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**SERVICE QUALITY ASSESSMENT  
SERIES**

**ACUTE LOWER RESPIRATORY INFECTION**

**A REVIEW OF EXPERIENCE  
IN FOUR COUNTRIES**

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## PREFACE

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Since 1985 PRICOR<sup>1</sup> has assisted Ministries of Health and private groups in 12 developing countries to systematically analyze the delivery of child survival services at the periphery. Depending upon local priorities, these systems analyses have examined one or more of six essential child survival interventions: oral rehydration therapy (ORT), growth monitoring, immunizations, the treatment of acute respiratory infections, malaria, and maternal care. For each intervention, the studies have analyzed service delivery and critical support systems at the periphery: in homes, at the community level, and at first-line health facilities. These systems analyses have employed direct observation and systematic quantification of task performance, using measurement instruments derived from the *PRICOR Primary Health Care Thesaurus*, a detailed compendium of significant health worker tasks. By documenting specific areas of strength and weakness in service delivery and support activities, the analyses enable the health manager to identify operational problems and target corrective actions more precisely. Accordingly, systems analyses have been followed, in most cases, by problem solving operations, research studies, or administrative adjustment.

This report is one of a series of PRICOR service quality assessments based on systems analyses and operations research studies. This series presents comparative reviews of results from these analyses that document multi-country program experience, using standardized task definitions and measurement techniques more precise than previously thought possible. The results add significantly to knowledge of program operations and their common problems. The objective of this report series is to identify operational problems commonly faced by primary health care and child survival programs as well as to describe solutions that PRICOR-supported district managers and supervisors have devised and tested for improved quality of care. While country programs are discussed alongside each other, the objective is not to evaluate relative performance, but rather to illustrate international variations and shared problems.

Reflecting the structure of the thesaurus, the comparative framework employed in this report on acute lower respiratory infection (ALRI) is organized around the following service delivery components: clinical assessment; classification, treatment and referral; and counseling and health education. Also reviewed were four essential support services for ALRI: training, supervision, and logistics and supplies. To the degree feasible, all of the essential tasks that must be correctly performed to carry out ALRI service delivery are enumerated and performance variants described.

This report and others in the Service Quality Assessment Series summarize findings from systems analyses within PRICOR's comparative framework. Comments on the series are invited and should be submitted to Dr. Jeanne Newman.

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<sup>1</sup> The PRICOR (Primary Health Care Operations Research) Project is operated by the Center for Human Services (Bethesda, MD, USA) for the United States Agency for International Development.

<sup>2</sup> Colombia, Costa Rica, Haiti, Indonesia, Niger, Pakistan (Punjab and Regi Province), Peru, Philippines, Senegal, Togo, Thailand, and Zaire.

## **ACKNOWLEDGEMENTS**

Recognition is given to the host country field staff who served as principal investigators in the country studies in Colombia (Fundacion Santa Fe de Bogota), Pakistan (North West Frontier Province), Philippines and Indonesia. Credit is given to our colleagues from the Western Consortium for the Health Professions, who carried out the systems analysis in Indonesia. Special thanks is given to Lani Marquez, Jeanne Newman and Stewart Blumenfeld for their contributions to the country studies included here. We also express our gratitude to Dr. David Nicholas, PRICOR Director, Dr. James Heiby, PRICOR Project Officer, AID/S&T/Health, and Dr. Jeanne Newman, PRICOR Deputy Director, for reviewing the document in its early stages.

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## EXECUTIVE SUMMARY

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### **Service Quality Assessment of Acute Lower Respiratory Infection Service Delivery**

#### **A Review of Experience in Four Countries**

Acute lower respiratory infections (ALRI) pose a major threat to child survival in developing countries. While upper respiratory infections of the ear, nose, and throat can cause morbidity and disability, lower respiratory infection, specifically pneumonia, is the major ARI killer. Pneumonia accounts for 4 million deaths annually. Mild lower respiratory infections such as colds and bronchitis can often be treated at home without antibiotics, however pneumonia can be fatal if not treated promptly with antibiotics. The identification of pneumonia and appropriate antibiotic treatment which are crucial to effective ALRI case management, are the focus of this report.

Major donors such as WHO, UNICEF and USAID did not emphasize ARI until the latter part of the 1980's. There were no ARI programs in countries with infant mortality rates greater than 40 until 1984. USAID had initiated 23 ARI programs by 1988. If WHO meets its ARI goals, 88 countries with infant mortality rates greater than 40 will have national ARI programs in place by 1995.

The Primary Health Care Operations Research (PRICOR) Project reviewed and documented ALRI service delivery in the following four countries: Indonesia, the Philippines, Pakistan, and Colombia. PRICOR assessed ALRI service delivery at first line health facilities, at the community level, and in the home. Documentation of the quality of ALRI services provided is useful not only to improve programs but also to inform international ALRI policy.

PRICOR has developed two complementary technologies for improving the quality of primary health care services provided by peripheral health workers. The first method, called systems analysis, evaluates service delivery in operational terms in order to identify both operational strengths and weaknesses. The second, operations research, focuses on problem-solving by systems analysis of the problems identified and the selection and monitoring of specific solutions. Systems analyses were conducted in all four countries. Operations research studies followed in Colombia, Indonesia, and Pakistan.

PRICOR used a variety of methodologies to collect information on both clinic-based and community-based ALRI services. Systematic observation of health workers performing clinical assessment; classification, treatment and referral; and counseling and health education were used during both home visits and clinic visits. Some of the studies used household surveys with mothers, as well as exit interviews. Interviews with health workers and their supervisors were used in all four countries and observations of supervisory visits were conducted in the Philippines. Record reviews supplemented the information for some of the studies.

The systems analysis demonstrated that, with proper support, health workers can successfully carry out effective ALRI case management. Managers, in turn, can use supervision and

training to improve service quality. ALRI programs seemed to have a positive impact on service quality. The following areas of improvement were identified:

- Health workers often neglected ALRI-specific clinical assessment tasks and demonstrated a lack of knowledge in ALRI.
- Classification of the illness and treatment by severity required improvement.

Health workers often failed to educate the mother as to the importance of administering the full course of antibiotics and to alerting her as to the danger signs that indicate that medical attention is required.

- Mothers did not have adequate information to make appropriate decisions about when to seek care.
- Supervision, training, and logistic support fall far short of their potential to improve service quality because of irregular implementation, ineffective methods or incomplete or inappropriate content.

In addition to assessing technical service quality, the systems analyses assessed the adequacy of management support activities. These studies focused on training, supervision, and logistics as support activities critical to the provision of ALRI services. These support services were developed to varying degrees within and among the countries studied. However, a number of weaknesses in these areas were identified which clearly affected the program.

Operations research studies tested a number of strategies to improve ALRI services relative to problems identified in the systems analyses. The successful solutions implemented were the following:

- A participatory training course and a supervised practicum were developed in Colombia. A Trainers' Manual was also developed along with note-taking guides for participants.
- Village health workers in Indonesia conducted a community-based health education campaign.
- A variety of health education techniques such as videos, leaflets, flip charts, and posters were used in Indonesian clinics.
- Indonesian village health workers were trained in skills in conducting home visits.
- A series of guides were developed as memory aids for Pakistani health workers and placed under plexiglass on the health workers' desks.
- An outpatient slip was designed for each patient to record each aspect of taking a medical history, conducting a physical exam and providing treatment and counseling for Pakistani health workers.
- A pilot study designed to show that over use of antibiotics did not improve the quality of ALRI services was conducted in Indonesia.

- A management strategy of issuing a letter and strengthening supervision to reduce antibiotic use was applied in Indonesia.

Although not all of these solutions were completely evaluated before the writing of this report, they all showed signs of effectively improving the conditions causing the problems identified. The common problems found in these studies should be taken into consideration by international donor agencies in planning ARI strategies. Weaknesses in both the quality of clinical activities as well as the support systems significantly affect the potential impact the programs can have on ALRI. The assessment methods described here are important tools which can be employed by managers and researchers in efforts to improve case management of ALRI.

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## 1. INTRODUCTION: SERVICE QUALITY ASSESSMENT OF ACUTE LOWER RESPIRATORY INFECTION CASE MANAGEMENT IN FOUR COUNTRIES

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Acute lower respiratory infections (ALRI) pose a major threat to child survival in developing countries. Of the 15 million child deaths which occur each year, an estimated 25-30% are caused by acute respiratory infections. Pneumonia, the major ALRI killer, accounts for 4 million childhood deaths annually. While mild respiratory infections such as colds and bronchitis can often be treated at home without antibiotics, pneumonia can be fatal if not treated promptly with antibiotics. Because the child death toll due to pneumonia is so high, a major objective of ALRI case management is the identification of pneumonia and appropriate antibiotic treatment. This report reviews studies of the management of ALRI, carried out by PRICOR, in four countries: Indonesia, the Philippines, Pakistan, and Colombia. Documentation of the quality of services provided by these programs is valuable, both because it provides a basis for program improvement, expansion, and replication, and because it can inform international ALRI policy.

PRICOR studies assessed ALRI service delivery at first line health facilities, at the community level, and in the home. In each of the four countries considered, an initial ALRI systems analysis was carried out, including direct observation of health worker performance, exit interviews, interviews with health workers, and household surveys. Once strengths and problem areas were identified, problem-solving operations research studies followed.

This comparative review is presented in 6 parts. Part 1 presents a brief overview of international ALRI initiatives, PRICOR's systems analysis methodology, and a summary of the research design and methods used in each of the country studies. In part 2, results of service quality assessments are brought together in an attempt to characterize the state of ALRI service delivery. Part 3 reports on mothers' ALRI-related knowledge, attitude and practice. Part 4 discusses three major determinants of ALRI service quality: training, supervision, and logistics. Part 5 explores the actions taken as a result of these studies, and summarizes lessons learned from operations research studies in Colombia, Indonesia, and Pakistan. Finally, conclusions and recommendations for future directions in ALRI health services research are presented in part 6. While ARI can include ear, nose and throat infections, these studies focused on lower respiratory infections only.

### 1.1 INTERNATIONAL ALRI INITIATIVES

In spite of the fact that pneumonia is a major cause of infant mortality in developing countries, ARI initiatives and programs are relatively new. There were no ARI programs in countries with infant mortality rates greater than 40 until 1984. Major donors such as WHO, UNICEF, and USAID did not emphasize ARI until the latter part of the 1980s.

WHO issued its first technical guidelines for ARI in 1985, and revised them in 1990<sup>1</sup>. In 1986, UNICEF issued policy statements emphasizing the importance of ALRI for the first time, and in 1987 UNICEF began to support the development of ALRI programs in Bolivia, the Gambia, and Thailand. By 1987, 57 USAID projects or subprojects in 25 countries addressed ALRI in some way, demonstrating growing involvement in the area. By 1988, 23 ARI programs were in existence; 16 of these were operating in countries with high infant mortality rates, including Colombia, Indonesia, and the Philippines. Only 4 programs (Costa Rica, Colombia, Oman, and Zimbabwe)

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<sup>1</sup>WHO, 1990, Management of the Young Child with an Acute Respiratory Infection. Prepared by the World Health Organization's Programme for Control of Acute Respiratory Infections through a contract with ACT International, Atlanta, Georgia, USA.

reported national implementation of the program by the end of 1988<sup>2</sup>. Many of the other programs are operating on a limited, experimental scale. If the WHO ARI Programme goals are achieved, 88 countries with an infant mortality rate above 40 will have national ARI programmes by 1995.

## 1.2 TECHNICAL NORMS FOR ALRI

In 1990 the World Health Organization published clinical guidelines for management of the child with cough or difficult in breathing. These guidelines include assessment, classification, treatment, home care, and counselling. They emphasize identification of pneumonia and treatment with antibiotics. These guidelines were designed especially for case management in small hospitals in developing countries. Therefore they rely on physical signs and symptoms, rather than sophisticated diagnostic equipment. Because ALRI initiatives in LDCs are relatively new, additional changes in treatment protocols are possible.

When a child presents with a cough or difficulty breathing, health workers are advised to ask the mother or caretaker about the age of the child, the presence and duration of the cough, the presence and duration of fever, and whether the child has had convulsions. They should also ask if the child is able to drink, or, if the child is less than two months old, whether the child has stopped feeding well. The physical exam should include a respiratory count, and examination for chest indrawing, stridor, or wheezing. The health workers should also observe whether the child is abnormally sleepy or difficult to wake, feverish, or severely undernourished.

According to the WHO guidelines, ALRI can be classified as a cough or cold, pneumonia, severe pneumonia, or very severe disease. Each classification has a distinguishing physical sign. In the absence of chest indrawing or fast breathing a cough is classified as a cold. If fast breathing is occurring (50 respirations per minute), it is classified as pneumonia. Severe pneumonia includes chest indrawing as well as fast breathing. Very severe disease is marked by convulsions, inability to drink, stridor, abnormal sleepiness, or severe undernutrition. Classification for infants younger than 2 months of age differ slightly from older children. The respiratory cutoff is higher (60 per minute) and all cases of pneumonia are considered severe pneumonia at this age.

Antibiotic treatment is recommended for all cases of pneumonia. In cases of severe pneumonia and very severe disease referral to a hospital is recommended after the first dose is given. If the pneumonia is not severe, the mother or caretaker is advised to return in 2 days for reassessment.

Supportive home care is always recommended unless the child is required to go to a hospital. Home care emphasizes increased feeding during illness, increased fluids or breastfeeding, and soothing the throat/relieving the cough with a safe remedy.

One of the most important aspects of care is to counsel mothers of children with colds about the signs of pneumonia (difficult breathing, fast breathing, inability to drink, child becomes sicker), and to advise her to return quickly if these signs occur. For mothers of children with pneumonia, it is important to advise her of danger signs that indicate that she should return to the health center, such as inability to drink, chest indrawing, stridor in a calm child, convulsions, or if the child is abnormally sleepy or difficult to wake.

The research reported here was carried out prior to 1990. Therefore, the norms applied do not always correspond to the most current WHO standards. It is also important to note that the PRICOR studies measured the extent to which local norms were implemented, rather than assessing the degree to which performance complied with internationally recognized standards. In some cases, local norms differed from the Thesaurus or WHO norms.

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<sup>2</sup>WHO, 1988, ALRI Programme for Control of Acute Respiratory Infections. Programme Report.

These differences reflect the fact that ARI norms and programs are continually evolving and developing. The PRICOR studies did not include an evaluation of the adequacy of local norms in the various study sites.

### 1.3 IMPROVING SERVICE QUALITY: THE PRICOR APPROACH

PRICOR has developed two complementary technologies for improving the quality of primary health care services provided by peripheral health workers. The first method, called systems analysis, evaluates service delivery in operational terms in order to identify both operational strengths and weaknesses. The second, operations research, focuses on problem-solving by systematic analysis of the problems identified and the selection and monitoring of specific solutions. Systems analyses were carried out in all four countries considered here. Operations research studies followed in three of the four countries.

A systems analysis treats the service delivery system as a classic input/output system. See table 1-1 for a model of the ALRI service delivery system. In such a system, inputs (such as drug supplies and trained staff) are transformed through processes (such as patient assessment, classification of illness, treatment, and counseling) to produce outputs (correct diagnosis and treatment), effects (properly treated children), and impacts (reduced ALRI mortality). If the desired outputs, effects, or impacts are not realized, it may be assumed that inputs are missing or that processes were not carried out properly.

In order to carry out a systems analysis, an operational definition of the PHC service of interest is needed. The PRICOR Thesaurus<sup>3</sup> was developed for this purpose. For each PHC activity, the Thesaurus lists all the tasks that must be carried out during service delivery, and provides a list of quantitative indicators of task performance. It also includes support areas such as supervision, training, logistics, planning, information, and community organization. The Thesaurus brings together the experience of PRICOR staff, expert opinion, and WHO guidelines.

The ALRI service delivery system, as defined in the PRICOR Thesaurus, is made up of 5 subsystems: medical history, physical exam, classification, treatment, and counseling. Table 1-1 profiles the key components of ALRI assessment and treatment. The data collection instruments used in each of the studies included here were based on the Thesaurus. The principal focus of PRICOR studies was the identification and treatment of pneumonia. Appendix 1 contains selected portions of the ALRI chapter of the Thesaurus.

Once specific deficiencies in service inputs or processes have been identified, operations research studies can be employed to improve service delivery. These studies are developed in three stages: 1) problem analysis; 2) solution development; and 3) solution validation. Solutions developed in this way can then be monitored for effectiveness, and modified as needed. Operations research studies in Indonesia, Colombia and Pakistan measured the impact of interventions which addressed the problems identified in the systems analysis.

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<sup>3</sup>Primary Health Care Thesaurus, Volumes I and II. PRICOR, Center for Human Services, Bethesda, MD.

Figure 1-1

# SYSTEMS MODEL FOR ARI CASE MANAGEMENT

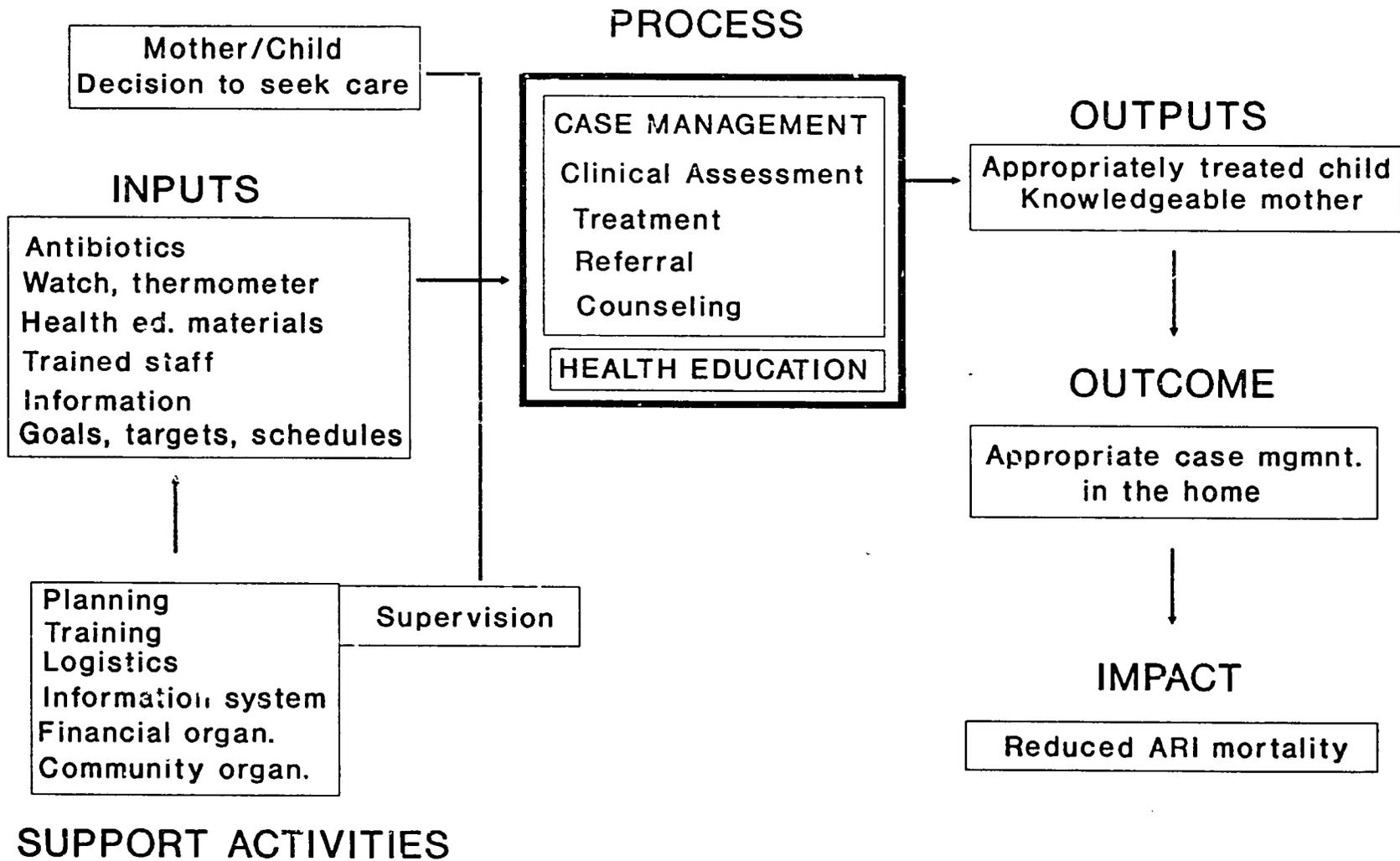


Table 1-1: ALRI Service Delivery Tasks

**MEDICAL HISTORY**

- Ask about duration of cough
- Ask about difficulty breathing
- Ask about ability to drink
- Ask about fever

**PHYSICAL EXAM**

- Count respiratory rate
- Observe breathing for chest indrawing
- Listen for stridor, wheeze, hoarseness
- Exam: ears, throat, nose, nails, lips
- Take temperature

**CLASSIFY CHILD'S CONDITION**

- Very Severe Disease
  - Unable to drink, stridor,*
  - severe undernutrition, convulsions*
  - Chest indrawing*
- Pneumonia
  - Fast breathing without chest indrawing*
- Cough or Cold
  - No chest indrawing or fast breathing*

**ADMINISTER APPROPRIATE TREATMENT**

- Refer to hospital per local policy
- Treat with antibiotic per local policy
- Treat wheezing and fever if present
- Assess and treat ear/ throat problems
- Advise mother to give home care

**COUNSEL MOTHER ABOUT:**

- How to administer drug
- Completing the entire treatment
- Importance of continued breast-feeding
- Keeping the child's nose clear
- Maintaining a neutral environmental temperature
- Danger signs:
  - Stridor, chest indrawing,*
  - trouble drinking, cyanosis*

#### 1.4 A METHODOLOGICAL OVERVIEW OF THE COUNTRY STUDIES

Although the four ALRI systems analyses considered in this review followed the same methodology, there were variations in its application depending on the structure of the specific health system being analyzed. This section describes the research methods of the four studies, highlighting differences in the types of health workers studied, sampling methods, and other program features that have implications for the comparability of the studies.

All of the studies were carried out in selected programs at the regional level and all employed some combination of observation of service delivery, record review, and interviews to assess service quality. The composite analysis of the 4 studies is intended to characterize rather than quantify the quality of ALRI services, and to identify common problems and areas for improvement. Table 1-2 shows the study methods and sample sizes used.

**TABLE 1-2**  
**PRICOR SYSTEMS ANALYSES**  
**PROFILE OF STUDY METHODS AND SAMPLE SIZES**  
**ACUTE RESPIRATORY INFECTIONS**

Country:	Colombia		Indonesia		Philippines	Pakistan
	Clinic-based	Community-based	Clinic-based	Community-based		
Observation of Health Worker Service Delivery	132	36	-	-	380	40
Record Review	131	-	159	-	-	-
Household Interviews	504	-	100	-	-	487
Exit Interviews	-	-	-	-	-	73
Health Worker Interviews	201	92	53	60	111	7
Supervisor Interviews	7	-	-	-	24	10
Supervisory Visits Observed	-	-	-	-	49	-

- Data not available

#### 1.4.1 PHILIPPINES

In the Philippines, an ALRI program began in 1988 and is active in 2 of 79 provinces. Recently, an ALRI division which will report directly to the Under-secretary of Health has been created. The 1988 PRICOR study in the Philippines was carried out in the province of Bulacan, which had no specific ALRI program. A bracketing approach was used to choose 18 Rural Health Units (RHUs) and their satellite clinics for study. Provincial staff ranked the RHUs according to their performance. Then, 6 RHUs were randomly selected from the top, middle and bottom of the ranked list<sup>4</sup>. Public health nurses and rural health midwives were observed during service delivery and data was collected on ALRI cases. Three hundred and eighty (380) ALRI cases presented during the time of the study. Forty-nine (49) ALRI cases were observed while a supervisor was present, providing information about supervisory activities. Interviews with 24 nurse/supervisors and 87 midwives about supervision, training, and logistics complemented the observation data.

#### 1.4.2 PAKISTAN

In Pakistan, the study took place in 1989 at the Regi Model Basic Health Unit, an experimental program located in the North West Frontier Province. Service quality in that clinic may have been better than other clinics where no innovative program existed. There was no specific ALRI program at the Regi BHU. Management of ALRI patients had only recently become a focus of program attention in Pakistan, and treatment protocols had not yet been standardized or disseminated at the time of the study. The clinic doctors, two medical technicians and an LHV (lady health visitor) were observed during 40 ALRI visits. The sample included all ALRI cases which presented during the time of the study. Interviews with supervisors(10), key informants (4), and health workers (7) addressed supervision, training, and logistics. Also, 487 women selected from the BHU service area were interviewed in their homes about a variety of PHC topics including ALRI knowledge and practices. Seventy-three (73) exit interviews were also carried out. Forty (40) took place during the initial study and 33 occurred during the subsequent operations research study.

#### 1.4.3 INDONESIA

In Indonesia the ALRI program is active in 9 provinces. It is implemented through the department of Epidemiology. In the 1988 PRICOR-sponsored study, 2 ALRI demonstration projects and a non-project area were compared and related service outputs and impacts were assessed. The three areas included (Kediri, Nusa Tenggara Barite (NTB); Turi, East Java; and Pulo Gebang/Cakung, East Jakarta). The NTB site had an ALRI program that was functioning well. The program in the East Java site was believed to be functioning poorly; and the East Jakarta site had no program. While one objective of that study was to compare the three areas, the data have been aggregated for the purpose of this comparative review. The aggregated sample includes the range of ALRI-related skills and competencies in Indonesia at the time of the study.

In Indonesia, the service providers were doctors, nurses and village health cadres. Service delivery by doctors and nurses was assessed through a record review by a qualified physician (N=159). The sample included all ALRI cases which presented during the time of the study. In addition, the knowledge and practices of 60 community-based cadres and 53 clinic-based health workers (doctors, nurses, and midwives) were assessed through interviews. Household surveys of 100 mothers from each of the three study areas were also carried out (N=300). These household interviews dealt specifically with ALRI knowledge or practices.

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<sup>4</sup>Bracketing involved ranking the health centers according to their perceived performance. Equal numbers of good, average, and substandard facilities were chosen randomly from the ranked list. This method insures that the full range of performance is represented in the systems analysis.

#### 1.4.4 COLOMBIA

The Colombian ALRI program began in 1988 and is national in scope. Two studies of ALRI service delivery were carried out. The first was a study of volunteer health workers (VHWs), carried out by PRICOR and the Fundacion Santa Fe de Bogota (FSFB) in 1988. It assessed VHW performance of ALRI education, prevention and referral. The study employed a sample of 28 Volunteer Health Workers for observation of household visits. A total of 36 ALRI encounters were observed. Interviews with health workers (92), supervisors (7) and mothers (504) were also carried out. The second study focused on clinic-based service providers, and was carried out by the FSFB and the Bogota Community Health Services<sup>5</sup> in 1989. It attempted to include a complete sample of service providers. In practice, more than 85% of health workers were included in the study. A total of 201 doctors, nurses, and nurse assistants were interviewed and 65 were observed in 132 clinic visits. A record review drawn from the regular reporting system for ALRI (N= 131) was also carried out.

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<sup>5</sup>While the latter study was not sponsored by PRICOR, it is included here because PRICOR methods were used, and the information gathered complements, rather than duplicates, the PRICOR-sponsored study.

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## 2. THE QUALITY OF ALRI SERVICE DELIVERY

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Aspects of ALRI service delivery examined in the systems analysis include clinical assessment, classification, treatment and referral and counseling and health education. Quality was assessed based on observation or record review, complemented by interviews with health workers to assess knowledge and practices. Before presenting the data, it is important to note the limitations of each of these methods. While data obtained from observations is very useful, it does not accurately measure tasks that are difficult to observe, such as whether or not the health worker examined the color of the child's lips. These data cannot evaluate mental processes that occur during service delivery, such as classification of the severity of the illness. These can only be detected if the health worker speaks or writes down the findings. Interview data also have limitations. Prompted questions may overestimate health worker knowledge, while unprompted questions may sometimes underestimate the knowledge that health workers could apply were an actual case present.

### 2.1 CLINICAL ASSESSMENT

#### 2.1.1 OBSERVATION OF MEDICAL HISTORY

Three of the four studies, the Philippines, Pakistan, and Colombia, addressed some aspect of the medical history. All three observed whether the service provider asked about treatments given at home. Correct performance for this component ranged from 13% for clinic-based staff in Pakistan, where there is no ALRI program, to 64% for volunteer health workers in Colombia, where there is an ALRI program. The relatively high performance of Colombian VHWs, in spite of their lower level of training, suggests that the ALRI program may be having an impact on service quality.

Two studies, in the Philippines and Pakistan, assessed whether the service provider asked about chest pain and the history of TB or respiratory problems in the household. Performance for all three components was very low in the Philippines, never exceeding 10%. In Pakistan performance was somewhat better for questions about TB (23%), and chest pain (55%). Only the Philippines study asked about other symptoms. While fever and cough were asked about frequently (57-85%), sore throat, ability to drink, and trouble breathing were the subject of inquiry during fewer than 8% of clinical encounters. These results suggest that while health workers do address general symptoms like fever and cough, performance of diagnostic tasks related to ALRI-specific symptoms is weak.

#### 2.1.2 OBSERVATION OF PHYSICAL EXAM

The data about the physical exam also point to some weaknesses in performance of ALRI-specific tasks. Overall performance was best for a general diagnostic task that was not ALRI-specific, that is, taking the child's temperature. Performance ranged from 45% in Pakistan to 68% in Colombia. Two studies, in the Philippines and Colombia, assessed tasks specific to ALRI including respiratory count, throat exam, and ear and nose exam. A count of respirations, perhaps the most important element of the physical exam for identifying pneumonia, was done 80% of the time by doctors in Colombia, but only 16% of the time in the Philippines. The throat was examined in 93% of clinical encounters in Colombia, and 28% in the Philippines. Examination of the ears and nose was inadequate in both studies, but still considerably higher in Colombia. In the Philippines, examination for restricted breathing was carried out 29% of the time and for cyanosis, only 1% of the time. Auscultation of the lungs was studied only in Colombia where it was done 100% of the time. In Pakistan, patients were examined for at least one physical symptom other than fever in 62% of the cases. It is interesting to note that performance for these three components was consistently better in Colombia, where there is an ALRI program. Table 2-1 summarizes the observational data related to the medical history and the physical exam.

**TABLE 2-1**  
**OBSERVATION OF HEALTH WORKER PERFORMANCE**  
**ARI: Clinical Assessment**

Percent of cases where activity was carried out.

Country:	Colombia		Philippines	Pakistan
Medical History	Clinic-based	Community-based		
General Health Status	-	100	-	-
Fever	-	-	67	-
Cough	-	-	85	-
Throat Pain	-	-	7	-
Chest Pain	-	-	2	55
Trouble Breathing	-	-	6	-
Ability to drink	-	-	1	-
History of TB	-	-	2	23
Hist of Respiratory Prob	-	-	8	10
Treatment given	-	64	44	13
Physical Exam				
Observe child	-	19	-	-
Count respirations	80		16	-
Take Temperatures	68		57	45
Check on one other sign	-		-	62
Examine ears and nose	44		4	-
Restricted Breathing	-		29	-
Color of Nails	-		1	-
Examine Throat	93		28	-
Asculcate lungs	100		-	-

- Data not available.

### **2.1.3 HEALTH WORKER KNOWLEDGE RELATED TO CLINICAL ASSESSMENT**

In Colombia, health worker knowledge of the signs and symptoms of ALRI and appropriate case management was assessed from interviews. These interviews complement the observational component of the study by providing additional information about the knowledge of the health workers.

Clinic-based health workers' ability to define ALRI was assessed through a self-administered questionnaire made up of multiple choice questions about the definition of ALRI. While 89% of doctors, nurses and assistant nurses knew the correct signs and symptoms of ALRI, they were less able to identify the correct definition of ALRI. Only 61-63% of doctors and nurses chose the correct definition, while assistant nurses did so 32% of the time.

In addition to being familiar with general signs and symptoms of ALRI, health workers should be particularly aware of the danger signs that require immediate medical attention. Health workers need this information to make appropriate referrals and to inform mothers about when they should bring a sick child back to the health center. In the Philippines, 87 health workers were asked about their health education activities. Of 74 who said they carry out educational sessions, fewer than 10% mentioned danger signs when asked what messages were included. The unprompted responses of the health workers included 2 danger signs: trouble in breathing and cyanosis. In Colombia, only 40% of clinic-based workers were able to select at least one danger sign from a list. Trouble in breathing was the most common sign mentioned (34%). Other signs, such as fever or inability to drink were mentioned by less than 12% of health workers. When asked about signs and symptoms of ALRI without prompting, VHWs in the FSFB program in Colombia performed relatively well. In fact, they named high fever and difficulty breathing nearly twice as often as clinic-based workers in the department of community health. They also mentioned chest indrawing (33%) and cough (41%) more often. Other symptoms, such as ear aches, cyanosis, sore throat, and rapid breathing, were mentioned by fewer than 10% of VHWs. Overall, the interview data underscore the weak areas noted during observation of service delivery. Even in Colombia, where performance was the best, gaps in knowledge about ALRI signs and symptoms, especially danger signs, were noted. Table 2-2 summarizes the interview data related to clinical assessment.

### **2.2 CLASSIFICATION, TREATMENT AND REFERRAL**

Performance in classification, treatment and referral for ALRI was studied through observation in the Philippines and through record reviews in Indonesia. Both methods were used in Colombia, where VHWs were observed and clinic-based workers were assessed through record reviews. Interviews complemented the record reviews in Colombia and Indonesia.

Record review procedures differed in the two countries where they were employed. In Colombia, records drawn from the regular reporting system for ALRI were reviewed. However, only 131 (52%) of all ALRI cases seen were recorded on the standard ALRI forms. Thus, the record review contains a bias, since cases that were not documented were excluded. In Indonesia, PRICOR study forms were completed for all cases seen during the study period. This information provided the basis for a record review by study physicians (N=159). Table 2-3 summarizes the data related to classification, treatment and referral.

**TABLE 2-2**  
**ACUTE RESPIRATORY INFECTIONS**  
**CLINICAL ASSESSMENT: From Interviews**

Percent of health workers who responded correctly.

Country:	Colombia		Philippines
Clinical Assessment	Clinic-based	Community-based	
Knows signs/symptoms	89*	-	-
Knows definition of ARI	47*	-	-
Knows danger signs	40*	-	-
Fever	-	65	-
Cough	-	41	-
Throat Pain	-	5.7	-
Earaches	-	7.6	-
Trouble Breathing	34*	64	9
Chest indrawing	-	33	-
High Respiratory Rate	-	4.6	-
Cyanosis	-	6.8	1

- Data not available.

\* Data are based on multiple choice questionnaires

**TABLE 2-3**  
**CLASSIFICATION, TREATMENT AND REFERRAL**

Percent of health workers who responded or performed correctly.

	Colombia	Indonesia		Philippines
From Interviews		Clinic-based	Community-based	
Classified correctly	35 @	53+	-	-
Correct treatment	74 @	-	-	-
No antibiotics for mild	-	64+	80+	-
Antibiotics for pneumonia	-	77+	48+	-
Don't refer mild ARI	-	-	48+	-
Refer pneumonia	-	-	39+	-
From Observation and Record Review				
Classified/diagnosed	89*	65*	-	23
Treated	53	30*	-	31
Classified/diagnosed correctly		65		
Treated correctly		30		

- Data not available.

\* Based on record reviews.

+ Prompted

@ Based on Multiple Choice Questionnaires

### 2.2.1 CLASSIFICATION

Both the Philippines and Colombia studies assessed whether the service provider classified the case. In the Philippines, researchers observed whether classification had taken place by observing whether the case classification was written on the health record during or immediately after service delivery. Such classification took place in 23% of all cases. While some classification may have taken place without the knowledge of the observer, these data indicate that a significant proportion of ALRI cases are at risk for incorrect treatment because they are not classified by severity. Also, it is important to note that the assessment methodology did not permit the observer to make a judgment about whether the classifications were correct.

In a record review in Colombia, 89% of documented cases included classification by severity. However, since 48% of cases were not documented, this apparently high performance may be biased. If we assume that undocumented cases were not classified, the classification rate would drop to 45%. Again, the assessment did not address whether the classifications were correct. Clinic-based health workers' ability to classify ALRI correctly was assessed through interviews. Of 71 doctors, nurses, and nurses assistants, only 35% correctly classified the 3 model cases (1 mild, 1 moderate, 1 severe) described in a multiple choice questionnaire. Therefore, it is possible that a significant proportion of the classified cases were classified incorrectly.

According to a record review by Indonesian study physicians, 65% of the cases reviewed were classified correctly. However, we do not know if health workers would have classified the cases if they had not been required to fill out forms especially for the study. These forms included all tasks that are required in a complete diagnosis. Thus, the study instrument served as a prompter for service providers. Still, the results show that the health workers studied were able to classify cases fairly well. Although the Indonesia VHW study did not address classification of ALRI explicitly, it did ask cadres whether they count respirations with a watch; 53% said that they do. Since assessing respiratory rate is necessary for accurate classification, we can assume that, at most, 53% of cadres are able to classify cases properly. It is interesting to note that in NTB, the study area that was described as having a successful ALRI program, 100% of cadres said that they count respirations with a watch.

### 2.2.2 TREATMENT

Weaknesses were also noted in the treatment of ALRI. Treatment was studied in Colombia, the Philippines and Indonesia. Of the 131 documented cases in the Colombian ALRI case registry, 70% recorded some form of treatment for moderate ALRI, and 28% recorded treatment for severe ALRI. While some cases may have been treated in spite of the fact that the treatments were not recorded, these data suggest that health workers are failing to treat a significant proportion of cases. Also, the failure to document treatment undoubtedly compromises the health workers ability to follow-up the cases. The record review did not address the appropriateness of the treatments that were given. However, knowledge about ALRI treatment was assessed with a multiple choice questionnaire that required respondents to match the treatment protocols with the severity of the case. Overall, 74% of doctors and nurses, and nurses assistants responded correctly, choosing the treatment protocol that matched local norms.

Indonesian study physicians judged that health workers gave correct treatment that was in accordance with local norms for ALRI in about 30% of cases studied. While the study did not report whether the incorrect treatment consisted of the failure to use antibiotics or their overuse, interview data suggest that both types of error occurred. Prescribing practices of health workers were studied through interviews in which symptoms for a cough/cold and pneumonia were described. Health workers were then asked whether they would prescribe antibiotics and/or refer the patients. When symptoms for pneumonia were described, 77% of health professionals said they would prescribe antibiotics. Of cadres who worked in the area with a strong ALRI program, 95% said they would

recommend drug treatment for patients with symptoms of pneumonia. Almost all cadres in the other two areas said they would not recommend treatment. However, this is explained by the fact that they do not distribute antibiotics as part of their tasks.

Indonesian researchers were particularly interested in assessing whether health workers refrained from prescribing antibiotics for coughs and colds, since this type of over-medication can result in drug resistance, and can lead to drug shortages. Results of the survey suggest relatively high performance. Sixty-four percent (64%) of clinic-based workers and 80% of cadres responded correctly. However, it should be noted that these cadres do not have access to antibiotics.

### **2.2.3 REFERRAL**

Referral practices of cadres were also included in the Indonesia study. Minimizing unnecessary referral was an objective because of high utilization of health services. During interviews, 48% of cadres said they would refer coughs and colds while 39% said they would refer pneumonia. It is interesting to note that 60% of those who said they would refer mild cases came from the area that had no ALRI program, suggesting that cadres did not have the skill to differentiate cases that needed referral from those that did not. Cadres who worked in the areas where there is no effective ALRI program also said they would refer moderate cases of ALRI. This is explained in part by the fact that, unlike NTB cadres, they are not supplied with antibiotics. Therefore referral was necessary for all treatment.

## **2.3 COUNSELING AND HEALTH EDUCATION**

Counseling and health education aspects of ALRI services were also examined. For the purpose of this analysis, health education differs from individual counseling in that it may be done in a group setting and it may be provided when the child is not sick.

### **2.3.1 INDIVIDUAL COUNSELING DURING TREATMENT**

ALRI counseling was observed in the Philippines and Pakistan, as well as for VHWs and health professionals in Colombia. Interviews about health worker knowledge related to health education and counseling were carried out in Indonesia and Colombia, where some or all responses were prompted, and in the Philippines, where responses were not prompted. The data are summarized in Table 2-4.

Specific advice given the mothers was analysed. The following key messages were studied in detail:

**Explain treatment.** Studies in the Philippines and Colombia assessed whether treatments were explained during individual counseling. Performance ranged from 67-84%. However, the importance of taking the full course of antibiotics, which is critical for effective treatment of ALRI, was only mentioned 8% of the time in the Philippines. In spite of the fact that most mothers are receiving instruction about ALRI treatment, this finding suggests that mothers may stop the treatment early, when symptoms disappear, because they were not told to complete the whole dose.

**Recommend Continued Feeding.** For counseling about continued feeding, performance was high in the Philippines and Colombia, as were response rates to prompted interview questions in Indonesia. Only in Pakistan was continued feeding mentioned infrequently.

**Table 2-4**  
**HEALTH WORKER PERFORMANCE ASSESSMENT**  
**ACUTE RESPIRATORY INFECTIONS: Counseling/Health Education**

Data are reported as percentages.

Country:	Colombia		Indonesia		Philippines	Pakistan
Observation of Counseling	Clinic-based	Community-based	Clinic-based	Community-based		
Explained Treatment	84	-	-	-	67	-
Stressed full course	-	-	-	-	8	-
When to get help	30	-	-	-	-	42
Chest indrawing	-	-	-	-	1	8
Cyanosis	-	-	-	-	0	5
Other symptoms	51	-	-	-	-	-
Continue feeding	68	-	-	-	57	20
Neutral temperature	-	-	-	-	23	5
Other home temperature	54	-	-	-	-	85
Ventilation	28	-	-	-	-	-
Verified mother's comprehension	-	5	-	-	0	0
<b>From Interviews</b>						
Explain treatment	-	-	-	-	46	-
Stress full course	-	-	-	-	30	-
Continued feeding	52	-	73	98*	73	-
Extra fluids	96	37	-	-	-	-
Neutral temp/warm clothe	77	-	-	81*	65	-
Vapor	50	67	-	-	-	-
Cough medicine	13	-	61	88*	-	-
Anti-histimine	-	-	60	56*	-	-
Clear nose	61	4	-	98*	-	-
Treat fever	67	-	-	95*	-	-
Warm bath for fever	76	17	83	-	-	-
<b>Health Education (from Interviews)</b>						
Group ed provided	<1%	-	77%	-	85%	-
Mothers participated	<1%	-	75%	-	-	-

- Data not available.

\*Responses were prompted.

**Recommend Maintenance of Neutral Temperature.** Frequency of counseling about maintaining a neutral temperature for the child was observed to be low in Pakistan, as well as in the Philippines. However, a high percentage of Philippine health workers interviewed listed maintaining a neutral temperature as one of the messages that they give during health education. Although the 74 respondents excluded 13 nurses and midwives who do not carry out health education, these results still indicate a large gap between knowledge (65% of interviews) and performance (23% of observations) in the Philippines. There may be several reasons other than lack of knowledge why health workers do not emphasize maintaining a neutral temperature for the child. Perhaps it is not relevant because the local climate is warm. Or, alternatively, health workers may address the issue of keeping the child at the right temperature by suggesting that the child be dressed warmly, which was not included as a key message in those studies. In the Indonesia study, response rates to questions about dressing the child warmly were high.

**Recommend Other Appropriate Treatments.** At least one supportive treatment other than continued feeding was mentioned by health professionals in Colombia 54% of the time. Specifically, they mentioned the importance of good ventilation 28% of the time. Although they had the aid of multiple choice questions, health professionals in Colombia did not respond as well to questions about supportive and home treatment as they did to questions that were more medical in nature. However, the correct response rate was still relatively strong. In Pakistan, another supportive treatment was mentioned 85% of the time. No attempt was made to judge whether these messages followed standard treatment protocols. This finding reflects the fact that health workers in Pakistan are working without the benefit of a standardized protocol. They are taking action to address ALRI, but their actions are not focused on key ALRI treatment tasks.

Correct response rates were high in Indonesia for such supportive measures as clearing the nose, or treating fever with drugs and a warm bath. These findings suggest that Cadre-level workers can be charged with providing education about supportive and home treatments, such as treating fever and providing relief for cough and runny nose. However, from the data available we can not be sure that the advice given to caretakers would be comprehensive and accurate without prompting. Colombian VHWS' knowledge about supportive treatments varied according to the treatment. In general, they mentioned vaporization without prompting, but fewer than 20% mentioned clearing the nose and warm baths for fever. This uneven knowledge could reflect gaps in training or incomplete understanding of symptoms and treatment.

**Explain When to Get Help/Danger Signs.** ALRI-specific danger signs include chest indrawing, cyanosis, inability to drink, convulsions, or stridor. The mother should be advised to return to the health center if any of these signs are present. Discussion of when to come back for help was mentioned less than 45% of the time by health workers in Colombia and Pakistan. Messages about chest indrawing and cyanosis, important danger signs for ALRI, were noted 5% of the time or less. While information about ALRI symptoms was provided 51% of the time by Colombian health professionals, most of this information addressed general symptoms rather than danger signs. Thus, health workers are not providing mothers with the information they need to identify medical emergencies or to make decisions about whether to seek further medical care. As a result, some cases that require further attention may not receive it, which could result in fatalities.

Prevention of ALRI was studied in Colombia. VHWS mentioned prevention during 13% of household visits where ALRI was encountered, and health professionals discussed transmission, the importance of vaccination, breastfeeding, and environmental factors during 23% to 47% of clinic visits. VHW knowledge of preventive measures was also assessed through interviews. Fifty-one percent (51%) of VHWS could cite 3 or more preventive measures without prompting. The most commonly mentioned preventive measures were: avoid contact with people who have ALRI (48%), keep the child's face clean (36%), and avoid temperature change (30%). Also, 44% of VHWS could identify 2 modes of transmission. The most common mode of transmission was exposure to other sick

people (69%), followed by airborne transmission (33%), viral infection (28%), and climate change (20%). The fact that VHWs know more than they currently communicate during household visits may reflect the fact that ALRI prevention was not a major emphasis of the program. In interpreting the findings about prevention, it is important to mention that the effectiveness of these measures is limited; further attempts to define effective prevention methods should be made before placing major emphasis on prevention strategies.

### 2.3.2 HEALTH EDUCATION

Health workers were asked about their health education activities in Indonesia, the Philippines, and Colombia. Mothers were interviewed about their exposure to health education in Indonesia and Colombia.

In Indonesia, 77% of all health workers said that they had talked to groups of mothers about actions to take for a baby's respiratory infections; 90% of health workers said that they had provided health education to individual mothers when their children were not ill. When asked if a health worker had ever talked to them about what to do if her child had a respiratory infection, 75% of Indonesian mothers said yes. In the areas where an ALRI program was ongoing, the rates rose to over 90%. Eighty-eight percent (88%) of the health education was carried out by cadres. Of mothers who had received health education, 37% received information and instruction in a group setting and 63% received individual health education. Based on these findings, the Indonesian program appears to have been effective at reaching mothers, although it is important to bear in mind that mothers were selected from cadre client lists, not from the population at large. It is interesting to note that a large proportion of mothers were reached through individual education.

In the Philippines 85% of health workers interviewed said that they talk to mothers in groups about ALRI management. According to unprompted questions about the content of the education, 73% discuss the importance of continued feeding, 65% discuss the importance of maintaining a neutral temperature, 46% discuss the administration of medicines, and 30% discuss the importance of completing the treatment regimen. As is noted above, mention of danger signs was low at less than 10%. Philippine performance in the area of ALRI education is quite high and of relatively good quality, considering that ALRI-specific training and activities had not taken place.

In Colombia, volunteer health workers were asked if they had participated in the organization of community health education. Of 92 volunteers, 54% had participated and those that had done so averaged 3 meetings each. However, ALRI was rarely the subject of these talks. Only one talk addressed ALRI. Approximately 25 mothers attended this talk. Of the 304 mothers who lived in areas where health education activities were taking place, 24% had participated in a meeting during the last year, but only 1 mother said that ALRI had been a topic at the meeting she attended. Ninety mothers, 30% of those in the health volunteer service area, had been visited at least once by a health volunteer, but none of the home visits addressed ALRI. The lack of emphasis on ALRI education by Colombian VHWs may reflect a lack of emphasis on ALRI in the overall program. As a result of these findings, Colombian program managers decided to carry out an operations research study that addressed ALRI service delivery. The results are summarized in part 4.

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### 3. MOTHERS' KNOWLEDGE AND PRACTICE

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Mothers' ALRI-related knowledge and practices also have a large impact on the quality of ALRI case management. The initial decision to seek care is made by the mother or caretaker in the home, and is based on her knowledge of the disease and her perception of the severity of the case at hand. Thus, it is a major determinant of the level and appropriateness of service utilization. In areas where ALRI education programs are in place, information about mothers' knowledge and practices is also important because it identifies gaps in knowledge that should be addressed by health workers.

Mothers' knowledge and practice were assessed through household interviews in Colombia, Pakistan, and Indonesia. Exit interviews were carried out in Pakistan and Colombia. Interviews with mothers included the following topics: knowledge about signs and symptoms, knowledge about drug treatment and home treatment, and care seeking behavior.

#### 3.1 KNOWLEDGE OF GENERAL SIGNS AND SYMPTOMS OF ALRI

Mothers' knowledge of signs and symptoms of ALRI were assessed in Colombia during a household survey. Symptoms that were named frequently by mothers were runny nose (78%), high fever (50%), and cough (47%). Trouble breathing and sore throat were mentioned by fewer than 20% of mothers, and general ill health was mentioned by 26%. While the other household surveys did not emphasize assessment of mothers' knowledge of the signs and symptoms of ALRI, they did gather some related information. In Indonesia, mothers were asked to agree or disagree with the statement, "an infection in the lung/trouble breathing in a small child probably isn't very serious." Of mothers surveyed, 26% agreed with the statement, 35% disagreed, and 39% did not know. In exit interviews in Pakistan, mothers were asked what danger signs would mean they would need to get more medical help. Of 73 respondents, 60% were unable to name one danger sign in response to this question. Although most mothers are familiar with the basic signs and symptoms of ALRI, they are unable to recognize danger signs that indicate that they should seek care. The gaps in mothers' knowledge may reflect the knowledge gaps of health workers (documented above), who were also weak in these areas.

#### 3.2 TREATMENT OF ALRI

Mothers' knowledge and practice about antibiotic treatment for ALRI was addressed in Colombia and Indonesia. According to the treatment norms for ALRI, children with mild ALRI should not be treated with antibiotics while children with moderate or severe ALRI should be given a complete regimen. In Colombia, 88% of mothers said they would treat ALRI with antibiotics. In Indonesia, mothers were asked if they would treat mild ALRI with antibiotics; seventeen percent (17%) said yes, 29% said no, and the remaining mothers said they did not know. For severe ALRI, 29% of mothers said they would use antibiotics, 18% said they would not, and the remainder were unsure. When asked about actual practice in recent mild ALRI cases, 23% said they had administered antibiotics. While some of these antibiotics may have been prescribed by a health professional, it is important to note that antibiotics can be procured without a prescription in Indonesia. These responses suggest that the mothers interviewed could not clearly differentiate mild from moderate or severe ALRI. This skill is essential if they are to treat the child effectively, or seek care appropriately.

According to WHO norms, mothers should apply the following supportive treatments when children are sick with ALRI: maintain a neutral temperature, keep the nose clear, continue feeding and fluids, and watch for danger signs. Use of cough medicines or nose ointments, which can be used to alleviate symptoms, should be avoided because

they are often ineffective and may be harmful. Inquiries were made about supportive treatments in household interviews in Colombia, Indonesia, and Pakistan.

In Colombia, 86% of mothers use home treatments. Their unprompted responses when asked how they treat ALRI included: giving extra fluids (29%), vapor treatments (13%), and clearing the nose (10%). In Indonesia, mothers responded to prompted questions about the home treatment for mild, moderate, and severe ALRI. Over 80% of mothers use cough medicine for all degrees of severity and 73-75% of mothers dress the child warmly during the illness. Over 90% of mothers say they administer drugs for fever regardless of severity. Between 68-72% say they use nose ointments. Over 95% of mothers say they should clear the child's nose during respiratory illness, but only 9.5% said they did it during the last episode of mild ALRI. Overall awareness about the importance of continued breast-feeding was high, with 93% for mild ALRI, 87% for moderate ALRI, and 79% for severe ALRI. Eighty-one percent (81%) of mothers said that they continue breast-feeding when a child has a mild respiratory infection. In Pakistan, mothers' knowledge was not a principal focus of the household interview. However, it was found that, in 65% of households surveyed, at least one woman knew at least one ALRI home treatment. No effort was made to assess the appropriateness of the methods named. While these studies did not explore home care practices in depth, the results suggest that more education about appropriate supportive home treatment for ALRI is also needed.

### 3.3 CARE SEEKING BEHAVIOR

Care seeking behavior was assessed in Indonesia, Colombia and Pakistan. Studies explored how often ALRI cases occur, why mothers sought care, what type of health facilities were visited, and what types of providers were sought. Results showed the actions taken by mothers to seek care for their sick children depended heavily on numerous local factors, the scope of which is poorly understood.

In Colombia, 32% of mothers surveyed reported a case of ALRI in the last 15 days. Mothers were also asked if their children had ever had a cough or pneumonia. Of 327 mothers who responded yes, 36% said they sought care. The most common reason given for seeking care was high fever (34%), followed by cough (23%), wheezing (19%), and mucus (16%). Of mothers who sought care, 63% took their children to the health center, 21% sought a private physician, 5% chose tertiary care hospitals, and 12% chose other providers.

In Indonesia, interviewers described the symptoms associated with mild, moderate and severe ALRI, and asked mothers if they had experienced a case in the household during the last two weeks. In response, 37% of mothers reported a recent mild case, 23% reported a recent moderate case, and 16% reported a severe case. In mild cases, 90% said they would seek care; moderate and severe cases were slightly higher at 93%. While Indonesian mothers sought care for all types of coughs and colds, there was a relationship between the severity of the case and the type of care they sought. Of mothers who said they would seek care, 41% said they would see cadres in mild cases. This rate dropped to 26% in moderate cases and 13% in severe cases. Mothers increasingly chose more highly trained providers as the severity of the cases increased.

In Pakistan mothers were asked if anyone in the household (including adults) had been ill in the last 30 days and, if so, what was the nature of the illness. In response, at least one case of ALRI was reported in 8.6% of 487 households. Seven (7) households (1.4%) had more than one case, and 5 households (1%) reported a death due to ALRI. Of the 51 ALRI cases during the last 30 days reported in Pakistan. Fifty-five percent (55%) sought care at a private clinic or hospital, 23% in a government hospital, 8% at the Regi BHU clinic, and 14% treated the illness at home. Ninety-three (93%) of the cases treated outside the home were treated by a physician.

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## 4. SUPPORT SYSTEMS

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In addition to assessing technical service quality, the ALRI systems analyses assessed the adequacy of management support activities. This section will focus on three support activities: logistics, training, and supervision. These are featured because they were addressed in all four studies and because they have a direct impact on the ability of health workers to do their jobs. Because of differences in the way services are organized and because researchers chose different methods, the data in the four countries sometimes addressed different questions in ways that are not comparable. This section highlights major findings from each of the individual studies for the three critical support areas.

### 4.1 TRAINING

Although training programs were not observed during the systems analyses, information about the training that health workers had received in ALRI was obtained in all four countries through interviews. Questions were asked about the frequency, duration, methods and content of ALRI training activities.

#### 4.1.1 HAVE HEALTH WORKERS BEEN TRAINED FOR ALRI ACTIVITIES?

Information about the frequency and duration of training was collected in the Philippines, Indonesia, and Pakistan. In Colombia, health workers were asked to assess the adequacy of their training. Most health workers had received some training, and areas having ALRI programs reported more training activities than non-program areas. Training tended to be of short duration and in-service training was not common. Findings are reported below by country.

In the Philippines most health workers had received training in ALRI case management. Eighty-four percent (84%) of nurse midwives (NMW) and 72% of public health nurses (PHN) said they had received some training in ALRI. However, most of the health workers had not been trained recently, and therefore could not be expected to be up to date on new treatment norms. Twenty percent (20%) of both groups had received training less than one year ago; 17% of midwives and 31% of nurses had received training in the last three years; and 63% of midwives and 50% of public health nurses received their training more than three years ago.

In Pakistan, 4 BHU staff members were interviewed about their professional training in ALRI. While their experiences may not be representative of all health workers in Pakistan, their responses are noted here for their descriptive value. No health workers had been trained in ALRI management during the past year, 2 had received training in the last three years, and 2 were trained in the last 6 years. One respondent said his training had lasted one day, and two others said it was longer than one day. It should be remembered that no national ALRI program had yet been instituted at the time of the study.

In the Colombia VHW study, the volunteers were asked to assess the quality of the general training they received. Overall, 92% of health workers felt that the training was good, and the remainder felt that it was average. When asked specifically about the quality of continuing education for ALRI, 39% said it was good, 13% said it was average, 7% said it was deficient, and 29% said that they had not received continuing education in ALRI.

In Indonesia, 70% of cadres surveyed had received training in the management of ALRI. All cadres in the areas with ongoing programs had received training, while none in the area without a program had received training. As is noted above, these trained workers were better able to differentiate colds from pneumonia, and were more likely to provide health education about management of ALRI. Of cadres who had received training, 93% had received

training on at least two occasions. For all but 7% of cadres, the most recent training had taken place in the last 6 months. Doctors, nurses, and midwives were also interviewed about training in the Indonesia study. When asked how often someone from the provincial level comes to give training sessions, 52% said "never", and the remainder chose "other" rather than "yearly" or "monthly," indicating irregular training when it does occur.

#### 4.1.2 WHAT TRAINING METHODS WERE USED?

According to respondents in the Philippines, the majority of health workers stated that the courses emphasized lecture over demonstration (65% of midwives and 88% of public health nurses) while the remainder gave equal time to both methods. Overall 75% of midwives and 44% of public health nurses were tested at the end of training. Most of the tests were written, although some (20%) midwives received oral tests and a few (4%) were tested through demonstration or role play.

In Pakistan, two health workers reported that the training had devoted equal time to lecture and practice. Another said that more time was devoted to practice. One respondent was given a written test, another an oral test, and a third a practical test that included demonstration.

In Colombia, descriptive information about the training methods for ALRI case management was not collected. However, that study compared the effectiveness of distributing a training manual along with the combined impact of the training manual and a course on ALRI case management. The results, summarized here, have implications for training methods.

Physicians, nurses, and nurse assistants were tested to assess their knowledge of ALRI case management. Some had read a manual on the subject and others had both read the manual and received a formal course. As can be seen in Table 4-1, there are no noticeable differences between the knowledge of those that attended the course and those that read the manual only. For these literate and, in some cases, highly educated health workers, the course offered no benefits over self-instruction through written materials.

Nevertheless, classification, knowledge of danger signs, the definition of ALRI, the use of antibiotics and home treatments were unacceptably low after training. These deficiencies point to a need to review the content and methods employed in both the manual and the course to see how the training effort could be more effective.

TABLE 4-1

#### THE IMPACT OF TRAINING ON HEALTH WORKER KNOWLEDGE IN COLOMBIA

	Manual Only N = 185	Training + Manual N = 125
Signs and Symptoms	90%	89%
Classification	50%	42%
Danger Signs	40%	39%
Definition of ALRI	48%	44%
Fever: warm bath	78%	78%
Fever: drug	68%	70%
Use of Antibiotics (MD only)	50%	40%
Cough: Vapor	41%	39%
Support Measures	39%	46%

### 4.1.3 WHAT TOPICS DID TRAINING COVER?

In the Philippines, nurses and midwives were interviewed about the content of the training. Both unprompted and prompted responses to questions about history taking, physical exam, and counseling were recorded. According to the prompted information, the training seems to have covered all key areas very well. In fact, when prompted and unprompted responses are taken together, more than 80% of health workers said that the areas listed in the table below were included in their training. However, their unprompted responses, displayed in table 4-2, were considerably lower, with only one, taking the child's temperature, above 50%. This implies that, although training content may have been complete, the health workers generally did not retain the material well.

**TABLE 4-2**

**TOPICS INCLUDED IN TRAINING ACCORDING TO FILIPINO HEALTH WORKERS**

	Mentioned without Prompting
<b>Medical History</b>	
Chest/throat pain	40%
Difficulty Breathing	27%
Difficulty Drinking	7%
TB in Family	12%
Has Asthma	11%
What treatment has been given	20%
<b>Physical Exam</b>	
Take Temperature	57%
Count Respirations	20%
Note nail color	5%
Examine ears	4%
Examine throat	24%
Observe for restricted breathing	30%
<b>Advice/Counseling</b>	
Continue feeding/fluids	24%
Complete drug regimen	10%
How to recognize cyanosis	4%
How to recognize indrawing	2%

### 4.1.4 DISCUSSION

While most health workers had been trained in ALRI, many had not been trained during the last three years. This is especially true in areas where there was no ALRI program at the time of the study. Also, since many health workers were trained more than three years ago, the content of their training may not have reflected the most current guidelines and treatment protocols. Training often lasted less than one day. In general, training methods were based on a lecture format with little demonstration or practice. Training content was studied only in the Philippines where it appeared to be fairly comprehensive, but information was not retained well by trainees. Overall, the systems analyses suggest that training activities have fallen far short of their potential to contribute to ALRI service quality.

## **4.2 SUPERVISION**

In order to improve ALRI service delivery and maintain a consistently high quality of care, managers must monitor service quality through regular supervision. In addition to carrying out routine administrative tasks, supervisors should focus on the identification and resolution of problems in technical areas. All four studies addressed supervision to some degree. The systems analyses assessed the frequency of supervision, described the methods that were used by supervisors, and collected information about the topics addressed during supervision. The following characterization of supervision of ALRI is based on interviews with supervisors and supervisees in all four countries, as well as observation of service delivery in the Philippines.

### **4.2.1 ARE HEALTH WORKERS SUPERVISED REGULARLY?**

The frequency of supervision was addressed in Colombia, Pakistan, the Philippines, and Indonesia. Of 92 health volunteers in the FSFB program in Colombia, 75% said that a supervisor had accompanied them on home visits at least once. Sixty-one (61%) of 70 health workers who conduct health education on ARI in the community had been accompanied by a supervisor in that activity. Sixty-six percent (66%) of volunteers had participated in tutorial meetings during the last year, and 74% of the participants found the meetings helpful. Finally, 71 of 72 health volunteers who had experienced serious problems in their work said that they received help from supervisors. Overall, the FSFB supervisory system seemed to be responsive to volunteers and includes frequent contact between supervisors and supervisees. Although some of the supervisory effort profiled here was spent specifically on ALRI, it was probably a small proportion overall. In fact, given the little effort spent on ALRI suggested by training and health education activities, VHW knowledge and performance was surprisingly high. This finding suggests that the benefits of frequent clinical supervision may spill over into other technical areas that are part of the program.

In the Colombian study of the Bogota Community Health system, doctors and head nurses were interviewed about their supervisory practices. Eighty-one percent (81%) said that they supervised ALRI activities, but none of them kept a record of these activities or prepared supervisory reports. Responses to questions about supervisory activities and their periodicity were inconsistent and contradictory. Overall the supervisory system can be characterized as irregular and informal.

In Pakistan, both supervisors and supervisees were interviewed about the frequency of supervision. Supervisors' reports varied from daily to quarterly supervision. Of 18 supervisor/supervisee pairs, only 3 supervisees reported having regular meetings with supervisors. Reported intervals varied from 2-4 weeks to 6 months. Supervision of PHC activities, which includes ALRI and other services not covered by vertical programs was estimated at 6 hours per month. The same health center staff devoted 15 hours per month to supervision of EPI, and 8 hours per month to malaria. Like the Colombia VHW program, the Pakistan program spent a small portion of its supervisory time on ALRI. Unlike Colombia, there was no ALRI protocol in place at the model clinic at the time of the study.

In the Philippines, 93% of rural midwives, who are supervised by public health nurses, said that they have regular meetings with their supervisors, and 86% had met with a supervisor during the last week. Meetings usually took place at the supervisor's workplace. In spite of frequent supervision, services delivered by both rural health midwives and public health nurses were not of high quality for ALRI.

Supervision was also touched on in the Indonesian study where doctors, nurses, and midwives were asked how often someone from the provincial level comes to observe the care of patients. Seventy-one percent (71%) of these clinic-based health workers stated that supervisors never came from the provincial level to observe the care of patients. While other types of supervisory visits may occur, this finding suggests that technical supervision is infrequent. Considering this lack of supervision, performance of clinic-based workers in Indonesia was relatively

high. The weak areas, classification and treatment, might be enhanced through more frequent technical supervision.

#### **4.2.2 WHAT DO SUPERVISORS DO?**

Supervisory methods were assessed in the Philippines, Pakistan, and Colombia. In the Philippines, supervisors were present during 49 ALRI clinical encounters. The supervisor observed health worker performance in 53% of cases. While it is possible that supervisors were more likely to observe the encounter because the researchers were there, supervisees reported similar supervisory behavior in interviews. Fifty percent (50%) of supervisees said that their supervisors watch them provide ALRI services during every visit. The investigators observed feedback given after supervisors had observed service delivery in fewer than 10% of cases. Data from supervisee interviews portrayed feedback to be much more frequent. Seventy-six (76%) of those interviewed said they received some type of feedback. While this information about feedback contradicts what was observed, it is unclear which source of information is more likely to be accurate. Supervisees, when interviewed, may have felt compelled to report that their supervisors were supportive, leading to an overestimate of feedback. It is also possible that supervisors refrained from providing feedback in front of the researchers during observation, leading to an underestimate of what normally happens. In spite of the fact that observation of service delivery and feedback were taking place in the Philippines, shortcomings in service quality are apparent.

In Pakistan, supervision was mainly administrative. Few supervisors reported providing technical supervision on a routine basis, although they gave ad hoc technical advice, training, and assistance. Supervisees also reported that supervision was mainly administrative. In the course of the interviews, one individual volunteered the need for more technical assistance in the area of ALRI diagnosis. Checklists were not used during regular supervision, except for EPI. Supervisors kept a diary and reviewed records of staff attendance, drug supply, and patient registers. In general, supervisors did not use the information they gathered for decision-making, but collected it to report to higher authorities. The following methods were mentioned by at least one supervisor when asked about how they motivate supervisees: provide feedback, encourage questions, praise good work, appeal to their commitment to community or country, help to solve their problems, refer problems to higher authorities, and provide direct assistance.

In the FSFB health volunteer program in Colombia, 7 supervisors were interviewed about the supervision system. Each supervisor supervised an average of 9 volunteers. When asked their opinions about the best type of supervision, 5 said one-to-one communication, 1 mentioned group meetings, and one recommended informal contact. When asked what supervisory method they use most frequently, 4 supervisors said observation of volunteers' performance, 2 indicated interviews with volunteers, and 1 used review of forms and records. All supervisors said they gave feedback as part of supervision. Tutorial meetings are also held on an ad hoc basis. Supervisors reported that 31 tutorial meetings were held during the previous 12 months. The majority of these meetings dealt with administrative issues, but approximately 12 meetings reviewed technical areas.

While a variety of methods were mentioned during interviews or observed during service delivery, supervision was irregular in almost all cases, and none of the country programs had a clear strategy in place for problem identification or problem solving.

#### **4.2.3 CONTENT OF SUPERVISION AND PROBLEMS IDENTIFIED**

The content of supervisory encounters, and/or the problems identified by supervisors were assessed in Colombia, the Philippines and Pakistan. Supervisors in Colombia were also asked what topical areas were included in the evaluation of volunteers. When asked specifically about ALRI, 3 of 7 supervisors said that they included skills and knowledge of ALRI, 2 evaluated how well health workers followed ministry norms, and one supervisor said he

"assessed the outcome" of ALRI activities. ALRI was included less often than EPI, growth monitoring and ORT, which were included by between 4 and 6 supervisors for each of these activities.

During observations of clinical encounters in the Philippines, few supervisors addressed technical issues. However, when their supervisees were asked if their supervisors helped them improve their service delivery in history taking, physical exam, and education related to ALRI, between 69 and 76% responded affirmatively. Therefore, there is some evidence that the content of supervisory feedback was technical. When asked to estimate the quality of services provided by their supervisees, supervisors consistently overestimated how well health workers carried out service delivery tasks. For example, 82% of the supervisors thought that the midwives they supervised "almost always" or "often" told mothers to complete the regimen of medication for respiratory infections, while correct performance during the systems analysis was only 8%. Supervisors overestimated performance by more than 30% for 15 of the 20 service components studied.

These overestimates may be due to technical shortcomings on the part of the supervisors. Service delivery data showed that public health nurses, who supervise midwives, did not perform technical tasks significantly better than their supervisees<sup>6</sup>. The study did not address how often the public health nurse supervisors themselves had received technical supervision. However, the fact that their performance was weak suggests a break in the supervisory chain. This break prevents supervision at the peripheral level from having its full service enhancing impact.

When asked what problems their supervisees faced, supervisors in Pakistan reported drug shortages as the principal ALRI-related problem. Supervisees also noted the drug shortage and, in addition, said that they had difficulties making ALRI diagnoses. They also said that patients demand medicines for ALRI when they are unnecessary. Thus, in spite of the fact that supervisory visits were taking place, supervisors were unaware of two important service delivery problems.

### **4.3 LOGISTICS AND SUPPLIES**

Logistic and supply systems that relate directly to ALRI were assessed to varying degrees in all four studies. The studies examined the availability of diagnostic materials, educational materials, and drug supplies.

#### **4.3.1 DIAGNOSTIC MATERIALS**

Diagnostic materials, such as a watch to count respirations and a thermometer to determine if the child has a fever, are required for ALRI assessment. The adequacy of these materials was assessed in Indonesia. Of 60 cadres interviewed, only 15% had access to a thermometer and 53% had access to a watch. However, all the cadres in NTB and 60% of those in East Java, where active ALRI programs exist, had access to watches. It is also interesting to note that the 53% of health workers who had watches reported that they used them to count respirations as part of ALRI clinical assessment.

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<sup>6</sup>Like their supervisees, their performance was inadequate in a number of areas. For example, they asked about trouble in breathing only 12% of the time; they counted respirations only 23% of the time; and they advised the mother about maintaining a neutral temperature for the child only 24% of the time.

### 4.3.2 EDUCATIONAL MATERIALS

In the Philippines, 66% of nurses and midwives received materials about ALRI case management when they were trained. Of these, 85% reported using these materials. In Pakistan, two of the four health workers surveyed were given written material to keep, and both said that they still used those materials. In Indonesia, 41% of health workers surveyed had teaching aids. In the area with the stronger ALRI program (NTB), 90% of health workers had teaching aids. In the other two areas, 25% and 10% of health workers had teaching aids.

In the study of health volunteers in Colombia, volunteers were interviewed about the availability and adequacy of materials. Since their job was mainly to promote healthful practices through health education and to refer patients to the health center, general record keeping materials (family record forms, census update sheets, and referral slips), and health education materials were required. Nearly all health volunteers had access to family record forms, census update forms, and referral slips. Of the 92 health volunteers interviewed, 54 (58%) had educational materials about ALRI. Twenty volunteers had pamphlets, 5 had posters, 1 had booklets, 1 had a flip chart, and 51 had signs. Health volunteers were also asked which materials were most often used for which topic. Most health workers said they used signs more often. Although many health workers had signs about ALRI treatment, none said that ALRI materials were the ones they used most often. This reflects the fact that, while Colombia did have a national ALRI program, ALRI was not a major emphasis of the FSFB community outreach effort at the time of the study.

### 4.3.3 DRUG SUPPLIES

The adequacy of drug supplies was assessed in the Philippines, Pakistan, and Indonesia. In the Philippines, the adequacy of drug supplies was assessed in only 35 facilities. The other facilities did not stock drugs. Half of the facilities said they had not experienced shortages in the past 12 months, but 40% had experienced shortages of one month or more. At the time of the study, 57% of the facilities had at least 10 ccs of an antibiotic available and none of the drugs had expired. The adequacy of the drug supply was also assessed during the observation of service delivery in the Philippines. Of 147 prescriptions, the drugs were available for 48% of the facilities, and were partially available for 42%.

Interviews with health facility staff in Pakistan revealed that shortages in antibiotics were a concern. This problem was caused, in part, by the design of the drug supply system. Drugs and supplies are normally issued on a fixed schedule, and there is no routine provision for obtaining them if they are unavailable or if supplies are exhausted. Thus, there is no monitoring or ordering of drugs in the BHU. Although the medical officer may request additional supplies from district headquarters when needed, supplies are often unavailable once routine distribution has been completed.

In Indonesia, drug supplies were adequate in the area with an ALRI program. Seventy-five percent (75%) of cadres in that area said that they never had shortages. The remainder said they had shortages only sometimes. Antibiotic supplies were non-existent in the other areas where cadres were not responsible for administering antibiotics. In general, supply systems were working as planned in all areas. However, they were not adequate to support Cadre treatment of moderate ALRI in two areas.

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## 5. OR STUDIES

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To resolve problems identified through the systems analyses, operations research studies were carried out in Colombia, Indonesia, and Pakistan. Each operations research study addressed a specific problem or set of problems. Two general topics were addressed. The first, service quality, emphasized ALRI assessment and was addressed in all three countries. The second and related area was the appropriate use of antibiotics, which was studied in Indonesia. Results of the operations research studies are summarized below. They are included as examples of the problem-solving potential of the overall methodological approach.

### 5.1 IMPROVING ALRI ASSESSMENT AND HEALTH SERVICE DELIVERY

In Colombia, a training and supervision program was developed to strengthen health education and referral. In Indonesia, three strategies for health education were tested. In Pakistan, job aids intended to remind health workers of all tasks to be carried out for each child survival intervention were developed and tested.

#### 5.1.1 COLOMBIA

In Bogota, Colombia, acute respiratory infections are the leading cause of illness among children under five. The systems analysis showed that mothers' knowledge of ALRI home management was very poor, with a high reported use of antibiotics (obtained through prescriptions or over-the-counter) and ineffective or potentially harmful home remedies. Further, health volunteer knowledge and activities were weaker for ALRI than for other activities, and ALRI seemed to receive less attention from supervisors. In response, the FSFB developed and implemented a training program for volunteers to make them active promoters of ALRI home management in their communities.

The FSFB drew on WHO recommendations and the latest norms of the Ministry of Health to define volunteer tasks in the areas of prevention (conducting home visits to educate mothers about ALRI risk factors), treatment of mild ALRI (classifying cases according to signs and symptoms, teaching supportive therapies and warning signs), referral (giving mother clear instructions), and follow up (making return visits) to mothers of cases of moderate or severe ALRI. The interdisciplinary team of researchers then developed a training curriculum which used participatory learning approaches to teach the specific knowledge and skills defined. To guide the trainers, the training content and techniques were documented in the form of a Trainer's Manual for ALRI. Particular concern in the design of the ALRI training was to ensure that the volunteers were able to apply their knowledge in home visits. To this end, the training emphasized what the volunteers could do to address this problem and included a post-course practicum to give volunteers an opportunity to practice their ALRI skills. Feedback was given on their performance. During the course, 25 pages of structured note-taking guides were handed out for pupils to complete. These notes were designed as written reinforcements of skills.

Thirty-eight (38) volunteers completed the 18-hour course. Comparison of the pre- and post-test results showed that the volunteers' knowledge improved substantially in relation to:

- ALRI symptoms, with a tendency toward recognition of a larger number of symptoms, especially those indicating moderate or severe ALRI
- application of supportive therapies for fever, cough, and stuffed nose
- activities related to ALRI that they should perform in the community.

Following the classroom instruction, volunteers were asked to make three home visits accompanied by an FSFB nurse to complete their training. Seventy-one percent (71%) of those who attended all of the classes made at least one home visit accompanied by the observer.

Observations of home visits indicated that the majority of volunteers performed well in assessing the child's ALRI symptoms and in instructing the mother in what she should do for mild respiratory illnesses. The training was successful in improving volunteer ability to educate mothers about ALRI management. Also, the field observations allowed the trainers to pinpoint problems the volunteers continued to have in applying their new ALRI knowledge and skills. Supervisors gave feedback, and carried out additional follow-up one month, two months, and three months after the training. Performance improved incrementally with each supervisory visit, as shown in table 5-1.

**TABLE 5-1**

**IMPROVEMENTS IN VHW PERFORMANCE IN COLOMBIA**

After training; after 1 supervisory visit; after 2 supervisory visits.

Activity:	After Training	After 1 Sup.	After 2 Sup.
Checked Frequency of Respirations	30	66	88
Took Temperature	52	76	82
Classified Case Correctly	74	76	100
Told Mother Diagnosis	63	61	100
Explained signs of mod/severe ALRI	59	71	94
Told Mother to Continue Feeding	74	85	100
Told Mother to Increase Liquids	74	80	100

Interviews with 20 mothers one week after the volunteer visits indicated that mothers had good retention of the ALRI messages given them. Mothers correctly identified several signs of a worsening respiratory infection, such as persistent or high fever (named by 95% of the mothers), purple fingernails (60%), nasal flaring (30%), strong cough (30%), and rapid breathing (8%). Seventy-five percent (75%) of mothers correctly recalled the instructions given by a volunteer about preparing saline solution for stuffy nose and giving acetaminophen for fever. Fifty-three percent (53%) said they had prepared and applied the saline solution, and 43% said they gave acetaminophen.

These results led the FSFB researchers to conclude that while the training design was very successful in both improving volunteer ALRI knowledge and stimulating the volunteers to apply this knowledge in their communities, continuous supervision is also needed to correct the deficiencies found in the observations. The inclusion of a supervised practicum was found to be a particularly valuable part of the training. Because of the volunteers' very positive response to the training methodology including having an observer accompany them on the home visits, the ALRI course will serve as a model for future FSFB training activities.

**5.1.2 INDONESIA**

One problem revealed by the Indonesia systems analysis was that most mothers believed that children with symptoms of mild ALRI required medical attention. This problem contributed to the over-utilization of puskesmas (health centers) and posyandus (health posts) for mild ALRI. Approximately 30% of the clients presenting at

puskesmas were children under five with ALRI. Of those, about 70% had symptoms of mild ALRI. The under-utilization of health facilities for moderate or severe ALRI was also a concern. These findings were corroborated by another study which showed that nearly 90% of the ALRI deaths among infants and children in Indonesia never entered the medical system.

Three operations research studies were carried out to provide health education to mothers about supportive therapies for ALRI management, to increase the proportion of children with moderate or severe ALRI attending health facilities, and to reduce the number of cases presenting with mild ALRI. The first study tested the effectiveness of using cadres to conduct a community-based education campaign. Cadres participated in a five-day training, which emphasized skills in running effective group health education programs. Following the training, the cadres initiated a series of health education programs through existing community groups. These groups included mothers' clubs and lottery clubs, which met monthly, and religious study groups, which met each week.

The second study assessed the impact of a clinic-based health education program for mothers. This program, operated through health clinics, mobile facilities and health posts, utilized a variety of health education techniques such as the use of videotapes and recorded messages, flip charts, posters and leaflets. The media messages and written materials provided mothers with information about skills for home management of mild ALRI. The leaflets were distributed by health personnel from the puskesmas, mobile clinics and posyandus.

Finally, a third study tested the effectiveness of training cadres in conducting home visits. During these home visits, it was expected that cadres would detect cases of ALRI, provide education to mothers about supportive therapies, and make referrals when necessary. The cadres received four days of competency-based training in differential diagnosis of ALRI cases according to severity of disease, appropriate treatment, and referral. They also learned skills for conducting home visits, such as making contact, introducing health subjects and stimulating two-way communication with mothers.

The three strategies tested through these operations research studies all achieved the objective of reducing the overall proportion of mild ALRI cases presenting at health clinics. Table 5-2 provides a summary of the results from all three interventions.

**TABLE 5-2**

**DECREASES IN THE PROPORTION OF MILD ALRI PRESENTING AT HEALTH CLINICS, BY INTERVENTION**

	Community-based Ed		Clinic-based Ed		Home Visit Ed	
	(I)	(C)	(I)	(C)	(I)	(C)
Pre-test	9.2%	6.1%	15%	2.0%	26%	4.5%
Month 1	17.6	4.2	31.8	2.9	23.3	23.3
Month 2	20.6	4.3	27.2	3.4	41.9	12.1
Month 3	31.1	1.1	52.4	4.8	50.8	9.8

I = Intervention Group; C = Comparison Group

As these results indicate, all three interventions succeeded in the objective of decreasing the proportion of mild ALRI cases treated at the health clinic. The changes in patterns of clinic use for ALRI resulting from all 3 interventions suggest that they each succeeded in changing behavior so that relatively more families began treating mild ALRI at home and utilizing the clinic only for moderate and severe cases.

### **5.1.3 PAKISTAN**

Senior health managers in Pakistan felt that some of the deficiencies in service quality observed at the Regi Model Basic Health Unit were a result of the health workers simply forgetting the relatively large number of procedures to be followed in delivering a given intervention. To address this problem, health workers were provided with two memory aids to help guide them in delivering PHC services. Improvements in supervision were implemented during the same period.

The first job aid consisted of a series of guides, one for each PHC intervention, which would serve as a reference during service delivery. The guides were placed under plexiglass on the health worker's desk, for protection against loss and damage. The second job aid was an outpatient slip which was filled out for each patient. This form was designed to record each aspect of taking a medical history, conducting a physical exam, and providing treatment, and counseling. Service providers were to use the slip as a checklist during service delivery.

After the job aids had been in place for a month, changes in provider performance were measured through exit interviews. The results of these interviews were compared to exit interviews carried out during the systems analysis.

Three ALRI service delivery tasks improved as a result of the job aids. First, health workers asked mothers about treatments used at home 70% of the time after the job aids, compared to 13% before the job aids. The frequency with which health workers asked about asthma also increased from 10% to 27%. Finally, and perhaps most importantly, the proportion of health workers who told mothers about at least one danger sign that indicated that she should return to the health center rose from 42% to 97%.

Performance on 7 of the 14 ALRI service tasks studied did not improve and 4 were performed less often after the job aids were introduced. Although gains were made in ALRI service quality, they were smaller than gains made in other service areas, suggesting that the job aids had less of an impact on ALRI than on other services. This is not surprising in the absence of well-established ALRI protocols.

### **5.2 APPROPRIATE USE OF ANTIBIOTICS**

Operations research was also carried out in the areas of antibiotic treatment for ALRI. Three studies on this topic were carried out in Indonesia. One study demonstrated that ampicillin has little effect on the course of mild respiratory infections. This study was a first step toward convincing health professionals that using antibiotics in mild cases is ineffective and inappropriate.

Another study of antibiotic treatment attempted to demonstrate that a reliable supply of antibiotics and knowledge of ALRI case management would lead to better treatment outcomes for moderate ALRI. In the test site, staff were given special training and the drug supply was assured. Children diagnosed in the test and a control site were then followed up after two weeks to see if the control group had experienced fewer cases progressing to severe ALRI. However, since only 3 of 557 cases progressed from moderate to severe status, no comparisons were possible.

A third study tested a management strategy to reduce the use of antibiotics for mild ALRI. A letter of order reminding health workers that antibiotics not be used for mild ALRI, along with more intensive supervision, was

effective. The study also showed that the strategy was cost effective, since the mailing and the added supervision cost less than the sustained overuse of antibiotics. Further study is underway to assess whether the behavior change persisted and to determine how often a message such as this might require reinforcement.

### **5.3 DISCUSSION OF OPERATIONS RESEARCH STUDIES**

The operations research studies summarized here demonstrate that program managers can improve service quality through focused studies which address program-specific problems. Most of the programs studied chose to improve service delivery through supervision and training. This decision probably reflected program managers' awareness that these systems were operating inadequately. Perhaps more importantly, it also suggests that program managers felt that they had enough control over supervision and training to take effective action through these mechanisms.

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## 6. CONCLUSIONS: LESSONS LEARNED AND FUTURE DIRECTIONS

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This review of PRICOR systems analyses in Colombia, the Philippines, Pakistan and Indonesia identifies common areas of strength and weakness in the ALRI programs studied. It also demonstrates the usefulness of the systems analysis and operations research methodology for improving service quality. Finally, the review points to topics for future research in the area of assessment of ALRI service quality.

### 6.1 STRENGTHS

The following program strengths were identified in the review:

- ALRI programs, like those in Colombia and Indonesia, seemed to have a positive impact on service quality.
- If adequate training and supervisory support are provided, community-level workers can successfully carry out case identification, classification by severity of illness, treatment, and health education.
- Managers can successfully use supervision and training to improve service delivery problems.

### 6.2 WEAKNESSES

The following areas for improvement were identified in the review:

1. While health workers routinely performed some type of general clinical assessment, they often neglected ALRI-specific clinical assessment tasks, such as counting respirations or looking for danger signs. Further, interviews showed that they had knowledge gaps in these areas.
2. Health workers also needed to improve classifying the illness and treating by severity.
3. Health workers generally explained treatment to mothers, but did not stress the importance of administering the full course, and did not explain danger conditions that indicate that the mother should seek further medical counsel.
4. Mothers' knowledge about danger signs for ALRI and when to seek care reflected health workers' gaps in knowledge. Thus, mothers did not have adequate information to make appropriate decisions about when to seek care.
5. While efforts to supervise, train and provide logistic support to health workers were apparent, these management activities fell far short of their potential to improve service quality because of irregular implementation, ineffective methods, or incomplete or inappropriate content.

### 6.3 METHODOLOGY

This review documents the usefulness of the systems analysis and operations research methodology in a variety of settings. In all four studies, systems analysis allowed researchers and program staff to identify specific problem areas in the service delivery process. These methods were relatively simple and quick, and, as is evidenced by the Bogota Community health services study, they are replicable with minimal technical assistance.

Operations research activities improved ALRI service delivery in Colombia and Indonesia. Although the operations research study in Pakistan did not have a clear impact on ALRI service delivery, it was effective for some other services. In the Philippines where no operations research studies had been carried out at the time of this review, operations research activities related to overall technical supervision were planned. This initiative was, in part, a response to the PRICOR study.

#### **6.4 FUTURE DIRECTIONS**

In order to assure that ALRI services effectively decrease ALRI-related mortality, further efforts to improve service quality are essential. Studies like those reviewed here can contribute to a more complete understanding of the determinants of health worker performance, and can explore how critical activities such as supervision and training can be made more effective. Ultimately, ad hoc service quality assessments must be replaced by ongoing quality assurance programs, which, through better management of technical performance, can substantially improve the effectiveness of ALRI and other primary health care services.

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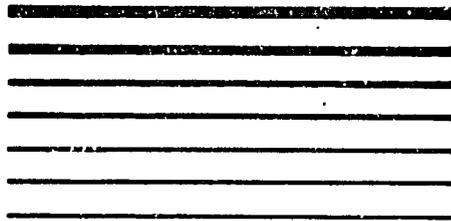
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PRICOR

**PRIMARY  
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THESAURUS**



*VOLUME I*

Acute  
Respiratory  
Infections  
Service  
**ACTIVITIES**

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## **ACUTE RESPIRATORY INFECTIONS SERVICE DELIVERY ACTIVITIES, TASKS AND SUBTASKS**

### **1. IDENTIFY CHILDREN UNDER 5 NEEDING ARI SERVICES**

### **2. MANAGE ARI CASES**

#### **2.1 ASSESS SEVERITY OF ARI**

##### **2.1.1 TAKE MEDICAL HISTORY**

**2.1.1.1 Ask about presence/level of fever**

**2.1.1.2 Ask about duration of cough**

**2.1.1.3 Ask about activity level**

**2.1.1.4 Ask about ability to drink**

**2.1.1.5 Ask about presence of sore throat**

**2.1.1.6 Ask about presence of earache**

**2.1.1.7 Ask about any past history of respiratory problems (asthma)**

**2.1.1.8 Ask about past history of choking on food or swallowing foreign body**

**2.1.1.9 Ask about family history of TB or other respiratory illness**

**2.1.1.10 Ask about any treatment administered**

##### **2.1.2 CONDUCT PHYSICAL EXAMINATION**

**2.1.2.1 Count respiratory rate**

**2.1.2.2 Observe breathing for chest indrawing**

**2.1.2.3 Listen for stridor, wheeze and/or hoarseness**

**2.1.2.4 Observe for nasal flaring and/or listen for grunting**

**2.1.2.5 Auscultate chest (per local policy)**

**2.1.2.6 Assess general status (alertness, muscle tone)**

**2.1.2.7 Observe coloration of lips, ears, face and nailbeds**

**2.1.2.8 Examine throat for exudate/discharge, enlarged tonsils and inflamed pharynx**

**2.1.2.9 Examine neck for tender glands**

**2.1.2.10 Examine ears (tympanic membrane) (per local policy)**

**2.1.2.11 Take temperature**

#### **2.1.3 CLASSIFY CHILD BY SEVERITY OF ARI (SEE APPENDIX A FOR CLASSIFICATION SCHEME)**

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- 2.2 ADMINISTER APPROPRIATE TREATMENTS PER CHILD'S CLASSIFICATION AND PER LOCAL POLICY (SEE APPENDIX B FOR TREATMENT PROTOCOLS)**
- 2.2.1 ADMINISTER THERAPEUTIC TREATMENT**
- 2.2.1.1 Administer appropriate antimicrobial drug per recommended schedule (locally determined)
- 2.2.1.2 Prescribe or distribute appropriate antimicrobial drug per recommended schedule (locally determined)
- 2.2.2 ADMINISTER SUPPORTIVE TREATMENTS**
- 2.2.2.1 Administer fluids, if child is dehydrated
- 2.2.2.2 Administer, prescribe or distribute antipyretic drug
- 2.2.2.3 Administer appropriate bronchodilator and/or cough mixture (locally determined)
- 2.2.2.4 Drain nose, if necessary
- 2.3 COUNSEL MOTHER (SEE ARI: SERVICE DELIVERY - 3.1 PROVIDE INDIVIDUAL COUNSELLING TO MOTHERS OF ARI CASES)**
- 2.4 REFER CHILDREN WITH SEVERE ARI OR WITH COUGH LASTING MORE THAN 30 DAYS**
- 2.5 FOLLOW UP ARI CASES AS APPROPRIATE TO REASSESS CONDITION AND MODIFY TREATMENT, IF NECESSARY (SEE ARI: SERVICE DELIVERY - 3.1.1.5 TELL MOTHER TO BRING HER CHILD FOR RETURN CONSULTATION IF CHILD'S CONDITION WORSENS OR DOES NOT IMPROVE)**
- 3. MOTIVATE/EDUCATE MOTHERS AND OTHER COMMUNITY MEMBERS REGARDING ARI TREATMENT**
- 3.1 PROVIDE INDIVIDUAL COUNSELLING TO MOTHERS OF ARI CASES**
- 3.1.1 TRANSMIT KEY MESSAGES AND REQUIRED SKILLS**
- 3.1.1.1 Tell mother how to administer antimicrobial drug prescribed or distributed for home administration
- 3.1.1.2 Tell mother the importance of completing entire treatment course
- 3.1.1.3 Tell mother how to administer basic supportive treatments
- 3.1.1.3.1 Tell mother to continue breastfeeding and to give extra fluids and appropriate foods (locally determined)
- 3.1.1.3.2 Tell mother to maintain a neutral temperature in the home or sickroom
- 3.1.1.3.3 Tell mother how to administer appropriate bronchodilator and/or cough mixture (locally determined)
- 3.1.1.3.4 Tell mother how to drain nose and ears, if necessary
- 3.1.1.4 Tell mother about the signs and symptoms of moderate or severe ARI
- 3.1.1.4.1 Tell mother about stridor

- 3.1.1.4.2 Tell mother about chest indrawing/rapid breathing
- 3.1.1.4.3 Tell mother about inability to drink
- 3.1.1.4.4 Tell mother about cyanosis
- 3.1.1.4.5 Tell mother about weakness or lethargy
- 3.1.1.5 Tell mother to bring her child for return consultation if child's condition worsens or does not improve
- 3.1.2 USE APPROPRIATE COUNSELLING TECHNIQUES
  - 3.1.2.1 Demonstrate required skills
    - 3.1.2.1.1 Demonstrate how to recognize rapid breathing
    - 3.1.2.1.2 Demonstrate how to inspect for chest indrawing
    - 3.1.2.1.3 Demonstrate how to inspect for cyanosis
    - 3.1.2.1.4 Demonstrate nasal draining methods
  - 3.1.2.2 Ask mother to repeat key messages and/or demonstrate required skills
    - 3.1.2.2.1 Ask mother to repeat the administration schedule for antimicrobial drug prescribed or distributed for home administration
    - 3.1.2.2.2 Ask mother to repeat under what circumstances to return for consultation
    - 3.1.2.2.3 Ask mother to demonstrate how to recognize rapid breathing
    - 3.1.2.2.4 Ask mother to demonstrate how to inspect for chest indrawing
  - 3.1.2.3 Ask mother if she has any questions
- 3.2 PROVIDE OUTREACH ARI EDUCATION
  - 3.2.1 TRANSMIT KEY MESSAGES
    - 3.2.1.1 Explain how to distinguish mild from moderate or severe ARI
    - 3.2.1.2 Explain recommended treatment for mild ARI in the home
    - 3.2.1.3 Explain importance of immediate medical care if signs of moderate or severe ARI develop
    - 3.2.1.4 Explain general preventive measures for ARI
  - 3.2.2 USE APPROPRIATE HEALTH EDUCATION TECHNIQUES AND MATERIALS
    - 3.2.2.1 Ask questions of and respond to questions from attendees
    - 3.2.2.2 Use visual aids in transmitting key messages

# ACUTE RESPIRATORY INFECTIONS

## Appendix A

### Plan of Classification for Mild, Moderate, and Severe ARI

#### Definitions:

**ARI Case:** Any child suffering from one or more of the following conditions will be considered a possible case of ARI - cough, wheeze, stridor, grunting, chest indrawing, nasal flaring, hoarseness, sore throat, earache or ear discharge.

**Severity of ARI:** Once it has been established that a child has possible ARI, severity is determined by the signs and symptoms listed below. A child is classified as moderate or severe if the child has one or more signs or symptoms in that category.

#### SEVERE ARI

- Respiratory rate  $> 70/\text{min}$
- Chest indrawing
- Inability to drink
- Stridor at rest
- Cyanosis
- Apnea, seizures, or change in consciousness
- Marked reduction in activities and play
- Dehydration

#### MODERATE ARI

- Respiratory rate 50-70/minute
- Temperature  $\geq 40^{\circ}\text{C}$  ( $104^{\circ}\text{F}$ )
- Nasal flaring or grunting
- Earache, ear discharge, or pulling at ears (classification and treatment per local policy)
- Sore throat with enlarged tender nodes, with or without exudate, (classification and treatment per local policy)
- Moderate reduction in activities and play

#### MILD ARI

- Respiratory rate,  $< 50/\text{minute}$
- Temperature  $< 40^{\circ}\text{C}$  ( $104^{\circ}\text{F}$ )
- Stridor relieved at rest
- Sore throat without enlarged tender nodes

**SEE ACCOMPANYING NOTES ON CLASSIFICATION SCHEME**

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## Notes on ARI Classification Scheme

1. One important objective of this classification scheme is to identify those children who should receive antibiotics. One is especially interested in treating early pneumonia.
2. There is no perfect scheme for classifying cases of ARI in the field. This is a fairly conservative approach in that it tends to err on the side of treating rather than not treating.
3. Using fever as a classification criterion is problematic in that high fever due to any cause may increase respiratory rate. In general a child should have some sign or symptom of ARI (see above definition) before assuming that fever and increased respiratory rate are due to ARI. If there is doubt, one might administer an antipyretic and see if the respiratory rate returns to normal when the fever drops.
4. Local program directors should decide if they wish to classify or treat suspected cases of throat infection that could be caused by Group A Beta Hemolytic Streptococcus or ear infections, especially where laboratory or otoscopic examination is not feasible.

# ACUTE RESPIRATORY INFECTIONS

## Appendix B

### Treatment Protocols for mild, moderate and severe ARI

**SEVERE ARI:** The child must be seen by a health worker immediately. Therapeutic and/or supportive treatment can be initiated by the health worker or the mother, but the patient should be referred to a higher facility as soon as possible, if he/she does not respond to therapeutic treatment administered or if his/her condition worsens. Recommendations:

- A. Supportive treatment<sup>1</sup>
- B. Therapeutic treatment<sup>2</sup>
- C. Referral to higher facility for more intensive treatment<sup>3</sup>

**MODERATE ARI:** Supportive treatment can be initiated by the mother, but a health worker will usually have to intervene without delay, particularly for antimicrobial treatment. Recommendations:

- A. Supportive treatment<sup>1</sup>
- B. Therapeutic treatment<sup>2</sup>

**MILD ARI:** Treatment can be initiated by the mother with or without information to a health worker. Recommendations:

- A. Supportive treatment<sup>1</sup> only

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#### <sup>1</sup>Supportive treatments:

- Antipyretics
- Bronchodilators and cough medicine (per local policy)
- Adequate fluids
- Proper feeding
- Maintenance of neutral environmental temperature  
(Do not bundle up the child with too many clothes. Do not overheat the room. Assure proper ventilation but protect the child from chills)
- Keep air passages clear
- Other recommended local measures

#### <sup>2</sup>Therapeutic treatments:

Primarily first line antimicrobials to be given per local policy. According to WHO recommendations benzylpenicillin or procaine penicillin G injections, or cotrimoxazole, amoxicillin, or ampicillin orally should be considered as first line antimicrobials, which can be distributed for ambulatory treatment.

#### <sup>3</sup>Intensive treatment:

May include intensive first line or second line antimicrobials (such as gentamycin, kanamycin, oxacillin and chloramphenicol), oxygen therapy, bronchodilators, steam humidification or other measures that are available mainly in referral centers.