
PART III

Chapter 6

**CONTROL OF ACUTE RESPIRATORY
INFECTIONS (ARI)**

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I. Introduction

Acute respiratory infections (ARI) are currently one of the leading health problems among children under 5 years of age in the countries of the Region of the Americas. The extent of the problem is illustrated by the following facts:

- Every year, around 150,000 under-5 children in the countries of the Americas die from pneumonia, which is responsible for 80%-90% of all deaths from ARI. The majority of these almost 150,000 pneumonia deaths occur in the less-developed countries of the Region (mainly Bolivia, Haiti, Peru, Mexico, northeastern Brazil, and countries of Central America), which account for close to 90%. Pneumonia continues to be one of the leading causes of child mortality and ranks among the first five causes of death in this age group.
- While in the developed countries of the Region of the Americas, mortality from pneumonia has tended to decrease, in the developing countries of the Region the decline in pneumonia deaths has been much less marked. In some, the rates have not decreased at all.
- In many countries of the Region, ARIs—which include not only pneumonia but also bronchitis, bronchiolitis, and other disorders of the respiratory system—are among the main causes of hospitalization.
- Although quantitative information does not exist in some countries of the Region, it is known that some acute upper respiratory infections, such as otitis and streptococcal pharyngitis, cause serious sequelae in children, including hearing loss, deafness, and, to a lesser extent, rheumatic heart disease.
- ARIs are also the main reason that children under 5 are taken to health services at the primary care level, especially during winter months; this cause accounts for between 40% and 60% of health service visits in this age group.
- Treatment of ARI is also the main reason for administration of antibiotics to under-5 children. Most of the time these drugs are unnecessary and may even be harmful, owing to their side effects and the increase in bacterial resistance. Eighty percent of the ARI cases seen in health services do not require the use of antibiotics, as they are generally relatively minor illnesses of short duration which resolve spontaneously. Nevertheless, it is estimated that between 50% and 90% of children with ARI treated in health services in the developing countries receive antibiotics.
- In addition to the inappropriate use of antibiotics, ARIs are frequently the reason for administration of cough and cold medications. Far from being inoffensive and innocuous, these medications have components that make them potentially dangerous to children. They are also expensive and ineffective in relieving the symptoms they are intended to treat.

In summary, among the principal factors that characterize the problem of ARIs among children in the countries of the Americas are their importance as a cause of death, hospitalization, sequelae, health service visits, inappropriate use of antibiotics, and unnecessary use of cough and cold medications.

According to the available data, ARIs, acute diarrheal diseases (ADD), and malnutrition are three of the five leading causes of death in most of these countries (the other two are malaria and

measles, among other vaccine-preventable diseases). The need to step up control measures in order to reduce the prevalence of these diseases has led agencies such as WHO and UNICEF to join forces in recent years to develop a strategy known as *Integrated Management of Childhood Illness (IMCI)*.

IMCI is an initiative of PAHO, WHO, UNICEF, and other agencies. Its purpose is to coordinate all available resources and activities with a view to achieving specific objectives, which include reduction of mortality from the prevalent childhood illnesses, as well as their occurrence and severity. Above all, the initiative seeks to improve the quality of care that children receive in health services. Given its importance to the attainment of the goals of the World Summit for Children, the IMCI strategy will be described in detail in a separate chapter of this publication.

Because the objectives of enhanced ARI control are virtually the same as those for control of acute diarrheal diseases and other prevalent childhood illnesses, the management of these illnesses is being integrated in many countries of the Region. At the central level, within PAHO, the programs for ARI and diarrheal disease control are now managed in a coordinated fashion and have been combined to form the unit responsible for implementing the IMCI initiative.

At the same time, those responsible for ARI/CDD at the national level, under the coordination of PAHO, have committed themselves to support the strengthening of the process of integrating ARI/CDD control activities at all levels of the health system. In this framework, efforts will be aimed at increasing the population's access to the ARI/ADD standard case management strategies and at bringing about the progressive integration of other priority components of child health.

II. Objectives of ARI Control

The main objective of ARI control activities is:

- To reduce mortality from pneumonia in children under the age of 5 years.
- In addition, ARI control is intended to achieve three other objectives:
- To reduce the inappropriate use of antibiotics and other drugs in the treatment of ARI in children;
- To reduce the severity and avoid complications of acute upper respiratory infections in children (deafness subsequent to otitis media; rheumatic fever and heart disorders subsequent to streptococcal pharyngitis);
- To reduce the complications of acute lower respiratory infections (pneumonia, bronchiolitis) through early diagnosis and effective case management.

III. Strategies

Standard case management (SCM) is the primary specific strategy available for the achievement of the ARI control objectives. However, there are also several general strategies that may be helpful for accomplishing the objectives. These include immunization against measles and pertussis and prevention of risk factors.

1. Standard case management (SCM)

SCM places special emphasis on the reduction of pneumonia deaths in children and on reduction of the inappropriate use of antibiotics for treatment.

One of the components of SCM is a decision-making chart that systematizes the three stages of case management: assessment, classification, and treatment. It provides a group of highly predictive signs and symptoms that make it possible to classify children with ARI according to their probability of having pneumonia. It also provides a series of standardized treatment recommendations of proven effectiveness to be administered to children based on the classification of their condition.

SCM includes the following components:

- 1.1 Hospital treatment of cases of very severe disease and severe pneumonia in children under the age of 2 months;
- 1.2 Hospital treatment of cases of very severe disease or severe pneumonia in children between 2 months and 4 years of age;
- 1.3 Treatment of pneumonia cases in children between 2 months and 4 years of age;
- 1.4 Treatment of cases of cough or cold (not pneumonia);
- 1.5 Treatment of cases of children with wheezing;
- 1.6 Treatment of cases of ear infection;
- 1.7 Treatment of cases of sore throat;
- 1.8 Education of the mother (or person responsible for caring for the child) regarding danger signs and home care.

The case management charts, including the criteria for diagnosis, classification, and treatment, are included in Annex 1.

It may be necessary to make several decisions in order to adapt SCM to local characteristics. Generally, these decisions relate to national guidelines and policies on ARI control and concern issues such as the following:

- *Antibiotics to be provided for standard treatment of pneumonia*

The SCM strategy recommends four antibiotics for the treatment of pneumonia: cotrimoxazole, amoxicillin, ampicillin, and procaine penicillin. The selection will depend on the local situation and on factors such as cost, dosage frequency, and the need for disposable elements for injectable antibiotics, among others.

- *Health personnel other than doctors (if there is one) to be authorized to use antibiotics in the treatment of pneumonia and bronchodilators for the treatment of wheezing*

In some situations in which part of the population has limited access or does not have access to health services staffed by a physician, pneumonia cases that are detected do not receive antibiotics and run the risk of becoming worse and causing death due to lack of antimicrobial treatment.

In such situations, it would be advisable to train non-physician health personnel to detect and treat cases classified as pneumonia based on the SCM criteria. This personnel should be closely supervised in order to prevent excessive and unnecessary use of antibiotics, which is also an objective of ARI control.

A similar situation might occur in relation to management of wheezing in children. Many cases would not need to be referred to a physician-staffed health service if treatment with a bronchodilator could be administered at the primary care level by personnel other than doctors.

- *Home remedies to be recommended to mothers for symptomatic treatment of cough or cold*

Since many cough and cold remedies contain several ingredients, some of which are potentially harmful to children, a decision should be made at the local level with regard to which of these medications can be used safely by mothers to treat children at home.

At the same time, there may be various homemade preparations that mothers and others in the community often use for the treatment of coughs and colds. These should be examined at the local level with a view to determining which may be harmful and discouraging their use, at the same time encouraging the community to use remedies that are safe for children.

Some additional considerations relating to these issues, as well as a more in-depth analysis thereof, are contained in the *National policies* module of the ARI program management training course (see reference in Annex 2).

2. Immunization against measles and pertussis

Immunization against measles and pertussis is an important strategy currently being recommended as a means of preventing some cases of pneumonia.

Pneumonia is a frequent complication of measles or pertussis in children. An estimated 15% of pneumonia deaths in under-5 children are due to secondary complications of these diseases. Since, without immunization, a large proportion of children aged 6 months to 3 years will contract measles and pertussis, vaccination against these illnesses is an important strategy for reducing the number of pneumonia cases and deaths.

3. Reduction of risk factors

Reduction of the prevalence of risk factors, such as low birthweight, malnutrition, bottle-feeding of infants and poor weaning practices, indoor air pollution, and exposure to excessive cold or chilling, is another important strategy for decreasing the incidence and severity of pneumonia episodes and thereby reducing mortality from this cause. Reduction of the prevalence of these risk factors is also a strategy for ARI control in general in the countries of the Region.

IV. Stages for Implementation of the Strategies

For the implementation of the strategies, four stages have been proposed. They are ordered so as to make the implementation process more efficient. Efforts are to be aimed first at ensuring the effective application of the control strategies in health services, before the population is encouraged to seek assistance from the services. This is intended to avoid the problems that might arise if an increased number of children begin to seek assistance for ARI before the health personnel have been fully trained in how to apply the recommended strategies.

The stages proposed and the principal activities to be carried out under each one are outlined below.

Stage 1

Provide standard case management for ARI in first-level health facilities and for cases of severe pneumonia and very severe disease in public and private hospitals.

Activities:

- Increase access to SCM for ARI by training personnel in health facilities and supplying appropriate drugs and equipment. Case management includes educating mothers who come to the health establishments in how to care for ARI in the home.
- Increase access to SCM for severe pneumonia and very severe disease by training hospital personnel and providing the necessary treatment materials and equipment.

Stage 2

Provide standard case management of ARI through community health agents (CHA).

Activities:

- Increase access to SCM for ARI through training, provision of supplies, and supervision of community health workers.

Stage 3

Promote proper home care for children with ARI, including the early identification of signs of pneumonia by mothers or caregivers so that children will be taken promptly to a health worker if needed.

Activities:

- Educate the family about caring for ARI in the home and about the signs of pneumonia in children and when to seek help outside the home, promoting the use of health services.

Stage 4

Provide specialized treatment of cases of respiratory infection that have not responded to SCM and/or cases that could benefit from specialized treatment.

Activities:

- Increase access to specialized case management in referral hospitals at the secondary and tertiary levels.

The foregoing sequence is not rigid, and some stages may be carried out simultaneously, depending on the local situation. Nevertheless, the proposed sequence makes it possible to focus first on the activities that it is most feasible to control, such as case management in primary health care facilities and in hospitals.

Initiating the implementation of ARI control through SCM in primary health care establishments should have a significant impact on the reduction of ARI deaths and should also improve the early detection of cases by health personnel as a result of timely and appropriate management.

V. Steps to be Followed for Implementation

The implementation of ARI control strategies at the local level includes the following steps:

1. Describe the geographic area of application for the strategy.
2. Describe the current status of the ARI problem in the area of application.
3. Identify the health care structure that will be used, including the different levels of care.
4. Plan the implementation of ARI control strategies in the area of application.

1. Description of the geographic area of application of the strategy

The first step in the implementation of ARI control strategies is to clearly establish the geographic area in which the activities will be carried out, which in turn will make it possible to establish the total population to be covered, as well as the population of children under the age of 5 years and its distribution in the following age groups: under 2 months, 2-11 months, and 1-4 years (these age groups will be useful for calculating drug needs for treatment of ARI, as described below).

It is helpful to make a map of the area of application in order to identify where the population is concentrated, the routes of communication, and geographic features that might hinder access. The distribution of health care providers could also be shown on this map, as described in Step 3.

2. Description of the current status of the ARI problem in the area of application

Before beginning to plan, it is very important to know the magnitude of the ARI problem in the area of application, especially with regard to the aspects that are to be targeted by control efforts, namely, mortality, morbidity, and quality of care. Information should therefore be collected on the following:

- *Number of deaths from pneumonia in children aged under 1 year and 1-4 years in the last year for which information is available.*

In some cases in which mortality data are not available, or information on causes of death is unreliable, the total number of deaths in these age groups may be used as an indicator. In most developing countries, pneumonia causes 10%—30% of all deaths of under-5 children.

Information on the characteristics of the deaths that have occurred, such as the place of death (in a health care establishment or at home), the care received prior to death, and the child's immunization status, nutritional status, and birthweight, will also help to define the strategies that need to be strengthened in the implementation of ARI control.

The latter information can be extracted from medical records in the case of children who have died in a hospital. For children who died at home, the information might be obtained from the records of health centers and posts in the area in which the children lived or through visits to families.

- *Number of hospitalizations of under-5 children for pneumonia or other ARIs in health establishments in the area of application during the last year for which information is available.*

Here again, some of the characteristics of the hospitalizations are of interest, such as whether the children were referred from peripheral health services or were taken directly to the hospital by their parents, average number of days of hospitalization, case fatality rate, and treatment administered.

- *Number of health service visits for pneumonia or other ARIs for under-5 children in the area of application (including both peripheral services and outpatient and emergency hospital services), and proportion of cases in which antibiotics were prescribed for treatment.*

Information on the proportion of ARI cases treated with antibiotics will be more useful if it can be broken down according to diagnosis. One of the aims of ARI control is to reduce the use of these drugs for non-pneumonia cases of ARI (cough, common cold, bronchitis) and pharyngitis.

Other details that may be of interest in regard to health service consultations for ARI include the proportion of cases of cough or difficult breathing in which chest x-rays were ordered, as well as the proportion of ARI cases that were treated with cough or cold syrups.

To analyze these points, it will be necessary to review the available information on mortality, morbidity, health service visits, and hospitalizations, in order to compile sufficient data on the problem. The formats proposed for operations research in the publication *Investigaciones operativas prioritarias para evaluar el impacto de las acciones de control de las IRA* (see Annex 6) might be used for this purpose. Although this publication (currently only available in Spanish) contains protocols for studies aimed at assessing the results of application of the control strategies, such studies may also provide baseline information if they are conducted prior to the initiation of the activities.

3. Identification of the health care structure for implementation of ARI control strategies

Once the area of application and the characteristics of the problem have been determined, the next step is to identify the structure available for implementation of the control strategies. This

structure includes all health care providers who will participate in ARI control, including not only hospitals, health centers, and health posts, but also community health agents (CHA) in specific populations that do not have a formal health care establishment.

The health care structure may include both public and private establishments, as well as social security institutions, churches, and nongovernmental organizations, among others. It should be decided whether non-public establishments will be included from the outset of the implementation process or at a later stage.

To identify the health care structure, the following procedure might be followed:

- Make a list of all health care establishments in the area of application, ranking them according to their level of complexity and capabilities for treating ARI cases: i.e., establishments that can manage cases of very severe diseases, establishments that can manage cases of severe pneumonia, establishments that can manage cases of pneumonia; and establishments that can manage only cases of cough or cold (not pneumonia). The determination of the level of complexity of health services should also take into account whether or not a vehicle is available for transport of referred cases, as well as available means of communication (radio, telephone, etc.).
- Identify the location of the establishments on the map of the area, specifying the level of care as described above.
- Establish the flows of referral and back-referral between the various levels of care.

Through this process, the population's access to the various providers can be clearly discerned and the possibilities for treating cases of varying severity in each population can be established. In particular, the average time required for referral from one level to another can be ascertained in order to determine the access of cases that require hospitalization.

Based on these findings, decisions can be made about specific aspects of SCM. For example, it can be decided which health personnel other than doctors (if there are any) will be authorized to prescribe antibiotics for the treatment of pneumonia or bronchodilators for the treatment of wheezing. It can also be determined where drugs and other supplies should be available outside hospitals for the management of severe cases that cannot be referred. These decisions should be made based on the possibilities of access and case referral by the various health workers.

Identifying the available health care structure also means determining the number and category of health personnel who will be involved in the planning and supervision of strategy application (area or sector chief, director of health service, supervisor, statistician, as well as the personnel responsible for treating under-5 children with ARI).

4. Planning the implementation of ARI control strategies in the area of application

The implementation of ARI control strategies in a selected area should be carried out in a sequential and organized manner so as to ensure achievement of the proposed objectives as efficiently as possible. To this end, it is essential to plan activities to:

- Provide access to standard case management of ARI to the under-5 population in the area of application (access subgoal);
- Provide standard case management for cases of pneumonia and other ARIs that occur among children under 5 in the area of application (use subgoal).

In order to provide the population with access to ARI control strategies, basically three activities should be implemented:

- Training of health personnel;
- Provision of drugs for treatment and other supplies necessary for the application of the strategies;
- Supervision of health personnel in order to ensure effective application of the strategies.

Since ensuring access to SCM does not guarantee that cases will be effectively treated or that mothers will in fact bring their children to the health services for care, an additional activity should be carried out in order to increase the use of SCM:

- Health communication and education aimed at enhancing the knowledge, attitudes, and practices of the community in relation to the management of children with ARI. These activities should emphasize, in particular, early detection of the warning signs of pneumonia that should prompt a visit to the health services and proper management of children with ARI in the home.

Planning of the implementation of ARI control should also include two other activities aimed at monitoring the process and the results:

- Monitoring and surveillance of the activities and results;
- Periodic evaluation of the results obtained, both in regard to the process of implementation and the impact of the activities on the problem.

4.1 Training of health personnel

Training of health personnel is the first activity that must be carried out in order to successfully implement ARI control strategies in the area of application. Training includes two basic aspects: (1) the organization, planning, and supervision of activities; and (2) ARI case management.

Personnel in the area of application responsible for the implementation of ARI control—for example, the area or sector chief or director and the supervisors of health establishments—should be trained in the organization, planning, and supervision of activities.

This includes training in problem assessment, priority-setting, establishment of goals and sub-goals, and planning and organization of activities to be carried out in the implementation of the strategies.

This training also includes knowledge of the strategies to be applied, especially SCM. This aspect is of special importance in the case of supervisors, who will be responsible for verifying that health personnel are applying the strategy correctly.

The training of supervisory personnel should occur prior to the training of health personnel responsible for treating cases in order to ensure that the introduction of SCM in health services will be carried out in a planned manner and that health workers will have supervisors who are capable of identifying and solving problems.

Training in case management is aimed at all health personnel involved in the care of under-5 children with ARI, both in health services (for the first stage of implementation) and in the community (for the second stage). This includes doctors and nurses in referral hospitals, health centers, health posts, and other establishments in the area and, subsequently, community health agents.

Another consideration in the training of this personnel is the order of training. It is generally preferable to have qualified personnel in place in hospitals at the first referral level before or at the time that training of personnel in peripheral health services is begun. In this way it will be possible to avoid the rejection of cases referred to hospital from peripheral health services due to the use of different treatment guidelines by the two types of services.

Over time, the process of training health personnel could also be extended to personnel in the private sector, social security institutions, and NGOs that are involved in activities at the municipal or departmental level. This would increase access to standard case management of ARI and would also encourage greater standardization of treatment criteria.

Since the training of personnel in case management is intended to prepare them to assess, classify, and treat children with ARI, it is very important to emphasize practical training in the care of children. For this reason, it has been recommended that 50% or more of the training time be devoted to practice and that the remaining time be spent in studying the materials in which the SCM strategy is described and analyzed.

For the latter to be possible, the creation of ARI training units (ARITU) has been suggested. These units would be established in health care facilities that have a high number of consultations or hospitalizations of children under 5 with ARI and would make it possible to offer practical training to health personnel.

Annex 2 contains information on the training materials available and the various types of courses suggested to facilitate implementation of the control strategies. In addition, the publication used as a basis for the creation and operation of ARI training units is included in the list of technical documents for training of health personnel (Annex 6).

4.2 Provision of drugs and other supplies

Continuous availability of drugs in health services is an essential requirement for the effective application of the SCM strategy. The necessary drugs for ARI control are specified in the strategy and include antibiotics, antipyretics, and bronchodilators.

The availability of antibiotics for the treatment of pneumonia is essential to the reduction of mortality from this cause in children under 5 years of age, which is the main objective of ARI control activities.

Planning for the provision of drugs comprises several aspects. Among the most important are calculation of the necessary amounts and distribution and monitoring of their use. Both aspects are cov-

ered in detail in the course on ARI program management and other technical documents available (see Annexes 2 and 3).

It is very important to have the drugs in stock before beginning the training process in order to ensure that they will be available in health services immediately after the health personnel have been trained. Cases of pneumonia that are identified can thus be treated. If the drugs are not available, the trained personnel may become frustrated because they are unable to implement the recommended control activities. However, if the drugs are distributed to personnel who have not yet been trained, it is likely that the supply will be quickly depleted through inappropriate and unnecessary use.

The supplies necessary for application of the control strategies also include posters on case management (Management of the Child with Cough or Difficult Breathing and Management of the Child with an Ear Problem) and treatment record forms. In addition, it may be necessary to supply timers to count respiratory frequency. These may be especially useful in cases in which there is no other means of counting one minute.

In some cases, ensuring the timely and regular availability of antibiotics and other drugs will be difficult for economic reasons. In these situations, the creation of a revolving fund for drugs should be promoted, as this will provide a permanent mechanism for recovering costs through the contributions of the community and its representative institutions.

4.3 Supervision of health personnel

Supervision of the effective application of standard case management of ARI is of utmost importance in order to ensure that the population has real access to the appropriate management of pneumonia cases. Supervision is seen as an indispensable complement to training, its purpose being to analyze and assess with health workers the possible difficulties that they may face in the implementation of the control strategies and determine the adaptations necessary for their daily use.

Supervision should also serve to clarify doubts and elucidate concepts that have not been sufficiently explained during training in order to ensure effective application of the strategies.

It is very important for trained personnel to receive a supervisory visit within the first two months after the training course in order to address any possible difficulties that they may be encountering in the application of the control strategies. This visit is of crucial importance for assuring health personnel that they will have the necessary assistance for the resolution of problems and that the implementation of the activities will be carried out effectively.

Supervision should be carried out regularly and should assess the following aspects of ARI control.

- *Quality of care provided to under-5 children with ARI in order to detect possible problems in the application of the control strategies.* This can be determined by observing health personnel as they manage children with ARI, questioning the health worker, reviewing records on recently treated cases, and interviewing the mothers of children treated at the health service.
- *Availability of drugs and other supplies necessary for treatment and whether or not they are being stored under appropriate conditions.* This can be verified by direct observation, questioning of health workers on the most recent requisitions and receipt of drugs, and review of records on drug supplies and use.

- *Current situation and evolution of the indicators of ARI control.* This can be assessed by asking health workers about deaths of children under 5 in the area of the service (especially deaths attributed to pneumonia) and about referrals of severe cases to hospitals, as well as on the actions to be taken for their control.

In order not to omit any essential issues, it is recommended that a guide for supervisory visits be developed. The guide should include the principal questions to be asked and activities to be carried out in the health service in connection with the aforementioned aspects (Annex 4). Several such guides are included in the reference documents listed in Annex 2.

4.4 Health communication and education

Health communication and education are aimed at teaching mothers to identify the warning signs of pneumonia in a child with ARI and promptly consult a health worker. Additionally, the education of mothers and others responsible for the care of children is intended to teach appropriate home care of children with ARI. It seeks to encourage appropriate practices and discourage harmful or potentially dangerous practices in the management of cases in the home.

Since the main objective of communication activities is to ensure early consultation of a health worker, it is essential that these workers practice standard case management effectively. In order to do so, they must have received the necessary training, have the necessary drugs, and be periodically supervised.

Communication can take basically two different forms: targeted communication and mass communication. The emphasis to be placed on each of these forms of communication should be evaluated at each stage of the program.

At the start of control activities, it is preferable for communication efforts to target population groups that have access to health workers who practice SCM. It will thus be possible to avoid generating demand for care in places in which the training has not yet been provided or drugs have not been made available, or the personnel are not being supervised.

At this stage, the education of mothers and other caregivers during visits to health services can be emphasized. Education can be imparted in waiting rooms of hospitals and at health centers and posts that are already providing SCM and in educational and other establishments in the area served by these health care establishments.

Mass communication, on the other hand, should be reserved for situations in which widespread application of the control strategies has been achieved. This avoids the risk that educational messages encouraging early consultation will be received by people who do not yet have access to SCM.

Thus implemented, health communication and education should provide an appropriate response to situations in which mothers and families are not consulting health services or are doing so too late. In these situations there is generally a high proportion of deaths occurring at home. It is therefore necessary to improve mothers' ability to recognize the signs of danger and to ensure their access to health services that practice SCM effectively. In this way, health education is also a means of promoting prevention.

As part of the process of health communication and education, it is very important to develop materials and methodologies that are adapted to the cultural characteristics of the local community. Local materials should be developed based on the principal messages contained in the SCM strategy.

In some regions or areas in which specific population groups exist, the messages may require linguistic, cultural, or ethnographic adaptations. In such cases, guides for the execution of specific studies have been developed to facilitate identification of the adaptations needed.

4.5 Monitoring of activities and results

In order to ensure the success of planned activities it is very important to continually monitor whether they are being implemented as intended. Since the activities are aimed at achieving the control objectives, the only way to verify their effectiveness is to periodically review the progress that is being made in relation to the problem.

The purpose of monitoring or surveillance is to promptly detect any problems, both in the execution of the activities and in the achievement of the objectives. Monitoring also makes it possible to quickly design the most appropriate solutions to the problems identified. Monitoring thus prevents the investment of resources and efforts in activities that do not yield the expected results.

Monitoring should be carried out regularly (monthly or bimonthly, for example) in order to promptly detect any problems in the execution of the activities. It should be accomplished through indicators that provide information on the aspects of the situation to be measured.

These aspects will include the activities aimed at increasing access to and use of the control strategies by the population (training of health personnel, provision of supplies, supervision, and communication), as well as the expected results in terms of impact on the problem.

There are certain basic indicators that should be taken into account in monitoring the activities and results of application of ARI control strategies. These are derived from the records generally available in health services in the developing countries. A list of these indicators appears in Annex 5, which also includes the method of calculation and the source of the information.

4.6 Evaluation of the results obtained

Evaluation is a process of reviewing activities and results aimed at determining whether these activities have been carried out and whether the proposed objectives have been achieved.

Although the methods and indicators for evaluation may coincide in many cases with those used for monitoring, the latter takes place more continuously and includes specific monitoring indicators. These indicators are designed to reveal how the activities are progressing and what headway has been made toward the achievement of the objectives.

Evaluation entails a comprehensive, in-depth review that makes it possible to analyze the effectiveness and efficiency of the activities undertaken. It seeks to identify various alternatives and strategies to be applied in future efforts to address the problem.

Both evaluation and monitoring require the measurement of indicators that reflect changes in the status of the problem. These indicators are closely associated with the objectives for ARI control and are summarized in Annex 5.

VI. Proposed Goals and Subgoals for ARI Control

Bearing in mind the effectiveness of the control strategies and the countries' capacity to undertake the implementation process, several goals and subgoals have been proposed for the countries of the Region in the framework of international commitments to improve the health of the maternal and child population.

It is intended that these national goals be adapted to the different realities of each country. They should serve as a guide for those responsible for ARI control at the national level during the process of gradual implementation of the control strategies.

The national goals and subgoals, in turn, can also be adapted for use within countries at the state, provincial, departmental, and, especially, local levels.

The subgoals and goals proposed for 1995 are listed below.

1. Goals related to training

- Train 100% of those responsible for ARI control in the countries and their administrative divisions (states, provinces, departments) in the organization, programming, and supervision of control activities.
- Train 80% or more of health personnel responsible for the treatment of children in health institutions at the primary care level in effective management of ARI cases.
- Assure the existence of at least one ARI training unit (ARITU) for each geographic-administrative territory (state, department, province).

2. Goals related to access to and use of standard case management of ARI

- Provide at least 80% of the population with access to a health service that practices standard case management of ARI (this includes qualified personnel, appropriate supplies, and periodic supervision).
- Provide standard case management for 80% of pneumonia cases in children under the age of 5 years (this includes outpatient treatment with antibiotics, referral, and treatment in a hospital for cases that require it).
- Instruct 100% of the mothers who visit health services on home care of children with ARI.

3. Goal related to program impact (goals of the World Summit for Children)

- Reduce mortality from pneumonia in under-5 children 30% by the year 2000 (in relation to 1990 levels).

VII. Development of Operational Plans

It is recommended that operational plans be developed to facilitate the implementation of ARI control strategies. These plans should include a detailed description of the activities to be carried out in each of the areas discussed in Section IV of this chapter. They should also establish specific goals and subgoals adapted to the characteristics and realities of the country, and should include a timetable of activities that will allow monitoring and evaluation by national authorities.

These operational plans can be very useful in guiding the implementation of activities, organizing the work of those responsible for ARI control in the countries, and monitoring the results obtained through the efforts undertaken.

Operational plans are useful not only at the national level but also at the level of the states, provinces, or departments into which the countries are divided and even at local levels (areas, sectors, zones). The content of an operational plan for the local level is summarized in the following table. More detail is presented in Annex 4.

**Content of an Operational Plan for the Implementation
of ARI Control Activities at the Local Level**

A. Introduction

General characteristics of the area
Current status of the problem
Available health care infrastructure

B. Assessment of the current situation

C. Objectives

D. Standard case management strategy

E. Goals and subgoals

F. Implementation activities

1. Training plans
2. Drug and equipment needs
3. Plans for supervision
4. Plans for communication
5. Plans for monitoring
6. Evaluation

G. Timetable of activities

VIII. References

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Annex 1
ARI Standard Case Management Charts

MANAGEMENT OF THE CHILD WITH COUGH OR DIFFICULT BREATHING


ASK:

- How old is the child?
- Is the child coughing? For how long?
- Age 2 months up to 5 years: Is the child able to drink?
Age less than 2 months: Has the young infant stopped feeding well?
- Has the child had fever?
- Has the child has convulsions?


LOOK, LISTEN:

(Child must be calm)

- Count the breaths in one minute.
- Look for the chest indrawing.
- Look and listen for stridor.
- Look and listen for wheeze.
Is it recurrent?
- See if the child is abnormally sleepy.
- Feel for fever or low body temperature (or measure temperature).
- Look for severe malnutrition.

MANAGEMENT OF THE CHILD WITH COUGH OR DIFFICULT BREATHING		
Assess		
<p>ASK:</p> <ul style="list-style-type: none"> • How old is the child? • Is the child coughing? For how long? • Age 2 months up to 5 years: Is the child able to drink? Age less than 2 months: Has the young infant stopped feeding well? • Has the child had fever? For how long? • Has the child had convulsions? 	<p>LOOK, LISTEN</p> <p>(Child must be calm)</p> <ul style="list-style-type: none"> • Count the breaths in one minute. • Look for chest indrawing. • Look and listen for stridor. • Look and listen for wheeze. Is it recurrent? • See if the child is abnormally sleepy or difficult to wake. • Feel for fever or low body temperature (or measure temperature). • Look for severe malnutrition. 	
THE YOUNG INFANT (AGE LESS THAN 2 MONTHS)		
<p>SIGNS:</p> <ul style="list-style-type: none"> • Stopped feeding well, • Convulsions, • Abnormally sleepy or difficult to wake, • Stridor in calm child, • Wheezing, or • Fever or low body temperature. 	<p>CLASSIFY AS:</p> <p style="text-align: center;">VERY SERIOUS DISEASE</p>	<p>TREATMENT:</p> <ul style="list-style-type: none"> ▶ Refer URGENTLY to hospital. ▶ Keep young infant warm. ▶ Give first dose of an antibiotic.
<p>SIGNS:</p> <ul style="list-style-type: none"> • Severe chest indrawing, or • Fast breathing (60 per minute or MORE) 	<p>CLASSIFY AS:</p> <p style="text-align: center;">SEVERE PNEUMONIA</p>	<p>SIGNS:</p> <ul style="list-style-type: none"> • No severe chest indrawing, or • No fast breathing (less than 60 per minute). <p>CLASSIFY AS:</p> <p style="text-align: center;">NO PNEUMONIA: COUGH OR COLD</p>
<p>TREATMENT:</p> <ul style="list-style-type: none"> ▶ Refer URGENTLY to hospital. ▶ Keep young infant warm. ▶ Give first dose of an antibiotic. <p>(If referral is not feasible, treat with an antibiotic and follow closely)</p>	<p>TREATMENT:</p> <ul style="list-style-type: none"> ▶ Advise mother to give the following home care: <ul style="list-style-type: none"> ▶ Keep young infant warm. ▶ Breastfeed frequently ▶ Clear nose if it interferes with feeding ▶ Return quickly if: <ul style="list-style-type: none"> ▶ Breathing becomes difficult ▶ Breathing becomes fast ▶ Feeding becomes a problem ▶ The younger infant becomes sicker. 	

THE CHILD AGE 2 MONTHS TO 4 YEARS	
SIGNS:	<ul style="list-style-type: none"> ● Not able to drink, ● Convulsions, ● Abnormally sleepy or difficult to wake, ● Stridor in calm child, or ● Severe malnutrition
CLASSIFY AS:	VERY SEVERE DISEASE
TREATMENT:	<ul style="list-style-type: none"> ▶ Refer URGENTLY to hospital. ▶ Give first dose of an antibiotic. ▶ Treat fever, if present. ▶ Treat wheezing, if present. ▶ If cerebral malaria is possible, give an antimalarial.



SIGNS:	<ul style="list-style-type: none"> ● Chest indrawing (If also recurrent wheezing, go directly to: <ul style="list-style-type: none"> ▶ Treat Wheezing 	<ul style="list-style-type: none"> ● No chest indrawing, and ● Fast breathing (50 per minute or more if child 2 months up to 12 months; 40 per minute or more if child 12 months up to 5 years). 	<ul style="list-style-type: none"> ● No chest indrawing, or ● No fast breathing (Less than 50 per minute if child 2 months up to 12 months; Less than 40 per minute if child 12 months up to 5 years).
CLASSIFY AS:	SEVERE PNEUMONIA	PNEUMONIA	NO PNEUMONIA: COUGH OR COLD
TREATMENT:	<ul style="list-style-type: none"> ▶ Refer URGENTLY to hospital. ▶ Give first dose of an antibiotic. ▶ Treat fever if present. ▶ Treat wheezing, if present. (If referral is not feasible, treat with an antibiotic and follow closely). 	<ul style="list-style-type: none"> ▶ Advise mother to give home care. ▶ Give an antibiotic. ▶ Treat fever, if present. ▶ Treat wheezing, if present. ▶ Advise mother to return with child in 2 days for reassessment, or earlier if the child is getting worse. 	<ul style="list-style-type: none"> ▶ If coughing more than 30 days, refer for assessment. ▶ Assess and treat ear problem or sore throat, if present (see chart). ▶ Assess and treat other problems. ▶ Advise mother to give home care. ▶ Treat fever, if present. ▶ Treat wheezing, if present.

Reassess in 2 days a child who is taking an antibiotic for pneumonia:			
SIGNS:	WORSE	THE SAME	IMPROVING
	<ul style="list-style-type: none"> ● Not able to drink. ● Has chest indrawing. ● Has other signs of danger 		<ul style="list-style-type: none"> ● Breathing slower. ● Less fever. ● Eating better.
TREATMENT:	▶ Refer URGENTLY to hospital.	▶ Change antibiotic or Refer.	▶ Finish 5 days of antibiotic.

INSTRUCTIONS FOR TREATMENT

► Give an antibiotic

- Give first dose of antibiotic in clinic.
- Instruct mother on how to give the antibiotic for five days at home (or to return to clinic for daily procaine penicillin injection).

AGE or WEIGHT	COTRIMOXAZOLE trimethoprim + sulphamethoxazole ► Two time daily for 5 days			AMOXICILLIN ► Three times daily for 5 days.		AMPICILLIN ► Four times daily for 5 days.		PROCAINE PENICILLIN ► Once daily for 5 days.
	Adult Tablet single strength (80mg trimethoprim + 400 mg sulfamethoxazole)	Pediatric Tablet (20mg trimethoprim + 100 mg sulfamethoxazole)	Syrup (40 mg trimethoprim +200 mg sulfamethoxazole per 5ml)	Tablet 250 mg	Syrup 125 mg in 5 ml	Tablet 250 mg	Syrup 250 mg in 5 ml	Intramuscular Injection
Less than 2 months (<5kg)*	1/4*	1*	2.5 ml*	1/4/*	2.5 ml	1/2	2.5 ml	200,000 units
2 months up to 12 months(6-9kg)	1/2	2	5 ml	1/2	5 ml	1	5 ml	400,000 units
12 months up to 5 years (10-19 kg)	1	3	7.5 ml	1	10 ml	1	5 ml	800,000 units

◆ Give oral antibiotic for 5 days at home only if referral is not feasible.

* If the child is less than 1 month old, give 1/2 pediatric tablet or 1.25 ml syrup twice daily.

Avoid cotrimoxazole in infants less than one month of age who are premature or jaundiced.

► Advise Mother to Give Home Care (For the child age 2 months up to 5 years)*

► Feed the child.

- Feed the child during illness.
- Increase feeding after illness.
- Clear the nose if it interferes with feeding.

► Increase fluids.

- Offer the child extra to drink.
- Increase breastfeeding.

► Soothe the throat and relieve the cough with a safe remedy.

► **Most important: In the child classified as having No Pneumonia: Cough or Cold, watch for the following signs and return quickly if they occur:**

- Breathing becomes difficult.
- Breathing becomes fast.
- Child is not able to drink.
- Child becomes sicker.

This child may have pneumonia.

* See section on young infant for home care instructions for that age group.

► Treat Fever

• Fever is high ($\geq 39^{\circ}\text{C}$).	• Fever is not high ($38-39^{\circ}\text{C}$).	In a falciparum malarious area: • Any fever, or • History of fever.	• Fever for more than five days.
► Give paracetamol.	► Advise mother to give more fluids.		► Refer for assessment.
		► Give an antimalarial (or treat according to your malaria program recommendations).	

PARACETAMOL doses:

→ Every six hours

Age or weight	100 mg tablet	500 mg tablet
2 months up to 12 months 6-9 kg	1	1/4
12 months up to 3 years 10-14 kg	1	1/4
3 years up to 5 years 15-19 kg	1 1/2	1/2

FEVER ALONE IS NOT A REASON TO GIVE AN ANTIBIOTIC EXCEPT IN A YOUNG INFANT (AGE LESS THAN 2 MONTHS). GIVE FIRST DOSE OF AN ANTIBIOTIC AND REFER URGENTLY TO HOSPITAL.

► Treat Wheezing

Children with first episode of Wheezing

If in respiratory distress → Give a rapid-acting bronchodilator and refer.
If not in respiratory distress → Give oral salbutamol.

Children with Recurrent Wheezing (Asthma)

- Give a rapid-acting bronchodilator
- Assess the child's condition 30 minutes later:

IF: THEN:
RESPIRATORY DISTRESS OR ANY DANGER SIGN → Treat for SEVERE PNEUMONIA or VERY SEVERE DISEASE (Refer).

NO RESPIRATORY DISTRESS AND:
FAST BREATHING → Treat for PNEUMONIA.
NO FAST BREATHING → Give oral salbutamol.
Treat for NO PNEUMONIA: COUGH OR COLD.
Give oral salbutamol.

RAPID ACTING BRONCHODILATOR		ORAL SALBUTAMOL *Three times daily for five days	
Nebulized Salbutamol (5 mg/ml)	0.5 ml Salbutamol plus 20 ml sterile water	AGE or WEIGHT	2 mg tablet 4 mg tablet
Subcutaneous Epinephrine (adrenaline) (1:1000=0.1%)	0.01 ml per kg body weight	2 months up to 12 months (<10 kg)	1/2 1/4
		12 months up to 5 years (10-19 kg)	1 1/2

SORE THROAT

Assess

ASK:

- Is the child able to drink?

LOOK, FEEL:

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

CLASSIFY THE DISEASE

SIGNS:	<ul style="list-style-type: none"> • Not able to drink. 	<ul style="list-style-type: none"> • Tender, enlarged lymph node on neck and • White exudate on throat.
	CLASSIFY AS:	THROAT ABCESS
TRATAMIENTO:	<ul style="list-style-type: none"> ▶ Refer to hospital. ▶ Give benzathine penicillin (as for streptococcal sore throat). ▶ Treat fever, if present. ▶ Give paracetamol for pain. 	<ul style="list-style-type: none"> ▶ Give an antibiotic for streptococcal throat. ▶ Give safe, soothing remedy for sore throat. ▶ Treat fever, if present. ▶ Give paracetamol for pain.

▶ Treat Fever

<ul style="list-style-type: none"> • High fever ($\geq 39^{\circ}\text{C}$) 	<ul style="list-style-type: none"> • Fever is not high ($38\text{--}39^{\circ}\text{C}$) 	In a falciparum malarious area: <ul style="list-style-type: none"> • Any fever, or, • History of fever 	<ul style="list-style-type: none"> • Fever for more than five days
<ul style="list-style-type: none"> ▶ Give Paracetamol 	<ul style="list-style-type: none"> ▶ Advise mother to give more fluids. 	<ul style="list-style-type: none"> ▶ Give an antimalarial (or treat according to your malaria program recommendations. 	<ul style="list-style-type: none"> ▶ Refer for assessment

PARACETAMOL doses

→ Every six hours

AGE or WEIGHT	100mg tablet	500 mg tablet
2 to 12 months 6-9 kg	1	1/4
12 months up to 3 years 10-14 kg	1	1/4
3 to 5 years 15-19 kg	1 1/2	1/2

FEVER ALONE IS NOT A REASON TO GIVE AN ANTIBIOTIC EXCEPT IN A YOUNG INFANT (AGE LESS THAN 2 MONTHS). GIVE FIRST DOSE OF AN ANTI-BIOTIC AND REFER URGENTLY TO HOSPITAL.

▶ Give an Antibiotic for Streptococcal Sore Throat

▶ Give Benzathine Penicillin

BENZATHINE PENICILLIN IM
A single injection

< 5 years	600,000 units
≥ 5 years	1,200,000 units

OR

▶ Give amoxycillin, ampicillin, or penicillin V for ten days.

▶ Soothe the throat with a safe remedy.

▶ Give paracetamol for pain or high fever.

EAR PROBLEM

Assess

ASK:

- Does the child have ear pain?
- Does the child have pus draining from the ear? For how long?

LOOK, FEEL:

- Look for pus draining from the ear or red, immobile ear drum (by otoscopy)
- Feel for tender swelling behind the ear.

CLASSIFY THE ILLNESS

SIGNS:	<ul style="list-style-type: none"> • Tender swelling behind the ear. 	<ul style="list-style-type: none"> • Pus draining from the ear LESS than two weeks, or, • Ear pain, or, • Red, immobile ear drum (by otoscopy). 	<ul style="list-style-type: none"> • Pus draining from the ear two weeks or MORE. 	
	CLASSIFY AS:	MASTOIDITIS	ACUTE EAR INFECTION	CHRONIC EAR INFECTION
	TREATMENT:	<ul style="list-style-type: none"> ▶ Refer URGENTLY to hospital. ▶ Give first dose of an antibiotic. ▶ Treat fever, if present. ▶ Give paracetamol for pain. 	<ul style="list-style-type: none"> ▶ Give an oral antibiotic. ▶ Dry the ear by wicking. ▶ Reassess in five days. ▶ Treat fever, if present. ▶ Give paracetamol for pain. 	<ul style="list-style-type: none"> ▶ Dry the ear by wicking. ▶ Treat fever, if present. ▶ Give paracetamol for pain.

TREATMENT INSTRUCTIONS

▶ Give an Oral Antibiotic for an Ear Infection

- ▶ Give the first dose of antibiotic in clinic.
- ▶ Instruct mother on how to give the antibiotic for five days at home.

AGE or WEIGHT	COTRIMOXAZOLE Trimethoprim + sulphamethoxazole ▶ Two times daily for 5 days			AMOXICILLIN ▶ Three times daily for 5 days		AMPICILLIN ▶ Four times daily for 5 days	
	Adult Tablet single strength (80mg trimethoprim + 400 mg sulphamethoxazole)	Pediatric Tablet (20mg trimethoprim + 100 mg sulphamethoxazole)	Syrup (40mg trimethoprim + 200 mg sulphamethoxazole per 5 ml)	Tablet 250 mg	Syrup 125 mg in 5 ml	Tablet 250 mg	Syrup 250 mg in 5 ml
Less than 2 months (<5kg) [♦]	1/4*	1*	2.5 ml*	1/4	2.5 ml	1/2	2.5 ml
2 up to 12 months (6-9kg)	1/2	2	5 ml	1/2	5 ml	1	5 ml
12 months to 5 years (10-19kg)	1	3	7.5 ml	1	10 ml	1	5 ml

♦ Give oral antibiotic for 5 days at home only if referral is not feasible.

* If the child is less than 1 month old, give 1/2 pediatric tablet or 1.25 ml syrup twice daily. Avoid cotrimoxazole in infants less than one month of age who are premature or jaundiced.

▶ Dry the Ear by Wicking

- ▶ Dry the ear at least 3 times a day:
 - ▶ Roll clean, absorbent cloth into a wick.
 - ▶ Place the wick in the child's ear.
- ▶ Remove the wick when wet.
- ▶ Replace the wick with a clean one until the ear is dry.

Annex 2 Training Materials Available for Training Health Personnel in ARI Control Activities at the Local Level		
TYPE OF COURSE	PERSONNEL TO BE TRAINED	MATERIALS AVAILABLE
ARI program management training course	Coordinators or personnel responsible for ARI control at the national, regional, state, provincial, departmental levels	Modules: Introduction, Management of the Young Child with an Acute Respiratory Infection, National Policies, National Goals, Planning and Monitoring Activities, Evaluation, Course Director's Guide, and Facilitator's Guide
Supervisory skills course	Local, area, and regional supervisors with supervisory and monitoring functions	Modules: Introduction, Management of the Young Child with an Acute Respiratory Infection, Goals, Planning and Monitoring Activities, Training, Community Involvement, Course Facilitator's Guide
Outpatient management of ARI in children	Physicians, nurses, nursing auxiliaries, and other personnel from outpatient health services (health centers and posts, outpatient clinics, and hospital emergency services)	Modules: Participant's Manual, Management of the Young Child with an Acute Respiratory Infection, Instructor's Guide Audiovisual support material
Course on the management of children with ARI	Personnel from health services at the local and regional levels	Modules: Management of the Young Child with an Acute Respiratory Infection, Course Director's Guide, Facilitator's Guide, Clinical Course Instructor's Guide
Course on the management of children with ARI in the community	Personnel responsible for instructing community health agents	Modules: Guide for the Coordinator of ARI Control Activities, Course Director's Guide, Instructor's Guide, Learning Materials
Course for community health agents	Community health agents (health promoters, health visitors, and other community health workers)	Modules: Monitor's Guide, Training Module for Health Workers Audiovisual support material

Note: Information on the training materials is included in the list of technical documents on ARI. Reference publication OPS/HMP/IRA/94.08 (Annex 6)

Annex 3

Model for Estimating Drug Amounts Needed for the Treatment of ARI in Children (*)

Introduction

Calculation of drug needs for treatment of ARI cases is an important activity which must be undertaken in all health services in order to ensure the availability of sufficient materials to cover the needs of the service. In making this calculation, the estimated amounts should be adjusted as much as possible to real needs. The aims are to ensure that drugs will available continuously, to avoid stockpiling excessive amounts of drugs, and to avoid increasing the cost of care unnecessarily.

Drug needs in a particular health service can be calculated on the basis of past consumption, on the basis of an adjustment to real needs to cover treatment requirements, or on the basis of an estimate of the annual incidence of diseases that will require the use of each drug. The latter method is recommended for calculating the drug needs for the treatment of ARI in children under the age of 5 years.

Steps for calculating drug needs

Calculating drug needs based on estimated morbidity requires the following steps:

1. Estimate the number of cases that occur in the population in a year;
2. Estimate the number of cases that will be treated;
3. Estimate the number of units of drug (ampoules, tablets, bottles of syrup) that will be required for each treatment;
4. Estimate the amount of drug required;
5. Estimate the cost of the drug.

The following model summarizes the 5 steps for calculating drug needs for the treatment of pneumonia and wheezing in children under the age of 5. To calculate antibiotic needs for the treatment of otitis and pharyngitis, the same model as for pneumonia can be used, modifying the variables as necessary.

(*) Additional considerations relating to the use of this estimation model at the local level are included in reference document OPS/HMP/IRA/94.09, which may be obtained from the Pan American Health Organization.

CALCULATION SHEET

Drug needs for treatment of ARI

DISTRICT/AREA: _____ YEAR _____

	ESTIMATED PERCENTAGE	FORMULA (No.x %)	TOTALS
Number of pneumonia cases that occur in the population in a year			Example:
1. Total population	-	-	100,000
2. Population aged under 5 years	15.0%	1 x 0.15	15,000
3. Estimated number of pneumonia cases	15.0%	2 x 0.15	2,250

Number of pneumonia cases that will be treated

4. Pneumonia cases that will have access to standard case management (access)	60.0%	3 x 0.60	1,350
5. Pneumonia cases with access that will actually receive standard case management (use)	50.0%	4 x 0.50	675

Number of units of drug (ampoules, tablets, bottles of syrup) that will be required for treatment

6. Cases of severe and very severe pneumonia in children under the age of 2 months	10.0%	5 x 0.10	68
6.1. Cases that will receive inpatient treatment	90.0%	6 x 0.90	61
6.2. Cases that will receive outpatient treatment	10.0%	6 x 0.10	7
7. Cases of pneumonia (total) in children aged 2 months to 4 years	90.0%	5 x 0.90	608
7.1. Cases of very severe pneumonia	3.0%	7 x 0.03	18
7.1.1. Cases that will receive inpatient treatment	90.0%	7.1 x 0.90	16
7.1.2. Cases that will receive outpatient treatment	10.0%	7.1 x 0.10	2
7.2. Cases of severe pneumonia	12.0%	7 x 0.12	73
7.2.1. Cases that will receive inpatient treatment	90.0%	7.2 x 0.90	66
7.2.2. Cases that will receive outpatient treatment	10.0%	7.2 x 0.10	7
7.3. Cases of pneumonia	85.0%	7 x 0.85	517

CALCULATION SHEET

Drug needs for treatment of ARI

DISTRICT/AREA: _____ YEAR _____

	ESTIMATED PERCENTAGE	FORMULA (No. x %)	TOTALS
Number of cases of wheezing that occur in the population in a year			Example:
1. Total population	-	-	100,000
2. Population aged under 5 years	15.0%	1×0.15	15,000
3. Estimated number of wheezing cases	15.0%	2×0.10	1,500
Number of cases of wheezing that will be treated			
4. Wheezing cases that will have access to standard case management (access)	60.0%	3×0.60	900
5. Wheezing cases with access that will actually receive standard case management (use)	50.0%	4×0.50	450
Number of units of drug (ampoules, tablets, bottles of syrup) that will be required for treatment			
6. Cases of severe and very severe wheezing	10.0%	5×0.10	45
6.1. Cases that will receive inpatient treatment	90.0%	6×0.90	41
6.2. Cases that will receive outpatient treatment	10.0%	6×0.10	4
7. Cases of wheezing (not severe)	90.0%	5×0.90	405

Calculation of Drug Needs and Estimated Cost							
DRUG TO BE USED	TYPE OF CASE TO BE TREATED	No. OF CASES	AMOUNT PER CASE	TOTAL AMOUNT	PLUS 20% TO COVER LOSSES	UNIT COST	TOTAL COST
Cotrimoxazole syrup	Cases of pneumonia (not severe) in children aged 2 months to 4 years	517	1 bottle	517	620	0.67	415.00
Crystalline penicillin	Very severe and severe cases of pneumonia in children under 2 months of age	68	5 ampoules	705	846	0.123	104.00
	Severe cases of pneumonia in children aged 2 months to 4 years	73					
Chloramphenicol	Very severe cases of pneumonia in children aged 2 months to 4 years	18	5 ampoules	90	108	0.3585	38.72
Nebulized salbutamol	Very severe and severe cases of wheezing	45	1 bottle	45	54	3.30	178.20
Oral salbutamol	Cases of wheezing (not severe)	405	1 bottle	405	486	0.50	243.00

Annex 4
Guide for Supervision of ARI Case Management

Region: _____ Date: ___/___/___

District: _____ Type of health worker: _____

Health Service: _____ Trained in ARI: Yes [] No []

1. Observe the health worker as he/she cares for children under the age of 5 years with ARI, and answer the following questions:

	CHILD 1		CHILD 2		CHILD 3	
	YES	NO	YES	NO	YES	NO
Did the health worker correctly assess: - danger signs? - chest indrawing? - respiratory frequency?						
Was the child correctly classified based on the health worker's assessment?						
Was the child's illness classified as very severe disease or severe pneumonia?						
Were antibiotics given if the child's illness was classified as pneumonia, acute ear infection, or streptococcal sore throat?						
Were antibiotics given if the child's illness was classified as not pneumonia?						
Were any potentially harmful cold or cough remedies recommended?						
Was the child's immunization status checked?						
Was the mother instructed about: - how to use an antibiotic? - how to care for the child at home? - when to bring the child back to the health service?						
Were the diagnosis and treatment recorded in a case log or file?						

2. Ask the health worker the following questions:

2.1. How do you assess a child under the age of 5 years with cough or difficult breathing?

2.2. When do you refer a child with ARI to a hospital?

2.3. When do you prescribe antibiotics for a child with cough or difficult breathing?

2.4. What signs and symptoms do you take into account in order to classify a child with cough or difficult breathing as pneumonia?

2.5. How do you treat a child with pneumonia?

2.6. What instructions or recommendations do you give to mothers or those responsible for caring for children with pneumonia?

3. Analyze with the health worker any problems detected in the health service at the time of the visit in relation to ARI control.

4. Interview some mothers or caregivers of children with cough or difficult breathing who have been treated by the health worker (do not interview mothers of children who were referred to a hospital or were hospitalized).

4.1. Were you advised to give any kind of drug treatment at home?

Yes [] No []

If yes, ask whether an antibiotic was prescribed.

4.2. If an antibiotic was prescribed, ask the mother the following questions:

How much antibiotic will you give the child?

How many times a day? _____

For how many days? _____

4.3. Did the health worker tell you when to bring the child back?

Yes [] No []

If yes, ask the mother when she will return with the child.

4.4. Did the health worker tell you how to care for the child at home?

Yes [] No []

If yes, ask the mother how she will care for the child at home.

DRUG	AVAILABILITY		AMOUNT	MATERIAL IN THE LAST 12 MONTHS		HOW LONG?	
	Yes []	No []		Yes []	No []	m___	w___
Cotrimoxazole	Yes []	No []		Yes []	No []	m___	w___
Amoxicillin	Yes []	No []		Yes []	No []	m___	w___
Ampicillin	Yes []	No []		Yes []	No []	m___	w___
Procaine penicillin	Yes []	No []		Yes []	No []	m___	w___
Benzathine penicillin	Yes []	No []		Yes []	No []	m___	w___
Paracetamol	Yes []	No []		Yes []	No []	m___	w___
Salbutamol	Yes []	No []		Yes []	No []	m___	w___
Others:	Yes []	No []		Yes []	No []	m___	w___

5. Check to see that the health services has adequate supplies of the materials needed for standard case management

5.1. Drugs

5.2. Are the ARI case management charts prominently displayed in the place in which ARI cases are assessed, classified, and treated? Yes [] No []

5.3. Are there enough forms and records to log the ARI cases treated during the next 2 months?

daily case record: Yes [] No []

case referral form: Yes [] No []

education pamphlets for mothers: Yes [] No []

6. Review the records of ARI cases treated in the health service.

Summarize the findings of a review of 20 or more cases of ARI in children under 5 years of age using the calculation sheet on the next page. Check the records for the following:

- Was the following data recorded: age of the child, classification/diagnosis, and treatment?
- Were cases of severe pneumonia and very severe disease referred (these cases may be recorded as sepsis, pneumonia, meningitis)?
- Were antibiotics administered to pneumonia cases that were not referred?
- Were antibiotics used unnecessarily to treat non-pneumonia cases (cough, common cold, bronchitis, non-streptococcal pharyngitis)?

Annex 5
Proposed Monitoring and Evaluation Indicators
Control of Acute Respiratory Infections

INDICATOR	FORMULA FOR CALCULATION	SOURCE OF INFORMATION
Mortality from pneumonia among children under the age of 1 year	$\frac{\text{Number of deaths of children under the age of 1 year due to pneumonia in a given place and period}}{\text{Total number of live births in the same place and period}} \times 1000$	Deaths: Vital statistics registry or another agency; Births: Vital statistics registry, department of statistics, or another agency responsible for recording births
Mortality from pneumonia among children aged 1-4 years	$\frac{\text{Number of deaths of children aged 1-4 years due to pneumonia in a given place and period}}{\text{Total number of children aged 1-4 in the same place and period}} \times 1000$	Deaths: Vital statistics registry or another agency responsible for registering deaths Population aged 1-4: Department of statistics, census bureau, or another agency responsible for population statistics
Hospital mortality from pneumonia	$\frac{\text{Number of deaths from pneumonia in children under the age of 5 years occurring in a hospital in a given place and period}}{\text{Total number of deaths from pneumonia in the same place and period}} \times 1000$	Hospital deaths: Hospital statistics registry Total deaths: Vital statistics registry or another agency responsible for registering deaths
Hospital case fatality rate from pneumonia	$\frac{\text{Number of deaths from pneumonia in children under the age of 5 years occurring in a hospital in a given place and period}}{\text{Number of cases of pneumonia in children under the age of 5 hospitalized in the same place and period}} \times 1000$	Hospital statistics registry
Use of antibiotics to treat cases	$\frac{\text{Number of ARI cases in children under the age of 5 years classified as not pneumonia and treated with antibiotics in a given place and period}}{\text{Total number of ARI cases in under-5 children classified as not pneumonia in the same place and period}} \times 1000$	Daily record of cases treated in health services

Annex 5 (cont'd.)		
INDICATOR	FORMULA FOR CALCULATION	SOURCE OF INFORMATION
Access to standard case management in health services	$\frac{\text{Number of children under the age of 5 years who have access to standard case management by health personnel in a given place and time}}{\text{Total number of children under 5 living in the same place and time}} \times 1000$	Children with access: Health services survey Population: Department of statistics, census bureau, or another agency responsible for population statistics
Maternal knowledge about when to seek assistance	$\frac{\text{Number of mothers of children under the age of 5 years who know the signs that indicate that a child with ARI should be taken to a health service}}{\text{Total number of mothers of children under the age of 5 years}} \times 1000$	Community survey (10)
Appropriate treatment of pneumonia in health services	$\frac{\text{Number of pneumonia cases in children under the age of 5 years seen in health services who received standard case management}}{\text{Total number of pneumonia cases in children under 5 seen in health services}} \times 1000$	Health services survey (9)
Rate at which assistance from a health worker was sought when needed for a child with ARI	$\frac{\text{Number of children under the age of 5 years with ARI who needed to be assessed by a health worker and for whom assistance was in fact sought by the mother or caregiver}}{\text{Total number of children under the age of 5 with ARI who should have been assessed}} \times 1000$	Community survey (10)

Annex 6
List of Available Technical Documents for Use
in Training of Health Personnel

- Module on Management of the Young Child with an Acute Respiratory Infection
- Technical Bases for the PAHO/WHO Recommendations on Treatment of Pneumonia in Children at the Primary Care Level
- ARI Outpatient Management - Participant Manual, Talking to the Mothers.
- Antibiotics in the Treatment of ARI in Young Children in Developing Countries
- Oxygen Therapy for ARI in Young Children
- The Management of Fever in Young Children with ARI
- Bronchodilators and Other Medications for the Treatment of Wheeze-Associated Illnesses in Young Children
- Vitamin A Supplementation and Childhood Pneumonia: Report of a Meeting (Geneva 1-3 February/93)
- ARI in Children. Case Management in Small Hospitals in Developing Countries: A Manual for Doctors and other Senior Health Workers.
- The Overlap in the Clinical Presentation and Treatment of Malaria and Pneumonia in Children
- Investigaciones operativas prioritarias para evaluar el impacto de las acciones de control de las IRA
- Unidades de capacitación en el tratamiento de las infecciones respiratorias agudas (UCIRA):guía para su implementación y monitoreo

NOTE: Some of these publications are available only in Spanish. For more information, contact the Integrated Management of Childhood Illness (IMCI) Unit at PAHO/WHO headquarters, 525 Twenty Third Street N.W., Washington, DC, 20037, tel. (202) 974-3881, e-mail <benguigy@paho.org>.

