in the mouth (thrush).
Is the child losing weight?	Look for painful rash with blisters. Is
If Yes:	it confined to one part of the body?
Record the weight and follow-up in 30 days.	
Is the father, mother or sibling:	
-known to have HIV infection?	
-known to have TB?	

If child is known to be HIV positive:
Is the tuberculosis status known?

If the child is known to be HIV positive:

- Refer to community- or institution-based home care or social support, if appropriate.
- If child is not already being treated for tuberculosis, refer for tuberculosis evaluation if the child has:
  Father, mother, or sibling diagnosed as TB
  Weight loss
  Painless swelling in neck or armpit
  Persistent diarrhoea

  (Other children with possible TB will be referred based on IMCI referral criteria such as severe malnutrition, cough > 30 days, or fever for 7 days or more.)

If HIV status is unknown, refer the child for HIV counselling and testing if the child has:

- Repeated infections
- Herpes zoster (painful rash with blisters confined to one part of the body)
- Ulcers or white patches in the mouth (thrush) in a child 2 months or older
- Received a blood transfusion
- A father, mother, or sibling known to be HIV positive
- A father, mother, or sibling known to have tuberculosis

In any child:

- If there are ulcers or white patches in the mouth, treat for thrush.
- If there is painful rash with blisters confined to one part of body, treat for herpes zoster.

Follow-up care for oral thrush

If no improvement or worse, change to nystatin (100,000 IU oral suspension 4-6 times daily for 7 days) or refer.

If improvement, continue half-strength gentian violet until resolved.

Refer to hospital if the child has problems swallowing or cries when swallowing, repeated vomiting, very poor feeding, or severe oral thrush.

Follow-up care for herpes zoster

If no improvement, refer.

If improvement, continue gentian violet treatment until resolved.

Modify the follow-up box for very low weight-for-age to also address children who have been reported to be losing weight:

Very low weight or losing weight

After 30 days:

Weigh the child and determine if the child is still very low weight- for-age or is still losing weight. Reassess feeding.

See questions at the top of the *Counsel* chart.

Treatment:

If the child is **no longer very low weight-for-age or has gained weight,** praise the mother and encourage her to continue.

If the child is still **very low weight-for-age but has not lost more weight**, counsel the mother about any feeding problem found. Ask the mother to return again in month. Continue to see the child monthly until the child is feeding well and gaining weight regularly or is no longer very low weight-for-age.

***Exception*:** If you do not think that feeding will improve, refer the child.

If the child **continues to lose weight**, refer.

3. Add to the *Follow-up* module text:

- Definition of new clinical signs:

  - *Herpes zoster*: a rash which is not generalised but which has painful blisters confined to one part of the body. Often some of the blisters have crusted over.

  - *Painless swelling in the neck or armpit.*

- Explanatory sections:

  - The case management guidelines you are learning in this course will result in the referral of children who may have tuberculosis.[19] This could happen because the child: is very low weight-for-age and does not respond to counselling on feeding; is severely malnourished; or has had a cough for more than 30 days, diarrhoea for 14 days or more which does not respond to the recommended changes in feeding, or fever present every day for more than 7 days.

  - Children who have been sick should also be checked on the follow-up visit for painless swelling of the neck or armpit as this could be a tuberculosis infection of the lymph nodes.

  - During the follow-up visit, it is important to determine the HIV status of a child who has not responded to treatment or who has more than one infection in a month, if the child has clinical signs or other risk factors which suggest the possibility of an HIV infection. If HIV status is not known, refer to a hospital or health centre which is able to provide HIV testing and counselling.

4. It is important to avoid missing children who are brought repeatedly for infection but always fail to return for follow up. At the very beginning of the assessment, after the mother is asked what the problem is, there is a question about whether this is an initial or a follow-up visit. In the module text accompanying this, add the following:

   - If the child has been treated in the last month for a serious infection, the child should be reviewed using both initial assessment and classification and the box on HIV screening.

***POSSIBLE ADAPTATION*: Adapt guidelines in areas where HIV testing is <u>not</u> available but counselling and/or social support services are available for mothers of children with suspected symptomatic HIV infection:**

Several further adaptations would be required in the "HIV Screening and Treatment" box. These are presented in the box entitled "Screening for possible symptomatic HIV infection and treatment" at the end of this section.

***POSSIBLE ADAPTATION*: Give cotrimoxazole prophylaxis for recurrent bacterial infections in children with symptomatic HIV infection.**

Data on the effectiveness of cotrimoxazole prophylaxis come from developed countries, demonstrating a reduced incidence of *Pneumocystis carinii* pneumonia and bacterial infection in HIV-positive children.[3,6,20,21] There is very limited experience with cotrimoxazole prophylaxis in developing countries, but similar beneficial effects would be expected.

***POSSIBLE ADAPTATION*: Substitute nystatin for gentian violet in the treatment of thrush.**

Nystatin is more effective but substantially more expensive than gentian violet. In most settings, the use of nystatin would need to be limited to treatment failures with gentian violet.

***POSSIBLE ADAPTATION*: Limit the adaptation to adding further explanation about how the course is appropriate for the initial treatment of infections in children with HIV disease and will refer most children with severe symptomatic HIV infection (AIDS).**

This is the approach taken in the Ugandan and Tanzanian adaptations.

***POSSIBLE ADAPTATION*: Counsel mothers on the comparative advantages and risks of breastfeeding and the use of breastmilk substitutes (see Section C14).**

Screening for possible symptomatic HIV infection and treatment

Screen all children seen in follow up, especially those who fail to respond to treatment or who have more than one infection in a month:

ASK	LOOK, FEEL
Has the child had an HIV test?	Feel for painless swelling in neck and
If no:	armpit.
Has the child had a blood transfusion?	Look for ulcers or white patches in the mouth (thrush).
Is the child losing weight?	Look for painful rash with blisters. Is
If mother says yes: Record the weight and follow-up in 30 days.	it confined to one part of the body?
Is the father, mother, or sibling: -known to have HIV infection? -known to have TB?	

Is the tuberculosis status known?

. Risk factors for HIV infection-

- Herpes zoster (painful rash with blisters confined to one part of the body)
- Ulcers or white patches in the mouth (thrush) in a child 2 months or older
- Received a blood transfusion
- A father, mother, or sibling known to be HIV positive
- A father, mother, or sibling known to have tuberculosis

. If the child has recurrent infections and is losing weight, and has risk factors for being HIV positive, refer to community- or institution-based home care or social support, if appropriate.

. If there are ulcers or white patches in the mouth, treat for thrush.

. If there is painful rash with blisters confined to one part of body, treat for herpes zoster.

. If child is not already being treated for tuberculosis and has risk factors for being HIV positive, refer for tuberculosis evaluation if the child has:

-Father, mother, or sibling diagnosed as TB
-Weight loss
-Painless swelling in neck or armpit,
-Persistent diarrhoea

(Other children with possible TB will be referred based on IMCI referral criteria such as severe malnutrition, cough > 30 days or fever for 7 days or more.)

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21. WHERE REFERRAL IS DIFFICULT OR IMPOSSIBLE

Generic guidelines

The *Treat the Child* chart includes brief summaries of how to continue treatment with intramuscular quinine, chloramphenicol, benzylpenicillin, and gentamicin, if referral is not possible.

Annex E of the *Treat* module provides treatment instructions, with clinical examples, for children with severe classifications. These instructions are based on the same drugs used in the IMCI course plus: oral chloramphenicol; diazepam and/or paraldehyde for the treatment of convulsions; and D10 or D50 for intravenous treatment of hypoglycaemia. The Annex does not include guidelines on the use of bronchodilators; for these instructions health workers are referred to the ARI small hospital manual.[1]
However, no time is allocated during the IMCI course to cover the information in Annex E, and the Annex is not intended to be used as it is to train health workers to carry out the treatment instructions. Work is under way to develop more specific guidelines for where referral is very difficult or impossible. Interested countries should request the latest information from WHO CHD.

21.1 Importance and difficulty of referral

Training health workers to identify and refer severely ill children has the potential to impact substantially on childhood mortality by providing special care for those at highest risk of death. The development of guidelines and training materials for health workers at the referral level is currently being given a high priority at WHO[2] to improve the case management of severely ill children who arrive at district or regional hospitals. However, in many countries referral from peripheral first-level health facilities to hospital is difficult or impossible. In these settings, the current IMCI guidelines may refer too many children. Identifying feasible guideline adaptations to reduce the rate of referral, and providing additional training to prepare first-level facility health workers to manage some severely ill children, would make the guidelines and training materials more effective for health workers from peripheral facilities where referral is difficult.

Work is ongoing to explore several approaches to safely reduce the rate of referral by preparing first-level facilities to better manage some severely ill children outside of hospital.

The target group for such training would not include health workers at urban facilities or facilities within close range of a district or regional hospital, or health workers in the outpatient department of hospitals or large health centres with paediatric beds. An increasing proportion of the population in developing countries lives in urban or peri

urban areas, and a proportion of the rural population has access to district hospitals and might use them if the health workers were adequately trained and supplied with drugs and equipment.

21.2 Referral based on the generic IMCI guidelines

A key consideration in developing the IMCI guidelines for the assessment and classification of illness was safety. This meant reducing to a low level the number of children who need but do not receive a specific, potentially life-saving treatment (antibiotics for pneumonia or an antimalarial in an area with *P. falciparum* malaria) or referral for a treatment which is only available in hospital. To achieve adequate sensitivity in detecting these cases, some loss in specificity is expected. This loss in specificity can result in substantial rates of referral in some settings. Studies which compared the conclusion of a health worker with that of a paediatrician have found that health workers refer 7% to 16% of sick children when using the IMCI guidelines (see the following table).

Referral using the IMCI guidelines: performance in sick children age 2 months up to 5 years

Country	Health worker using IMCI guidelines		Physician using paediatric expertise + laboratory: gold standard	Physician or computer applying IMCI guidelines	
	% referred	**Sensitivity, specificity and positive predictive value (PPV), compared to expert MD**	**% referred for admission or admitted**	**% referred**	**Sensitivity/ specificity; PPV compared to expert MD**
Bangladesh[3]			34%	36%	Sensitivity 86 Specificity 64 PPV 55%
Gambia[4]	14%	Sensitivity 46 Specificity 93 PPV 59%	18%		
Kenya[5]	14%	Sensitivity 42 Specificity 95 PPV 42%	22%		
Ethiopia[6]	7%	Sensitivity 74 Specificity 99 PPV 68%	7%	9%	Sensitivity 84 Specificity 97 PPV 71%
Uganda[7]	16%		22%		

The substantial variation in rates of referral reflect several factors, the most important being the differences in the study settings, which also determine the case mix of children seen. The lowest rate of referral (7%) was found in Gondar, Ethiopia,[6] the only study set in health centres not attached to a hospital, including two in rural areas. Studies in Kenya[5], Uganda[7], and the Gambia[4] and Bangladesh[3] occurred in the outpatient departments of a district, regional, or capital city hospital, respectively. The positive predictive value of the health worker=s decision to refer based on the algorithm, compared to a paediatrician=s assessment of the need for admission, ranged from 42 to 71%.[8] The Bangladesh study used only a paediatrician, comparing his expert decisions with a computerized application of the IMCI guidelines to his clinical observations. High rates of referral and/or admission in hospital settings also reflect the fact that mothers tend to bring children who are more sick to these institutions.

The IMCI guidelines are designed to refer urgently children who need to be assessed by an expert clinician, with laboratory support, who then makes a decision about admission. In the five studies, the clinicians were usually deciding which children should be admitted or referred for definite admission, rather than simply referred.

Factors that probably contributed to the variation in rates of admission include individual differences in clinical performance between expert paediatricians, differences in the availability of paediatric inpatient beds and in admission policies, both of which influence the decisions of paediatricians, and differences in rates of severe malnutrition and in the availability of good domiciliary care for this condition. Paediatricians who participated in the studies also took into account social factors, such as whether or not the mother would deliver oral treatment adequately. This could result, for example, in admission of pneumonia cases that could be treated at home if clinicians were not confident that treatment instructions would be followed.

In practice, health workers will also take other factors into consideration when deciding about referral. This is reflected in the training course, which covers more than the guidelines: the modules explain that health workers should also refer sick children who have problems which they cannot manage, even if the children do not have a severe classification.

21.3 Possible adaptations where referral is difficult

The following adaptations could be considered for first-level health facilities where referral is difficult but not impossible. For example, in situations where

travel to referral facilities may require several hours, only very ill children can be referred if it is essential for their survival. These adaptations emphasize:

- Identifying children who are misclassified as severely ill by the generic IMCI guidelines, thus avoiding referrals of "false positives;"
- Managing children with specific conditions of moderate severity who are likely to respond to a treatment regimen which can be effectively delivered at a first-level health facility;
- Early treatment of potentially severe illness with careful follow-up; and
- Avoiding referrals where the sick child is taken home without special follow-up, thus missing key treatments.

The care described in the possible adaptations could be delivered in clinic or at home on a daily basis (sometimes several times per day). Some of the possible adaptations could be included within the current IMCI guidelines and 11-day training course without lengthening the course. Others would be more appropriate in a follow-on training course (see the next section). None of these adaptations address the few very severely ill children with conditions which require surgical or other specialized interventions only available in hospital (such as tracheostomy for severe croup, drainage of an empyema, or provision of oxygen for severe hypoxia).

With all of these possible adaptations, some children with severe illness will be managed at the first-level health facility and at home. Unfortunately, they will have less than optimal back-up should the illness become life-threatening. In such circumstances, therefore, it will be important for the health worker to see the child at least daily. It is recommended that these possible adaptations be developed with support from WHO CHD, to ensure that safety is not compromised.

***POSSIBLE ADAPTATION*: Teach health workers to distinguish a febrile convulsion from convulsions due to a potentially serious cause.**

This adaptation would require teaching health workers to observe the child for a period of time after the convulsion, lower the fever with paracetamol, educate the mother about danger signs, and arrange easy access to the clinic if another convulsion occurs.

***POSSIBLE ADAPTATION*: Change the criteria for referral of children with severe pneumonia to reduce the referral of children with chest indrawing.**

See Section C2 and the table below.

• Any general danger sign *or* • Chest indrawing *or* • Grunting *or* • Severe respiratory distress *or* • Stridor in a calm child	SEVERE PNEUMONIA OR VERY SEVERE DISEASE	< ***Give first dose of an appropriate antibiotic.*** < ***Refer URGENTLY to hospital.*** If referral is difficult, treat child with chest indrawing but no other signs of severity with amoxycillin and see the child each day. If wheezing is present, treat wheezing.
• Fast breathing	PNEUMONIA	< ***Give an appropriate antibiotic for 5 days.*** < Advise mother when to return immediately. < Follow-up in 2 days.
No signs of pneumonia or very severe disease	NO PNEUMONIA: COUGH OR COLD	As in generic chart

***POSSIBLE ADAPTATION*: Add management of wheezing with a rapid-acting bronchodilator, followed by reassessment of the child's need for referral.**

See Section C2.

***POSSIBLE ADAPTATION*: Make sure that first-level health facilities are able to provide both IV and NG rehydration, according to Plan C.**

For this adaptation, it may be necessary to upgrade the skills of health workers in inserting IV and NG tubes and monitoring the rehydration.

***POSSIBLE ADAPTATION*: Treat the child with diarrhoea who has SEVERE DEHYDRATION plus VERY SEVERE FEBRILE DISEASE or SEVERE PNEUMONIA OR VERY SEVERE DISEASE (but <u>not</u> SEVERE MALNUTRITION OR SEVERE ANAEMIA) with Plan C, then reassess before deciding to refer.**

This approach was considered during the development of the generic guidelines, but rejected because it complicates the treatment instructions. Adaptation of the generic guidelines based on this approach, however, would avoid referring:

- Children with fever, diarrhoea, and severe dehydration (but no stiff neck as noted in the box below), who are lethargic or vomiting everything because of their diarrhoeal disease, if they respond well to rehydration.

  According to the generic algorithm, these children would also be classified as having VERY SEVERE FEBRILE DISEASE. This combination of signs can occur in children with rotavirus diarrhoea.

- Children with cough or difficult breathing, without chest indrawing, and diarrhoea with severe dehydration, who are lethargic or vomiting everything because of their diarrhoeal disease.

  According to the generic algorithm, these children would also be classified as having SEVERE PNEUMONIA OR VERY SEVERE DISEASE, on the basis of their lethargy or vomiting. With rehydration, these symptoms may resolve, avoiding the need for referral.

With this adaptation, the treatment box for children with SEVERE DEHYDRATION could be modified as follows:

SEVERE DEHYDRATION	< ***If the child also has SEVERE MALNUTRITION OR SEVERE ANAEMIA or stiff neck, refer URGENTLY to hospital with mother giving frequent sips of ORS on the way. Advise the mother to continue breastfeeding.***
	< If the child has another severe classification but none of the above signs or classifications OR If the child has no other severe classification: Give fluid for severe dehydration (Plan C). Reassess. ***If the other severe classification persists, refer URGENTLY to hospital.***
	< ***If the child is 2 years or older and there is cholera in the area, give an antibiotic for cholera.***

***POSSIBLE ADAPTATION*: Give domiciliary care for some cases of SEVERE MALNUTRITION, without prior inpatient management**

In some countries, more children present with SEVERE MALNUTRITION than can be hospitalized for initial inpatient treatment. If there is an adequate programme of well-supervised domiciliary care for children with severe malnutrition, such children could be cared for as outpatients, provided that they have no other severe classifications and do not have the classification PNEUMONIA.

It is advisable, if the child is to be managed at home, to start all children who initially present with SEVERE MALNUTRITION on an appropriate oral antibiotic such as cotrimoxazole or amoxycillin. With this adaptation, the pink row of the classification table for malnutrition and anaemia would be modified as follows:

• Visible severe wasting *or* • Severe palmar pallor *or* • Oedema of both feet	SEVERE MALNUTRITION OR SEVERE ANAEMIA	< ***Give vitamin A to all children with this classification*** < ***If severe palmar pallor, another severe classification or PNEUMONIA, refer URGENTLY to hospital*** < If none of the above and domiciliary care is available for children with SEVERE MALNUTRITION: - ***Give appropriate oral antibiotic*** - Refer to domiciliary care - Follow-up through the domiciliary care programme, or ask to return to clinic in 2 days

***POSSIBLE ADAPTATION*: Measure haemoglobin using a simple system and treat children with severe palmar pallor who do not require referral for transfusion.**

These children could be treated with oral iron (and an antimalarial and mebendazole, if indicated) and followed on an outpatient basis. See Section C10 and the table below.

• Visible severe wasting *or* • Severe palmar pallor *or* • Oedema of both feet	SEVERE MALNUTRITION OR SEVERE ANAEMIA	< ***Give vitamin A*** < ***If visible severe wasting or oedema, refer URGENTLY to hospital.*** < If severe palmar pallor, obtain a haemoglobin: - If less than 5 grams or another severe classification, refer urgently to hospital. - If 5 grams up to 8 grams: > Give iron. > Give oral antimalarial if high malaria risk. > Give mebendazole if child is 2 years or older and has not had a dose in the previous 6 months.

		> Follow-up in 1 day. > Advise the mother when to return immediately. - If 8 grams up to 10 grams, treat as ANAEMIA

***POSSIBLE ADAPTATION*: Improve the specificity of the young infant criteria for referral based on POSSIBLE SERIOUS BACTERIAL INFECTION.**

This would require somewhat more complex guidelines than the simple combination of clinical signs presented on the generic chart. See Section C16.

21.4 Further training to prepare first-level health workers to manage severely ill children

More extensive modifications would be needed for facilities where referral was extremely difficult or impossible. For health workers from these facilities, it may be preferable to **also** train them in those aspects of inpatient care which can be delivered at their facility, using the materials on referral care that are currently in development, or to develop special follow-on training materials specific for first-level health workers. These would require more skills, drugs, and legal authority to expand the range of care provided by these first-level health facilities. This expanded range of care would require additional training which cannot be accommodated within the 11-day IMCI course.

A follow-on course might include:

- Management of some children with severe malaria with intramuscular quinine, treatment to prevent hypoglycaemia, and use of other antibiotics (when meningitis cannot be excluded);

- Management of some children with severe pneumonia or very severe disease, or suspected serious bacterial infection in young infants, using once daily treatment with ceftriaxone;

- Management of children with acute convulsions with airway management and rectal diazepam;

- Management of dehydration with intravenous and nasogastric therapy;

- Management of severely malnourished children using a simplified domiciliary care program; and

- Management of wheezing with a rapid-acting bronchodilator (a metered-dose inhalor plus a spacer device), followed by a reassessment of the child's need for referral.

By including the management of several acute conditions in a follow-on training course, more appropriate training methods and clinical practice could be used than could be added to the 11-day IMCI training course.

21.5 Guidelines in Annex E

The following adaptations to the guidelines in Annex E could be considered.

***POSSIBLE ADAPTATION*: Change the intramuscular antibiotics in the *Treat the Child* chart and in Annex E.**

Other antibiotics can be substituted, bearing in mind adequate coverage for *S. pneumoniae*, *H. influenzae*, and *S. aureus* infections.

If ceftriaxone is available for other indications (such as STD treatment), consideration should be given to providing it for sick children with serious bacterial infections who cannot be referred, because it has broad coverage and is given once daily.

Cefotaxime requires several doses per day but is currently less expensive.

***POSSIBLE ADAPTATION*: Change the anticonvulsants in Annex E.**

Some experts would recommend that paraldehyde only be provided, rather than both diazepam and paraldehyde. See Section C20.

***POSSIBLE ADAPTATION*: Choice of intravenous treatment for hypoglycaemia.**

The generic guidelines specify the infusion rate for both D10 and D50. If only one formulation is used, the other can be deleted. If D10 is desired but only D50 is available, instructions can be included on how to add D50 to D5 to make a D10 solution.

***POSSIBLE ADAPTATION*: Add instructions on administration of rapid-acting bronchodilators to Annex E, if these are available at first-level health facilities.**

This material can be taken from the draft IMCI referral care manual[2] and the ARI first-level facility training module.[9]

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22. WHERE HEALTH WORKERS DO NOT HAVE PRIOR TRAINING ASSUMED BY THE COURSE

Generic guidelines

The course assumes that health workers have had training that includes such basic skills as how to give an intramuscular injection, how to weigh a child and how to take and interpret axillary temperature.

Although the clinic session includes a review of how to set a weighing scale to zero and test its accuracy, for example, this would not be sufficient for a health worker with no experience using a scale or who does not know how to weigh children.

***POSSIBLE ADAPTATION*: Add instruction in basic skills assumed by the course.**

If basic skills in these few key medical procedures are deficient, exercises and clinical practice to enable health workers to develop them should be added to the course. Including training in basic skills will require a longer course.

Note: Adaptations for less literate health workers are not provided in the Guide.

The course requires health workers to be numerate and literate. They should be able to count and easily use a dosing table and to read the module text and exercises in the language in which the course is taught. This *Adaptation Guide* does not cover the extensive changes in teaching methodology which would be needed to successfully train health workers without literacy and numeracy skills. The USAID-supported BASICS project is developing a complementary course that may be more appropriate for these health workers.

23. LOCAL TERMS FOR EFFECTIVE COMMUNICATION WITH MOTHERS

Generic guidelines

Throughout the course, health workers practice communicating using words that mothers will understand. In the *Assess and Classify* module, health workers learn to ask the mother or other caretaker several questions which include:

Does the child vomit everything?
Has the child had convulsions?
Does the child have cough or difficult breathing?
Does the child have diarrhoea?
Is there blood in the stool?
Has the child had fever?
Has the child had measles?

To advise the mother to return immediately if the child has signs of severe illness, the health worker must alert her to the following conditions:

Fast breathing
Difficult breathing
Blood in the stool
Not able to drink or breastfeed
Drinking poorly or breastfeeding poorly
Becomes sicker
Develops fever

In the section on counselling the mother about when to return, in the module *Counsel the Mother*, health workers are advised to use the mother's card, to use local terms the mother can understand, and to check her understanding.

In both the assessment and advising tasks, ensuring that caretakers understand is presented as an essential aspect of good case management. The terms for cough, diarrhoea, fever and signs that indicate when to return are usually identified before the course and may also be on the adapted charts (see page 14, *Facilitator Guide for Outpatient Clinical Practice*). If not, the facilitator is advised to discuss the words that mothers understand for the terms used on the chart.

23.1 The importance of identifying local terms

The effectiveness of IMCI requires more than health workers who are well trained to assess, classify, and treat sick children. Effective case management also requires that caretakers and health workers communicate about the child's condition, and that caretakers understand and follow advice for giving home care.

Good communication between a health worker and a caretaker depends in part on the use of language that both understand. There is, however, much research in medical anthropology which shows that there are differences in the meaning of the same words when they are used by people in a community compared to those who have been medically trained.[1] Communities and medically-trained practitioners use different words to refer to the same signs, symptoms, and diseases. Words used by families and communities reflect their cultural beliefs about disease, whereas the language used by health workers reflects their system of biomedical knowledge, used in diagnosis and treatment.

Identifying and using mutually understood local terms is important, therefore for accurate assessment, classification and treatment of a child's condition. Recent studies in various parts of the world, for example, have shown differences between the words used by caretakers and health workers to describe signs of respiratory illness.[2] In Honduras, a study found that caretakers believe "asthma" and "pneumonia" to be the same disease.[3] In another study, in northern Ghana, the literal translation of "fast breathing" was perceived to mean panting of the sort that occurs after running. In contrast, the local expression appropriate for the kind of breathing difficulty the caretaker needs to attend to is "tight ribs." Misunderstanding might arise if the health worker used the literal translation to communicate with the mother.

Lack of a shared understanding of the condition that is being referred to can result not only in misunderstandings, but also in inappropriate actions by the health worker and the caretaker. The purpose of identifying local terms for use in adapting IMCI materials, therefore, is to help health workers to obtain accurate information from the mother and advise her appropriately about when to return.

Using terms that are not understood locally can cause problems with specificity in case detection, resulting in significant over-treatment. For example, in the central region of Uganda, the Lugandan term for fever (*omusujiya*) refers to an elevated body temperature with body aches and joint pain. However, the same term is also used to describe a child who is not feeling well, without an elevated body temperature. Consequently, almost all mothers bringing a sick child to clinic answer "yes" if they are asked whether their child has had fever, using the common local term for fever, resulting in almost all children receiving an antimalarial. A short study identified the term "hot body" which, although not commonly volunteered by mothers, was well understood by them and was much more specific for an elevated body temperature. Other ambiguities in the terminology for measles and blood in the stool were also

clarified by this study, as noted in the table below.

Local terms related to childhood illness - Central region of Uganda
(terms selected for use in IMCI materials indicated with an asterisk*)

IMCI chart	Local term/phrase	Literal translation	Physical referent
Fever	Omusujja	Fever	Elevated body temperature, with body aches and joint pain
	Omuliro	Illness with fire	(same as above)
	Ayokya omubiri*	Hot skin	Elevated body temperature
Measles[a]	Olukusense*	Disease with rash	Measles rash plus other characteristic findings
	Mulangira	The Prince	(same as above)
	Oluseru	The thing	(same as above)
Blood in stool	Okudukana omusayi*	Running bloody stool	Diarrhoea with blood
	Embiiro zomusayi*	Frequent bloody stool	Diarrhoea with blood
	Gerenge	Bloody diarrhoea	Diarrhoea/dysentery

[a] All three terms for measles refer to illness with rash and other characteristics of measles. As this is a highly feared disease, however, the alternative terms, *the prince* or *the thing*, are often used. Caretakers may not spontaneously volunteer the information that a child has had it for fear of spreading the illness to other children in the house by naming it.

Similarly, problems can arise with sensitivity in case detection if the words used by health workers are not understood by caretakers as referring to the clinical sign or disease of concern. For example, in one area of Kenya, investigators found that the word commonly used by health workers for diarrhoea was understood by mothers to refer to only one of several different kinds of diarrhoea.[4] As a result, children with other types of diarrhoea may fail to be assessed for dehydration.

Research results have also demonstrated that maternal recall is greater when appropriate local terms are used. In Viet Nam, researchers compared caretakers' recall of the warning to return to clinic if the child develops "fast or difficult breathing" when the message was given as a direct translation ("fast or difficult breathing") and when it was given using local cultural terms ("strong" or "tired breathing"), determined by a short ethnographic study.[5] The caretakers who were given the message using local terms were more likely to remember the warning (27% recall

compared to 12% for the literal translation; p<.009). Although mothers understood the literal translation into Vietnamese, they were less likely to pay attention to a message that was not as culturally meaningful.

23.2 How to identify effective local terms

ESSENTIAL ADAPTATION: **Identify local terms to use when asking the mother questions about the child's condition and for advising mothers about signs which indicate she should return with the child to the health worker immediately.**

The following generic terms occur in the questions health workers address to mothers in order to assess the child: *vomiting everything, convulsions, cough or difficult breathing, diarrhoea, blood in the stool, fever*, and *measles*. Any of these terms may be ambiguous if local terms are not used. For example, studies in Iran found that the word in the local language used by health workers for convulsions was understood by mothers to include a range of conditions related to fever. In this example, the guidelines would need to be adapted to avoid many false positive answers of "yes" in response to the question: "Has the child has convulsions?" resulting in over-referral for convulsions in infants.

The following generic signs appear in the advice health workers give to mothers on when to return: *fast breathing, difficult breathing, blood in the stool, not able to drink or breastfeed, drinking poorly or breastfeeding poorly, becomes sicker,* and *develops fever*. Using local terms in place of these generic terms may help to prevent delays in returning the severely ill child or young infant to the health worker for care.

Contrary to what is often assumed, it may not be advisable to rely on health workers, even local ones, as the primary source for local terms. Studies have shown that they often do not know or use the most appropriate terms. For example, a study in Cebu, Philippines, found that, of the four terms most commonly used by mothers for "fast" or "difficult breathing," only one was mentioned by any of the local health workers interviewed.[6]

Section E, *Protocol for Identifying and Validating Local Terms*, provides a set of procedures to identify local terms to make these essential adaptations. Step 1 begins with gathering information: from written sources, and then from members of the planning team, other clinicians, and caretakers. Unless there is confidence in the validity of terms identified in programme documents, it is advised that information be gathered from all these sources.

In Step 2, local terms are validated, if necessary, through interviews with caretakers of sick children. Step 2 may be needed to identify local terms for which there is no clear consensus among the caretakers interviewed in Step 1. It may also be necessary for terms that are difficult to discuss in the absence of physical signs.

23.3 How many versions of local terms are necessary?

The way that local terms will be incorporated in IMCI materials will vary from country to country. In some, it may be necessary to identify local terms in several languages. However, even though there may be many ethnic groups with multiple languages, there is often one or several common languages understood by mothers in addition to their local dialect. There are, for example, three common languages used on the radio in Uganda and the appropriate local terms may be expressed in any one or more of these languages. In some circumstances, the appropriate local terms in one or several languages could be included on the mother's counselling card for a particular geographical area, even if all terms are not included in the national or regional materials. Where there is substantial local variation, local terms - in particular those for signs for when to return immediately to the health worker - could also be written on blank lines left on the mother's card.

***POSSIBLE ADAPTATION*: Put local terms on the *Assess and Classify* and the *Counsel* chart.**

This approach was taken in Uganda, as follows.

Does the child have diarrhoea*?**

*****Use local term e.g. in Luganda use "ekiddukano" or "embiro" for diarrhoea and "ekiddukano kyomusayl" or "embiro zomusayi" for bloody diarrhoea**

Does the child have fever[H]?
(by history or feels hot or temperature 37.5° C or above)

[H] Use local terms e.g. in Luganda use "Ayokya omubiri" for fever and "Olukusense" for measles.

POSSIBLE ADAPTATION: **Summarize effective local terms for the key words or phrases in the facilitator guides and/or the modules.**

POSSIBLE ADAPTATION: **Put blanks on the counselling card next to the illustrations of children who should be taken immediately to clinic, for health workers to fill in.**

This approach was taken in Tanzania.

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24. COUNSEL THE MOTHER ABOUT HER OWN HEALTH

Generic guidelines

On the *Counsel the Mother* chart, the health worker is reminded to provide care for or to refer a mother who is sick or has a breast problem (such as engorgement, sore nipples, or a breast infection). The health worker also advises the mother to eat well to keep up her strength and health, checks her immunization status and gives her tetanus toxoid if needed, and makes sure she has access to family planning and counselling on STD and AIDS prevention.

In addition to childrearing and household labour, many women perform strenuous physical work. This, combined with inadequate food intake, working late into pregnancy and many births in close succession, can result in maternal malnutrition. A woman's health and nutritional status has consequences not only for the woman but also for her children, undermining her ability to provide adequate childcare.

If the mother is herself sick, the health worker needs to consider this in planning the child's treatment. It may be necessary to involve other family members or neighbours in the care of the mother and child.

Sick child clinic visits can play a limited role in assuring that the mother receives the health care that she needs. The instructions in the box "Counsel the Mother About Her Own Health" remind health workers to also consider the mother's health needs and preventive interventions which will protect her own health and that of her next child (STD counselling, family planning, and tetanus toxoid immunization). This is intended to help coordinate but not to integrate the care of the mother and child. There is no time in the training course to teach the assessment, classification, and treatment of maternal health problems. Hopefully, health workers will have received training in these areas and have the necessary drugs available so that they can provide key services, rather than only referring the mother to another provider.

***POSSIBLE ADAPTATION*: Add specific instructions based on existing immunization guidelines or women's health programmes.**

In the Tanzanian adaptation, for example, a note was added to remind health workers to ask to see the mother's tetanus toxoid card. In the Ugandan adaptation a note was added about making sure the mother has access to antenatal care, if she is pregnant (see Annex A-10).

***POSSIBLE ADAPTATION*: In countries with a high prevalence of HIV infection, add specific information on referral for mothers who are either known to be HIV positive or are at high risk.**

Because it is not always possible for health workers at primary level facilities to give HIV counselling, a mother who is known to be HIV positive should be referred for counselling. Depending on locally available services, this can be to a first level referral hospital, a community-based home care programme, a community-based social support programme, or a community- or institution-based voluntary counselling programme.

If the mother's HIV status is not known, but there are reasons to suspect HIV infection, she should be referred for counselling and testing. The specifics of referral need to be coordinated with the recommendations for the child (see Section C20), as well as adapted to locally available services.

***POSSIBLE ADAPTATION*: Provide more specific information on referral to a breastfeeding counsellor for breastfeeding problems.**

See Section C14.

25. CLINICAL RECORDS

Generic guidelines

The generic modules do not include an exercise on clinical records to keep track of patients. Only the use of the recording form is taught in the course.

Methods of keeping track of patient visits vary greatly, from nothing to a well kept chart. Well-managed patient charts, which have an entry for each visit and provide information for follow-up visits and over longer periods of time, are the most effective from the perspective of care of the child. To maintain patient charts requires effective and functioning systems for supplies, filing, and ongoing inputs. Since most clinics do not have these systems, patient charting is not taught in the generic course.

***POSSIBLE ADAPTATION*: Use existing patient charts.**

Add an explanation of patient charting and an exercise to the training modules if there is already an established system of using patient charts in clinics. The most appropriate place to add an exercise on patient charting is at the end of the module *Counsel the Mother* (see *Section G, 13.0 Add an exercise on charting* for the exact changes to make in the module). The exercise should summarise how to make a chart entry using vital signs (including respiratory rate), classifications, feeding problems, treatment, follow-up and feeding advice. The exercise is appropriate for health workers from clinics where patient charts are maintained (and can be found and used on subsequent visits). It may also be appropriate to write an entry in small script on a multivisit card or record where there is adequate space for descriptions of the illness and the possibility of using multiple pages (for example, in clinics where the records are kept in a small exercise book which the mother provides and keeps).

This single exercise will not give health workers who can use the recording form sufficient skills for effective patient charting: review of charting during skill reinforcement after training is essential.

***POSSIBLE ADAPTATION*: Use multivisit cards.**

Modify multivisit cards to ensure adequate space for clinic entries. However, these cards are usually kept by the mother and may get lost. Using multivisit cards for patient charting may be feasible where this card is well taken care of because it is needed, for example, to obtain a passport for the child or entry into school.

***POSSIBLE ADAPTATION*: Use clinic registers.**

Where clinics are already using a register, the modules could describe modifications in the system in order to keep track of children. Even brief routine register entries required for the collection of statistics can be supplemented with a system to record follow-up visits; this can be made more effective by also keeping a list in clinic (kept on a blackboard or large calendar). This can provide information at follow-up and enable health workers to track children of particular concern if they do not return for follow-up.

A very large register, which allows health workers to record respiratory rate and more than one classification, treatment and follow-up, linked with a system to check on follow-up, is less desirable than patient charts or multivisit cards but may be the only feasible approach.

***POSSIBLE ADAPTATION*: Give a follow-up note to the mother and keep a list of children scheduled for follow-up.**

Where there are no patient charts, multivisit cards or registers, or these records cannot be kept for all children, it is important that there is an alternative system for tracking which children should return for follow-up. At a minimum, health workers can keep a list and note key information required for the follow-up visit.