Integrated Management of Childhood Health in the Eastern Mediterranean Region

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Contents

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I. Laher (ed.), *Handbook of Healthcare in the Arab World*,
https://doi.org/10.1007/978-3-319-74365-3_113-1

Abstract

Preventable and treatable diseases are significant causes for the high mortality in young children. More than two-thirds of deaths in young children are attributed to five conditions which are also responsible for 80–90% of outpatient consultations. In the latter part of the twentieth century, global meetings alerted many countries and the international health community to the severity of the situation of child morbidity and mortality. The response to this situation was to package a set of simple, affordable, and effective interventions for the combined management of the major childhood illnesses and malnutrition, under the label of "Integrated Management of Childhood Illness" (IMCI) developed by the World Health Organization and the United Nations Children's Fund in the early 1990s. This chapter focuses on the rationale of developing and implementing IMCI; its action, phases, components, and targeted health conditions; and the international multi-country evaluation efforts.

The chapter details the context of IMCI implementation in the Eastern Mediterranean Region since its inception in 1996 and how the initial main focus of improving clinical care had developed to address not only the sick child but also the healthy child, in health facilities and in the home. Thus, attention in the Region was increasingly given to the development of a strategy on integrated childcare by broadening its scope into the Integrated Management of Child Health while still retaining its original acronym "IMCI." The chapter addresses the development of IMCI at the country level, illustrating the stages of implementation, barriers, constrains, success, and ongoing evaluation efforts.

Keywords

Child health · Morbidity · Mortality · Integrated Management of Childhood Illness · Eastern Mediterranean region · Deaths

Abbreviations

WHO AFRO	World Health Organization Regional Office for Africa
ARI	Acute respiratory infection
CHWs	Community health workers
C-IMCI	Community Integrated Management of Childhood Illness
DALY	Disability-adjusted life year
EMR	Eastern Mediterranean Region
EMRO	The Eastern Mediterranean Regional Office
HAZ	Mean height-for-age Z-score
Km	Kilometers
ICCM	Integrated Community Case Management
IMCI	Integrated Management of Childhood Illness
MDGs	Millennium Development Goals
MSP	Multisectoral platform
NGOs	Nongovernmental organizations
ORS	Oral rehydration salts

PCHI	Priority Child Health Indicators
PHC	Primary healthcare
RBM	Roll Back Malaria
SCHM	Supplemental Child Health Measures
UN	United Nations
UNICEF	United Nations Children's Fund
WA	Weight-for-age
WASH	Water, sanitation, and hygiene
WAZ	Mean weight-for-age Z-score
WHO	World Health Organization
WHZ	Mean weight-for-height Z-score

Introduction

Every child's inherent right to life, survival, and development is clearly articulated in Article 6 of the Convention on the Rights of the Child. Furthermore, Article 24 strengthens this issue and refers to the child's right to the highest standard of health and medical care attainable with particular mention of primary and preventive healthcare, public health education, and reduction of mortality (Southall et al. 2000).

Despite a nearly 50% reduction in global mortality of children aged under 5 years old (from 10.5 million in 2000 to 5.9 million in 2015), preventable and treatable diseases continue to kill young children (WHO 2005a). More than two-thirds of these deaths are attributed to five conditions which are responsible for 80–90% of outpatient consultations. Three in four childhood illnesses are caused by one of these five conditions. The commonest causes are (1) acute respiratory infections (ARI) mainly pneumonia (13%), (2) diarrhea (9%), (3) malaria (5%), (4) measles (1%), and (5) malnutrition (46%) as an associated factor of the 45% death rate in children under five and neonatal conditions (Victora et al. 2006a). It is estimated that about 95% of global mortality rates occur in 42 of the less developed countries (WHO 2015). Global meetings have alerted countries and the international health community to the severity of the situation of child morbidity and mortality. The response to this situation was to package a set of simple, affordable, and effective interventions for the combined management of major childhood illnesses and malnutrition, under the label of "Integrated Management of Childhood Illness" (IMCI) developed by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) in the early 1990s (WHO/UNICEF 1999a).

Rationale for an Evidence-Based Integrated and Comprehensive Approach for Child Health in Resource-Scarce Areas

The Millennium Development Goals (MDGs) to reduce child mortality has as its target to "reduce by two-thirds, between 1990 and 2015, the under-five mortality rate," which is based on targets established at the United Nations (UN) Millennium

Summit in 2000 and the UN General Assembly Special Session on Children in 2000 (WPRO 2003a).

In the last decades of the twentieth century, much progress has been made to reduce and contain childhood morbidity and mortality through universal childhood immunization through programs targeting each morbid condition, nutrition programs, as well as an implementation of other primary healthcare (PHC) activities. In spite of this progress, major challenges remain, as mortality rates are still unacceptably high, especially in sub-Saharan Africa and South Asia. Within countries, children at the bottom of the socioeconomic ladder consistently fare worse. Children die because they lack access to basic, inexpensive interventions that can prevent nearly all such deaths (Nicoll 2000; WHO 2006).

A large body of research shows that programs focusing on specific diseases have limited impact on child morbidity and mortality. These vertical disease-specific programs have been criticized because of their duplication of resources and because of their technical limitations and failure to adequately address the needs of children at risk for, or suffering from, multiple diseases or comorbidities. For example, cough and fast breathing in a child can be caused by pneumonia, but it could also be due to severe anemia or malaria. A "very sick" child may be suffering from pneumonia, meningitis, septicemia, or a combination of some or all of these conditions. The IMCI initiative integrates how health workers look at children and manage the conditions that they present with at health facilities (Baiden et al. 2011; Schellenberg et al. 2004). For example, a child seen at a health facility suffering from malaria, pneumonia, and malnutrition could be treated only for malaria in many settings. Likewise, a mobile team vaccinating children could miss the opportunity to promote other forms of disease prevention. Health training and health messages specific to vertical programs often compete with each other for the same limited human and financial resources. Thus, one could ask: *Should a sick child be evaluated according to the ARI or the malaria protocol? Should the health education talk given to mothers be on mosquito nets or breastfeeding?* (Winch et al. 2001). An integrated strategy is needed to address the overall health of children for the following reasons:

(a) Most sick children present with signs and symptoms of more than one condition. Thus, more than one diagnosis may be necessary. Health workers need to be prepared to assess the signs and symptoms of the most common conditions, and not simply those of a single illness.
(b) When a child has several conditions, therapies for those conditions may need to be combined. Health workers need to be prepared to treat conditions when they occur in combination. This will decrease the possibility that children would receive correct treatment for one disease and die from another unrecognized illness.
(c) There is a need to focus on the child as a whole and not just as a composite of diseases and conditions affecting the child.
(d) Other factors that affect the quality of care delivered to children such as drug availability, organization of the health system, referral pathways and services,

and community behaviors are best addressed through an integrated strategy (WHO 1999b).

An important set of reasons for the policy shift to an integrated approach was based on the need to promote managerial efficiency. The vertical approach required countries to appoint managers at national, provincial, and district levels to run each program. It also led to separate training activities; for example, health workers might be required to leave their posts on a number of occasions to be trained for the programs. Similar examples of duplication of efforts were often found in supervision and provision of essential drugs as well. There was a strong logical basis for believing that integrating the management structure of child health programs would lead to improved efficiency (Victora et al. 2006a).

There is a large body of observational and empirical evidence suggesting that many sick children who are taken to hospitals, health centers, doctors, traditional healers, etc. are not properly assessed and treated and that their parents are poorly advised (Tulloch 1999). At first-level health facilities – the closest healthcare services available to most sick children in low-income countries – and in settings other than in the main cities, diagnostic supports such as radiology and laboratory services are minimal or nonexistent, and drugs and some essential equipment are often scarce. Limited supplies and equipment, combined with an irregular flow of patients, leave healthcare providers at this level with few opportunities to practice complicated clinical procedures. Instead, they often rely on history and signs and symptoms to determine a course of management that makes the best use of the available resources. These factors make providing quality care to sick children a serious challenge (Simoes et al. 1997). Furthermore, the opportunities for appropriate childcare at home are often threatened by poor socioeconomic status and an environment that does not enable optimal health, growth, and development (Black et al. 2003).

The WHO and UNICEF and other technical partners addressed the aforementioned challenges in the early 1990s. Consequently, the WHO Department of Child and Adolescent Health and Development, in collaboration with 11 other WHO programs and the UNICEF, responded to these challenges by developing the IMCI strategy for reducing the mortality and morbidity associated with the major causes of childhood illness that was launched in 1995 (WHO/UNICEF 1999a). IMCI is one of the seven evidence-based strategies in the WHO/UNICEF essential package for child survival (WHO/UNICEF 2006).

IMCI: Development and Implementation

IMCI Evolution

The IMCI was developed with its syndromic approach (in contrast to vertical programs that focused on individual disease) by encompassing preventive and curative interventions. It is based on the premise that health workers should look at the child as a whole, with an aim to (Jones et al. 2003):

- Reduce deaths, frequency, and severity of illness and disability
- Contribute to improved growth and development
- Promote health and well-being of the child and not just disease treatment

Following the introduction of IMCI case management guidelines in 1995, an implementation based on local epidemiology and clinical practice was implemented, starting with the training of healthcare workers. The guidelines and training materials represented an attempt to outline what needed to be done at a first-level health facility by any health worker – doctor, nurse, or paramedical worker – seeking to treat sick children while reducing mortality. This was followed by a short period of exploratory implementation and documentation in a small number of countries (Gera et al. 2016). After an initial pilot phase, IMCI was introduced in Tanzania and Uganda in 1996. Results from these two countries were encouraging, with improvements noted in quality of care and healthcare worker practices (WHO 1999b). By confirming an encouraging response from partner organizations, including the World Bank, and various countries, the WHO provided a detailed blueprint of a three-phase rollout for countries wishing to adopt IMCI (WHO 1999a).

The IMCI initiative is an evidence-based strategy aiming to improve the management of childhood illness in places with high childhood mortalities. Furthermore, it brings together integrated and multipronged lifesaving interventions that have been proven effective into one package. The strategy is aimed at countries with infant mortality rates of 40 or more deaths per 1000 live births and where malaria is endemic with documented transmission of *Plasmodium falciparum* malaria, but the interventions could be more broadly applicable (Gelband and Stansfield 2001).

A review of IMCI literature shows that IMCI can be viewed as a technically sound, comprehensive strategy based on the premise that if the prevention and case management of the diseases causing most of the deaths in children are integrated with nutritional interventions and immunization, this will reduce child mortality more effectively than any single intervention could. In this context, IMCI estimated to manage 40–60% of children's mortality burden in a systematic and integrated way, mostly because IMCI relies on syndromic case management as the centerpiece of a strategy to establish basic child health services in very poor areas (WPRO 2003a).

Strategy of Action for the IMCI

The strategy is distinguished by not simply being a stacking of individual interventions. The developers of IMCI produced standard integrated treatment algorithms based largely on signs and symptoms, appropriate to situations where laboratory and clinical resources are limited. In addition, IMCI providers are trained to use encounters as opportunities to evaluate a child's overall health, rather than simply as a treatment episode. The basic IMCI elements are assessment of the child, classification of illnesses, treatment, and counselling of the mother. Other key elements

include prevention through immunization and improved nutrition and care and feeding of children within the family (WHO 1999b).

Countries are required to adapt the generic IMCI guidelines and training materials to specific local conditions through tool translation and modification of pictures and language following the WHO's Adaptation Guide. The Adaptation Guide urges countries to consider other local factors, such as epidemiology and disease patterns, drugs, drug resistance history, and culture, when deciding how to implement IMCI (WHO 1997). At a country level, IMCI was designed to evolve over three phases, namely, the introduction, early implementation, and expansion phases:

- *Introduction phase* entails adaptation of the generic global guidelines to a national context. During this phase, countries hold orientation meetings, train key decision-makers in IMCI, define a management structure for preparing for IMCI planning and early implementation, and build government commitment to move forward with the IMCI strategy.
- *Early implementation phase* includes field testing of IMCI in one or two pilot districts in each country. In the early implementation phase, countries gained experience while implementing IMCI in selected geographical areas. They develop their national strategy and plan, develop management and training capacity in a limited number of districts, and start implementing and monitoring IMCI. The end of this phase is marked by a review meeting with the objective of synthesizing the experiences gained during early implementation and planning for expansion.
- In the *expansion phase*, the experience gathered in the previous phases is used to disseminate IMCI widely in the country both in terms of IMCI interventions and IMCI coverage (WHO 1999b).

There are a series of possible programmatic and managerial criteria for selecting two or three districts for early implementation in a country. The criteria includes good physical access to central-level staff, committed staff at the district level, availability of a training site, availability of drugs, existence of referral care, and availability of funds to support IMCI, e.g., from a donor institution (WHO 1999a). However, Victora et al. (2006b) in their ecological study of three countries that implemented IMCI (Brazil, Peru, and Tanzania) indicated that the use of the WHO-recommended criteria for selecting districts for early implementation could result in the selection of districts where the under-five mortality rates may be lower than the national average. The thinking of the global team in charge of IMCI development and implementation has evolved over time; there was a substantial time lag between the development of new concepts and guidelines and their application at the country level and below. It was later realized that IMCI would be better implemented in districts with high under-five mortality rates and lower standards of living, and among these, priority would be given to districts with a large population of children younger than 5 years old. The WHO/UNICEF (1999a) summarized the benefits of IMCI:

(a) Systematically addresses major child health problems in terms of morbidity and mortality.
(b) Responds to demand as at least three out of four of pediatrician daily consultations are from one of the five conditions that are the focus of IMCI.
(c) Promotes prevention as well as cure – In addition to its focus on treatment, IMCI also provides the opportunity and emphasizes important preventive interventions such as immunization and improved infant and child nutrition, including breastfeeding.
(d) Promotes cost saving – Inappropriate management of childhood illness wastes scarce resources. Although increased investment will initially be needed for training and reorganization, the IMCI strategy will result in cost savings.
(e) Improves equity – Nearly all children in the developed world have ready access to simple and affordable preventive and curative care to protect them from death due to the major childhood diseases. Millions of children in the developing world, however, do not have access to this same lifesaving care. The IMCI strategy addresses this inequity in global healthcare.

This had led the World Bank in the 1993 World Development Report, *Investing in Health*, to rank IMCI among the ten most cost-effective health interventions in low- and mid-level countries which is likely to have a major impact on health status and the global burden of disease. According to the same report, IMCI can potentially avert 14% of disease burden in these countries at a cost of only 1.60 US$ per capita per year, with a cost-effectiveness of US$30 to US$100 per disability-adjusted life year (DALY) averted (World Bank 1993). Later evidence confirms that when applied, the strategy improved management of children in healthcare facilities (Arifeen et al. 2004, 2005; Bryce et al. 2005; Chopra et al. 2005; Schellenberg et al. 2004; Zhang et al. 2007).

Originally, IMCI developed in a stepwise fashion. It began with a set of case management guidelines for sick children seen in peripheral first-level health facilities and was adapted for individual countries. Over time, the strategy expanded to include a range of guidelines and interventions from the WHO and UNICEF to promote growth and development, to prevent illness, and to respond to it appropriately when it does occur. These interventions could take place in the health facility or in the home and are supported by the three components of the strategy, each of which was meant to be adapted at the country level according to local epidemiology, health system characteristics, and culture (Victora et al. 2006a).

Components of IMCI

Component 1

This involves improving case management and communication skills of healthcare providers through training, using locally adapted guidelines. Training is based on a set of adapted algorithms that guide health workers through a process of

assessing signs and symptoms, classifying the illness according to treatment needs, and providing appropriate treatment and education to the child's caretaker (WHO/UNICEF 2001).

The Case Management

It is performed as follows (Gelband and Stansfield 2001):

- Sick children attending a first-level health facility are initially checked for the main symptoms of the key IMCI conditions: diarrhea, malaria, pneumonia, measles, and other severe infections. All children are then assessed for malnutrition and anemia and vaccination status verified. Children under 2 years of age, as well as older children presenting with low weight-for-age (WA), receive nutrition counselling. Other health problems related to caretakers are then assessed.
- Children are classified according to a color code, pink (immediate referral), yellow (management in the outpatient facility), or green (home management), as shown in Fig. 1.

The case management algorithm depends on a simple systematized but comprehensive step-by-step history and examination and includes assessing the nutritional and immunization status of the child as shown in Fig. 2.

A ten-step checklist was used for children up to 5 years old and was later modified to an eight-step checklist for infants of less than 2 months of age (WHO 1999b).

Training of Health Workers

The first component is based on training health workers to assess sick children by using a checklist. The training course was designed to last 11 days, including a large amount of hands-on experience. The case management training course aims to inform frontline health workers on "what needs to be done" (Karrar 2003). The case management guidelines are built around a series of "simple questions" to be asked by the health worker to a child's caretaker to assess easily recognizable signs and symptoms (WHO/UNICEF 1999b).

The bulk of the training for health workers is conducted over 11 days, with standard case management courses consisting of 80 h of training designed to offer a mix of classroom teaching and "hands-on" (30%) training as clinical outpatient and inpatient sessions. The class work consists of small group teaching using active learning strategies including individual reading, exercises, drills, interactive video sessions, role-play, and demonstration. It is supported by active instruction by trained facilitators during clinical sessions where each participant assesses about ten children in inpatient sessions and over 24 cases in outpatient sessions. Each session starts with a demonstration by a facilitator or clinical instructor. The course is supported by excellent training material including six training manuals, a chart booklet recording forms, wall charts, video tapes, photograph booklet, and demonstration material. In addition, there are facilitator guides and clinical instruction guidelines for inpatient and outpatient sessions. There are a number of indicators

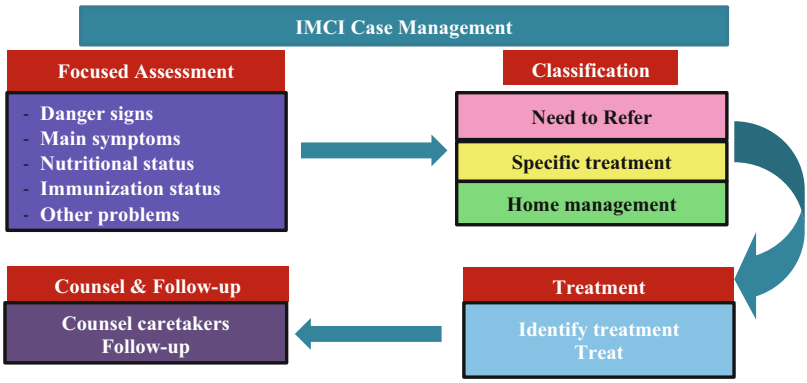

Fig. 1 Integrated case management elements. (Source: Adapted from Ashly 2015)

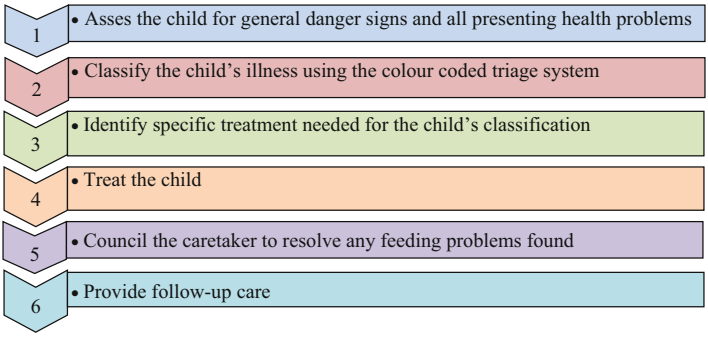

Fig. 2 IMCI Integrated case management process. (Source: Mupara and Lubbe 2016)

for assessment of the participants, and the course has a feedback session. This training was quite successful in achieving its main objective of improving case management skills through an integrated approach addressing priority health problems with curative, preventive, and promotive components including nutrition and vaccinations (WHO 1999c).

After training, providers are given a chart booklet to guide practice in facilities and a "mother's card" which shows the recommendation for feeding children. A special training module addresses effective communication with mothers (WHO/UNICEF 1999a). Guidelines from the IMCI confirm that counselling is a prominent component of IMCI. Counselling on aspects such as feeding practices, home management, and care-seeking behaviors are elements of IMCI. Health workers enter into a new partnership with caretakers, which is no longer based on asking a few simple questions and prescribing a treatment. For example, feeding problems must now be identified and acceptable solutions negotiated in collaboration with the mother. This form of counselling requires specific training for the health workers, but it is more effective (Pelto et al. 2004).

Component 2

This involves improving the health system by strengthening district health planning and management, making essential drugs available, ensuring effective case management, providing quality support and supervision at health facilities, improving referral and health information systems, and organizing work efficiently at the health facility (WHO/UNICEF 2001).Tools were developed for implementing specific system-strengthening interventions, including a planning guide for national and district managers, an integrated health facility assessment tool, and a tool for improving referral level care (Ahmed et al. 2010; Victora et al. 2006a). This requires ongoing commitment and ownership of IMCI at the national level (Pradhan et al. 2016).

Component 3

This component focuses on improving family and community practices by promoting those practices with the greatest potential for improving child survival, growth, and development (WHO/UNICEF 1999b). As they increasingly entered into dialogue with households, health workers in child programs realized how crucial interactions in the household are for the health of a child. Food, medicine, and a stimulating environment are all necessarily mediated by the activities of households and communities. Households and communities thus determine whether the health system's intervention can make a difference. Without reasonable home care, even the best health center will get poor results (WHO 2005a).

However, despite the implementation of the first two components of IMCI in 1995, the development of component 3 started only after the First Global Review and Cooperation Meeting on IMCI in Santa Domingo, September 1997, in the Dominican Republic. This meeting recognized the need to develop a household- and community-based approach to promote household practices that are a key to the child's survival, growth, and development. The UNICEF was given the mandate to take the lead in the development of the community IMCI (C-IMCI). In February 1998, the Interagency Working Group on Household and C-IMCI was founded to foster the development of C-IMCI and to develop guidelines for its implementation with the mobilization of the necessary resources and support. This group is comprised of representatives from WHO, UNICEF, the World Bank, and their related partners (WHO 2003).

The C-IMCI

The initiation of the C-IMCI was based on the realization that a facility-based strategy would not reach significant portions of the population that either did not have access to or chose not to use a health facility. Evidence shows that up to 80% of deaths of children under 5 years of age can occur at home with little or no contact with healthcare providers even though the large majority was living within few kilometers (km) from the health facility. The C-IMCI attempts to coordinate health

services initiatives with actions carried out in the community, involving all possible actors and sectors at the local level, in order to promote family and community practices for the care and protection of children in the home and community. The families and the social networks are the main targets of the interventions being developed (Winch et al. 2001). Advocates of the IMCI argue that for C-IMCI to be effective and sustainable, communities have to be empowered to take responsibility for their own health, meaning that communities should develop a sense of ownership over key practices and assume the responsibility for practicing and promoting them in the long term (Winch et al. 2002). Furthermore, the C-IMCI requires systematic planning, formative research, continuous monitoring to maintain responsiveness in the local context, and sufficient time and resources to achieve high coverage levels on child health outcomes. Community mobilization and behavior change communications to avoid conflicts with deep-rooted social and cultural values and roles act in combination to stimulate evidence-based childcare practices, leading to reduced child mortality despite scarce resources (UNICEF 1999).

According to the IMCI guidelines, both household and health facility levels should be involved in case management of child illness. Appropriate care implies that at the household level, caretakers should know when a disease could be treated at home and when they should seek professional care in a health facility. Healthcare providers, on the other hand, should be able to provide high-quality care in a technical and social sense which refers to communication skills and context-specific information (WHO 2005b). Mayombana (2004) in his qualitative study in two Tanzanian districts implementing IMCI found that the more healthcare providers knew about the background of those seeking care, the better they are able to interpret patients' explanations and so can more effectively communicate what they know and do.

In their extensive evidence-based review on the key family and community practices for child survival, growth, and development, Hill et al. (2004) concluded that recognizing the importance of what households do is one thing and identifying how they can be helped to do so is another. One approach is to improve the communication skills of health workers. Experience in Brazil shows that this results in improved care by families in the home (Pelto et al. 2004). Mayombana (2004) showed that at several stages of the assessment of sick children, communication with the mother about the child's health and well-being is critical for effective management. When the child is brought to the outpatient facility, the health staff should listen carefully to the caretaker and be able to communicate in a language that could be understood, using local words and avoiding medical terminology. Successful communication helps to assure the caretaker that the child will receive good care. In addition, effective home management depends on how well the mother is informed on danger signs and appropriate treatments. This seems particularly crucial in many developing countries where reports suggest poor utilization of health facilities (WHO 2005b). Another approach is to work through community development programs (EMRO/WHO 2003). A cluster-randomized study by Arifeen et al. (2004) in Matlab, Bangladesh, showed that health worker training in combination with community activities tripled the uptake of services from 0.6 to 1.9 visits per

child per year. However, Hill et al. (2004) postulated that while households carry the primary responsibility for what they do or do not do at home, the health system needs to enable households to meet these responsibilities. This is not a simple question of health education, but a more complex process of empowerment, for which the health worker also needs to change his or her way of working.

In an analysis of the history of C-IMCI, Winch et al. (2002) suggest that its development is more difficult compared to the first two IMCI components. Furthermore, its implementation is a complex undertaking and depends on multiple actors, entry points, and strategies. In fact, several implementation frameworks developed to explain the way that the C-IMCI should work with varying degrees of complexities and great similarities. These are based on some of the elements/components and activities to achieve them (EMRO/WHO 2012; WPRO 2003b) and are summarized below:

(a) Improving the partnership between health facilities and the communities they serve by increased utilization of health facilities and establishing mechanisms for community feedback on, and/or management of, health facilities
(b) Increasing appropriate and accessible care and information from community-based providers by increasing their quality of care, promoting their preventive practices, and decreasing the harmful practices
(c) Promoting key family practices critical for child health and nutrition by increasing its adoption in the community and engaging communities in the selection of behaviors to be promoted and the identification of actions to be taken

However, community and household levels are not isolated. This requires substantive collaboration between public and private health and non-health sectors. This led to the development of the multisectoral platform (MSP) as a critical component of the framework supporting sustainable child health and development. The MSP addresses social, economic, and environmental factors that facilitate or hinder the adoption of key family practices (Winch et al. 2001). Similar to the comprehensive PHC, the MSP acknowledges that many sectors can influence and contribute to the health and well-being of children and their families, including water and sanitation, education, income generation, food production, and local government. Therefore, alleviating illiteracy and poverty, providing clean water, and generating income for food and medicines all contribute in substantial ways to a community's ability to assure and sustain its health (Gera et al. 2016; Littrell et al. 2012).

The logic behind the MSP is that people may find it difficult or impossible to adopt new behaviors if other problems that they face, such as food insecurity or lack of access to clean water, are not also addressed. The platform expands the C-IMCI concept beyond health to include economic and social development activities that support the adoption of the key practices. Water, agriculture, income generation, and education, among others, have a direct, positive impact on the long-term health of the family and the survival of children. As with the three elements, the MSP can be applied in a variety of ways, and the strategies selected need to be locally determined (Winch et al. 2001).

Governmental bodies, nongovernmental organizations (NGOs), community leaders, community health workers (CHWs), special support groups including breastfeeding support groups, private health sectors, and private initiatives are involved in the C-IMCI implementation (CORE 2004; Winch et al. 2002; WPRO 2003a).

Key Family Practices for Child Survival, Growth, and Development

Promotion of practices critical for child health and nutrition has long been the cornerstone of child health programs (WHO 2004). The task facing the C-IMCI is not about how to implement single intervention or program components such as immunizations or exclusive breastfeeding, but rather to promote a range of key family practices without sacrificing the effective characteristics of the single intervention-focused program (Winch et al. 2002). Thus, improving family practices is the backbone of the C-IMCI (WHO 2002). Both the UNICEF and the WHO originally identified the importance of 12 key family and community practices which ensure survival, reduce morbidity, and promote healthy growth and development for young children. The 12 practices or behavioral objectives are grouped into four main areas (WHO 2002; WPRO 2003b) and are shown in Table 1.

The UNICEF and WHO Regional Office for Africa (AFRO) and several NGOs adopted four additional groups of practices after a meeting in Durban, South Africa, in June 2000 (AFRO 2004). However, these are set to be adapted according to the local situation and priorities at country, district, and community levels (WPRO 2003a). Moreover, these practices need additional work to reach a specificity whose impact can be measured (Hill et al. 2004). The four groups of practices proposed are (AFRO 2004):

(a) Take action to prevent child abuse, recognize that it has occurred, and take appropriate action.
(b) Provide appropriate care for HIV-/AIDS-affected people, especially orphans, and take action to prevent further HIV infections.
(c) Ensure that men actively participate in the provision of childcare and are involved in reproductive health.
(d) Prevent and provide appropriate treatment for child injuries.

C-IMCI Child Health Indicators

Several indicators targeting households and communities were used to measure the impact of applying IMCI in improvements of family practices in child health. Implementation of IMCI is expected to improve household and domestic hygiene, parenting practices, feeding practices for children, and participation of communities in child healthcare activities that are associated with reduced prevalence of common childhood illnesses. These are then manifested as better child health indicators. The C-IMCI indicators are grouped under two main categories: Priority Child Health Indicators (PCHI) and Supplemental Child Health Measures (SCHM) (PAHO/IMCI-TAG 2008; EMRO/WHO 2002a; WPRO 2003b) as shown in Table 2.

Table 1 The 12 C-IMCI key family and community practices

Growth promotion and development - Exclusively breastfeed for 6 months - Introduce appropriate complementary feeding from 6 months while continuing breastfeeding up to 24 months - Provide adequate micronutrients through diet or supplementation - Promote mental and psychosocial	**Home management** - Continue to feed and offer more food and fluids when child sick - Give child appropriate home treatment for illness - Take appropriate actions to prevent and manage child injuries and accidents
Care-seeking and compliance - Take child to complete full course of immunization before first birthday - Recognize when child needs treatment outside the home and take to health worker - Follow health worker' s advice about treatment, follow-up' and referral - Ensure that all pregnant women have adequate antenatal care and tetanus toxoid vaccination during pregnancy - Encourage active participation of men in child care and reproductive health activities	**Disease prevention** - Carry out proper disposal of feces, washing hands after defecation, before preparing meals, and before feeding the child - Ensure that children sleep under insecticide-treated bed nets - Ensure prevention and care of persons infected and affected with HIV/AIDS - Prevent child abuse/neglect and take appropriate action when it occurs

Linkage Between the Three Components of IMCI Strategy and Its Impact on Child Health

Experience shows that the three components of IMCI are linked, and they support each other when fully implemented. When components one (improved health worker skills) and two (strengthened health system) are in place, they can help to reinforce some aspects of component three (improved key family practices) (CORE 2004). For example, trained health workers can contribute to health information and promotion in the community by providing counselling to mothers during visits to the health facility or during outreach sessions. Likewise, strengthening the quality of services at health facilities makes those services more desirable and makes it easier to mobilize community members to use them. On the other hand, parts of the C-IMCI also contribute to the other two components. Partnerships between health facilities and communities help to strengthen the health system and improve the quality of services. Community mobilization and health education at the community level make it easier for health workers to conduct outreach activities and also make community members more likely to use health services (WPRO 2003b).

Because of the synergy between the components of IMCI, it is important to have all three components in place within a reasonable period of time. When these three components function simultaneously, they strengthen each other and could have a greater impact on child morbidity and mortality. However, the rapidly expanding literature on IMCI shows that IMCI implementation has resulted in demonstrable

Table 2 The C-IMCI child health indicators (PCHI and SCHM)

	PCHI Four indicators were identified under this category:	**SCHM** Another four indicators were identified under this category of C-IMCI child health indicators:
A.	**Nutrition** i. Infant less than 6 months of age is exclusively breastfed ii. Infant aged 6–9 months receives breast milk and complementary feeding iii. Child under two years of age with low WA	**Nutrition** i. Continued breastfeeding rate of children aged 12–15 months ii. Complementary feeding frequency iii. Stunting prevalence iv. Wasting prevalence v. Mean weight-for-age Z-score (WAZ) vi. Mean height-for-age Z-score (H AZ) vii. Mean weight-for-height Z–score (WHZ)
B.	**Prevention** i. Child 12–23 months old is vaccinated against measles before 12 months of age. ii. Child sleeps under an insecticide treated net (in malaria risk areas)	**Prevention** i. Diphtheria, pertussis and tetanus vaccine coverage ii. Oral polio vaccine coverage iii. Bacille Calmette-Guerin vaccine coverage iv. Vitamin A supplementation
C.	**Home case management** i. Sick child is offered increased fluids and continued feeding ii. Child with fever receives appropriate antimalarial (in malaria–risk areas)	**Home case management** i. Ownership of mother' s counselling card for children under 2 years
D.	**Care-seeking** i. Caretaker knows at least two signs for seeking care immediately	**Morbidity** i. Period prevalence of night–blindness ii. Period prevalence of history of fever iii. Period prevalence of parasitemia iv. Period prevalence of diarrhea v. Period prevalence of ARI needing assessment

changes and impact at different levels that mostly related to the first two IMCI components. For instance, the quality of care for children in healthcare facilities with IMCI-trained health workers has significantly improved in many countries (Nguyen et al. 2013) as has the reported appropriate care-seeking and derived information from careful questioning of mothers about recent illness in IMCI implementing districts (Gera et al. 2016) as shown in Fig. 3.

IMCI Targeted Diseases

The IMCI addresses most causes of childhood morbidity and mortality (Figs. 4 and 5) by providing basic guidelines to healthcare providers to avoid and reduce the mortality and morbidity in the children. The IMCI guidelines consist of particular

	Promotion of growth (preventive measures)	Response to sickness (curative care)
Home	-Community/home-based Interventions to improve nutrition -insecticide-impregnated bed nets	-early case management -appropriate care seeking -compliance with treatment
Health Facility	-vaccinations -complementary feeding -breastfeeding counselling -micronutrient supplementation	-case management of: ARI, diarrhea, measles, malaria, malnutrition, other serious infection -iron treatment -anti-helminthic treatment

Fig. 3 Linking integrated care and prevention. (Source: WHO 1999c)

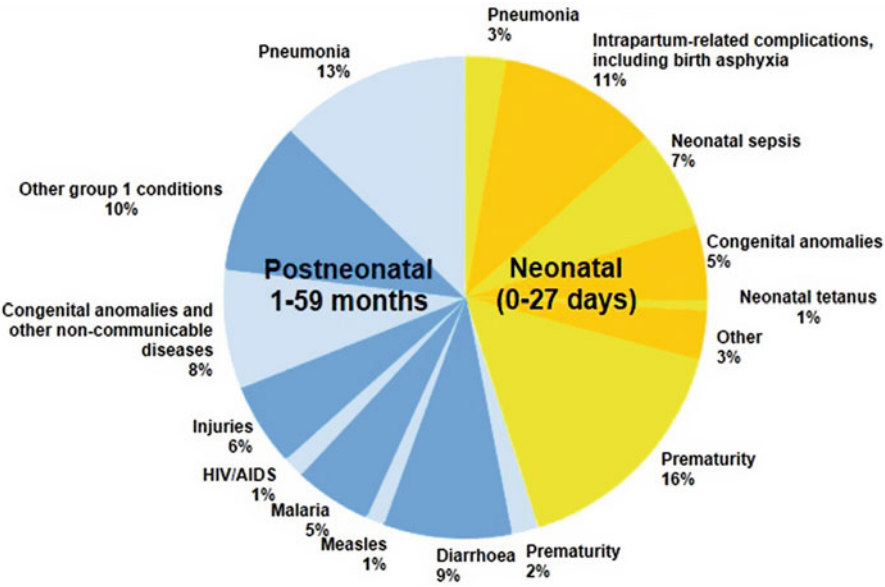

Fig. 4 Causes of deaths among children under 5 years, 2015. (Source: WHO-MCEE methods and data sources for child causes of death 2000–2015 (Global Health Estimates Technical Paper WHO/HIS/IER/GHE/2016.1))

danger signs which helps healthcare providers classify the severity of disease in the health facility and at home, particularly if the patient is not able to access a nearby hospital or healthcare facility. Most of these diseases are preventable (Mahmood and Aftab 2014).

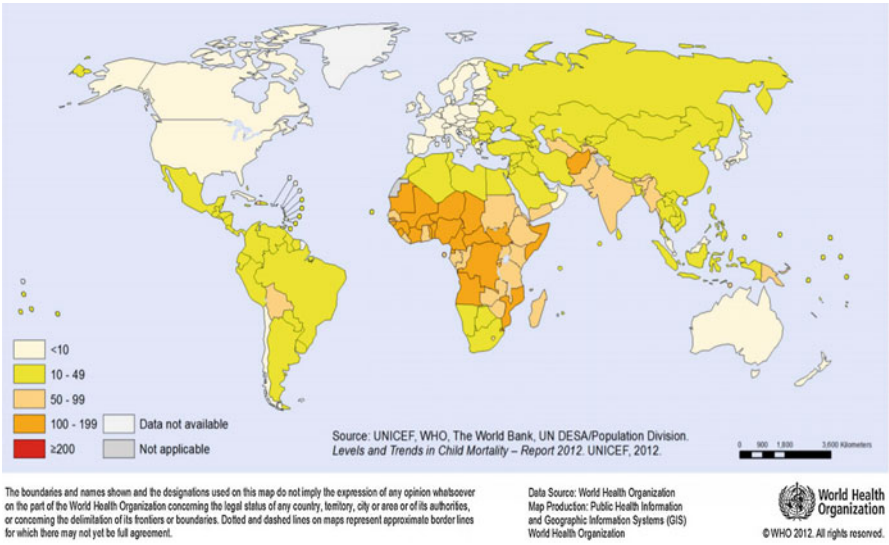

Fig. 5 Worldwide under-five mortality rates. (Source: WHO 2015)

ARI

It is estimated that pneumonia claims a child's life every 30 s, making it the number one global cause of childhood mortality (Mahmood and Aftab 2014). Pneumonia remains the leading infectious cause of death among children under 5, killing 2,500 children a day, and accounts for 15% of all under-five deaths and killed, for a total of 920,000 children in 2015. Most of its victims were less than 2 years old. Annual child deaths from pneumonia decreased by 47% from 2000 to 2015 – from 1.7 million to 920,000 – but many more lives could be saved. Mortality due to childhood pneumonia is strongly linked to poverty-related factors such as undernutrition, lack of safe water and sanitation, indoor air pollution, and inadequate access to healthcare. An integrative approach to tackle this important public health issue is seriously needed. An effective approach could be integrated community case management (ICCM), which is modelled on IMCI (George et al. 2012) and other relevant community-based interventions (Das et al. 2013), as a strategy to enable treatment at the community level and so complement facility-based services. In addition to increasing access to services, it can also facilitate more rational and cost-effective drug use by families (WHO 2002) and increase (up to 13%) in care-seeking behaviors, reduce (by 40%) treatment failure rates for pneumonia, and lower (32%) pneumonia-specific mortality (Das et al. 2013).

Diarrhea

Diarrhea is second only to pneumonia as the cause of deaths in the pediatric population globally and accounted for 9% of all deaths in children worldwide aged under 5 in 2015. This translates into over 1,400 young children dying each day, or about 530,000 children a year, despite the availability of simple effective treatments. Most deaths from diarrhea occur among children less than 2 years of age living in South Asia and sub-Saharan Africa. Despite this heavy toll, progress is being made. From 2000 to 2015, the total annual number of deaths from diarrhea in children under 5 decreased by more than 50% – from over 1.2 million to 0.5 million. Many more children could be saved with basic interventions such as improving drinking water, sanitation, and hygiene (WASH) for diarrhea prevention and the widespread use of a simple solution of oral rehydration salts (ORS) and zinc supplementation during episodes of diarrhea (UNICEF 2016a). In a recent systematic review, the IMCI was associated with improved care-seeking for common illness (Gera et al. 2016). This is important for reducing diseases such as diarrhea and pneumonia. Furthermore, a systematic review by Das et al. (2013) showed a 9% increase in care-seeking, 160% increase in the use of ORS, 80% increase in the use of zinc, and 75% decline in the unnecessary use of antibiotics for diarrhea.

Malaria

Fever encompasses a large number of illnesses. But in many countries, the most commonly implied differential diagnoses in clinical settings for fever are malaria, typhoid, measles, dengue, and meningitis when accompanied with neck stiffness. The most common of these encountered is malaria (Mahmood and Aftab 2014). In 2015, there were 214 million malaria cases that led to 438,000 deaths, of which about 80% were children under 5 years of age. This translates into a daily toll of more than 800 children under age 5. Most of these deaths occurred in sub-Saharan Africa. However, progress in reducing malaria mortality in children has been encouraging. Since 2000, mortality rates in children under 5 have fallen by 65%. An estimated 5.9 million child deaths have been averted. Malaria is an urgent public health priority. Malaria and the costs of treatment trap families in a cycle of illness, suffering, and poverty. Today, 3.2 billion (almost half of the world's population) are at risk (UNICEF 2016b). Malaria is addresses in the IMCI case management and in the ICCM (George et al. 2012). Malaria is considered the leading cause of child mortality in five countries of the Arab world. The Regional Office for the Eastern Mediterranean Region (EMRO) is contributing to the global efforts of the Roll Back Malaria initiative (RBM) launched by the WHO, the UNICEF, the World Bank, and the UN Development Program in 1998, focusing on progressively increasing control activities in countries. In EMRO, close collaboration between RBM and IMCI creates opportunities to benefit from the existing interventions of both improving quality of case management of malaria and improving health (EMRO/WHO 2002a).

Malnutrition

Malnutrition predisposes individuals to a multitude of disorders, mainly by causing immunosuppression. Undernutrition is the underlying contributing factor in nearly half (about 45%) of all child deaths, making children more vulnerable to severe diseases and causing the loss of about three million young lives a year. In addition, the interaction between undernutrition and infection can create a potentially lethal cycle of worsening illness and deteriorating nutritional status. Poor nutrition in the first 1,000 days of a child's life can also lead to stunted growth, which is irreversible and associated with impaired cognitive ability and reduced school and work performance (IFPRI 2016; UNICEF 2017).

Appropriate breastfeeding and complementary feeding practices can reduce the morbidity and mortality rates caused by malnutrition. The IMCI has a special algorithm for classifying malnutrition. In addition, a protocol exists in the IMCI protocols for malnutrition regarding complementary feeding and breastfeeding practices. However, many factors, such as illiteracy, customs, myths, a busy life schedule of mother, and more importantly lack of awareness, create obstacles in its proper implementation (Mahmood and Aftab 2014).

Measles

Measles is a highly contagious and serious viral disease. Before the era of global vaccine programs (1980), one of the highest mortalities reported in children was caused by measles with an annual number of about 2.6 million deaths. Moreover, despite the availability of a safe and effective vaccine, the disease has remained for a long time as one of the leading causes of death in young children globally. For example, in 2015 nearly 134,200 people died from measles; most were children under the age of 5, and the death rate from measles was about 367 deaths every day or 15 deaths every hour. Accelerated immunization activities have had a major impact in reducing measles deaths. During 2000–2014, measles vaccination prevented an estimated 17.1 million deaths. Global measles deaths have decreased by 79% from an estimated 546,800 in 2000 to 114,900 in 2014. A new Global Measles and Rubella Strategic Plan was launched in 2012 and covers the periods 2012–2020. By the end of 2020, the plan aims to achieve measles and rubella elimination in at least five WHO regions (WHO 2012, 2016; WHO/EMRO 2016).

Other conditions also addressed by IMCI are sepsis, meningitis, dehydration, anemia, ear infections, HIV/AIDS, and wheezing. Some countries use the IMCI in the management of other health concerns including development, asthma and broncho-obstructive disease, child abuse, diabetes and obesity, disasters, oral health, dengue and Chagas disease, accidents and violence, epilepsy, dermatologic problems, and nursing (Benguigui 2011).

IMCI Strategy in the Eastern Mediterranean Region

Development

The Eastern Mediterranean Region (EMR) is composed of 22 countries: Afghanistan, Bahrain, Cyprus, Djibouti, Egypt, Iraq, Iran, Islamic Republic of Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Morocco, Oman, Pakistan, Qatar, Saudi Arabia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates, and Yemen. The IMCI strategy was introduced in the EMR in 1996. Initially, the main focus of the strategy was on improving clinical care provided to outpatient sick children at health facilities. Over the years, attention was increasingly given in the Region to the development of a strategy on integrated childcare, addressing not only the sick child but also the healthy child, both in health facilities and in the home. The strategy has then broadened its scope and changed into the Integrated Management of Child Health while still retaining its original acronym "IMCI." More emphasis was also being placed on promoting good childcare practices at home and in the community (WHO 2015). While initial efforts focused on the delivery of integrated childcare services at health facilities, plans to develop interventions to promote key family practices on childcare as an integral part of the strategy (IMCI community component) lagged (WHO 2010). EMRO of the WHO held an Intercountry Workshop on Planning and Implementation of the IMCI Community Childcare Component in five IMCI EMR member states at the EMRO premises in Cairo, from 29 June to 4 July 2002 (Karrar 2003). The intercountry workshop aimed to:

- Review the community component progress in five IMCI EMR member states, namely, Egypt, Morocco, Pakistan, Sudan, and Republic of Yemen.
- Discuss the use of the EMR framework for the community component of the integrated childcare strategy, IMCI, as a practical tool to plan community interventions.
- Identify common constraints and issues in planning and implementation of the IMCI community component.
- Prepare 12-month plans for the IMCI community component.

This workshop was a follow-up to the Intercountry Meeting on Integrated IMCI Documentation and Community Component, held in Lattakia, Syrian Arab Republic, 7–11 October 2001 (EMRO/WHO 2002a). It was intended as the first of a series of similar workshops, designed to develop plans of action with small groups of countries. The countries selected in this first workshop were at an advanced stage of IMCI implementation, including all those already in the expansion phase (EMRO/WHO 2003).

The strategy has the ability to adapt to country needs and the health systems and socioeconomic situations in countries in the Region which differ greatly from each other. The IMCI's flexibility means that it is adaptable to different health policies and systems in those countries with rapid progress in IMCI implementation

in the Region. By the end of 2006, 17 of the 22 EMR countries introduced IMCI, of which 11 are in the expansion phase, 4 in the early implementation phase, and 2 in the introduction phase (WHO 2013).

However, countries in the Region have adopted IMCI at different years (Table 1) and committed to building capacity to support its implementation and child health more generally, with particular attention to planning, monitoring, and supervision (WHO/EMRO 2017). The EMRO has contributed to national capacity through its leading role in supporting medical and nursing schools to incorporate IMCI pre-service training in their programs. The overall experience from the Region demonstrates improved quality of healthcare services delivered to children and reduced costs of care due in part to rational use of medications and increased use of services as families and communities perceive the increased quality of care. Important issues for meeting the goal of implementing IMCI in the region include the following (EMRO/WHO 2003):

- More emphasis is needed on child development.
- Community participation must be accelerated.
- Prevention components must be strengthened.
- Regular collection and used of data for evaluation to adjust implementation.
- Strong political commitment and multisectoral collaboration must be maintained.

Implementation

There are currently huge disparities between and within countries in terms of implementation and coverage as shown Table 3 and Fig. 6.

IMCI Components in the EMR

According to the IMCI Strategic Review: Planning meeting for IMCI in the EMR (8–10 Feb 2016), a summary of which is given below (EMRO/WHO 2017):

First component: Health worker performance

- The most prominent component in the Region.
- Implemented in all IMCI-adopting countries.
- Mainly in-person training lasting 4–11 days based on targeted staff and context.
- Practical sessions including clinical practice constituting more than 50% of training time in all countries.
- Refresher training practiced in most countries, especially when new guidelines are introduced.
- IMCI pre-service education introduced in 1998; currently, more than 70 medical, nursing, and health allied schools are involved.
- Egypt, Iran, and Oman are doing well in the first component as a whole, while Egypt, Iran, and Sudan are leading in pre-service training.

Table 3 Implementation of IMCI in the EMR

Country	Introduction phase	Early implementation phase	Expansion phase
Afghanistan	April 2003	• Planning workshop and adaptation guidelines completed: August 2003 • Implementation at district level: February 2004 • Coordination for IMCI inclusion in the pediatric curriculum of medical schools: April 2004	2005
Djibouti	2001	• Planning and adaptation workshop: 2002 • Adaptation of IMCI clinical guideline completed: March 2004 • Implementation at district level: October 2004	June 2005
Egypt	February 1997	• Planning and adaptation workshop: March 1998 • Adaptation of IMCI clinical guideline completed: March 1999 • Introduction of IMCI in pre-service education in Alexandria University • Implementation at district level: November 1999 • Introduction of IMCI community component: 1999	Mid–2000
Iran	June 1997	• Adaptation of IMCI clinical guidelines completed: August 1998 • Implementation at district level: January 2000 • Introduction of IMCI community component: 1999	January 2002 Pre–service training: March 2002
Iraq	October 1998	• Planning workshop: May 2001 • Adaptation of IMCI clinical guidelines completed: May 2002 • Implementation at district level: August 2004 • Introduction of IMCI community component: 1999	2006
Jordan	2002	• Adaptation of IMCI clinical guidelines completed: January 2005 • IMCI Community Working Group: May 2005	2006
Morocco	March 1997	• Planning workshop: December 1997 • Adaptation of IMCI clinical guidelines completed: June 1998 • Implementation at district level: September 1999 • Introduction of IMCI community component: 1999	December 2000 Pre-service education: January 2001
Palestine	2000	• Adaptation of IMCI clinical guidelines completed: April 2003 • Implementation at district level: August 2003	-
Oman	July 2000	• Adaptation of IMCI clinical guidelines completed: October 2001 • Implementation at district level: March 2002 • Introduction of IMCI community component: 1999	July 2003
Pakistan	June 1998	• Planning meeting: February 1998 • Adaptation of IMCI clinical guidelines completed: October 1999 • Implementation at district level: November 2000 • Introduction of IMCI community component: 2002 • Introduction of IMCI in pre-service education at Nishtar Medical College, Multan: October 2002	June 2003
Saudi Arabia	2000	• Planning and adaptation workshop: May 2003 • Adaptation of IMCI clinical guidelines completed: January 2005	-
Somalia	July 2001	-	-
Sudan	May1997	• Planning and adaptation workshop: May 1997 • Adaptation of IMCI clinical guidelines completed: November 1997 • Implementation at district level: February 1999 • Introduction of IMCI community component: 2000 • Introduction of IMCI in pre-service education at Al-Gezira University: April 2000	2000
Syria	January 2000	• Planning workshop: 2001 • Adaptation of IMCI clinical guidelines completed: June 2001 • Orientation workshop on IMCI in pre-service education: April 2002 • Healthy child module (Arabic): May 2002 • Implementation at district level: April 2003	June 2003
Tunisia	March 2000	• Adaptation g of IMCI clinical guidelines completed: December 2001 • Implementation at district level: September 2002	June 2003 Healthy child module
Yemen	1998	• National IMCI planning and adaptation workshop: October 2000 • Adaptation of IMCI clinical guidelines completed: November 2000 • Implementation at district level: June 2002 • Introduction of IMCI community component: 1999	January 2003 Integrated child health mobile teams: 2007

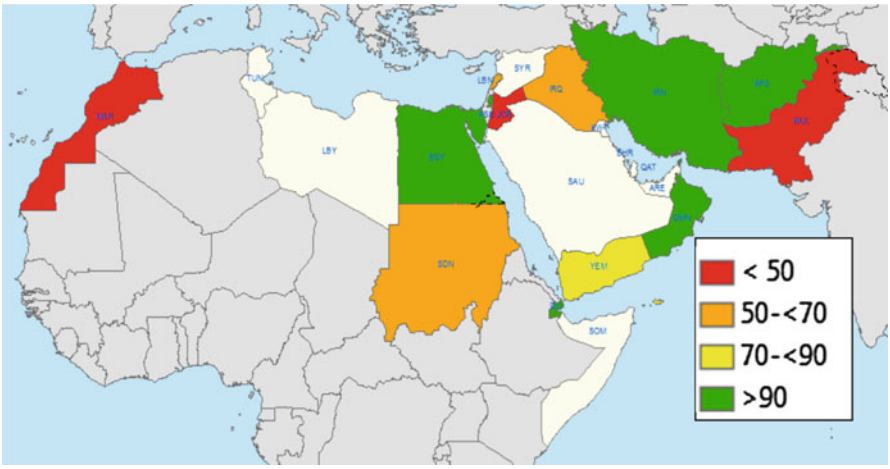

Fig. 6 PHC facilities implementing IMCI in EMR (%)

Second component: Health system support
Partially implemented with a focus on:

- IMCI medicines, equipment, and registries.
- IMCI information systems.
- IMCI supervisory systems.
- Organization of work at health facility.
- Referral system.
- Issues: Integration within existing systems of supply, information, and referral.
- Egypt, Oman, and Iran have good achievements in this component.

Third Component: Family and community practices
Adopted systematically in Sudan, Yemen, and partially in Egypt through:

- Community health promoters
- School intervention
- Media messages
- Health facility (vaccinators and nutritionists)
  - ICCM introduced in Sudan and Yemen in 2010, however, slow progress since then.
  - Sudan and Yemen are the forerunners of community interventions.

Barriers and Constraints

- Implementation of IMCI remains donor-dependent in many countries with very little national contribution.

- Difficulties to scale up to universal coverage (duration of training, cost, number of personnel requiring training, turnover, etc.).
- Resistance of some key policy-makers (mostly because of the duration and cost of training).
- Unclear vision on how the investment in pre-service training will benefit in-service training.
- Issues of adherence to the guidelines and being supervision-dependent.
- Incorporating the component on neonatal health was the weakest aspect in many countries.
- National capacities couldn't cope with the frequent global adaptations and updates of the guidelines.

IMCI Successes in the Region

- Perceived as a symbol of quality, particularly as the quality of training has increased the reputation of the IMCI in the Region
- Provided an excellent platform for pre-service teaching of outpatient and PHC childcare
- Entry point for other programs for families and caretakers through the community component of IMCI
- In countries where the coverage was very high, such as in Egypt, Iran, and Oman, obvious progress made in reducing under-five mortality rate

IMCI Evaluation and Health Facility Surveys in Five Countries

A summary of the IMCI evaluation either by a health facility survey or by evaluation studies in the five countries is shown in Table 4 (EMRO/WHO 2003).

Conclusion

Preventable and treatable diseases cause of morbidity and mortality in a countless number of young children. The response to this was to package a set of simple, affordable, and effective interventions for the combined management of major childhood illnesses and malnutrition, under the label of IMCI which has broadened its scope and changed into the Integrated Management of Child Health in the EMR. This chapter focuses on the rationale of developing and implementing IMCI; its strategy of action, phases, components, and targeted health conditions; and the international multicountry evaluation efforts. In the EMR, the IMCI is in various stages of implementation and coverage. Evidence from the region indicates improved childcare and reduced child morbidity and mortality.

Table 4 IMCI evaluation in five EMR countries

Egypt EMRO, Ministry of Health and Population, Egypt (2002)	• 73% correct classifications • 60% of caregivers know how to give oral treatment at home • Availability of IMCI drugs (5.8 out of 6) • Supervisory visits (36%) • High turnover of care providers EMRO (2010) • Egypt is close to achieving universal coverage of IMCI Rakha et al. (2013) • IMCI doubled the rate of reduction of under-five mortality, from 3.3% before IMCI implementation to 6.3% after IMCI implementation with evidence that the quality of child health care services improved remarkably as a result of the introduction of IMCI in PHC facilities
Sudan EMRO, Federal Ministry of Health, Sudan (2004)	• 46% correct classifications • Availability of IMCI drugs (5 out of 6) • Supervisory visits (11%) • Significant difference in case management skills between trained and untrained providers Republic of Sudan (2010): • Between 2001 and 2010, 23 universities are implementing IMCI • No. of HF implementing IMCIup to the end of 2010: 51.2% of health facilities are implementing IMCI with % of coverage per state ranged between 20% in Red Sea state and 100% in Blue Nile state. Mohammed (2015): • IMCI expanded to cover about 500 health facilities in 71 (30%) out of 240 districts located in 10 states
Morocco EMRO, Morocco Ministry of Health (2007)	• 77% correct classifications • 44% is the availability of essential oral drugs • 49% of facilities received supervisory visits in the last 6 months
Pakistan	Pirzado (2014) • Pakistan adapted 1998–2000 • Pre-service adaptation in Pakistan 2004 • First pre-service evaluation in Pakistan – Liaquat University 2011 Pradhan (2013) • By 2011, 95 out of 135 districts had started the implementation of IMCI
Yemen	Basaleem and Amin (2011) • IMCI is working better in peripheral than in central health facilities • Lack of integration of services • Poor supervision • High turnover rate of health workers Yemeni National Health and Demographic Survey (2013) • Child mortality decreased by 48% from 102/1000 live births in 2003 to 53/1000 live births in 2013 and infant mortality declined from 75.2/1000 live births in 2003 to 43/1000 live births in 2013 Al-Naggar (2016) : by end of 2015: • The Ministry of Public Health and Population supported by the WHO and other donors scaled up IMCI services in 308 districts (90%) in all 22 Governorates of Yemen • The health facilities that provide IMCI services expanded to 3441 or 88% of the total health facilities in the country over 12 years • IMCI training covered 8000 health workers trained in 353 courses, 977 physicians trained in 57 courses and 120 facilitators trained in 12 courses • Establishment of the IMCI task force and ongoing fourth adaptation (2016) • IMCI scale up plan 2016–2017 aims on revival and scale up of IMCI with focus on getting regular data from health facilities, outreaches and mobile teams

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