SUPPLEMENT

Research to Support Household and Community IMCI

Report of a meeting, 22-24 January 2001
Baltimore, Maryland, USA

Editors
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ABSTRACT
The Integrated Management of Childhood Illness (IMCI) strategy combines improved case management of childhood illness with aspects of nutrition, immunization, disease prevention, and promotion of growth and development. The household and community component of IMCI was formulated to reach the numerous sick children who are ill and often die at home without ever being treated by a trained healthcare practitioner. In January 2001, USAID (Child Health Research Project and BASICS II) and the CORE Group sponsored a meeting in Baltimore, Maryland, to determine the research needed to implement household and community IMCI effectively. This paper summarizes the presentations at that meeting and highlights the research and programme priorities expressed using the three-element approach devised by the CORE Group and USAID (BASICS II and Child Survival Technical Support Project). Research priorities to improve partnerships between health facilities and the communities they serve (Element 1) include finding ways to increase community involvement and management of health facilities, establishing accurate costs for community IMCI services, and formulating cost-recovery mechanisms tailored to local circumstances. Programme priorities in Element 1 include establishment of systems for maintenance of an adequate supply of essential equipment and medicines, while retaining access for the poor and ensuring adequate referral mechanisms for severely-ill patients that include monitoring and incentives for the performance of health workers. Research priorities to increase appropriate, accessible care and information from community-based care providers (Element 2) consist of activities to design simplified IMCI guidelines for use by community health workers (CHWs) and volunteers and evaluation of the impact of using these guidelines on morbidity and mortality. Also a priority item in this category is experimenting with ways to teach mothers and families to care for sick children at home and strategies to improve the practice of medicine in the private sector. More research is also needed to improve the quality of nutritional and preventive health counselling given by CHWs and to find ways to make community IMCI interventions sustainable. Programme priorities in Element 2 include efforts at the national level to establish policies to improve care by traditional and private care providers and to define the position of volunteer workers in the national health system. Research priorities to integrate promotion of key family practices critical for public health (Element 3) are focused on determining which interventions are the most effective in reducing child morbidity and mortality at the household and community levels, finding the best methods of delivering these interventions, and implementing these and scaling up in essential service packages. Particular issues in child health, needing urgent attention from the research and programme communities, are HIV/AIDS and neonatal morbidity and mortality.

Key words: Child health; Child nutrition; Healthcare; Interventions; Child development; Health services research; Community health; Developing countries
INTRODUCTION TO THE MEETING

In January 2001, USAID’s Child Health Research Project and Basic Support for Institutionalizing Child Survival (BASICS II), and the Child Survival Collaboration and Resources Group (CORE Group) sponsored a meeting on the research needed for household and community implementation of Integrated Management of Childhood Illness (IMCI) strategy of the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF). The primary objectives of the meeting were to:

- Review the results of recent research on child health and nutrition interventions that are implemented at the household and community levels
- Examine which interventions to improve child health and nutrition are both feasible and of proven effectiveness, and which should be incorporated into programmes
- Determine research needs in relation to the integrated implementation of child health and nutrition interventions at the household and community levels

Integrated Management of Childhood Illness

Of the nearly 10.5 million annual deaths among children aged less than five years, over 70% can be attributed to just five primary causes: pneumonia, diarrhoea, malaria, measles, and malnutrition. One response to this fact has been to create vertical, disease-specific programmes directed at each of these causes at both global and national levels. These vertical programmes can claim a number of successes, such as the widespread acceptance and use of oral rehydration therapy (ORT) and increased immunization coverage in many countries. However, the presence of multiple disease-specific programmes has contributed to a number of administrative, political and technical difficulties in the delivery of health services.

In response to these concerns, WHO and UNICEF led the development and promotion in the early 1990s of a new strategy known as Integrated Management of Childhood Illness, or IMCI (1), which provides a holistic approach to managing sick children. This initiative significantly reduces mortality and morbidity associated with the five major causes of disease in children aged less than five years and contributes to their healthy growth and development. IMCI was first field-tested in Tanzania in 1995 (2). Later that year it was introduced to six other ‘early-use’ countries and has since expanded to 79 countries as of June 2000.

The IMCI strategy combines improved case management of childhood illnesses in first-level health facilities with aspects of nutrition, immunization, disease prevention, and promotion of growth and development. There are three components to IMCI, and interventions in all three components encompass both curative and disease-preventive/health-promotive activities (1,2). These are: improving the skills of health workers, improving the health system, and improving the household and community practices.

Improving the skills of health workers

The cornerstone of this component of IMCI is a set of flow-charts and guidelines for the integrated case management of diarrhoea, pneumonia (ARI), malaria, measles, and malnutrition, and the promotion of immunization in health facilities. Use of these flow-charts ensures that health workers address not only the most obvious problems a sick child has, but a range of nutritional and infectious disease problems that commonly affect children in a country. Each country adapts the flow-charts and guidelines, taking into account the local patterns of disease prevalence, clinical presentation, and drug resistance.

An 11-day course trains health workers in the skills needed to apply these algorithms. These skills are developed as health workers assess, classify, and treat children with each of the major signs and symptoms in health facilities. Training takes place in a teaching hospital or other facility that provides a classroom and a sufficient number of actual cases of children with the five conditions. Health workers have generally reacted positively to the 11-day course, and evaluations of the training have documented clear improvement in the skills of health workers (4,5). IMCI also looks at approaches for maintaining the performance of health workers.

Tools are also available to improve the skills of health workers in referral care facilities. These include guidelines and training materials on the management of severely-ill children and children with severe malnutrition as well as a training course on breast-feeding counselling.

Improving the health system

To implement IMCI, healthcare infrastructure must be improved to provide equitable and sustainable solutions to the problems of childhood illnesses. Initial meetings with government ministers to inform and advocate for
the strategy and its advantages are followed by orientation and training of other high-level officials and consultations with the ministry of health in each country. Available resources are evaluated, partnerships are created throughout the country, and goals are set to develop systems which will maintain the IMCI programme and adapt it to changing conditions long after the initial stages of training and implementation have been completed. Particular issues that must be addressed include drug availability and incorporation into IMCI, IMCI planning and management, organization of work at the health facility level, and health information systems.

**Improving household and community practices**

The third component of the IMCI strategy is the household and community component which was officially launched at the First IMCI Global Review and Coordination Meeting in September 1997 (2,6,7). The participants recognized that improving the quality of care at health facilities alone would not be effective in realizing significant reductions in childhood mortality and morbidity, because numerous caregivers do not seek care at facilities. Since that first meeting, many activities have been undertaken by multilateral institutions, such as UNICEF, WHO, Pan American Health Organization (PAHO), and World Bank, bilateral agencies, such as USAID and their contractors, and non-government organizations (NGOs) to strengthen inter-agency collaboration for promoting and implementing community approaches to child health and nutrition.

Based on available evidence, 16 key practices were identified that are essential in providing the necessary care to improve child survival, growth, and development in families and communities. They relate to the provision of adequate home care to support healthy growth and development, appropriate responses to illness, seeking appropriate and timely care, and giving recommended treatments.

**Sixteen key practices for ensuring child survival**

- Breastfeed infants exclusively for at least four months and, if possible, up to six months. (Mothers found to be HIV-positive require counselling about possible alternatives to breast-feeding).
- Starting at about six months of age, feed children freshly-prepared, energy- and nutrient-rich complementary foods while continuing breast-feeding up to two years or longer.
- Ensure that children receive adequate amount of micronutrients (vitamin A and iron in particular) either in their diet or through supplementation.
- Dispose of faeces, including children’s faeces, safely, and wash hands after defaecation, before preparing meals, and before feeding children.
- Take children as scheduled to complete a full course of immunizations (BCG, DPT, OPV, and measles) before their first birthday.
- Protect children in malaria-endemic areas by ensuring that they sleep under insecticide-treated bednets.
- Promote mental and social development by responding to a child’s needs for care and through talking and playing, and by providing a stimulating environment.
- Continue to feed and offer more fluids, including breastmilk, to children when they are sick.
- Give sick children appropriate home treatment for infections.
- Recognize when sick children need treatment outside the home and seek care from appropriate healthcare providers.
- Follow advice of health workers about treatment, follow-up, and referral.
- Ensure that every pregnant woman makes the recommended four antenatal visits and receives tetanus toxoid vaccination, and is supported by her family and community in seeking appropriate care, especially at the time of delivery and during the postpartum and lactation period.
- Take action to prevent child abuse, recognize it has occurred, and take appropriate action.
- Adopt and sustain appropriate behaviours regarding prevention of HIV/AIDS and care for the sick and orphans.
- Ensure that men actively participate in providing childcare and are involved in reproductive health initiatives.
- Prevent and provide appropriate treatment for child injuries.

**Contributions of research to development of IMCI**

Ruth Frischer began the meeting by recalling the importance and contributions of research to advancements in child survival. Research was used for developing the tools, approaches, and interventions that were incorporated into programmes and implemented
to save millions of lives. IMCI exemplifies how many years of research led to the development of strategies that could diagnose and treat sick children at the health facility level. Further child-survival gains, Dr. Frischer noted, will not be possible unless we extend care, counselling, and treatment of illness to the household and community levels. She cited USAID-funded studies from Uganda and Bolivia in which 40% or more of children died without ever reaching any care provider. If children are dying in the home, that is where IMCI must reach them.

IMCI is also continually refined through research. The IMCI guidelines currently under revision include better clinical signs to improve the sensitivity of diagnosis for severe pneumonia and better signs to identify children who require hospital referral. Major evaluations of the impact of IMCI on mortality are also underway in Uganda, Bangladesh, and Tanzania.

Dr. Frischer then examined which interventions could be implemented to provide the greatest gains in child survival:

- More extensive breast-feeding could result in a 10% reduction in child deaths.
- Better complementary feeding could prevent 10% of deaths from diarrhea and acute respiratory infections (ARIs), and reduce malnutrition by 20%.
- Vitamin A use in deficient areas could reduce child mortality by 20%.
- Better home treatment for diarrhea could prevent 1.2 million child deaths.
- Timely care-seeking and appropriate treatment could result in 400,000 fewer child deaths.
- Wider use of insecticide-treated bednets by children could reduce child deaths by over 210,000.

Dr. Frischer closed by urging researchers and those implementing programmes to work more closely to forge catalytic relationships that bring research successes into action more rapidly and that answer questions most relevant to programmes in the field.

**UNICEF and the community child-health system**

The current focus of IMCI activities at UNICEF is the development of ‘community child-health systems.’ According to Rudy Knippenberg, this constitutes the promotion of appropriate family-care practices by an adequately-supported community system. UNICEF is addressing community and household needs at this time, because essential treatments and technologies have become simpler and more affordable and can, thus, be distributed at the community level. For example, an insecticide-treated bednet now costs approximately four US dollars. Intermittent malaria prophylaxis during pregnancy costs only 50 cents per woman. The price of immunizations is also decreasing, and even nevirapine to prevent the transmission of HIV from mother to child is becoming affordable at only three US dollars per dose.

Using the World Bank framework for poverty reduction (Fig. 1), Dr. Knippenberg explained that community implementation of health services is actually dependent on proper functioning of health facilities and on overall health-sector policies. He said that the key obstacles to the implementation of community IMCI are: household resource constraints, poorly-coordinated inter-sectoral support, low use of existing health facilities, care providers with limited skills, few essential commodities, and inconsistent government policies.

Since the poor have low access to quality care in the public sector, they are often dependent on more costly and unregulated private healthcare. Organizations can address this problem by distributing essential and cost-effective treatments through multiple systems—not only the public-health system.

Strategies to improve inter-sectoral support include clear definition of the roles and contributions of each sector, involving multiple sectors in policy dialogue, and holding each sector accountable for results from allocated resources.

Actions to increase the use of health facilities include increasing the role of public-private partnerships in the guise of managed networks and subcontracting service provision to NGOs and private care providers. Expanding the role of skilled and trained community health workers (CHWs) for the distribution of complex treatments will also increase access to healthcare.

Lack of skilled medical staff and inadequate supplies are perennial problems in health systems. Dr. Knippenberg suggested using performance incentives, innovative staffing arrangements, addressing the career-development needs of health workers, and subcontracting of staff. Options to improve sustained availability of essential commodities include competitive procurement, tiered pricing, and reliable central medical stores and distribution systems.

Government policies are often barriers to implementation of community health systems. Public
Research for household and community implementation of IMCI

Fig. 1. Strategic framework for child-health outcomes

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health is usually under-funded, and many developing nations cannot foresee the positive economic impact of investment in health. Some strategies to address these problems include linking public expenditure to outcomes in poor children and the use of a mix of complementary financing mechanisms. Other government policies needed are innovative regulatory frameworks for private-sector healthcare providers to stem the spread of antimicrobial resistance.

WHO’s community IMCI research agenda

Bernadette Daelmans spoke about WHO’s research agenda to improve community IMCI. The agenda, formulated by the Department of Child and Adolescent Health and Development (CAH), was determined by considering desired behaviours of caregivers to promote child health, prevent illness, and respond appropriately when a child is sick (Fig. 2).

Malnutrition is associated with over 50% of childhood deaths, and inadequate feeding practices have been identified in many settings. According to Dr. Daelmans, research is required to examine how health facility and community-based interventions can promote feasible and sustainable changes in feeding practices that will lead to improvements of children’s nutrition status and the reduction of anaemia.

Research to improve children’s micronutrient intake is also a priority at WHO. Specifically, she spoke about using zinc supplementation as an intervention to reduce the severity and incidence of diarrhoea and pneumonia—and possibly malaria. The most important research areas currently concern the development of effective and acceptable mechanisms for zinc delivery and further research on health benefits, including impact on child mortality.

One of the key innovative elements in IMCI counselling is to promote interactive feeding and psychosocial stimulation (8). The guidelines for counselling on care for psychological development are currently being tested in the health facilities. Research is needed on how these guidelines can be adapted and effectively integrated in community-based interventions.

Another priority area at WHO is finding ways to increase the regular and effective use of insecticide-treated bednets to reduce child mortality from malaria. Ways to create demand, sustain delivery, and improve the use of impregnated nets need to be identified.

High levels of indoor air pollution have been associated with an elevated risk of respiratory morbidity and mortality. Evidence suggests that interventions to reduce indoor air pollution have the potential to reduce childhood deaths from pneumonia by more than 10%. Research is needed on effective ways to reduce indoor air pollution and the impact of achievable reductions on morbidity due to pneumonia.

Many children who die never reach a health facility, or they arrive too late. Dr. Daelmans said that there is an urgent need to find out how to improve recognition of signs of childhood illness that require attention from a trained care provider, and how to overcome barriers to care-seeking. Also important is further understanding
of the effect of counselling on care-seeking as promoted in IMCI.

In several IMCI settings, adherence to follow-up care and referral recommendations is problematic. Research is needed to understand how adherence can be improved to assist managers in developing tailored responses.

Lastly, Dr. Daelmans spoke about neonatal mortality which makes up about 40% of all childhood mortality. Interventions that will encourage families to bring sick newborns for medical care and to improve the quality of care in the home and community must be designed.

CORE Group Workshop ‘Reaching Communities for Child Health’

The CORE Group is composed of 37 US-based international NGOs that collectively serve 600 million people each year. These NGOs rely on indigenous staff and leadership to run programmes and implement interventions in host countries. Larry Casazza defined the mission of the CORE Group as building capacity of host country NGOs and other partners to implement sustainable child-health programmes effectively. Since 1999, the CORE Group has helped NGOs work in partnership with ministries of health, donors, and each
other to develop and implement strategies jointly for community IMCI at the district and community levels.

Peter Winch presented a framework for the implementation of household and community IMCI that had been agreed upon at the CORE Group workshop in the week preceding the IMCI-research meeting. This consensus framework specifies that household and community IMCI is defined as the optimization of a multisectoral platform for child health and nutrition that includes three requisite linked elements:

- Partnerships between health facilities/services and the communities they serve
- Appropriate and accessible care and information from community-based care providers
- Integrated promotion of key family practices critical for child health and nutrition

Element 1 assumes that health facilities or services, such as immunization conducted by mobile teams, exist, that they are functional, and that people have geographic and economic access to the services. Element 1 involves increased outreach to communities by facility-based health personnel. It also requires increased involvement of communities both in providing feedback on the quality of services and in actual management of health services. Dr. Winch explained that accountability to communities for the quality of services provided is a crucial part of Element 1.

The implementation of Element 2 involves all community-based care providers, including CHWs and other voluntary workers, private care providers, traditional healers, traditional birth attendants, shopkeepers, and pharmacists. The goals of Element 2 are to improve treatment of sick children and to increase the role of community-based care providers in the promotion of preventive interventions, such as exclusive breast-feeding and insecticide-treated bednets. Strategies to improve the treatment of sick children include upgrading the skills of community-based practitioners through training courses and on-the-job training; creation of simplified guidelines for case management; improving referral of sick children from community-based care providers to health facilities; and decreasing harmful practices, such as injections with unsterilized equipment. The CORE Group is currently exploring incentives to help keep CHWs in their jobs and is assisting communities in setting up transportation systems and reserve funds for health emergencies.

The focus of Element 3 is to create sustainable changes in behaviour in the home and community. The list of 16 key family practices approved at the Durban meeting in June 2000 guides the implementation of this element. Key challenges include, how to promote multiple behaviours effectively, how to maintain behaviour change over time, and how to scale up to regional/national levels.

To date, most research on IMCI has focused on the performance of health workers in health facilities, referral between health facilities, and costing. There has been very little research conducted specifically on the third component of IMCI—household and community IMCI. Taking the new framework for household and community IMCI with the three requisite elements as a starting point, one working group at the CORE Workshop laid out a series of research priorities that include assessment of skills needed by CHWs; methods needed to transfer management skills to community groups; how to increase community input at the facility level to improve quality and access; and how to involve communities in analysis of costs. Research dealing with CHWs must address their effectiveness and that of volunteers, maintenance of performance quality, and effectiveness of different monetary and non-monetary incentives. Key to success of the second element of the framework is understanding how to get private healthcare providers to adopt IMCI practices, and how to improve and maintain the quality of care once the IMCI guidelines are established. Another important area is provision of necessary pharmaceuticals at the community level and exploration of cost-recovery mechanisms for drugs. Central to improving family practices are establishing effective role models, targeting decision-makers in the household, and seeking ways to maintain changed behaviours. Research is also urgently needed on how to promote packages of behaviours effectively.

**NUTRITIONAL INTERVENTIONS**

**Community-based strategies to promote breast-feeding**

Although the breast-feeding rates are high, the exclusive breast-feeding rates are low in Bangladesh. Breast-feeding promotion programmes exist in UNICEF-sponsored baby-friendly hospitals, but 95% of mothers deliver at home. So, community-based interventions must be launched to explain the health benefits of
exclusive breast-feeding to most families. Rukhsana Haider presented findings of a study that assessed the impact of home-based peer counselling on exclusive breast-feeding rates in the first months of life. The study took place among 30,000 households of middle or lower socioeconomic status in Dhaka city, Bangladesh. Peer counsellors were selected from the target community and trained with a simplified WHO-UNICEF breast-feeding counselling training course and other related guides.

Baseline characteristics of the study population showed that only 9% of mothers knew of the health benefits of exclusive breast-feeding and that more than 80% of women in both control and intervention groups intended to give other foods or fluids in the first few days of their infant’s life.

During the project, Dr. Haider’s team found that 84% of mothers in the intervention group were exclusively breastfeeding by day 4 of the infant’s life, and after five months, 70% of them were still exclusively breastfeeding. This was in marked contrast to the 30% of control group women who exclusively breastfed at day 4 and the 6% who were exclusively breastfeeding at the end of five months. Thus, community-based peer counselling is an effective way to increase rates of exclusive breast-feeding in Bangladesh.

**Nutritional counselling through health services in Peru**

The health services in Peru are well-organized, accessible, and extensively used by the poor. They also have a specific mandate for facilitating health programmes within the communities they serve. Mary Penny of the Instituto de Investigacion Nutricional in Lima spoke about a study designed to examine the effectiveness of these health centres to improve nutrition and feeding practices in the community.

Close collaboration with local and regional health authorities was established from the start and has been indispensable. Formative research of the infant-feeding practices at the household level and practices in the health facilities focused the intervention on three main areas with the common goal of changing behaviour in the home and a strong emphasis on strengthening the service, not just individuals.

Consistency in the nutrition messages was emphasized and facilitated by key messages, and coordinated standardized educational materials were introduced so that all health clinic staff who had contact with mothers and children were able to deliver the same basic message. Quality of counselling was improved and included the introduction of participatory demonstrations preferably carried out in the community. Increased coverage of the preventive growth and development monitoring programme, especially during the introduction of complementary feeding, was promoted by running popular group sessions for mothers and children of similar age and by encouraging community outreach activities. An accreditation programme provided a stimulus and a goal for the health facilities with an element of competition.

Mid-study results show that almost 20% of randomly-selected children in the community had attended the new group sessions, and 8% had participated in the demonstrations. More dramatic changes were observed in behaviours of caregivers. By the middle of the intervention and when compared with the baseline data, more caregivers fed purées to children and gave these before soup, and more mothers encouraged their children to eat and continued to feed them when they were ill. Mothers’ knowledge of foods that were nutritious for seven- and eight-month old babies also increased from 9.8% at baseline to over 25% at mid-term (Fig. 3).

Dr. Penny concluded by saying that changing infant-feeding behaviours in the community through
interventions in government health services is possible and is likely to be sustainable, but success of these programmes is dependent on available resources, personnel mobility, and demand for services from the community.

**Community nutritional counselling in India**

Nita Bhandari described an effectiveness trial in four intervention and four control communities of approximately 5,000 each in rural Harayana, India, to improve breast-feeding and complementary feeding practices in children aged less than two years. Formative research with close involvement of the local government identified locally-relevant feeding messages (WHO-IMCI guidelines) and channels for delivery to achieve high coverage and develop communication strategies, messages, and materials. Dr. Bhandari said that the main counselling venues were visits to government and private health workers, immunization sessions, weighing sessions at anganwadi centres, traditional birth attendants (TBAs) at delivery, and home visits for new births. Women’s core-group meetings (MSS) with health workers and neighbourhood meetings included feeding demonstrations for promoting portion size. Activities to reach children included rallies, debates in schools, roadside plays, and nutrition fairs.

The mid-study, cross-sectional survey of children aged less than two years showed that 54% of children had been visited at home; 44% and 42% had attended weighing and immunization sessions respectively; 47% had visited primary healthcare centres (PHCs); and 65% had visited private practitioners in the preceding three months. The highest proportion of mothers spontaneously recalled having received feeding advice at home visits and weighing sessions (80% each), followed by immunization (59%) and PHC (31%). Twenty-two percent of mothers had attended MSS meetings and 17% neighbourhood meetings. Of the TBA-conducted deliveries, 39% of mothers reported being counselled. Private practitioners had rarely (2%) counselled.

Within the intervention group, the following behaviours were observed at baseline and in mid-study cross-sectional surveys. In children aged less than four months, exclusive breast-feeding increased from 14% to 73%. In 9 to 11-month old children, median meal frequency increased from two to four per day, and median energy (kcal) intake increased from 131 to 447.

Of the foods promoted, significant increases were noted in the use of roti (23% to 60%), undiluted milk (10% to 53%), biscuits (14% to 43%), bread (3% to 16%), dal (7% to 22%), khichuri (1% to 25%), and bananas (6% to 22%).

In conclusion, Dr. Bhandari noted that high improvement in knowledge has been achieved by the study. Practices relating to exclusive breast-feeding have improved substantially; those relating to complementary feeding have improved but are still below the recommended level. More effective ways of promoting portion size are required. She said that it is possible to improve the basic skills of health workers and their motivation for counselling children in this community but less so for government physicians and private practitioners. Use of multiple channels improved the coverage but a significant proportion is still not reached.

**AIN approach in Honduras**

Atención Integral a la Niñez (Integrated Care for Children)–AIN–is a community-based, preventive health and nutrition programme that actively engages families of children aged less than two years and their community in maintaining the adequate growth of young children. The programme extends the IMCI package to sick children, aged 0-5 years, by either treating the illness in the community (pneumonia) or referring the child to a health centre.

The goal of AIN is to reduce child mortality by reducing mild and moderate malnutrition and the severity and duration of illness episodes. Marcia Griffiths spoke about how AIN achieves these results. The AIN strategy centres upon frequent contact with the family. Either at the weighing session or in a home visit, every child, aged less than two years, is seen monthly by a community volunteer, and children, aged three to five years, are seen when they are ill. Counselling tailored to meet family needs is provided monthly to families with children aged less than two years. The advice focuses on care-seeking and household practices, such as feeding of young children. Advice is given based on a child’s age, illness status, and growth pattern; an action plan for the month is negotiated. Particular attention is given to children aged less than two years, because most stunting and growth retardation occurs at this time. Adequate monthly weight gain, instead of nutrition status, is used as a dynamic measure of success that is meaningful for all programme participants—the family, community, and programme management. An important recent addition
is disease detection, treatment, and referral for all children less than five years of age, using a modified IMCI protocol that includes the use of antibiotics by community volunteers.

Dr. Griffiths reported that AIN was established in 2000 as the national community health programme of the Health Secretariat in Honduras. Implementation has reached 20 of Honduras’s 27 health areas and will be implemented in 25 areas by the end of 2001.

Preliminary information on impact indicates that programme managers are doing their job well; participation rates are extremely high with over 90% of mothers participating on a monthly basis. Household practices are improving. Aspects, such as density of weaning food and exclusive breast-feeding rates, for example, have improved. In over half of the AIN communities, fewer children had prolonged periods of poor growth than earlier in the programme. Over a period of nine months, children classified as malnourished fell from 19% to 14%. This represents an improvement of 26% in less than a year.

**Positive deviance for nutrition education**

The positive deviance model seeks to identify caregivers who are able to raise well-nourished children in poor environments even in the face of severe economic constraints. Dirk Schroeder said that some families supplement children’s diet with locally available low-cost foods (fresh-water shrimp in Vietnam), or treat their children’s illness sooner than other families in the same poor community. Once identified, these key practices are used in crafting local interventions to improve nutrition.

Studies have evaluated the impact of positive deviance and found that, from 1993 to 1995, severe malnutrition decreased from 28% to 4% in a population of approximately 80,000. These improvements were also sustainable for three years after researchers and programmes left the intervention areas. Dr. Schroeder and his colleagues found that older children in the intervention communities continued to be better-nourished than children of similar age in comparison communities and that the younger siblings were also better-nourished than age-matched controls.

Specific behaviours associated with increased nutrition include breast-feeding for two years, exclusive breast-feeding for the first six months of life, more feeding of all types when ill. Also associated was active feeding of children, more than three meals given per day, paternal involvement, and positive attitude toward preventive health measures. Clinic attendance and completeness of vaccinations were not associated with better nutrition.

Using data gathered from over 46,000 children, Dr. Schroeder and colleagues demonstrated that growth faltering is essentially complete by 15 months of age and that most faltering occurs in the first eight months of a child’s life (Fig. 4,5).

Research needed to adapt the positive deviance approach into IMCI includes identifying how to modify it to improve nutrition behaviours before and during pregnancy and to explore adaptability of the approach into other IMCI programme targets, such as bednet use and drug compliance.
VECTORS CONTROL

Acceptance and use of insecticide-treated bednets

In 1997, there was an epidemic of falciparum malaria in Iquitos, Peru, that had an infection rate of almost 40%, although the disease was virtually absent from the region until the early 1990s. Peter Winch spoke about a study that examined the use of insecticide-treated bednet, exposure to mosquitoes, and attitude toward retreatment of nets in Iquitos. His team followed up 898 people from November 1999 to May 2000 and found that 98.1% of all families used bednets, but that exposure to mosquitoes was still high due to evening activities outside the home and that most people used nets incorrectly. Specifically, they found that mosquitoes can bite from underneath 86% of beds, and in 59% of cases, the borders of nets were not properly secured. Another problem identified was that families washed their nets every two to four weeks and that there was little or no retreatment of nets with insecticide.

The entomology component of Dr. Winch’s study documented peak biting hours of principal vector *Anopheles darlingi* and related these peak hours of biting with patterns of human activity in an attempt to assess actual exposure. Using mobile mosquito collectors—individuals who followed up villagers and collected all the insects that landed—the investigators found that the peak exposure times were between 6 and 7 in the evening.

Dr. Winch concluded by saying that the greatest additional reduction of disease in this area of Peru, where the principal vector is *A. darlingi*, might be gained from reducing exposure to mosquitoes in the early evening and early morning when people are outside the nets. This conclusion would not necessarily apply to Africa where *A. gambiae* and *A. funestus* are important vectors.
Social marketing of insecticide-treated materials

Nancy Nachbar spoke about the NetMark Project—a USAID-funded effort to promote the use of insecticide-treated materials (ITMs) to prevent malaria in sub-Saharan Africa through formation of public-private partnerships. Managed and carried out by the Academy for Educational Development, other NetMark partners include the U.S. Government, the Malaria Consortium of the London and Liverpool Schools of Hygiene & Tropical Medicine, the Johns Hopkins Bloomberg School of Public Health, and Group Africa. The primary goal of NetMark is to develop a sustainable market for ITMs, especially mosquito nets (bednets), in target countries in Africa. The main objectives of the project are to increase the proportion of households that own ITMs, increase nightly use of treated nets, especially by those most vulnerable to malaria (pregnant women and children aged less than five years), and increase the proportion of net owners who regularly retreat their nets with insecticide.

NetMark conducted formative (qualitative) research in Nigeria, Senegal, Uganda, and Zambia and carried out baseline surveys in these countries and Mozambique. From this research, NetMark found that there was universal or near-universal understanding of the English term ‘malaria’ or the French term ‘palu.’ There was high awareness that mosquitoes transmit malaria, but erroneous beliefs about other causes of the disease persist. In most settings, malaria was viewed as a potentially fatal disease. Understanding of the special vulnerability of children aged less than five years and
pregnant women varied by country but was sometimes inadequate.

They also found that there was high use of commercial methods of mosquito control in several countries (even in rural settings), but that household net use varied. It was highest in Senegal and Zambia and lowest in Nigeria where adult-sized net owners were extremely difficult to find. Nets were generally considered very expensive luxury items. Perceptions of nets also varied. They were viewed most positively in Zambia and least positively in Nigeria.

Further, those most vulnerable to diseases–children aged less than five years and pregnant women–did not regularly use the nets. In all countries, reaction to the use of insecticide to treat nets is generally favourable. However, aside from cost and access issues, an important barrier to the wider use of treated nets and other ITMs is the serious concern about the potential dangers they pose to children and pregnant women, and worries about the efficacy and safety of foreign chemicals.

The study also examined commercial market concerns, and in some settings, e.g. Nigeria, found problems of market segmentation of the insect-control products (nets sold in one place, chemicals to treat them in another).

In closing, Dr. Nachbar said that there are favourable markets in the study countries for the sale of insecticide-treated materials. However, product development and promotional efforts will need to build on existing positive perceptions of ITMs, address concerns of consumers, and stress that ITMs protect against mosquito bites and malaria. Additionally, to build a sustainable commercial market for these products, promotional efforts must counter the perception of nets as luxury items and direct significant effort toward reassuring the public about the safety and efficacy of ITMs (Table 1).

### Alternative forms of vector control

Alternative vector-control measures consider environmental management, chemical application, biological control, and personal protection as part of an integrated programme that is complementary to rapid case management and the use of insecticide-treated materials. Defining the entomological infection rate (EIR) as the number of infective bites received by a person in a single year, Michael Macdonald said that the EIR must be very low to reduce parasite prevalence, but that incremental reduction lowers mortality for all causes.

Priority operations research for community vector management includes developing an algorithm to choose a specific intervention appropriate to particular communities and environments; creating standardized indicators to determine the percentage of productive breeding sites eliminated, bites to human per hour and EIR; and determining the best way to implement these programmes.

Strategies that do not work to control mosquito populations are brush clearance and drain cleaning. Instead, Dr. Macdonald said that researchers and programmes should focus on reducing personal exposure which tends to be highest in Africa from late evening through the early morning hours.

### ILLNESS MANAGEMENT AND CARE-SEEKING IN THE HOME AND COMMUNITY

**Recognition of illness and care-seeking in Bangladesh**

Shams El Arifeen presented selected findings on two studies examining care-seeking for sick children in Matlab, Bangladesh. Using findings from the Matlab IMCI evaluation, Dr. Arifeen first described the baseline

### Table 1. NetMark project: major programme and product implications

- Favourable climate for ITM production
- Promotional efforts needed to address misperceptions of malaria transmission and seasonality
- Efforts should build on the positive perceptions of nets in Senegal, Uganda, and Zambia. More intensive efforts are needed in Nigeria to build this perception and counter negative views
- Promotional efforts must counter perception of nets as luxury items and build on the idea of net owners as ‘health conscious’ and ‘caring’
- Significant efforts are needed to introduce the concept of ITMs and to reassure the public of the product efficacy and safety, especially in regard to pregnant women and children
- Significant work is needed to achieve nightly use of ITMs by target groups
characteristics of the study population prior to IMCI implementation. He found that, although most illnesses were mild enough to be treated at home, two-thirds of children aged less than five years were ill in the two weeks prior to the survey. Less than 40% of sick children received the normal amount of food and fluids during their illnesses, with the great majority receiving significantly less than usual.

Sixty-three percent caregivers sought care outside the home for severely-ill children; high fever and severe diarrhoea were the most common reasons for seeking care. Most outside care was received from traditional healers (53%), with only 11% of care given by the formal health sector which includes CHWs, private doctors, or state clinics. Children requiring repeated visits to outside care tended to be taken back to traditional care providers rather than to private doctors or clinics. However, mothers showed an increasing tendency to bring sick children to formal healthcare providers if they displayed more than five symptoms of illness or were sick for a week or more.

In conclusion, Dr. Arifeen said that, if IMCI is to have a great impact on this community, efforts must be made to improve care-seeking from formal healthcare providers.

**Effectiveness of ORT in the community**

Since its first demonstration in 1968, many national diarrhoeal disease-control programmes have been successful in promoting ORT to prevent deaths from diarrhoea due to loss of fluids and electrolytes. Mohammed Khalequzzaman discussed positive trends in the ORT use for the management of diarrhoea in most parts of the world. The ORT use-rates in developing countries have increased (Table 2) from 40% in 1993 to 69% in 2000 (9), with village-based distribution of ORT by CHWs resulting in a 29% reduction in hospitalization in Bangladesh (10).

Although results of community-based ORT trials were not uniform, Dr. Khalequzzaman said that most studies yielded positive results in preventing deaths from watery diarrhoea. With easy availability of ORT and improved case management, the diarrhoeal mortality rates have gone down an average of 50% in children aged less than five years. After the introduction of ORT as a routine measure in the management of diarrhoea in several health facilities, there were also significant reductions in admission rates (median reduction 64%). The case-fatality rates were also reduced (median reduction 71%). The major constraints identified with achieving high use of ORT during diarrhoeal episodes were misperception about diarrhoea, incorrect assessment of the severity of diarrhoea, inadequate supplies of oral rehydration salts (ORS), and difficulties in administration.

Attempts should be made to motivate communities with proper training, education, and an adequate supply of ORS to formulate an effective diarrhoeal disease-control programme. In addition, type and quantity of fluid consumed, accuracy of preparation of ORS, time of starting the therapy, and continuation of feeding are also important for proper rehydration.

**Home treatment for malaria in Ethiopia**

According to Gebreyesus Kidane, it is possible to substantially reduce deaths in children aged less than five years in intensely-malarious areas by training mothers to treat their own children with presumed malaria using appropriate anti-malarial drugs at home. In 1997, he carried out a randomized study in northern Ethiopia in an area with a total population of over 70,000 and showed that deaths in children aged less than five years were reduced by over 40%.

This was done by training mother-coordinators (MCs, mothers who were selected by their neighbours) to teach their neighbouring mothers to recognize possible malaria and to promptly give chloroquine (using simple charts to explain the proper dosage and delivery of medicine) and by ensuring that all MCs had supplies of chloroquine to distribute to all families with young children. The MCs were also trained to record all births and deaths of young children.

In 10 of 12 paired tabias (group of villages), malarial deaths in children were significantly lower in the

<table>
<thead>
<tr>
<th>Region</th>
<th>ORT use (%)</th>
<th>1993</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>43</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>51</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>South Asia</td>
<td>19</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>East Asia and the Pacific</td>
<td>49</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>Latin America and Caribbean</td>
<td>58</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>Developing countries</td>
<td>40</td>
<td>69</td>
<td></td>
</tr>
</tbody>
</table>

intervention tabias (Fig. 6). The combined mortality rate in children aged less than five years in the 12 intervention tabias was 29.8 deaths per 1,000 children and in the control tabias, 50.2 deaths per 1,000. Verbal autopsy confirmed that mortality due to malaria can indeed be reduced by home care.

Zambia. Nearly 44% of 575 participants associated malaria with mosquito-bite, and 63% of 27 vendors indicated that mosquitoes caused malaria. All study subjects treated malaria with commercial medicines at the household level or took patients to the nearest rural health centre. The choice between modern and traditional medicines varied with perceived cause of illness and availability of those providing the services. When malaria was severe, people turned to indigenous medicine, as witchcraft was suspected as the source of the disease.

Only 7% of respondents knew of the correct dose of chloroquine for children aged less than five years, with 81.5% of vendors unable to give the correct dose. However, the majority of respondents regarded health facilities as their first choice for treatment. Health workers were also considered a good source of information for malaria treatment.

Dr. Kaona’s recommendations to improve community use of anti-malarials included:

- An intervention that will provide practical knowledge to influence drug-sellers to conform to the national malaria-treatment guidelines

<table>
<thead>
<tr>
<th>Fig. 6</th>
<th>Mortality rate per 1,000 child-years among children aged less than five years, January-December 1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Pairs of tabias</td>
<td></td>
</tr>
<tr>
<td>Intervention tabias</td>
<td></td>
</tr>
<tr>
<td>Control tabias</td>
<td></td>
</tr>
<tr>
<td>Mortality rate</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

It is vital to understand what family and community-based efforts can achieve when properly designed and applied in a receptive setting. With suitable modifications of the approach taken by Dr. Kidane to fit each locale, this should be tried in other settings. However, it is important to recognize the special biological and sociopolitical factors of this study that may limit applicability in other parts of Africa: the presence of chloroquine-sensitive falciparum malaria, a disciplined population accustomed to coping for themselves, strong community solidarity, and no alternative income opportunities for the MCs.

Community use of anti-malarial drugs in rural Zambia

Frederick Kaona reported the results of his study which documented the household use of anti-malarials in rural
• An intervention to encourage appropriate use at the household level that will enable communities to treat malaria in conformity with the national malaria-treatment guidelines

• Training of village health monitors and drug vendors as agents of behaviour change to conduct health-promotion activities with emphasis on prompt and correct treatment of malaria in children aged less than five years

**DEVTA Project: reducing malnutrition and mortality in India**

Despite the widespread implementation of health programmes, malnutrition is still pervasive in India. Recent estimates show that 75% of all preschoolers are stunted, and mortality in young children remains high (90/1,000). Shally Awasthi spoke about the ongoing DEVTA Project which aims at improving nutrition status and reducing the rate of mortality of children aged less than five years with routine deworming of preschool children, coupled with periodic large-dose administration of vitamin A. The intervention, implemented in partnership with the Integrated Child Development Services (ICDS), delivers 200,000 IU of vitamin A and 400 mg of albendazole to children aged between 6 months and 6 years in seven districts (72 blocks) of Uttar Pradesh. Approximately, one million children are participating in the study.

Crucial to the project’s success are: meetings at the state, district, and block level, which make participants at each level feel vested in the project. Dr. Awasthi said that another aspect of the project is detailed training of anganwadi workers to deliver the drugs. Assessment of anganwadi training was done by monitoring two randomly-selected centres in each block everyday of the campaign. In each area, greater than 90% of all the centres were properly functioning. Drug use was 87% in the first campaign and 91% in the second. Dr. Awasthi attributed the success of the project to continued presence of the project staff in the community; continued dialogue with the decision-makers at the state level; periodic results provided to the district-level staff and to the primary and secondary implementers; and successful deworming of children, which increased the community’s faith in the project. She concluded that anganwadi workers can be trained to deliver other health services to increase the rate of child survival.

**Community management of neonatal infections**

Neonatal mortality comprises approximately 66% of all deaths worldwide in infants aged less than one year, and 40% of all deaths in children aged less than five years. Of the annual 5 million neonatal deaths, approximately two-thirds occur in the first week of life, and 98% take place in developing countries (11,12). For nearly every death of a newborn, there is another stillborn (13). Gary Darmstadt reported that 30-50% of all neonatal deaths occur due to infections, including tetanus, pneumonia-septicaemia-meningitis, and diarrhoea. Other causes include pregnancy- and delivery-related complications, such as birth asphyxia and injury, prematurity or low birth-weight, and congenital anomalies.

Strategies to improve neonatal outcomes must take place within a sustainable health system and a broader context of improving maternal and child health. These strategies must also encompass home-based care, where most neonatal births and deaths occur, and include links with referral facilities (14,15). Priority interventions are shown in Table 3 and 4.

Community-based intervention trials have shown that adherence to basic care practices for the newborns reduces neonatal deaths due to infections by 40-80%. In Guatemala, pregnant women were enrolled during the third trimester or at the time of delivery, and the newborns who survived beyond the first day of life (n=380) were followed up prospectively through regular home visits by health workers and the study physician for the first three months of life (16). When symptoms of severe illnesses were detected, immediate empiric treatment was begun in the community with referral to an area hospital. Of the 19 episodes of lethal or potentially lethal illness identified during days 2 to 28 of life, more than half (n=10) presented during the first week, and most (n=16) were diagnosed clinically as probable sepsis. The mortality rate among infants enrolled in the study was reduced by 85% compared to the historical controls, leading the authors to conclude that families could be oriented to recognize a simple set of signs and symptoms of illness, and once oriented, were capable of responding properly.

Dr. Darmstadt also reported the results of a prospective, home-based trial in India by Abhay Bang that evaluated the efficacy of case management of neonatal pneumonia, including empiric antimicrobial therapy (17). In the intervention area, the adult population was educated in the recognition of pneumonia; village health workers (VHWs) were trained in hygienic delivery practices, essential neonatal care, diagnosis of pneumonia, and empiric oral antibiotic
Table 3. Priority interventions to reduce perinatal and neonatal mortality

<table>
<thead>
<tr>
<th>Before or during pregnancy</th>
<th>During delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotion of maternal health and capacity</td>
<td>Clean delivery</td>
</tr>
<tr>
<td>Education</td>
<td>Handwashing</td>
</tr>
<tr>
<td>Family planning/birth spacing</td>
<td>Clean delivery surface</td>
</tr>
<tr>
<td>Gender equality</td>
<td>Clean cord-cutting</td>
</tr>
<tr>
<td>Minimization of workload/stress</td>
<td>Skilled attendants at birth</td>
</tr>
<tr>
<td>Antenatal care</td>
<td>Prevention/management of complications</td>
</tr>
<tr>
<td>TT immunization</td>
<td>Eclampsia</td>
</tr>
<tr>
<td>Birth preparedness</td>
<td>Haemorrhage</td>
</tr>
<tr>
<td>Identification/management of high-risk</td>
<td>Pre-term/prolonged labour</td>
</tr>
<tr>
<td>pregnancies</td>
<td>Pre-term/prolonged membrane rupture</td>
</tr>
<tr>
<td>Elimination of substance abuse</td>
<td>Chorioamnionitis/puerperal sepsis</td>
</tr>
<tr>
<td>Maternal nutrition</td>
<td>Prevention of HIV transmission</td>
</tr>
<tr>
<td>Preparation for early, exclusive breast-feeding</td>
<td>Resuscitation of the newborn</td>
</tr>
<tr>
<td>Supplementation</td>
<td>Prompt recognition (&lt;1 min)</td>
</tr>
<tr>
<td>Iron/folate</td>
<td>Tactile stimulation</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>Artificial breathing when necessary</td>
</tr>
<tr>
<td>Zinc</td>
<td></td>
</tr>
<tr>
<td>Multinutrients</td>
<td></td>
</tr>
<tr>
<td>Malaria prophylaxis</td>
<td></td>
</tr>
</tbody>
</table>

...of the implementation of this package of essential care practices for the newborns, mortality due to sepsis was reduced by 76% and neonatal mortality declined 62% compared to the control (non-intervention) area at an estimated cost of US $30. Other studies are in progress to assess the impact of similar service packages.

In addition to identifying ill neonates accurately, case management of neonatal infections in the community also requires knowledge of the agents of infections in the community, including antimicrobial susceptibility patterns. The principal comprehensive, prospective study was conducted by WHO in Ethiopia, The Gambia, Papua New Guinea, and The Philippines in 1990 to 1993 for identifying the aetiology of community-acquired neonatal infections, based on laboratory diagnostic testing in conjunction with medical history and clinical examination (19). Although there were minor regional differences in the agents identified, the primary pathogens were: *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *S. pyogenes*. Most of the remainder were various Gram-negative enteric organisms, particularly *Escherichia coli*, *Salmonella*, *Enterobacter*, and *Klebsiella*, which also were relatively more important during the neonatal period compared to month 2 or 3 of life. Of 43 positive cerebrospinal fluid cultures, 17 were *S. pneumoniae*. The most common upper respiratory viral pathogen was respiratory syncytial virus; cases due to influenza A, influenza B, and...
parainfluenza virus also were identified. Prospective community-based studies which involve surveillance in the home and early identification of infected neonates are urgently needed to identify the pathogens causing infections in the community.

Dr. Darmstadt concluded by defining the main research questions that are central to efforts in reducing neonatal infections in the community. Efforts must be made to understand:

- Traditional neonatal care practices in the home, and how they impact neonatal health
- Sociocultural and logistical factors which impact seeking and receiving care, and how they affect outcome
- How neonatal healthcare and messages can best be delivered in the community
- Which organisms (and their antibiotic susceptibilities) cause neonatal infections in the community
- What risk factors and clinical signs and symptoms are of most use by first-line health workers and caregivers for identifying neonates with serious infectious illness

**COMPLIANCE WITH RECOMMENDED TREATMENTS AND REFERRALS**

**Improving use of pharmaceuticals**

Angela Wakhweya of Boston University’s ARCH Project spoke of the need to improve the use of pharmaceuticals at the household and community levels (Fig. 7). Improving drug use is an important part of IMCI implementation, because drugs continue to consume a large segment of household budget; are effective against certain childhood illnesses, such as malaria and ALRI, but ineffective against diarrhoea and upper respiratory tract infections; and misuse and over-use contribute to the growing threat of antimicrobial resistance in bacterial pathogens.

Dr. Wakhweya described the characteristics of current drug-use interventions. She said that most interventions were targeted at the public sector and that the private sector tended to be ignored. She also said

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**Table 4.** Priority practices for newborn care to reduce perinatal and neonatal morbidity and mortality from infectious diseases

<table>
<thead>
<tr>
<th>Practice</th>
<th>Ease of implementationa</th>
<th>Costb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hygiene (hands, skin)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Umbilical cord care</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Cutting and tying cord with sterile devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prompt treatment of omphalitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification/surveillance of high-risk neonates*</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Low birth-weight (&lt;2500 g)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premature (&lt;37 weeks gestational age)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature maintenance*</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Maintaining warm ambient environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drying with warm, clean towels immediately after birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swaddling in layers of cloth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dressing as appropriate for the season, covering the head</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintaining skin-to-skin contact with the mother/Kangaroo care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring temperature, skin-to-skin contact for rewarming</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prophylaxis of <em>ophthalmia neonatorum</em></td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Breast-feeding*</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Early (within 1 hour) and exclusive for 4 to 6 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Promoting feeding of colostrum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoiding pre-lacteal feeds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education of mothers/caregivers and first-line community healthcare workers in recognition, simple treatment, and appropriate referral of ill neonates</td>
<td>+++</td>
<td>+++</td>
</tr>
</tbody>
</table>

*Principal measures for preventing hypoglycaemia

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*a* Scale: +=easy, +++=moderate, +++=difficult

*b* Scale: +=low, ++=moderate, +++=high
that most interventions focused on healthcare providers and addressed the perceptions and practices of consumers inadequately. Finally, community interventions have a tendency to be too focused on communication of proper practices rather than on desired behaviour change.

Successful research to support community IMCI activities should involve community networks and associations; be cognizant of the sociocultural landscape of the community; ascertain the decision-making dynamics within the households; target behaviour change rather than acquisition of knowledge alone; and use interventions that are evaluated on an ongoing basis.

Impact of training on compliance with IMCI treatment guidelines

The IMCI guidelines were first implemented in three Ugandan districts in 1995-1996. Currently, IMCI has been introduced in 42 of 45 districts and involves public sector and NGO health facilities. The community component has also been started in seven districts.

George Pariyo of Makerere University described a study to evaluate the impact of IMCI treatment counselling guidelines on completion of a full course of antimicrobial treatment in the home. Methods included observation of counselling by dispensers in the health facility and a follow-up interview with the caretaker in the home five days after the visit. He and his team compared 20 facilities with IMCI-trained prescribers and drug-dispensers in Hoima district with 20 facilities in Hoima in which only some prescribers and no dispensers were trained and nine facilities in Kibale that had no IMCI-trained prescribers or dispensers. The original study design, which called for a comparison group consisting of 20 facilities in Kibale district where neither prescribers nor dispensers had received IMCI training, had to be modified due to rebellious activity in the district.

In examining the use of chloroquine and co-trimoxazole, Dr. Pariyo reported that the IMCI counselling guidelines were extremely effective in improving the quality of drug-counselling given by dispensers as measured by a 12-point index of counselling quality with a Cronbach’s alpha of 0.92. Training of dispensers using IMCI counselling guidelines resulted in a statistically significant but modest improvement in the proportion of caretakers who administered a complete course of co-trimoxazole to the child in the home and a non-significant improvement for chloroquine (Fig. 8). There was a tendency in the intervention group to administer more chloroquine or co-trimoxazole than had been prescribed. Extra tablets were often bought from the private sector.
Evaluating the counselling of caregivers in Mukono district, Uganda

To date, more than 50% of health workers in Mukono district, Uganda, have been trained in IMCI case management. Reports, however, have indicated that the IMCI counselling is the most difficult and poorly-performed component. Charles Karamagi of Makerere University spoke of a study designed to develop a standardized methodology for assessing the IMCI counselling and the counselling of IMCI-trained healthcare providers to mothers and determining the factors that facilitate or constrain the IMCI counselling.

A cross-sectional study was carried out from February to June 2000 in 23 health units in Mukono district. Researchers designed a testing instrument with 14 items to assess the quality of IMCI counselling. Some items included were: does the care provider advise the caregiver on feeding practices, medication, and when to return for a follow-up visit? The test was considered highly reliable with a Cronbach’s alpha of 0.825 and was initially tested on 30 healthcare providers in Kampala district. The researchers then evaluated the IMCI-trained doctors using the 14-item test and found that it had a 76% sensitivity and a 75% specificity to predict satisfaction of the mothers.

The instrument was then further tested on 37 healthcare providers in over 161 counselling sessions in Mukono district. Most (73%) IMCI counselling sessions scored higher than the cut-off score of 42. According to Dr. Karamagi, the mean scores were significantly lower for healthcare providers working in hospitals compared to those working in the lower-level health units. The IMCI counselling of lower-level cadres was significantly better than that of higher cadres. Factors affecting the IMCI counselling included type of health unit, cadre of healthcare provider, number of supervisory visits, and number of patients seen per day.

The IMCI counselling instrument performed reasonably well but requires further evaluation, particularly in routine supervision. Contrary to previous reports, IMCI counselling by most healthcare providers was good. However, the IMCI counselling skills in hospitals and by clinical officers and registered nurses/midwives should be strengthened, and work be distributed among the healthcare providers so as to avoid overload.

Adherence to referral in Ecuador

A key strategy of the IMCI approach to reducing child mortality in less-developed countries is for health
workers to use the IMCI guidelines to identify severely-ill children requiring urgent referral to hospital. Undercutting this strategy is the widely-observed phenomenon that many referred children do not access hospital in a timely fashion or at all. Henry Kalter reported on the results of a study in Imbabura, Ecuador. The study was designed to determine the levels of key referral indicators and to identify which factors, hindering referral, could potentially be modified to increase hospital access.

The study was conducted from 1 September 1999 to 30 April 2000 in 51 of 53 primary care facilities of the Ministry of Public Health and in all four regional hospitals. All children, aged one week to five years, with an IMCI diagnosis, were registered in a study log, and the referred children were tracked to hospital or their homes with an attempted follow-up period of 24 hours after the referral. Preliminary findings showed that 170 of 11,672 (1.5%) children aged one week to five years, seen at the study primary care facilities with an IMCI diagnosis, were referred to hospital. The caregivers of 160 of the 170 referred children were interviewed with a median follow-up time of two days (range, 0-12); 67 of the 160 (41.9%) referred children did not access hospital. Twelve of the 160 (7.5%) referred children died of their acute illnesses, and 67 of 93 (72%) referred children who accessed hospital were admitted.

The five factors that Dr. Kalter found to be the most severe barriers to realization of referral were the following:

- The caregiver did not receive a referral slip.
- The health worker did not counsel the caregiver to go to hospital immediately after leaving the primary care facility.
- Transportation to hospital was very expensive.
- The mother was not the primary decision-maker of the family regarding whether to go to hospital.
- The caregiver had to spend the night away from home to take the child to hospital.

There was also a significant interaction between the last variable and the child’s age, such that a child who was aged less than three months and whose caregiver had to stay overnight had a 188-fold greater chance of not being taken to hospital than a child whose caregiver did not have to stay overnight. Also, not receiving a referral slip and not being told to go to hospital immediately multiplied the effect of each other so that the risk of not being taken to hospital increased from 19% in a child who received both interventions to 96% in a child who received neither intervention.

The findings suggest that access to hospital could increase if health systems made referral slips available to their health workers and trained them to provide a referral slip and counsel the caregiver of each referred child that the severity of illness requires going to hospital immediately after leaving the first-level facility. Health workers should also be trained to assess additional risk factors for each referred child, such as the child’s age or the caregiver having to spend the night away from home, to complete referral. Other barriers to referral identified by the study, such as transportation cost and the mother not being the primary decision-maker concerning hospital care, may be less amenable to health system intervention.

INTEGRATION OF INTERVENTIONS IN THE COMMUNITY

Impact of IMCI in Uganda

Gilbert Burnham reported the results of an IMCI impact study in western Uganda, which found that IMCI training
significantly increased the performance of health workers, but that the government and NGO health facilities were woefully under-used, medical referrals of ill children to higher-level facilities were not immediately followed, and immunization rates were perilously low.

Comparing four districts having no IMCI with six districts having more advanced IMCI implementation, Dr. Burnham’s team found that the IMCI-trained healthcare providers asked if sick infants could drink or take breastmilk 58% of the time and checked respiration rates 76% of the time. By comparison, health workers with no IMCI training checked feeding only 26% of the time and respiration rates 19% of the time (Fig. 9-12). The IMCI-trained care providers checked for dehydration in children reporting diarrhoea almost 70% of the time and checked children’s weight against growth cards 82% of the time. Again, health workers with no IMCI training checked for dehydration only 24% of the time and checked growth only 38% of the time.

Although the implementation of IMCI clearly increases the quality of performance of health workers, under-use of the government and NGO health facilities remains an important problem. Dr. Burnham found that only 17% of villagers sought care from formal health facilities and that most people still used private practitioners (41%), bought treatments directly from drug-mERCHANTS (38%), or visited traditional healers (4%). Also in the study area, people followed advice to take seriously-ill children to hospital for care, but often waited several days before complying with referral. The most frequently-cited reason for lack of timely referral was lack of money. Lastly, this study found that immunization rates were much lower than expected. They found that less than 30% of children were fully immunized against polio and that even fewer (12-14%) children received the full recommended complement of preventive vaccines.

Dr. Burnham concluded by saying that work is urgently needed to introduce the IMCI guidelines into private practice, to implement prescribing and dispensing the guidelines for the sale of pharmaceuticals, reform the referral of sick children, and increase the immunization rates.

**Bangladesh’s Chakaria Community Health Project: the self-help approach**

The Chakaria Community Health Project in Cox’s Bazar, Bangladesh, has created a health system for over 140,000 villagers that is guided by local committees and implemented by trained volunteers from the community. Since 1994, researchers from the ICDDR,B: Centre for Health and Population Research began meeting with community members to discuss health problems and practices and introduced participatory planning methods to facilitate health system development. Mohammad Iqbal described the achievements of the project which, to date, include training of health volunteers to identify and treat diarrhoea, ARIs, malaria, and other infectious diseases; training on basic preventive measures, such as proper nutrition, clean water and hygiene; and the establishment of village health posts for preventive and curative services. Health volunteers also disseminate health messages and monitor health activities, including participation in the government-sponsored National Immunization Days (NIDs) and the Expanded Programme on Immunization (EPI).

Village health posts provide essential services to the community through public-health physicians and health educators. Family health cards were introduced to encourage attendance at the village posts. By purchasing a health card for 50 taka, family members are entitled to consult the project physician at a reduced fee. For poor families, the cost of the health card is only 10 taka. More recently, training of midwives and paramedics has begun to increase the services to the community. Midwives are trained in basic antenatal care and safe-delivery practices, such as early management of pre-eclampsia, episiotomy, and infant resuscitation. Paramedics receive 200 hours of classes, 80 hours of practical training, and 200 hours of observed training in the field and are capable of administering a wide variety of drugs, management of simple injuries, diagnosis and treatment of infectious diseases, and family-planning counselling.

The Chakaria Community Health Project is an excellent example of how community volunteers can be successfully trained to deliver essential medical services, and how villages can be encouraged to plan and manage their own health system.

**Reaching private practitioners**

Formal and informal private practitioners treat a large proportion of sick children and yet are ignored by most child-survival programmes. In Uganda, private practitioners treat 78% of all sick children; in India, they treat 90% of children with diarrhoea (20), and in Nepal, 60% of children with diarrhoea and ARIs (21). Yet, according to Youssef Tawfik, the quality of their services is poor: they rarely give advice on feeding a sick child,
often give incorrect doses of drugs, and rarely counsel caregivers on warning signs of illness that may require urgent treatment or referral (Fig. 13). Nevertheless, private care providers are in high demand by the community, because they are generally closer than the government and NGO health facilities; they have longer working hours and less-waiting time; and they spend more time with their clients and seem more responsive to the needs of patients.

Dr. Tawfik discussed the varying strategies that the child-survival programmes and governments can use for improving the effectiveness of private practitioners’ quality of care. One such strategy is increased regulation of service providers or prescription of drugs. In 1990, Pakistan removed anti-motility drugs from their registered formularies, which stopped retail outlets from selling these and reduced cases of paralytic ileus (22). Crucial to the success of this approach is enforcement
of the new laws. Another strategy for reaching private physicians is increasing their motivation to deliver appropriate preventive measures (vaccines) or treatments with economic or other incentives, such as increased profits or tax incentives. The most promising intervention strategy, to date, has been education and negotiation programmes, especially when they focus on key practices and approach the target practitioners in a non-threatening way.

In closing, Dr. Tawfik said that the child-survival programmes must be expanded to use the potentials of formal and informal private practitioners and that more research is needed to understand care-seeking, and how to intervene to improve the effectiveness of care delivered in private practice.

**Bamako Initiative**

Since 1987, the Bamako Initiative of UNICEF has brought affordable, essential healthcare to over 60 million people in 33 countries around the world by targeting delivery of services at the local level and creating systems that ensure an adequate supply of equipment and medicines. Also central to the Bamako Initiative is community control and co-management of facilities. In many sub-Saharan African countries, the initiative has been scaled up to reach most people. For example, in Guinea, seven years after the implementation of Bamako Initiative, the number of health centres had increased to 295 and service reached approximately 80% of all Guineans; the immunization coverage increased to 74%, and antenatal care increased from 5% in 1987 to 71% in 1994.

Rudy Knippenberg spoke about the lessons learnt from the Bamako Initiative in regard to community co-financing, growth, and sustainability of services. In particular, revolving drug-funds ensured uninterrupted drug supplies and created an entry point for improving the quality of care. To have successful revolving drug-funds, there must be standard treatment guidelines and well-defined equity mechanisms in the community. Another strategy used by the Bamako Initiative was fee-for-service. This increased the cost-consciousness of health system users and supported operating costs and improvements in system access and quality. A key to the success of fee-for-service was the establishment of clear guidelines for exemption. Some countries implemented prepaid health accounts which supported continuity of care by erasing health facility cash-flow problems. Voluntary and compulsory health insurance schemes reduced barriers to service and raised the cost-consciousness of care providers but still need to be extended to all residents and have local co-management to be successful. In addition to these strategies, community co-financing increases the quality of care and also creates an entry point for community development and strengthening of the health system.

Dr. Knippenberg also recommended multiple strategies to target specific situations. For example, in a community with drug shortages and poor access to low-quality care, a revolving drug-fund should be implemented in conjunction with fee-for-service. Conversely, in a community with low use of high-cost services, a prepaid health account or voluntary insurance mechanism is likely to be successful. Likewise, in an
area with great economic inequity, he recommended compulsory health insurance with community co-financing.

**ROLE OF COMMUNITY HEALTH WORKERS**

**Use of IMCI guidelines by anganwadi workers in India**

Manjula Datta spoke about a study that evaluated the ability of anganwadi workers in Chennai, India, to use the IMCI guidelines for the diagnosis and treatment of children aged two months to five years. Before the initiation of the study, anganwadi workers received hands-on training in using clinical signs to diagnose illness; field training for two weeks; and retraining after a pilot phase of the project. In 30 centres, 3,301 children were examined first by anganwadi workers and then referred to the nearby Government Stanley Hospital and re-examined by a doctor. Gold-standard diagnosis by physicians and management decisions were then compared with those by the anganwadi workers.

Seven hundred two children had some form of morbidity over the nine-month study period (February-October 2000). Alarmingly, almost 10% of children had some form of protein-energy malnutrition (PEM), and 72% had some degree of anaemia. The sensitivity of the anganwadi workers’ diagnosis of danger signs was moderately high, but for some specific conditions, such as dehydration or anaemia, sensitivity was low (Table 5).

In conclusion, Dr. Datta said that anganwadi workers could use the IMCI guidelines effectively for the diagnosis and management of illness but that training methods could be improved to raise the sensitivity of diagnosis relative to a physician’s gold standard. She

<table>
<thead>
<tr>
<th>Table 5. Validation of use of IMCI guidelines by anganwadi workers</th>
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<tbody>
<tr>
<td>Condition</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Pneumonia</td>
</tr>
<tr>
<td>Dehydration</td>
</tr>
<tr>
<td>Anaemia</td>
</tr>
<tr>
<td>PEM</td>
</tr>
<tr>
<td>Low weight-for-age</td>
</tr>
<tr>
<td>General danger signs</td>
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</tbody>
</table>
said that clinics without investigation facilities could greatly benefit from the use of IMCI.

**Community Initiatives for Child Survival in Siaya, Kenya**

The Community Initiatives for Child Survival in Siaya (CICSS) project aims at reducing morbidity and mortality rates among infants and children aged less than five years and at improving the health status of women of childbearing age in 320 rural villages in Nyanza Province, Kenya. The project targets 32,674 children aged less than five years and 41,672 mothers by training CHWs, community health committees, and women’s groups to promote infant, child, and maternal health. This includes the establishment of pharmacies at the community level to enhance access to drugs and prescribed treatment of common diseases.

David Newberry reported on the achievements of the project and the strategies used in ensuring success. Using a modified form of the IMCI guidelines, the CICSS has reduced child mortality by 49%, increased DPT vaccination rates from 57% to 84%, and raised measles vaccinations from 41% to 59%. Using health-promotion practices, the project has also increased the level of care-seeking for malaria to 50% of the target population.

Community support at all levels of the project was crucial to its success. Community health committees assisted in assessing the initial needs for the community, and now review surveillance data regularly and make resource-allocation decisions to target identified problem areas. Since its inception, the CICSS has implemented home-treatment curricula for illnesses and a counselling programme for mothers. Work is currently in progress to ensure programme sustainability by seeking technical advice on cost-effectiveness and efficiency and by identifying local long-term funding mechanisms.

**Role of community health workers in Nepal’s IMCI Initiative**

Since 1993, the Ministry of Health (MOH) in Nepal has implemented a community-based approach to extending child-health services beyond health facilities. Penny Dawson reported that the programme builds on the success of the Jumla ARI intervention trial, which reduced child mortality for all causes by 28%. The current MOH programme trains female community health volunteers (FCHVs) to diagnose and treat pneumonia and refer more seriously-ill children to the nearest health facility. The same FCHVs have also been trained in recognition of danger signs of dehydration and appropriate use of ORS, the importance of good nutrition/vitamin A supplementation, and promotion of routine immunizations for children.

Beginning in 1997, thousands of FCHVs were monitored and evaluated, and it was found that over 80% had and maintained excellent knowledge about danger signs, respiration rates, and antibiotics dosage for several years after initial training (Fig. 14). They treated large numbers of pneumonia cases with paediatric co-trimoxazole and followed up over 80% on the third day of treatment. Not only have the FCHVs proved themselves capable of diagnosing and treating pneumonia correctly, but also their involvement in pneumonia case management has greatly increased access to treatment for children.

Since July 1999, the community-based child-health programme has been merged with the IMCI initiative, defining a clear direction for future child-health programmes in Nepal. Dr. Dawson reported that recognition of the efforts of CHVs is increasing, with some local leaders making financial commitments to support the FCHVs and child-health programmes in their villages. The programme is not only beneficial to child health, but is also empowering the FCHVs and improving the status of women in their communities. Partnerships between the Ministry of Health and private voluntary organizations have increased programme support and monitoring and allowed testing of other innovative approaches, such as cost-recovery, with FCHVs now selling co-trimoxazole in some districts.

**Role of community health workers in Latin American IMCI**

Alfonso Rosales presented the results of the El Salvador/Nicaragua Community-based Child Survival Project which trained 1,058 volunteer CHWs to promote child health and growth at the local level. One of the first problems identified by the programme was the low level of exclusive breast-feeding in infancy. Several years after implementation of the programme, the breast-feeding rates in El Salvador increased from 23% to nearly 30%, and in Nicaragua, the rates increased from 17% to 43%. Complementary feeding practices and nutritional supplementation during illness also increased during this time. Other major successes of the programme include an increase in tetanus immunization from 21% to 54.4%
in El Salvador and improvement in the ability of CHWs to diagnose and treat dehydration from 40% to 83% in El Salvador and from 16% to 44% in Nicaragua.

In closing, Dr. Rosales stated that the key elements of success of this programme were active involvement of the community, careful selection of CHWs, and dissemination of the project’s achievements within the community to build greater acceptance and use. He also said that operations research was urgently needed to understand the attitudes and practices on infant-feeding during diarrhoea, the types of fluids used orally for rehydration, and the barriers to exclusive breast-feeding.

**Implications for the role of community health workers in IMCI: Brazil**

To increase the impact of the IMCI strategy on infant morbidity and mortality, it is essential to reach families in the community. Juraci Cesar spoke about a study that was carried out in Sergipe State, Brazil, to determine the potential of CHWs. From May to September 2000, an anthropologist and an epidemiologist performed 106 in-depth and expert interviews with CHWs, nurses, doctors, heads of local departments of health, and coordinators of IMCI and CHW programmes in 21 of 75 municipalities. Also, six focus-group discussions were done with mothers of children aged less than five years.

Some barriers to extending IMCI to the community through CHWs were identified. The CHWs received inadequate training, support, and supervision. Low salaries without fringe benefits or job security and isolation in the community were also identified as limiting factors. Some mothers felt that the CHWs were a paternalistic intrusion in their lives and that a doctor, not a CHW, should treat diseases. Solutions to these problems included: improving the relationship between CHWs and mothers by selecting them from the communities in which they practise. It was hoped that this would be an efficient way not only to introduce a campaign in a community but also to connect people to health services.

Dr. Cesar said that this preliminary analysis suggests that the CHWs have great potential in extending the IMCI strategy into the community. Furthermore, to achieve this goal, the skills of CHWs must be reviewed, their tasks need to be redefined, training support and supervision should be improved, and the local health team, including CHWs, doctors, and nurses, needs to participate more in the community activities.

**FINANCING AND ACCESS TO CARE**

**Overview of costing interventions**

Hugh Waters reviewed the literature on costing community interventions for maternal and child
healthcare and found three major categories of studies: those using predictive costing, those using actual costing, and cost-effectiveness analyses.

Predictive models identify the types and extent of resources that are required for a programme and are based on the incidence of disease, treatment patterns, and the unit costs of inputs. In general, predictive costing estimates do not include training and other start-up costs and calculate service-delivery costs at a minimum level delivered at peak efficiency. For example, the Better Health in Africa estimated a facility-based basic package to cost as little as US$13.22 per person per year. Itemizing these costs shows that US$7.74 would be spent at the health-facility level; US$3.98 on inter-sectoral interventions, including safe drinking water and sanitation; US$1.50 on institutional support; US$0.47 on maternal health services, including nutrition; US$0.21 for a school-children’s health programme; and US$1.52 for well-baby services. Other examples of predictive costing models are shown in Table 6.

Actual costing ensures that all pertinent costs are counted, including maintenance, equipment, utilities, supplies, and capital and indirect costs, such as management, supervision, and administration.

A considerable amount of work has already been done to measure the cost-effectiveness of separate child-survival programmes, especially Control of Diarrhoeal Diseases (CDD) and Expanded Programme on Immunization. This work showed both interventions to be efficient—ORT costs just US$0.71 per childhood diarrhoea episode treated, and a full series of child immunizations costs between US$5 and US$13, depending on the setting and the mode of delivery (costs are lower when vaccines are delivered through fixed-facilities than when offered through campaigns). Mass-media campaigns have produced significant results, but unfortunately, viewers return to previous behaviours without constant reinforcement of health messages. In Egypt, television campaigns to promote ORS in 1984–1985 resulted in 96% recognition and 82% use-rates among mothers. By 1992, ORT use had decreased to 34% levels similar to those prior to the intervention. In the Philippines, however, television helped increase the immunization coverage for 9 to 11-month old children from 33% to 56% in 1990.

Interventions employing CHWs and VHWs have also generally been found to be cost-effective. However, in general, CHWs and VHWs are not effective if they are not continuously supported with salaries, financial incentives, or some other types of motivation. On the other hand, services provided by community-based TBAs are less cost-effective than facility-based services in reducing maternal mortality (23). A study of different options to reduce maternal mortality found that investments in health centres and rural hospitals were more cost-effective than TBAs, even when the TBAs receive specialized training. The study, conducted by the Prevention of Maternal Mortality (PMM) programme at Columbia University, compared programme investment options, including TBAs, prenatal care, family planning, and different levels of health facilities. Using predictive costing techniques, the study found investments in health centres and rural hospitals to be the most cost-effective option (23).

Community activities can play a significant role in generating demand for health and family-planning services—a factor that is difficult to quantify in the context of cost-effectiveness studies but still represents an important argument in favour of community activities. Women’s groups also have a large potential as community agents to influence healthcare behaviours.

<table>
<thead>
<tr>
<th>Country</th>
<th>Intervention</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt</td>
<td>In 1999, the World Bank and Partnerships for Health Reform estimated costs for a basic package of facility-based services, including family planning, reproductive healthcare, and basic ambulatory care</td>
<td>US$16-20 per person</td>
</tr>
<tr>
<td>Bolivia</td>
<td>Maternal and neonatal health services. In 1993, implementation of the Making Motherhood Safe package was estimated to be US$2-6 per person</td>
<td>Current package US$2.84 per person</td>
</tr>
<tr>
<td>Uganda</td>
<td>Maternal and neonatal health interventions at the district level</td>
<td>Current package 50-60 cents per person. Safe Motherhood Programme would cost US$1.40 per person</td>
</tr>
</tbody>
</table>
Where cost estimates exist, women’s groups have been shown to be a cost-effective means of promoting public-health causes.

The feasibility of other community financing schemes is still largely unknown. Various community-level insurance schemes have become more common in recent years, but their success in raising revenues and promoting access remains an important question. Research is needed to explore how these schemes can be promoted to increase financing levels, ensure access, and protect against risk.

It is clear that cost-recovery strategies only lead to improved access if the revenues are retained at the health facility level and significant improvements in service quality accompany price increases. Key questions remaining to be answered about cost-recovery strategies include the proportion of health-facility recurrent costs that can feasibly be financed through cost-recovery and methods to promote the effective use of revenues to improve the availability and quality of services.

Financial barrier is just one of the barriers to access to child healthcare. Information about appropriate care-seeking behaviours is the key. Transportation and geographic barriers play an important role. Cultural factors, including the role of women in household decision-making, are also clearly important. Poor counselling at the peripheral levels can lead to referred children not making it to hospitals. Understanding the barriers to access to child healthcare and policy interventions that can successfully address these barriers is a research priority.

In closing, Dr. Waters said that very few rigorous cost-effectiveness studies of community interventions have been done to date. Additional studies of this nature are an important research priority to help promote the cause of community-based healthcare and also plan for additional interventions.

**Development of a costing model for community IMCI**

According to James Eckroad, there is a need to classify interventions based on similarity in cost structures and a need to classify and summarize cost by focus or objective of the intervention to plan for community implementation of IMCI. For example, most of these items have travel and per-diem costs and facility and material costs that must be considered when planning interventions.

Costs included within service-delivery are costs of drugs, commodities, or micronutrients; cost per unit; size of target population; and number of unit items needed per person. Also figured into service-delivery costs are fees for CHWs, such as salaries and incentives, and travel allowances.

Mr. Eckroad provided a sample budget from the implementation of a community IMCI package (Table 7-8), which calculated the costs of meeting, training, and service-delivery.

**IMCI costing tool**

In March 1999, the Inter-agency Task Force (IATF), with members from the World Bank, WHO, and USAID, began to develop a simple and reliable tool to estimate the costs of introducing and implementing IMCI in a country. Eva Weissman spoke about the development and design of the tool and said that it was intended to establish the price of implementation start-up costs and the recurrent costs of the programme encountered in the introduction and expansion phases.

By January 2000, the preliminary costing tool was field-tested in Bolivia. The start-up cost model considered the cost of orientation meetings, national and district-level planning meetings, and review meetings. It also included the adaptation of IMCI case-management guidelines, feeding recommendations, translation, and the design and testing of a mother’s health card. Training expenses included IMCI training, facilitator training, supervisor training, and follow-up. Equipment costs, such as drugs and drug storage, were also figured by the tool. The cost per IMCI training course during the Bolivian implementation was US$10,900 for two 11-day workshops and US$4,600 for two five-day meetings. Courses in Peru were estimated to cost US$2,000 per trainee.

The recurrent cost model considered the costs of case management and treatment and IMCI-specific overhead costs and provided the total annual cost of child healthcare according to the IMCI guidelines and the cost per child of treating specific diseases (Fig. 15). Other information provided by the tool included the total cost of treatment for diseases, projections of the number of children needing treatment, and estimates of drug and staff-time requirements.
Table 7. Summary of start-up and expansion costs for community IMCI implementation

<table>
<thead>
<tr>
<th>Summary of start-up costs</th>
<th>In US dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meetings</strong></td>
<td></td>
</tr>
<tr>
<td>Total cost of all meetings</td>
<td>1,809</td>
</tr>
<tr>
<td>Central-level planning/district preparation</td>
<td>1,519</td>
</tr>
<tr>
<td>District-level planning and orientation: Nawalparasi</td>
<td>290</td>
</tr>
<tr>
<td><strong>Training courses/workshops</strong></td>
<td></td>
</tr>
<tr>
<td>Total cost of training</td>
<td>20,104</td>
</tr>
<tr>
<td>FCHV-level of training: Nawalparasi</td>
<td>13,259</td>
</tr>
<tr>
<td>FCHV-level of training, 2nd Phase: Nawalparasi</td>
<td>885</td>
</tr>
<tr>
<td>VHW/MCHW-level of training: Nawalparasi</td>
<td>4,726</td>
</tr>
<tr>
<td>Traditional healers’ training: Nawalparasi</td>
<td>1,234</td>
</tr>
<tr>
<td><strong>Summary of expansion costs</strong></td>
<td></td>
</tr>
<tr>
<td>Total cost of meetings</td>
<td>580</td>
</tr>
<tr>
<td>District-level planning and orientation: Bardiya</td>
<td>290</td>
</tr>
<tr>
<td>District-level planning and orientation: Kanchanpur</td>
<td>290</td>
</tr>
<tr>
<td>Total cost of training courses/workshops</td>
<td>31,110</td>
</tr>
<tr>
<td>FCHV-level of training: Bardiya</td>
<td>18,275</td>
</tr>
<tr>
<td>FCHV-level of training, 2nd Phase: Bardiya</td>
<td>4,062</td>
</tr>
<tr>
<td>FCHV-level of training: Kanchanpur</td>
<td>3,735</td>
</tr>
<tr>
<td>FCHV-level of training, 2nd Phase: Kanchanpur</td>
<td>872</td>
</tr>
<tr>
<td>VHW/MCHW-level of training: Bardiya</td>
<td>1,851</td>
</tr>
<tr>
<td>VHW/MCHW-level of training: Kanchanpur</td>
<td>1,332</td>
</tr>
<tr>
<td>Traditional healers’ training: Bardiya</td>
<td>631</td>
</tr>
<tr>
<td>Traditional healers’ training: Kanchanpur</td>
<td>351</td>
</tr>
</tbody>
</table>

RESEARCH AND PROGRAMME PRIORITIES FOR HOUSEHOLD AND COMMUNITY IMCI

The WHO and UNICEF developed IMCI in an attempt to reduce more effectively the nearly 12 million deaths of children, aged less than five years, that occur each year. Now implemented in over 79 countries (June 2000), IMCI is expanding beyond the health facility and into the community. The CORE Group, in collaboration with the USAID (BASICS II and Child Survival Technical Support Project), has articulated a framework for the third component of IMCI, improving the household and community practices. The framework consists of a multisectoral base and three programmatic elements that target the many influences on child health, nutrition, and development (24). A set of research and programme priorities for household and community IMCI will now be presented according to the following three elements:

Element 1: Improving partnerships between health facilities and the communities they serve

Element 2: Increasing appropriate, accessible care and information from community-based care providers (private sector, traditional care providers, and volunteers)

Element 3: Integrated promotion of key family practices critical for child health

Element 1: Improving partnerships between health facilities and the communities they serve

For community IMCI to become a sustainable and effective intervention strategy, the community must actively work to improve the skills of health workers and the health system.

Research priorities

Community involvement and management: Successful implementation of this element requires support of the people who receive services. Research is required in the following areas:

- How to increase community input at the facility level to improve the quality of, and access to, services
- How to transfer management skills to community groups

Outreach by facility-based personnel: The Pan American Health Organization and other organizations
have developed courses and tools to promote community outreach by facility-based personnel. The effects of these and other approaches on the use and perceived quality of health services need to be evaluated.

**User-fees and cost-recovery:** Central to the long-term sustainability of community IMCI programmes is the institution of cost-recovery strategies. The collection and paying of user-fees is also a critical link between health services and the communities. The revolving drug-funds used by UNICEF in the Bamako Initiative and community-level insurance schemes are two of several models for financing health programmes at the community level and are the key to ensuring reliable supplies of essential drugs and equipment. Research is needed to:

- Establish accurate costs for community IMCI activities. There have been surprisingly little good data on costing of community-level activities. A costing tool presented at this meeting is a significant contribution, but further studies are needed to refine the tool and to compare the costs of different types of community IMCI activities
- Tailor cost-recovery mechanisms to local circumstances. Inappropriate cost-recovery mechanisms can have adverse effects on the use of health services. Studies need to compare the process of implementation and effects on the use of different approaches
- Involve communities in cost analysis of services. Increased community involvement in costing of services and setting of fees can increase the acceptability of cost-recovery mechanisms, but there is little evidence about how to best promote this involvement

### Programme priorities

Programme priorities to improve partnerships between health facilities and the communities they serve include:

- Establishment of systems for maintaining an adequate supply of essential equipment and adequate...
financing of health services while maintaining access for the poor

- Adequate referral of severely-ill patients and incentives for, and monitoring the performance of, health workers

Activities to improve the links between the community and health system can also include simple outreach activities, such as informing villagers of improvements made to health facilities. Crucial to the improvement of health facilities is knowledge of the community needs. Community members must provide information to IMCI facilities on the health services they most require. This will also heighten the community sense of ownership of the IMCI facility. Ministries of health need to create incentives for health personnel to conduct community outreach and to take community concerns seriously.

Policies should be established that allow for a community role in decisions about the management and financing of health services.

**Element 2: Increasing appropriate, accessible care and information from community-based care providers**

Training of voluntary workers, such as CHWs and care providers in the traditional and private sectors to improve the quality of care sick children receive from outside health facilities and to promote preventive interventions, has been a part of the primary healthcare programmes for many years. The second element of the community IMCI framework differs from these previous programmes in its attempt to apply the IMCI concepts and standards of care to this work, in its increased focus
on private care providers, and in the development of courses and other interventions to improve the quality of care that are integrated rather than disease-specific.

**Research priorities**

**Assessment and treatment of sick children in the community:** For many years, CHWs, other volunteers, and various care providers in the traditional and private sectors have been trained successfully to diagnose and treat cases of ARI, diarrhoea, and malaria in the community. A major limitation of these interventions has been that they frequently have provided training on the diagnosis and treatment of one disease only as training was provided by vertical programmes. Recently, programmes in Nepal and Kenya have experimented with simplified algorithms for use by community-based providers that guide them to assess and treat all the important diseases affecting children in the area and refer (to facilities) children who cannot be treated in the community.

Research is needed to evaluate the impact of such training on mortality and morbidity, define immediate management for children with conditions, such as cerebral malaria or respiratory distress, so that they have time to be taken to a health facility, and define and test approaches for assessment and presumptive treatment of sick newborns in the community. Another model for treating children in the community is the direct training of mothers in the presumptive treatment for malaria and other conditions, including a recent study in Ethiopia that demonstrated a significant decrease in mortality for all causes. Such interventions involving caretakers of young children require replication in other sites, and their effectiveness and cost-effectiveness should be compared with interventions to train community-based care providers.

**Private practitioners:** Private practitioners provide a large proportion of healthcare in the developing world and are important sources for treating diarrhoea, ARI, and malaria, which when combined, are responsible for over half of childhood mortality. Studies show that the role of private care providers is prominent in rural and urban areas. They often provide sub-standard care and yet are in demand, because they are generally perceived by the community to be more accessible, more sensitive to the needs of clients, and more willing to spend time with their clients compared to the service given in the public sector. Research is needed on strategies to influence private practitioners, such as:

- Banning the use of harmful drugs or prohibiting the practice of unqualified personnel
- Providing financial incentives to improve the quality of care (for example distributing a drug at low cost or free of charge, and yet allowing the private care provider to charge for it)
- Improving medical education to focus on specific practices, guidelines, and tools
- Persuading practitioners to improve services through individual and group counselling sessions
- Assessing the current private practices and then negotiating a ‘contract’ for modified behaviours

**Referral:** Both community- and facility-based care providers have important roles in promoting early and appropriate referral of very sick children from community-based care providers to first-level facilities and from first- to higher-level facilities. A study of referral from first- to higher-level facilities in rural Ecuador presented at this meeting found that both provision of referral slips and communication by care provider about the importance of referral were associated with increased compliance to referral by caretakers. Assessments are needed of different interventions aimed at both community- and facility-based care providers to increase rates of compliance with referral, including referral notes or slips/forms, and systematic referral from the referral facility to the care provider making the referral.

**Role in disease-prevention interventions:** CHWs and other classes of voluntary workers have been used for many years for promoting preventive practices in the community. Research is needed on ways to improve the quality of preventive services that voluntary workers deliver and on how they can promote an expanded range of practices relating to prevention, nutrition, and mental development. Relatively few programmes have engaged the various classes of private care providers in the promotion of preventive interventions. One notable exception has been the programmes that have trained traditional practitioners in Africa to promote HIV/AIDS-prevention methods, including condom. Interventions need to be developed and tested that aim at engaging private providers in the promotion of preventive interventions.
Role in nutrition interventions: Most mothers start complementary feeding earlier than six months and give inadequate amount of food with little nutritional value. Consequently, growth faltering can occur before six months of age, just as infants begin to receive foods to complement breastmilk intake. Recent trials in India and Peru (summarized in this report) have demonstrated that it is possible to improve complementary feeding practices with community-based nutritional counselling. The Integrated Child Care/AIN programme in Honduras has used voluntary workers for implementing community nutritional counselling on a national scale. Further trials are needed in other settings to maximize coverage and find ways to motivate counselling activities in private practitioners.

Sustainability of interventions aimed at community-based care providers: Programmes to recruit and train or improve the skills of community-based care providers have been notoriously difficult to sustain due to attrition or turnover among voluntary workers and failure to maintain the quality of care after training among all classes of care providers. Research is needed on incentives to increase the quality of care and reduce attrition among voluntary workers and on sustainable approaches to supervision and performance maintenance for both voluntary workers and traditional and private care providers.

Programme priorities

In many countries, significant effort is needed at the national level to establish policies that allow for interventions to improve the quality of care by private and traditional care providers, to regulate the sale and distribution of essential drugs, to institute and enforce locally appropriate systems of licensing or regulation of private and traditional care providers and to define the place of voluntary workers in the national health system. In many cases, interventions cannot move forward, because community-based care providers are operating illegally, yet their illegal status does not prevent their continued provision of healthcare. The sale of expired, outdated, and mislabeled medicines threatens all efforts to improve the quality of care for sick children outside health facilities and should be addressed by clear and enforceable policies. The IMCI guidelines should be incorporated into all forms of pre-service training for health professionals. Many work in the private sector upon graduation, after which training is more difficult.

Element 3: Integrated promotion of key family practices critical for child health

Research priorities

Promotion of practices critical for child health, nutrition, and development is a cornerstone of the community IMCI programmes. Two categories of research questions are:

- Which individual interventions are effective in reducing child mortality and morbidity at the household and community levels?
- What is the best way to deliver packages of proven interventions on a large scale?

For many of the top causes of child mortality and morbidity, effective interventions, such as ORT, already exist. For others, effective intervention approaches remain to be defined. A number of child-health problems stand out as needing research to define and test effective community interventions, including neonatal mortality and HIV/AIDS. Interventions also need to be defined and tested for problems that have not been a traditional concern of child-survival programmes, such as injury prevention, care of AIDS orphans, and promotion of mental development.

Neonatal mortality: As child mortality has decreased over the last 30 years, neonatal mortality has declined more slowly and now comprises approximately 40% of all deaths in children aged less than five years. Research is needed on determinants of neonatal mortality and morbidity, including descriptive studies on:

- Traditional neonatal care practices in the home, and how they impact neonatal health
- Sociocultural and logistical factors that impact seeking and receiving care, and how they affect outcome
- Signs and symptoms that are of most use to caregivers and community-based care providers in identifying neonates with serious illness

Research is also needed to establish the content, method of implementation at the community level, and effectiveness of packages of ‘essential newborn care’ aimed at children born outside health facilities. These packages aim at promoting practices, such as drying and warming immediately after birth, care of the umbilical cord, immediate and exclusive breast-feeding, and early diagnosis and treatment of sick newborns.
HIV/AIDS: In sub-Saharan Africa, HIV/AIDS is erasing the gains made in child survival over the previous three decades. Other regions are on the brink of similar crises (notably southern Asia). Research is needed on how to deliver services for children in areas with poor geographic and/or economic access to health services, including interventions to decrease mother-child transmission, identify and provide care for positive children, and ensure the health, nutrition, and development of AIDS orphans and children with HIV-positive parents.

For many other child-health problems, effective interventions for the community and household levels already exist, but further research is needed to adapt the interventions to changing conditions, including resistance to drugs and insecticides, and changes in human behaviour.

Implementation of packages of proven interventions: The methods of behaviour change communication and social marketing have been successful in promoting single behavioural objectives, e.g. ORT use, or clusters of closely-related behavioural objectives, e.g. family planning. Intervention research needs to examine how to:

1. **Integrate promotion of several different behavioural objectives** while maintaining the effectiveness of communication programmes that promote single objectives. Integrated promotion of diverse behavioural objectives is a major issue in malaria control. Research is needed on the effectiveness of different models of integrated control, which include the promotion of a range of interventions, such as insecticide-treated materials; better care-seeking and diagnosis of cases using simple signs; appropriate drug use; prevention and treatment of malaria in pregnancy and nutritional interventions, e.g. vitamin A and zinc. Several recent meetings, most recently in Harare in November 2000, have discussed programmatic links between Roll Back Malaria activities and IMCI. Research is needed to document and evaluate different methods of integration of these two important initiatives.

2. **Scale up and sustain behaviour change interventions** to the district or national level. Taking exclusive breast-feeding as an example in most regions of the developing world, rates rarely top 10% (with the exclusion of some Latin American countries). Reasons for not breastfeeding often include concerns for milk quality or quantity. Recent studies, however, have shown that it is possible to increase exclusive breast-feeding rates significantly with peer counselling in the community (25,26). Operations research is needed to understand how to scale up such breast-feeding counselling to the national level.

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