

A black and white photograph of two young boys playing with a ball in a rural setting. The boy on the left is running towards the right, while the boy on the right is standing and looking at the ball. The background shows a simple building and some trees.

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50years

GLOBAL CHILD SURVIVAL AND HEALTH

A 50-year progress report from UNICEF Canada

For every child
Health, Education, Equality, Protection

unicef 

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A 50-year progress report from UNICEF Canada

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FOREWORD

For fifty years, Canadians have been connected to the world's children through UNICEF. Throughout every one of those years, a focus on child survival and health has been a core element of this relationship.

As Canadians, we can be proud of the role we have played and continue to play in improving the well-being of the world's children. From Canadian health experts, engineers, scientists and advocates, to civil society organizations such as Rotary International and Kiwanis International and their thousands of Canadian members, to the Government of Canada through the Canadian International Development Agency, Canadians have helped bring about remarkable achievements. The pages of this report bear witness to these achievements, accomplished in partnership with governments, communities and parents around the world. Without a doubt, these achievements light a bright path to the future.

Yet there is no room for complacency. While, in aggregate terms, reductions in global child mortality and morbidity rates have been significant over the last five decades, these aggregate data mask significant disparities between and within countries. A stronger focus on the most disadvantaged and vulnerable children is required to address such disparities. HIV/AIDS has had a hugely adverse impact on child mortality rates, particularly in sub-Saharan Africa where, as this report points out, these rates have actually increased in a number of countries. The knowledge and strategies to counter this pandemic are known to



us. They must be implemented on a wide scale, now, without further delay.

It is also discouraging to note the striking similarity between the diseases or conditions which form today's leading causes of child mortality and morbidity, and those of fifty years ago. We know what needs to be done to tackle these causes: proven, cost-effective technologies are readily available, while advances in public health research and delivery systems offer the opportunity for further breakthroughs. What is still missing is sufficient, sustained public commitment and political will to invest the necessary resources and measures to tackle the diseases — eminently preventable — that kill tens of thousands of children every day and which undermine the health of millions more. Without such significant investment, the vaunted commitment of the world's governments to the Millenium Development Goals, many of which are focused on child well-being, is empty rhetoric.

Our successes have been real. Let's celebrate them — but quickly move on and do more to ensure that our connection to the world's children is a lifeline, for every child.

A handwritten signature in black ink that reads "Nigel Fisher". The signature is written in a cursive, flowing style.

Nigel Fisher
President & CEO
UNICEF Canada

INTRODUCTION

INTRODUCTION

Fifty years ago, there were only about three billion people living on Earth, fewer than half as many as there are in 2005.¹ AIDS was unheard of, but children and their parents lived in constant fear of polio (or infantile paralysis, as it was known then). It was already known that young children were prone to be attacked by diseases of the respiratory or digestive system and to die from them,² and also that much of the illness and death among young children was due to the major infectious diseases which had been virtually eliminated in countries of relatively low infant and child mortality but which were still widespread in those regions where large numbers of children died before the age of five.³ It was also widely known that the world's highest mortality rates could be substantially reduced at relatively small cost with the administration of modern drugs and insecticides.⁴

There have been significant improvements in the health of the world's children over the past fifty years, but some challenges have remained constant. One of the more discouraging aspects of work over the decades to improve child health is the persistence with which some of the more significant causes of child death have exerted their baleful influence. In the year 2003, the leading causes of death among children under five, outside of the neonatal period, were: pneumonia, diarrhoea, malaria, measles and AIDS.⁵ In the 1950s, of course, AIDS would not have appeared on such a list, and polio would likely have had a notable place, but otherwise, many of the same diseases that threatened children fifty years ago



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continue to kill and undermine the health of children today.

A very significant and consistent contributing factor to childhood illness and death throughout the decades has been undernutrition, which is an underlying cause of 53 per cent of deaths among children under five years of age today.⁶ The quality and quantity of food and the quality of feeding practices, therefore, play important roles in child health. A family's nutritional security depends not only on access to wholesome food, but also on food storage and preparation, feeding practices and micronutrients. For infants and young children, nutritional security also means exclusive breastfeeding from birth to six months, and continued breastfeeding for two years or longer with age-appropriate complementary feeding to sustain growth and development.

The role that breastfeeding plays in a child's health cannot be overestimated. Not only is it critical to an infant's nutritional needs, but it also helps protect babies from diarrhoea and acute respiratory infections, stimulates their immune systems, improves response to vaccinations, and contains many hundreds of health-enhancing molecules, enzymes, proteins and hormones.



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The first month of life is the most dangerous period for the world's children. More than one third of children under five die during this one month period alone.⁷ Neonatal deaths are caused by preterm births, sepsis and pneumonia, asphyxia, congenital anomalies, tetanus, diarrhoea and other factors. Expanded obstetric services and facilities and community health services, including skilled birth attendants and the promotion and support of breastfeeding, could greatly reduce these numbers.

For this report, however, we have chosen to focus on some of the leading diseases threatening children, because important advances in research and in the delivery of public health interventions to prevent and treat these diseases provide such great hope for the road ahead, especially as we tackle the unprecedented challenge that HIV/AIDS now poses to global child health.

One of the most significant and relatively new developments in the fight against child mortality has been the discovery that the consumption of certain micronutrients, notably vitamin A and zinc, can prevent and minimize the impact of several infectious diseases. For this reason, combined with the fact that Canadians have contributed so greatly to micronutrient research and supply, we have decided to explore this critical area of intervention as well.

We know how to prevent the onset of most diseases that threaten children and how to treat them when they occur, so that the lives of many hundreds of thousands, perhaps millions, more children can be saved. What is required is only the public commitment and the political will to provide the necessary funds and other resources to the effort, as well as the knowledge and individual willingness on the part of health workers, parents and other care-givers to take the necessary measures.

We start from the fundamental assumption, known 50 years ago, that it is not only necessary but also absolutely possible to save the lives of millions of children through readily available and inexpensive means. This report will show what has been accomplished to date in dealing with some of the leading causes of under-five mortality worldwide, and how those accomplishments provide both a guideline and hope for what can be accomplished in the years to come.

CHILD HEALTH OVER FIVE DECADES

CHILD HEALTH OVER FIVE DECADES

Preventing the deaths of young children, as reflected in the under-five mortality rate, is only the beginning of concern for child health. The perilous first five years are fraught with dangers, not only to the lives of young children but also to the quality of those lives. It is not enough for these children merely to survive. Survival must be accompanied by the physical conditions for the fullest possible development of the child's potential in all areas.

Preventing illness and disability has, therefore, been the focus of efforts over the years to improve the health of children everywhere in the world, not only to reduce the number of child deaths to the absolute minimum but also to prevent the damage to children's overall physical and mental capacity which can result from common diseases even if they do not lead to death.

The Importance of Information

In order to see whether we are accomplishing this goal, it has been essential, almost above all else, to have accurate information about the condition of children, including mortality rates and the incidences of the major diseases, as well as the extent to which the means of preventing and/or curing those diseases are available to national health systems, health workers and families of children affected by or in danger from the major causes of child illness and death.

There are no firm statistics on the population of the world in 1955. It is



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difficult, therefore, to state with complete assurance just how many people there were, how many children were born and how many may have died in 1955. Even in Canada, information about the health of children in the mid-1950s is limited and not readily accessible. Although Canada has long had both a comprehensive census system that has been a model to the world, and well-developed structures for tracking births and deaths, it is difficult to determine precisely what the situation of child health was in Canada in 1955. UNICEF has estimated that Canada's under-five-mortality rate⁸ (U5MR) in 1960 was 33 out of every 1,000 live births. Given that these rates have declined steadily over the past five decades, we can assume that the rate in 1955 would likely have been somewhat higher, perhaps around 35 per 1,000. For the times, this was a relatively low figure for child deaths,⁹ although today, when Canada has achieved the commendable U5MR of six,¹⁰ it seems shockingly high.

Whereas one of the major difficulties in describing the situation of child health in the 1950s is the lack of reliable statistical information to describe what was actually happening then, there is no



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problem today in finding the information needed to tell the story of the illnesses that beset children worldwide. Improved data collection and analysis has been a significant component of the intense global focus on child health programmes in the past two decades. Since factual information is necessary in order to measure our progress in relation to targets set for child health, UNICEF and its partners have worked hard to help individual countries, regional bodies and global organizations develop and improve their

own systems for data collection, record-keeping and analysis. As a result, it is now possible for us to describe, with some precision, what is happening to young children in various parts of the world and, perhaps more importantly, why such things are happening.

The Path of Progress

Between the 1950s and today, there have been substantial improvements in the situation of child health generally. Remarkable progress has been made in reducing the numbers of children who die before the age of five in developing countries, at least on a global basis, from 210 deaths per 1,000 live births in 1955¹¹ to 79 deaths per 1,000 in 2004.¹²

Globally, under-five mortality continues to decline every year. As a result in large part of the efforts undertaken to achieve the goal of the 1990 World Summit for Children to reduce by one-third the death rate for children below the age of five by the year 2000, there were three million fewer under-five deaths at the turn of the millennium than there were in 1990. Although the amounts by which the death toll decreased varied from region to region, in every part of the world, on average, more young children were surviving than had done so ten years before.¹³ And the trend is continuing.

Nevertheless, progress has not been perfect, nor even. Although the global under-five mortality rate declined by 11 per cent between 1990 and 2000, the national rate actually increased in 14 countries, nine of which are in sub-Saharan Africa. Every day, 29,000 children below the age of five still die from largely preventable causes, for a total of about 10.6 million every year.¹⁴ Half of all these deaths occur in just six countries (India, Nigeria, China, Pakistan, the Democratic Republic of the Congo and Ethiopia). A full 90 per cent of the total take place in only 42 countries, 24 of them in sub-Saharan Africa.¹⁵

Even at the current rate of reduction it will take many years before most countries are able to meet the Millennium Development Goal (MDG), set by the United Nations at the UN Millennium Summit in the year 2000, to reduce the global under-five mortality rate by two-thirds by 2015. This is a much more ambitious goal than that of the World Summit, not only because the target reduction is so much greater in percentage terms, but also because most of the easy to achieve reductions have already been accomplished. It will be an especially difficult task for those countries in which the under-five mortality rates have remained unchanged in recent years or actually increased.

In some cases the challenge is geographical, such as delivering basic and essential services in regions which are hard to reach and lacking infrastructure, such as electricity service. Other challenges are posed by entrenched cultural and traditional practices which work against important child health measures, such as immunization. Most seriously of all are the complications presented by more intransigent variations of disease, such as chloroquine-resistant malaria, which require more elaborate and expensive treatment. The difficulties have grown especially in the last 20 years with the spread of HIV/AIDS, which makes it more difficult to treat even the simpler infections.

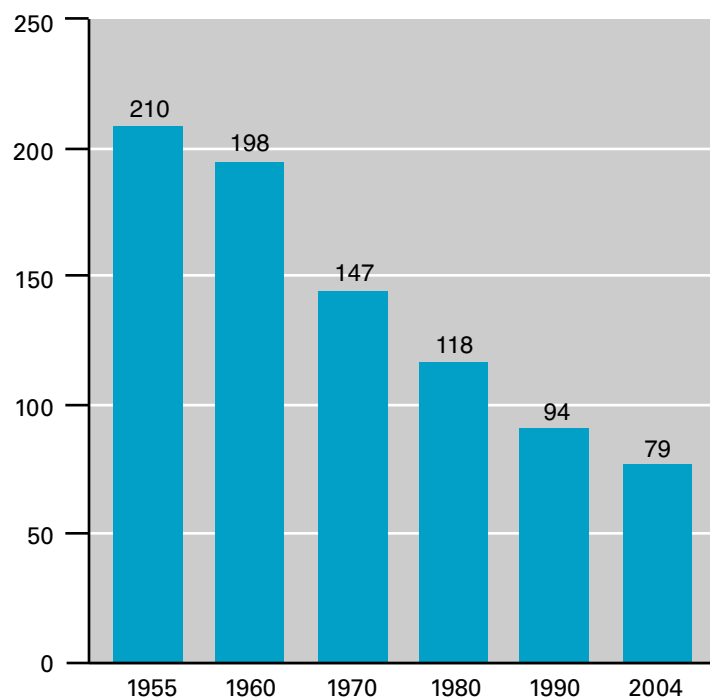
Of all the Millennium Development Goals, the challenge to reduce under-five mortality is the one that causes the most concern right now. Although one region, Latin America and the Caribbean, is on track to achieving the target reduction, and several countries in East Asia seem likely to make progress, the prospects for major reductions in under-five mortality in other developing regions are gloomy unless a major turnaround occurs in both government priorities and international donor support on behalf of

child survival. The UNICEF report *The State of the World's Children 2005* describes the inevitable result: "Failure to achieve the MDGs will have tragic consequences for children, particularly those in developing countries. Millions will see their childhood violated through ill health or death from preventable diseases."¹⁶

Efforts will continue to prevent and successfully treat the most common causes of illness and death among young children. The goal remains to reduce rates of under-five mortality by eliminating or controlling the most preventable of the diseases that afflict children less than five years old.

One significant new dimension to the treatment of these diseases is the realization, confirmed by epidemiological studies, that the principal diseases affecting young children do not operate

Global Under Five Mortality Rates 1955-2004 (per 1,000 live births)



Source: WHO, *The World Health Report 1998*; UNICEF, *childinfo.org* and *The State of the World's Children 2006*

on their own. Measles can lead to pneumonia. Repeated bouts of diarrhoeal disease may not directly kill a child, but may make him or her more vulnerable to other infectious diseases, malaria, or undernutrition. Malaria weakens the immune system and shares important characteristics with pneumonia, to the extent that they are sometimes treated with the same medication.¹⁷

It is increasingly important for the health workers who are treating these conditions to recognize the inter-connections among the common illnesses of young children and provide comprehensive treatment that bridges the boundaries between specific diagnoses.

THE CANADIAN CONTRIBUTION

It is worth noting that Canada has made some important contributions over the years to the efforts to reduce under-five mortality and prevent the most common killers of young children. From the beginning, Canadian support for UNICEF has been predicated on the importance of young child survival and development, and funding has often been provided, both by the Canadian Government and through private-sector donations to UNICEF Canada, for specific campaigns to combat young child mortality.

During the 1980s, a major focus for Canadian support was the prevention of diarrhoea by supporting the provision of clean water and sanitation. Later, this was supplemented by specific, targeted support for immunization campaigns to prevent the transmission of tuberculosis, diphtheria, whooping cough, tetanus, polio and measles.

Canadian support for the World Summit for Children in 1990 was demonstrated not only by financial contributions but also, in terms of political profile, by the participation of Canada's Prime Minister Brian Mulroney as co-Chair of the Summit. More recently, Canada has taken the lead in promoting the treatment of micronutrient deficiencies, specifically through the establishment of the Micronutrient Initiative.

Canada has also taken a leading role in the development of new approaches to saving children's lives, recognizing the complexity of childhood illnesses. Canadian support has been critical to UNICEF's "Accelerated Child Survival and Development" (ACSD) programme, which combines the most effective interventions for children, newborns and pregnant women in an integrated, cost-effective

package. This has been tested in 11 countries in West Africa that demonstrate a wide variety of disease patterns and social and economic conditions. Included in the package are immunization, micronutrient supplementation, promotion of breastfeeding and provision of both oral rehydration salts to treat diarrhoea and insecticide-treated bed nets for malaria control. UNICEF estimates that under-five mortality rates have declined by an average of 20 per cent in the participating districts where the programme was implemented in its entirety and by 10 per cent where it was implemented in part. Ann M. Veneman, Executive Director of UNICEF, has said, "We are grateful to Canada for its leadership and support, as well as to the governments in West Africa whose commitment made these results possible."¹

¹ UNICEF, press release, "Integrated Approach to Child Survival Achieving Important Results, UNICEF Finds," Geneva, 16 May 2005.

PNEUMONIA AND OTHER ACUTE RESPIRATORY INFECTIONS

PNEUMONIA AND OTHER ACUTE RESPIRATORY INFECTIONS

Pneumonia and other acute respiratory infections (ARI) constitute the leading cause of death among children below the age of five. Every year, pneumonia kills approximately one-fifth of all the children under five who die, some two million children out of the total of 10.6 million.¹⁸ These infections are caused by either bacteria or viruses and can occur in any part of the respiratory tract, including the nose, middle ear, throat, bronchial passages or lungs. Symptoms of an infection can progress quickly from a cough and sniffles to difficulty breathing that can, all too often, be fatal.

Young children are usually more vulnerable to pneumonia because they lack the immunity older people have acquired from repeated exposure to the infectious agent, and the immunity they may have had from their mother as a result of breastfeeding is usually gone for those more than one year old. Their small body mass also makes young children more likely to develop serious complications more quickly, so that a child may appear healthy in the morning and be deathly ill before the end of the day. Vulnerability is especially great if the child is already weakened by malnutrition or if the child's immune system is impaired as a result of other infections, including diarrhoeal disease, measles, malaria and, increasingly in sub-Saharan Africa and parts of Asia, HIV.

While every year approximately two million children die as a result of acute respiratory infections, many more experience the debilitating effects of the infection which, if not treated properly and promptly, may result in such problems as partial or complete hearing



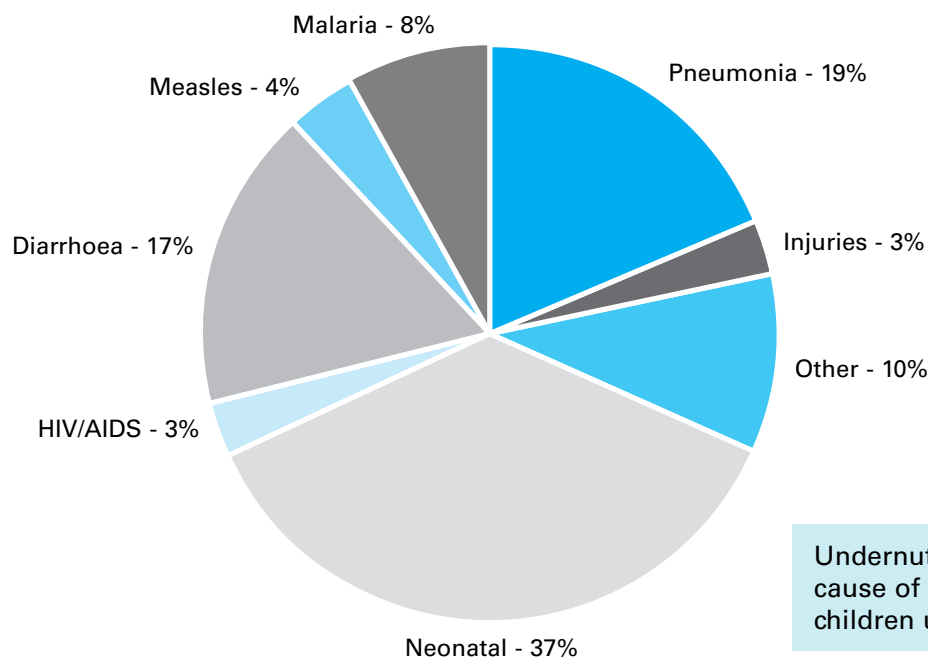
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loss or permanent lung damage. As well, the infections may deplete a child's immune system, making him or her more vulnerable to other illnesses.

It is estimated that, in 2003, 16 per cent of children worldwide less than five years old,¹⁹ or just under 100 million children, suffered from some form of acute respiratory infection.²⁰ The conditions in which many of the world's vulnerable children live, including crowded living quarters, with exposure on a regular basis to smoke from indoor fires for cooking and heating and other contaminants that affect the respiratory system, mean that they are often the most likely to contract an acute respiratory infection.

Although as many as 60 per cent of ARI deaths could easily be prevented by the selective use of affordable antibiotics,²¹ many children with ARI are never seen by a health worker until it is too late. Because the infection can begin subtly, as a "common cold", it does not always attract the necessary

Major causes of death among children under five years of age in the world, 2000-2003



Undernutrition is an underlying cause of 53% of deaths among children under five years of age.

Source: WHO, Child and Adolescent Health and Development

parental concern and proper medical attention. In 2003, only about 39 per cent of the children suffering from acute respiratory infection in sub-Saharan Africa were taken to see a health provider. The proportion of those in South Asia who were seen by a health provider is only somewhat higher, at 57 percent. That means that, in these two regions alone, some 14 million children were not treated.²²

In some areas, even if a child's parents were to recognize the signs of a respiratory infection, finding appropriate treatment would be a challenge. Clinics might be too far away, not have trained staff, and lack the needed antibiotics. There may also be restrictions which prohibit a nurse or health worker from dispensing the necessary antibiotics due to a reluctance by governments or other regulatory authorities to allow health workers to provide such medication.

Management of Pneumonia and ARI

As part of the joint UNICEF/World Health Organization (WHO) approach to improved health care known as Integrated Management of Childhood Illness (IMCI), all facility-based health workers are trained to treat acute respiratory infections in conjunction with the other common childhood diseases such as diarrhoea and malaria. These measures are now an integral part of a "case management" approach, dealing not only with the individual illnesses, but with the health situation of the child as a whole. IMCI also focuses on equipping and empowering local health centres and their health workers. One goal of IMCI is to ensure that any child who is brought to a health centre for ARI is given the proper diagnosis and treatment.

Despite the best efforts to have all health facilities properly staffed with trained workers, equipment and drugs, not all children who have symptoms of respiratory infection will be brought to an IMCI-capable health centre in time. A major challenge is helping families understand the danger signs of pneumonia and seek care in a timely manner. The next challenge is for the family to be able to get to a trained worker to diagnose and treat suspected cases of pneumonia. Especially for very young children, this health service must be nearby and available 24 hours a day.

Community IMCI, known as C-IMCI, was developed to meet this need. C-IMCI helps to build community awareness of improved family care practices for disease prevention and treatment as well as provide treatment for some common diseases in the community. C-IMCI relies upon community health workers. These are individuals who have no professional health care certification, but who are provided with very basic health care training over several weeks, then engaged by the community to help keep it healthy.

A number of studies sponsored by UNICEF and WHO have clearly shown that community health workers, given the necessary information and training, are capable of diagnosing pneumonia and prescribing an appropriate treatment. With C-IMCI, community health workers are being empowered to treat acute respiratory infections in conjunction with other diseases. Community health workers, when well-trained and supervised, can perform as well as professional health workers, and provide important access for poor families who would not otherwise have services.

The IMCI approach recommends that children who show symptoms of pneumonia be treated immediately with a course of antibiotics. A concern with regard to community-based

COMMUNITY PARTICIPATION IN DISEASE MANAGEMENT: THE STORY OF YAWS

During the 1950s, UNICEF, along with WHO, took part in a major campaign to control and radically reduce the occurrence of yaws, a pernicious disease which was widespread throughout the tropics in Africa, Asia, South America and the Caribbean. There were thought to be around 20 million cases of yaws worldwide, most of them among children between the ages of six and 11.

Yaws is transmitted from one person to another by means of direct contact and enters the skin through cuts, scratches or insect bites. If left untreated, the original “yaw”, a small red bump usually on the legs or buttocks, may heal itself, but the infection returns in progressively worse forms. A rash or more sores often develop, especially on the soles of the sufferer’s feet and, finally, it can lead to deformity of bones and joints and facial disfigurement.

The invention of penicillin heralded prospects of a cure. One shot cleared the sores and a few more cleared the disease from the body. But the campaign against yaws required a community level approach on a vast scale, previously unknown.

The largest national yaws campaign was in Indonesia. Mobile teams of lay health workers identified the cases and health professionals administered the treatment. By 1955, these lay-professional teams were treating over 100,000 cases of yaws a month in Indonesia alone. In Thailand, nearly one million cases had been cured and the possibility of full eradication in Asia was in sight. Today, worldwide, there are only about 500 cases of yaws a year.

The yaws campaign of the 1950’s marked a pivotal development in the history of UNICEF’s health programming. It laid the groundwork for future major health initiatives and demonstrated the crucial role of community health workers in the fight against childhood disease.

administration of antibiotics is the fear that the antibiotics will not be used properly, and that this will lead to the development of antibiotic-resistant bacteria. This is a legitimate concern, but the problem seems to arise more commonly when parents obtain antibiotics without visiting a clinic or receiving instructions on the correct use of such medications. In those situations, people may administer to a child only enough of the antibiotics to cause the symptoms to disappear, stopping before the bacterial infection is totally cured.



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Often, the reason for this is economic, which is why it is important that the antibiotics dispensed by the community health worker be as inexpensive as possible.

Examination of community pneumonia treatment programmes in various countries has shown that antibiotics are properly prescribed and administered in the vast majority of cases. For example, a large-scale programme in Nepal, in which direct observation of community health workers' performance and record reviews are used to monitor the quality of care, appropriate care was given in 80 per cent of cases. Of the remaining cases, inappropriate antibiotic use took place in only three per cent of cases.²³

Trials of the community case management approach to treating pneumonia were undertaken in Bangladesh, India (two separate areas), Nepal, Pakistan, the Philippines and Tanzania. Together, these trials have been extremely encouraging, showing an overall reduction in child mortality of 26 per cent and a 33 per cent reduction in mortality from pneumonia.²⁴ UNICEF and WHO are moving to apply this integrated approach to treatment of ARI on a broader scale. The Department of Epidemiology and Community Medicine at the University of Ottawa is an active participant in the programme.

Pneumococcus and Hib Vaccines

The two principal causes of pneumonia are a bacterium, *Pneumococcus*, which is responsible for as many as one million child deaths every year,²⁵ and a virus, *Haemophilus influenzae* type b (Hib), which kills an estimated 500,000 from Hib pneumonia (as well as some 30,000 who die from Hib meningitis).²⁶ Because pneumonia kills approximately one-fifth of all the children under five who die each year and often weakens the immune systems and physical health of those who survive, preventing these two forms of pneumonia would greatly contribute to country efforts to meet the Millennium Development Goal of reducing under-five mortality by two-thirds by the year 2015.

Effective vaccines against both of these pneumonia causing pathogens exist and are in common use in most industrialized countries, but they are not generally administered in developing countries, largely because of cost considerations. The Global Alliance for Vaccines and Immunizations (GAVI), of which UNICEF is a part, and its financing arm, The Vaccine Fund, are aiming to include the Hib vaccine in their support for national immunization programmes.²⁷ The goal is to ensure that 50 per cent of the poorest countries with the highest disease burdens and the necessary delivery systems introduce the Hib vaccine as part of the regular immunization cycle for young children.

The *Pneumococcus* vaccine may be more difficult to introduce, because it is more costly and because it needs to be administered every year. Although disease prevention, not just treatment, must remain the ultimate goal for those working to improve child health globally, for *Pneumococcus* infections, the solution for the short term has been to concentrate resources on establishing effective systems for treatment, and reserve the use of vaccines for only the most urgent cases, for example in situations of epidemics.

DIARRHOEAL DISEASE

DIARRHOEAL DISEASE

The 1990 World Summit for Children set the goal of reducing the number of deaths worldwide due to diarrhoeal disease by half by the year 2000, and this was accomplished. Despite this, diarrhoeal disease remains the second most important cause of death for children below five years of age, killing 3,900 children in this age group every day²⁸ — approximately 1.6 million young children every year. These represent only a small fraction of the number of cases of diarrhoeal disease, which can rise as high as four billion in a given year.²⁹ Some young children may suffer as many as half a dozen bouts of diarrhoeal disease in the course of a year. Even if the dehydration and other effects of the disease do not kill the child, they can significantly weaken his or her immune system and aggravate the effects of other infections. Additionally, a child who suffers such frequent debilitating illness is unable to play, study or develop to the full extent of his or her potential, laying the basis for lifelong incapacity.

Most diarrhoeal disease is caused by bacteria and/or viruses that are transmitted by human or animal feces, usually through contaminated water, food or direct contact with unwashed hands.

Oral Rehydration Therapy

Diarrhoeal disease kills primarily by causing severe dehydration as water is removed from the body in considerably greater quantities than normal. With their smaller body size, young children



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are particularly vulnerable, since the loss of several pints of water is much more drastic for them than for a full-grown adult. Dehydration can develop quickly, in a matter of hours, resulting in the failure of vital organs, finally leading to death.

The crucial first measure in preventing the death of children who are suffering from diarrhoeal disease is, therefore, to prevent dehydration or reverse its progress as quickly as possible. One continuing challenge is to

educate parents and others who have children in their care about preventing dehydration by more frequent breastfeeding or by giving fluids available in the household and about detecting the early signs of dehydration.

The crucial second measure is to rehydrate a dehydrated child. One means of rehydration is the administration of an intravenous electrolyte solution. This solution was pioneered in the 1950's by researchers at Yale University. As valuable as this technology is, its application is limited to medical facilities with trained staff and relatively advanced equipment. Families living in rural areas or urban squatter settlements are not likely to be able to access or afford the cost of such care.

Research with the electrolyte solution continued throughout the 1960's and it was demonstrated in the latter part of the decade that patients could drink a solution of salt and sugar in prescribed proportions and usually achieve the same rehydrating outcome. Given that most households, no matter how remote, use these two basic ingredients in food preparation, treatment of diarrhoea became possible at the doorstep. The problem of access and affordability had been solved.

But it was not until the 1971 Indo-Pakistan War when cholera broke out, affecting hundreds of thousands of displaced people returning home to Bangladesh, that the real value of the oral electrolyte solution was demonstrated. Without the extensive research into electrolyte replacement therapy that had already been done and its practical application during this emergency, it is safe to say the loss of life would have been much, much greater.

This oral rehydration therapy (ORT), a mixture of sugar and salt dissolved in water, became the central component of programmes to treat all kinds of diarrhoeal disease. In the early 1980's, when UNICEF helped drive a major international push to reduce the death

toll from dehydration, the general assumption on the part of most medical experts and those involved in expanding access to basic health care, was that ORT would provide the answer to the challenge of combating dehydration.

A simple mixture of sugar, salt and water — the Simple Solution, as it had become known — became the platform for a massive door to door campaign in Bangladesh. Thousands of village women, many of whom were illiterate, moved throughout the country promoting the sugar-salt solution and training mothers in how to prepare it. The Simple Solution included a four finger scoop of sugar and a three finger pinch of salt added to one litre of drinking water. This was possibly one of the earliest popularized public health messages. The task of these village women was in no way small. They needed to tell mothers to administer the Simple Solution with every bout of diarrhoea and they needed to ensure the scoop-pinch-litre of water message could be repeated by mothers after they were trained.

The lessons derived from the experience in Bangladesh laid the foundation for mobilizing efforts around the world in the treatment of diarrhoea and dehydration. Health Centres continue to promote ORT and have 'ORT Corners' in their facilities to educate clients. The home based Simple Solution was a good first level response by mothers to their children's diarrhoea. The strategy accomplished a lot for children, preventing dehydration from occurring, and it also contributed toward women's empowerment and skill development in Bangladesh.

One important lesson from the experience included a recognition that there were variations to the solution based on the size of a woman's hand, or the size of the measuring container being used. For example, a bigger or smaller scoop of sugar results in a slightly different electrolyte solution, potentially making the solution less

effective. Medical and scientific research continued in order to support the development of a standardized formula. Once found, the formula was packaged in foil packets bearing the WHO/UNICEF symbol of endorsement, assuring users that when mixed with an eight ounce glass of drinking water the mixture provided the perfect electrolyte solution. With the guidance of social marketing experts, the Oral Rehydration Salts packets (ORS) were distributed widely, sold for minimal cost alongside lentils and rice at the local market and distributed freely through health centres.

Packaged for use by anyone, no matter what their level of training, ORS packets seemed to offer the promise of eliminating a major scourge once and for all. But the limitations of this approach soon became apparent as distribution systems were often inadequate. While use of ORS remained the preferred way to treat dehydration due to diarrhoeal disease, global efforts paid increasing attention to the promotion of traditional remedies that had demonstrated effectiveness. Among these were “Recommended Home Fluids” including the sugar, salt, water solution, salted rice water and other cereal-based solutions.

At the same time, other traditional practices needed to be challenged and changed. In most cultures, a child with diarrhoea would not be fed while he or she was ill. In some cases this was done because the symptoms of diarrhoea and vomiting often disappear when food is withheld. In others, it was done because children often experience loss of appetite with diarrhoeal disease. But the restriction or abandonment of feeding can cause serious problems of its own, especially when a child’s system is being ravaged by the diarrhoeal infection. This is particularly true with extremely young children who may still be breastfeeding.

Building on research conducted in the 1980s, it became standard practice to recommend strongly that children

continue to be fed even when they were suffering bouts of diarrhoea. It had been demonstrated that continued feeding not only reduced the nutritional deficits that could occur during the course of an infection, but also reduced the length of time the illness would endure. Thus, the education provided to parents began to stress the importance of continued feeding along with the administration of ORS or other forms of ORT.³⁰ Education also included how to recognize the more serious signs of dehydration. Not all diarrhoeas respond successfully to ORT because of their complex nature. Some require intravenous care and carefully monitored treatment. For this reason the message to parents evolved to be more complete.

As health workers in the field gained greater experience using ORT in the treatment of diarrhoea in children and research focused more and more on practical measures to prevent or reverse the effects of dehydration, a further refinement of the treatment process was introduced, recommending substantially increasing the amount of fluid given to a sick child along with the rehydration solutions and continued feeding. By the early 1990s, this approach had become the standard method of treating diarrhoeal dehydration.

With ongoing experience and research leading to new advances in the treatment of diarrhoea and dehydration, UNICEF and WHO now recommend a newly formulated, low osmolarity ORS — containing slightly less sodium and glucose. Making the new formulation requires a simple change in the mixture and is already being implemented by many pharmaceutical companies. It has also been discovered that giving a child zinc supplements for 10 days will shorten the duration of the diarrhoea episode and help prevent another episode of diarrhoea in the subsequent months. These new practices are being introduced in many developing countries with assistance from UNICEF and other partners.

Although it is difficult to measure the use of ORT accurately around the world, since different methods of record-keeping are employed in different countries and the use of traditional solutions and home remedies raises questions of definition, the home management of diarrhoea and dehydration seems to have been successful in reducing the number of deaths of young children and improving their chances of quick recovery.³¹

Despite its success, ORT cannot always save a child's life. Its success is dependent on the severity of the disease when ORT is administered or on the virulence of the infection which may overwhelm the restorative effects of rehydration. The efforts to prevent child deaths must, therefore, lie more in the

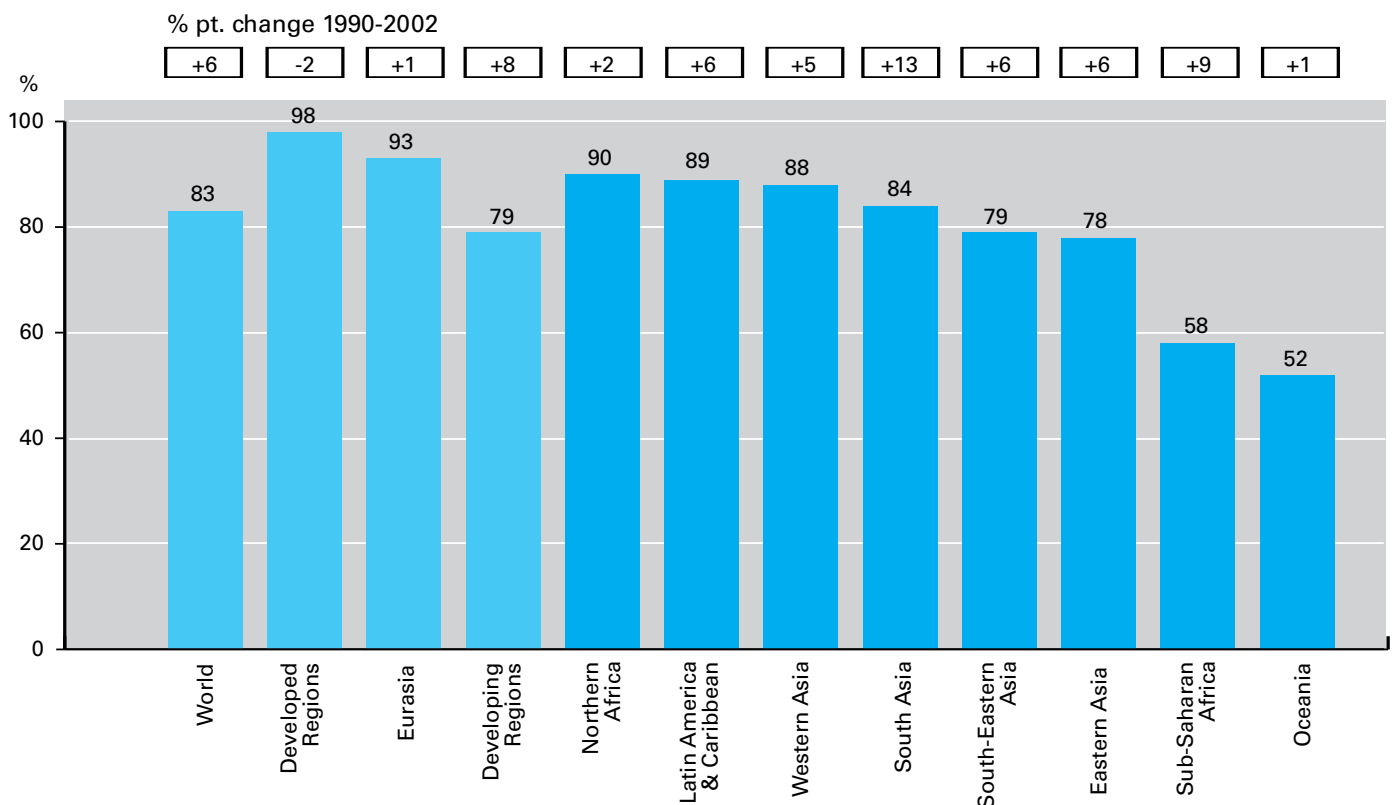
prevention of infection in the first place. Indeed, no matter what form the diarrhoeal disease might take, prevention will always benefit children more than treatment.

Water Supply and Sanitation

One of the most important means of preventing diarrhoeal disease is to assure the provision of clean water for drinking, cooking and personal hygiene. Between 1981 and 1990, the International Decade for Water Supply and Sanitation focused global efforts to ensure ready availability of reliable sources of clean water for household use and access to sanitary means of

Coverage with improved drinking water sources by region in 2002

More than 80 per cent of the world's population use improved drinking water sources



Source: UNICEF & WHO, *Meeting the MDG Drinking Water and Sanitation Target: A Mid-Term Assessment of Progress, 2004*

excreta disposal, providing technical services, material resources and community mobilization.

In its support for water supply and sanitation programmes around the world, UNICEF fostered a number of technological innovations that have made water supply and sanitation activities less costly and more easily undertaken at the community level. These include, among other things, the India Mark II hand pump and the

ventilated improved pit latrine. These advances, in turn, allowed many more water supply and sanitation programmes to be undertaken in even the most deprived countries and with some of the most marginalized communities.

Today, 83 per cent of the world's population — approximately 5.2 billion people³² — have reliable access to clean drinking water. This still leaves some 1.1 billion people without clean water,

THE INDIA MARK II HANDPUMP

The India Mark II Hand Pump is one of the great triumphs in the provision of reliable supplies of clean water in rural areas. As its name suggests, the pump was developed originally in India, where UNICEF implemented one of its earliest large-scale water supply programmes. The only hand pumps available for rural water supply projects were designed for use by a single household. They weren't able to stand up to the demands of an entire community with more or less constant use all day. A UNICEF survey in 1974 found that as many as 75 per cent of the hand pumps it had installed were not working.

A number of NGOs were already working on developing a simple, low-cost, sturdy hand pump which could be used easily on wells of varying depth. UNICEF joined them, supporting their research and development efforts with technical expertise and coordination. Basing their work on a pump designed by a Swedish engineer for the Sholapur Well Service, Indian technicians came up with the India Mark II design, which satisfied all requirements.

The India Mark II pump is made of heavy-duty steel, not the more



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fragile cast iron of traditional hand pumps. Its extra-long handle and simpler pumping mechanism are easy for children to use. It can survive the long hours of steady use and can bring water up from great depths underground with reasonably little effort. The pumping mechanism can be taken apart without the need for elaborate equipment and, when

breakdowns occur, a villager trained to maintain the pump can usually fix it in a couple of hours with a set of basic tools.

By 1984, the Mark II was the standard hand pump for use in India. It was being manufactured by 36 companies throughout the country. Some 600,000 pumps had been installed. That number had increased to three million by 1998. Thousands of Mark II pumps were also exported to be used in water projects in dozens of countries.

In some countries, where major water supply programmes were under way, it made more sense to manufacture hand pumps within the country, usually under a new name to reflect its place of manufacture, but based on the India Mark II design. Because the design had been developed with UNICEF assistance, it was available without the need to pay the usual substantial copyright or licence fees, so relatively small local factories could begin production without major up-front expenses. This also kept the price low, keeping the pump affordable for rural communities.

THE VENTILATED IMPROVED PIT LATRINE



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The key to preventing most cases of childhood diarrhoea is proper hygiene, a critical part of which is the sanitary disposal of human excreta. In many parts of the world, especially rural areas, the best way to assure this is through the use of a suitably designed outdoor toilet or latrine.

For many people, however, whose cultural background does not include such facilities, use of most styles of latrine is more off-putting than their traditional practices. The smell, the flies and the general unattractiveness make most people reluctant to use them. It is not enough to convince people that latrines are a good thing. They must also be made to feel comfortable with them.

The solution UNICEF found in the course of implementing several sanitation projects in Africa was a latrine design that addressed these concerns while also providing an unobtrusive structure that could blend in with the traditional village architecture. Its name, the “ventilated improved pit latrine”; commonly referred to as “VIP”; describes one of its main benefits. The latrine is ventilated with a pipe that runs along the outside of the structure, placed where it can be heated by the sun. As the hot air rises, it draws the unpleasant odours from the pit to the outside, rather than into the interior of the latrine. A screen on the end of the ventilation pipe traps the flies, and the germs they carry.

The entrance to the latrine is concealed by a wall outside which also reduces the amount of light inside the structure, thereby making the interior less attractive to flies. A cover on the latrine slab also serves to cut off the light to the pit, so the flies are not attracted to enter the structure.

Latrine slabs are manufactured locally out of cement with reinforcing wire, using simple moulds in conformity to the style with which the people are most comfortable. The structures are built of the same materials as people’s houses so they do not look out of place.

The VIP latrine design has proven so successful that it is used, with adaptations to suit local preferences, in almost every part of the world from Afghanistan to Zimbabwe.

however. Some may live in rapidly growing urban areas which have highly concentrated populations and contamination of surface water sources (such as rivers and lakes), combined with a lack of water delivery infrastructure. Others, in isolated rural communities, may be in naturally arid regions, where surface water is virtually non-existent, at least for part of the year, and the only possible underground water sources are deeply buried, often under layers of rock that are difficult to penetrate. The vast majority of those who lack access to adequate supplies of clean water live in sub-Saharan Africa, where only 57 per cent of the population can find safe water within reasonable distances of home and from sources that are relatively easy to use.³³

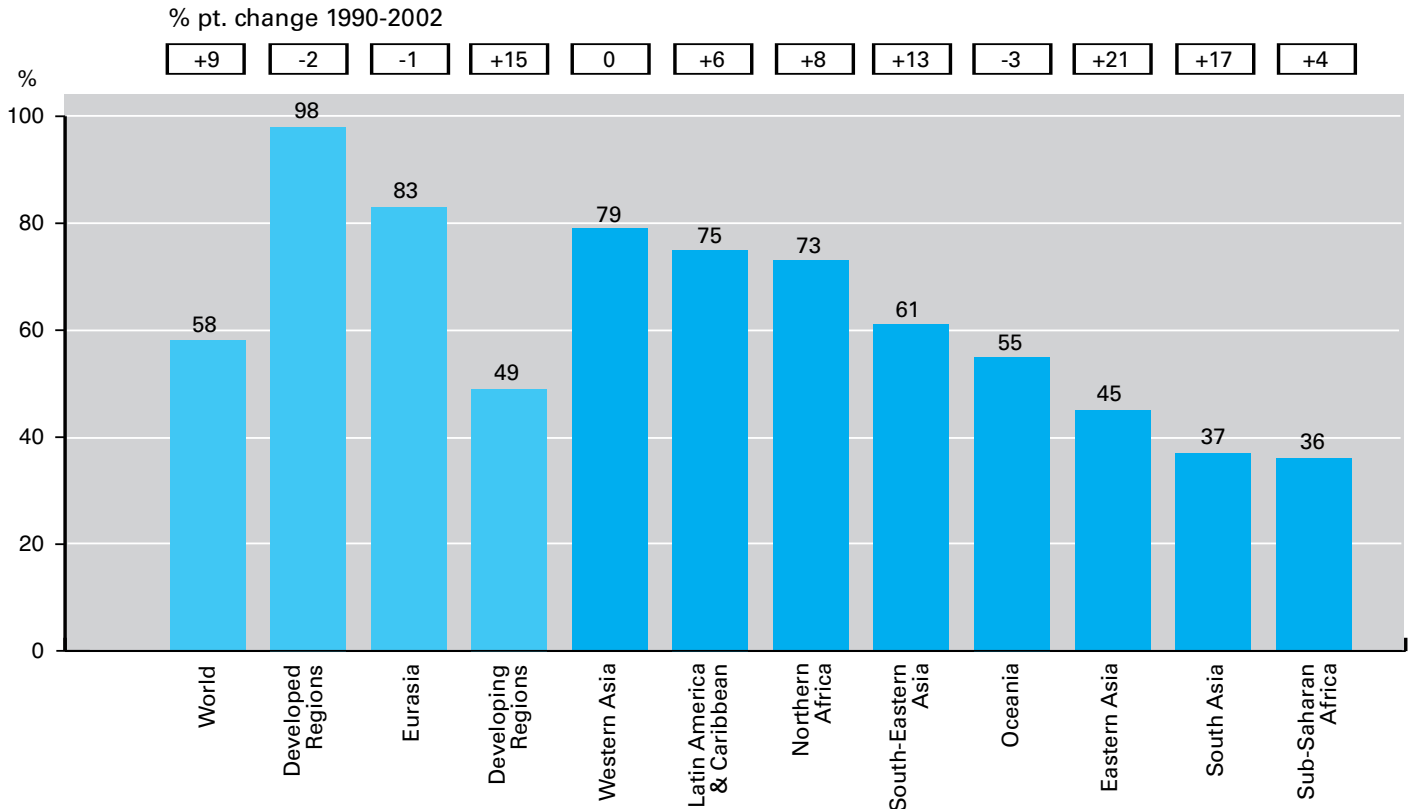
The problem is not only lack of disease-free, safe drinking water but also the lack of adequate facilities for the safe disposal of human excreta, the source of so much infection. Something as simple as a household latrine can be beyond the grasp of many of the world’s families. In 2002, 2.6 billion people did not have access to even the minimum sanitation they needed, such as a latrine.³⁴

The Millennium Development Goals of the United Nations have set the target of reducing the number of people who do not have access to clean water and sanitation by 50 per cent by the year 2015. This is a much greater challenge than the similar goal set at the World Summit for Children, since the people without service are increasingly those in hard-to-reach rural areas, or rapidly growing cities on marginal land, or displaced by natural disasters or warfare.

The challenge of reaching the target is most daunting in countries where population is growing and demands on limited resources are increasing all the time for services of all kinds. In order to meet the target for environmental sanitation, the world must reduce the number of people without sanitary

Coverage with improved sanitation by region in 2002

Sanitation coverage lowest in sub-Saharan Africa and South Asia



Source: UNICEF & WHO, *Meeting the MDG Drinking Water and Sanitation Target: A Mid-Term Assessment of Progress, 2004*

facilities from 2.6 billion in 2002 to 1.9 billion in 2015. Although that represents a difference of 760 million people today, keeping up with population growth at the same time means that, in fact, almost two billion people will have to be provided with adequate sanitation³⁵ by 2015 in order to meet the target.

According to interim reports, most parts of the world are on track to meet the MDG target. The region experiencing the greatest difficulty in terms of water supply is sub-Saharan Africa, although several African countries have already made remarkable progress toward meeting this goal.

More seriously, there is a definite shortfall in progress toward the sanitation half of this target in most developing countries, especially bearing

in mind that when it comes to sanitation, the challenge is not only to provide the facilities but to promote and ensure their use when cultural habits and long-standing behaviours are challenged with the new and unknown sanitation systems and unfamiliar hygiene concepts.

Rotavirus Vaccine

Rotavirus is the major cause of severe diarrhoeal disease, which is responsible for the deaths of some 800,000 children every year. Several rotavirus vaccine formulas are being developed by researchers around the globe, but as yet none have been fully approved for use.³⁶ In the event that a reliable and effective vaccine is developed, its cost

will be a significant factor in the degree to which it is used in most of the countries where it would be most useful.

In the meantime, the most effective interventions will continue to be the twofold effort to prevent child deaths

from diarrhoeal disease through the promotion of Oral Rehydration Therapy, and through improvements in drinking water supply, in sanitation and in hygiene practices to limit the transmission of the infections.

MALARIA

MALARIA

About 50 per cent of the world's total population is at risk of contracting malaria, and every year there are between 350 million and 500 million cases of the disease, the vast majority of them in sub-Saharan Africa and most of them children.³⁷ In Africa, malaria is currently the largest single cause of death among children less than five years old, killing one child every 30 seconds, or 3,000 children every day.³⁸ Many more children are left with persistent anaemia, lifelong brain damage or paralysis. Malaria in pregnant women can lead to low birth weight, anaemia and a greater risk of neonatal death to their babies.

A raft of diseases make the children of sub-Saharan Africa much more vulnerable to the deadly effects of malaria. In turn, repeated bouts of malaria so weaken a child's immune system that he or she becomes more vulnerable to the bacteria and viruses that cause those other diseases. This creates a spiral of repeated infection leading ever downwards, often to death. A major key to breaking that spiral is interrupting the malaria cycle of transmission and infection.

Malaria's effects on African countries are felt everywhere. It costs African countries more than US\$14 billion annually in both health care and lost productivity and is therefore one of the most important causes of the continuing lack of development and economic deterioration in that part of the world, confining so many of Africa's people to perpetual poverty. The anaemia and persistent fatigue that malaria causes in those children who manage to live



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through it means that they are often physically unable to learn effectively, and so the education of an entire continent suffers.³⁹

In Africa, malaria accounts for 30 to 50 per cent of all outpatient clinic visits and up to 50 per cent of hospital admissions, representing a major drain on the health care system.⁴⁰ In 2004, African countries as a whole spent US\$600 million on treating and preventing malaria. This represents only 20 per cent of the US\$3.2 billion needed to ensure effective malaria control.⁴¹ Since malaria costs those countries more than four times that much in health care and lost productivity, full control of the disease would be extremely cost-effective, but this requires a "jump-start" in the form of donor support from other parts of the world.

Malaria is a parasitic disease caused by a one-cell parasite called Plasmodium.

The parasite is transmitted from person to person through the bite of a female *Anopheles* mosquito, which serves as the alternate host for the parasite and an essential part of the parasite's life cycle.⁴²

In the 1950s, with the optimism and faith in technology that was characteristic of the times, UNICEF joined with other international and governmental organizations in what was supposed to be an all-out effort to eliminate malaria by exterminating the *Anopheles* mosquito. Massive spraying campaigns using DDT were undertaken in most of the world's tropical countries, and there was, at least initially, a substantial reduction in the numbers of mosquitoes. Some survived, however, carrying not only the deadly parasite but also a growing resistance to the effects of DDT. At the same time, the organizations and people in charge of the spraying campaigns, as well as the population in general, became aware of the damage the spraying was doing to the rest of the environment, so it was stopped and other methods of controlling the transmission of malaria, such as anti-malarial drugs, were sought.

More recently, some varieties of the *Plasmodium* parasite have become resistant to the effects of the anti-malarial drugs most commonly used in the treatment of the disease, forcing the development of new and more expensive drugs. Failure to follow a full course of treatment, because of cost, inconvenience or undesirable side-effects of the medication, is the main reason for the development of the chloroquine-resistant varieties of *Plasmodium*.

One important need is to increase the supply of safe, effective and affordable anti-malarial drugs. In 2004, UNICEF alone spent US\$8.2 million to purchase such medications, which represented only a small fraction of the amount needed. The total annual cost of advanced medication to meet all the

anticipated global needs — about 150-180 million treatments in 2006⁴³ — would be over US\$300 million.

One solution to the problem posed by the expense of treatment drugs is to increase the supply of raw materials needed for the drugs' production. In this regard, UNICEF advocates strongly for increased planting and harvesting of the Quinghao (*Artemisia annua*) plant which is the source for Artemisinin-containing combination therapies (ACT). Although most *Artemisia annua* is grown in Asia, several African countries are now beginning to grow the plant, a practice which could allow for a significant increase in quantities of these medicines in the near future.

Even when the necessary drugs are available and affordable for the family of the infected person, the lack of an adequate health service infrastructure in many African countries severely limits the possibilities for both diagnosing the disease and delivering the treatment required. In the case of immunization, the problems with the lack of regular health services, in rural and isolated regions especially, can be overcome by holding special immunization campaigns which send health workers into all parts of the country for two or three special days. However, this approach is not practical for the treatment of malaria, which is a constant problem requiring more persistent attention.

Roll Back Malaria

The Roll Back Malaria partnership was established in 1998 by UNICEF, WHO, the United Nations Development Programme (UNDP) and the World Bank. The partnership facilitates the coordination of international efforts toward meeting the target of reducing malaria deaths by 50 per cent by the year 2010. It now brings together governments of countries affected by malaria, national and international

development agencies, the private sector (including pharmaceutical companies), non-governmental and community organizations, foundations, and research and academic institutions.⁴⁴

Through Roll Back Malaria, most countries in Africa and many in Asia have created their own strategic plans for malaria control, with measures to strengthen national health systems and mobilize resources for broad, community-based activities and programmes.⁴⁵ By 2003, comprehensive strategic plans to address the problem of malaria had been developed in more than 30 countries in Africa in which malaria is endemic.⁴⁶ Roll Back Malaria is also credited with increasing global awareness of the problems caused by malaria and the methods already identified for controlling it.

Since the establishment of Roll Back Malaria, international spending on malaria prevention and treatment has significantly increased, but is nevertheless far short of the total amount required to achieve the goal of reducing malaria deaths by 50 per cent by 2010. Significant additional resources have recently been provided from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), which has spent US\$1.4 billion between 2002 and 2005 for support of various malaria control programmes.⁴⁷ The money will enable countries to purchase needed mosquito nets, ACT medication, and insecticides to spray where it is appropriate.

The Abuja Declaration

On April 25th, 2000, Heads of State or senior representatives from 44 malaria-afflicted countries in Africa met in Abuja, the capital of Nigeria, at the first Summit on Malaria. The Summit resulted in the Abuja Declaration, which committed those countries to the goal of reducing the death rate due to malaria to half its level at the time by the year

MALARIA AND PREGNANCY

The treatment of pregnant women with medication to prevent them from developing malaria is particularly important because of the effects a mother's bout of malaria may have on her unborn child. The anaemia caused by malaria can lead to a miscarriage or the birth of a child with low birth weight, which makes the child much more vulnerable to infections of all kinds and more likely to die before reaching his or her first birthday. It is estimated that 10,000 women and as many as 200,000 infants die every year as a result of malaria during pregnancy. Moreover, there is something about pregnancy which makes women more vulnerable to malaria. A pregnant woman is four times more likely to contract malaria than other adults and twice as likely to die as a result.¹

To address this problem, it is recommended that pregnant women receive what is known as "Intermittent Preventive Treatment" (IPT). This involves giving the woman at least two doses of an anti-malarial drug, sulfadoxine-pyrimethamine, at every pre-natal check-up after the first trimester whether or not she shows symptoms of malaria. UNICEF works closely with national pre-natal care services as part of the "Making Pregnancy Safer Initiative" to help ensure that mothers and their babies have access to high quality pre-natal care, including IPT.

¹ Childinfo.org, "Malaria" at www.childinfo.org/areas/malaria

2010. There were also a series of interim goals which were supposed to be attained by 2005, goals which were reiterated in the outcome document of the United Nations Special Session on Children under the title, "A World Fit for Children". Those goals sought to ensure that

- at least 60 per cent of those suffering from malaria have prompt access to and are able to use correct, affordable and appropriate treatment within 24 hours of the onset of symptoms;
- at least 60 per cent of those at risk of malaria, particularly pregnant women and children under five years of age, benefit from the most suitable combination of

personal and community protective measures such as insecticide-treated nets and other accessible and affordable interventions; and

- at least 60 per cent of all pregnant women who are at risk of malaria, especially those in their first pregnancies, have access to chemoprophylaxis or presumptive intermittent treatment.⁴⁸

To help meet these targets, UNICEF is supporting the delivery of an integrated package of effective interventions for children through community health services and outreach clinics. The package is usually combined with routine immunizations and distribution of vitamin A capsules, and includes insecticide-treated bed nets and retreatment kits. An integrated package for pregnant women is also delivered through antenatal care services, and includes insecticide-treated bed nets as well as intermittent preventive malaria treatment. This is supported by strengthening the management of malaria illness at the community level by increasing the availability of anti-malarial drugs in “blister packs” which can be used for managing the fever associated with malaria at home.⁴⁹

Public education is an essential part of national efforts to control malaria throughout Africa. As a focus for this, the Abuja Declaration established April 25th as “Africa Malaria Day” which uses events such as concerts, bicycle races, parades, rallies, media events, awards ceremonies and poster competitions for children to spread the message about ways to control malaria and prevent its transmission.⁵⁰ In 2005, the day was also marked by the European Parliament and legislatures in many industrialized countries, whose financial assistance and technical support are essential to attaining the Abuja Declaration goals.

Insecticide Treated Bed Nets

Sleeping under a bed net treated with insecticide is the most effective and inexpensive way to prevent mosquitoes from biting children and transmitting the parasite that causes malaria. Since, as with all other diseases, prevention of malaria benefits children more than treatment, UNICEF has become the largest purchaser of mosquito bed nets in the world. In 2004, the organization bought 7.3 million nets.⁵¹ These were treated with insecticide and distributed throughout malaria-endemic areas, mainly in Africa, as the first line of defence against the spread of malaria.

Studies have shown that insecticide-treated bed nets are much more effective than plain bed nets not only in preventing illness in the children who sleep under them, but also in preventing the spread of the disease. While untreated bed nets merely keep the mosquito from reaching a sleeping child, treated bed nets actually kill the mosquito. Properly used insecticide-treated bed nets can reduce malaria transmission by at least 50 per cent and deaths of children by 20 per cent.⁵²

In order to treat a “conventional” bed net, the plain net is immersed in a liquid insecticide, which it absorbs into its fibres. These bed nets need to be retreated at least once a year. This is a sometimes messy, complicated and time-consuming task, requiring measurement of the net, calculating how much water the bed net will absorb and how much insecticide is needed. Rubber gloves need to be worn to protect the skin during the soaking process, and the leftover dip, along with the insecticide packaging, has to be carefully disposed of.⁵³ Since this retreatment is recommended to be done once or twice a year, it can be a significant extra burden on the person responsible. If it is not done, the



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effectiveness of the bed net is substantially reduced over time.

To address this problem, UNICEF has supported the development and production of new, long-lasting treated net technologies. This involves either directly incorporating insecticide into the net fibres during production, or applying insecticide to the net after production along with a special “binding agent”. These nets retain their mosquito-killing ability for up to five years without retreatment,⁵⁴ which is likely longer than the life of the bed net itself because of regular wear and tear. UNICEF is also supporting the development of a home-treatment kit which would be able to transform an ordinary bed net into a long-lasting insecticide-treated bed net.⁵⁵

Convincing people to use treated bed nets, especially for their children, is a challenge. Not all countries have the

tradition of sleeping under a bed net. And even where they do, the percentage of bed nets which have been treated is negligible. Beyond the cultural customs, the main problem seems to be one of cost, since the treated bed nets — especially the long-lasting version — are more expensive than untreated ones. Some countries have increased the use of the treated bed nets by reducing the taxes on them.⁵⁶

A survey of 34 African countries between 1999 and 2004 showed that only three per cent of children below the age of five sleep under insecticide-treated bed nets. Since 2002, distribution of insecticide-treated bed nets has increased tenfold, which will hopefully result in increased use for children.⁵⁷

Malaria Vaccine Development

The development of an effective vaccine to provide immunity against malaria is the great challenge of malaria control programmes. Creating artificial immunity to malaria through immunization should be possible, because it is well-established that people who live in malaria endemic areas often have considerable immunity to malaria infection developed over years of exposure. Such a vaccine would make at least as significant a change in human health as the development, fifty years ago, of a vaccine against polio. Given the human and economic costs of malaria, the benefit might even be much greater.

In line with the enormous significance of such a vaccine are the technical difficulties. Because malaria is caused by a parasite, not a virus or bacterium, it does not lend itself easily

to the kind of immune reaction that works so well with many other vaccines. The parasite changes form as it moves from one organ to another within the body and it conceals itself inside red blood cells, which are not patrolled by the immune system. Although a number of researchers are working on the development of the vaccine, usually with support from organizations such as WHO and the Malaria Vaccine Initiative (supported by the Bill and Melinda Gates Foundation) it will likely be many years yet before an effective vaccine is readily available.

In the meantime, it is extremely important to continue to make malaria control a priority. The 2010 goals set by the Abuja Declaration should be a part of all development programming in Africa. Bearing in mind the extremely high cost in human lives and lost potential, efforts to mitigate the threat of malaria will continue to be worth every penny spent and every hour devoted to the task.



MEASLES, SMALLPOX, POLIO AND IMMUNIZATION

MEASLES, SMALLPOX, POLIO AND IMMUNIZATION

Every year, measles is directly responsible for the deaths of half a million children.⁵⁸ Even when it does not result in death, measles is often responsible for blindness, malnutrition and deafness.⁵⁹ It can also cause the immune system to function less effectively, with the result that other infections are likely both to occur more frequently and to be more deadly. Africa and South Asia are the areas where measles remains a major threat to the health and survival of young children. In 1999, for instance, those two regions accounted for the majority of measles-related deaths in the world.⁶⁰

In 1974, WHO launched the Expanded Programme on Immunization (EPI) to provide protection for young children against six vaccine-preventable diseases. Measles was included among the six, along with diphtheria, whooping cough (pertussis), tetanus, polio and tuberculosis. Initially, the goal was to ensure universal child immunization by 1990. This was clearly overly optimistic. By 1980, after a very slow beginning, the immunization coverage rates in most developing countries averaged only about 20 per cent.⁶¹ Since then, however, with concerted attention from international agencies, led by UNICEF and WHO, donor governments, governments in developing countries and a range of non-governmental organizations, childhood immunization has expanded phenomenally.

In total, it is estimated that immunization activities worldwide over the past two decades have saved more than 20 million lives. Today, more than 100 million infants are immunized every year, resulting in the saving of two



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million lives annually. Coverage in the East Asia and Pacific region increased from 38 per cent in 1980 to almost 90 per cent in 1990. Between 1980 and 1999, coverage in Latin America and the Caribbean increased from 38 per cent to about 87 per cent.⁶²

The Global Alliance for Vaccines and Immunization (GAVI) is one of the key players in the current programmes to expand immunization coverage. It includes governments, non-

governmental organizations and international agencies all working in the field of immunization. The goal of this group is to develop sustainability for immunization programmes everywhere, and also to customize existing national programmes to provide immunization coverage suited to the particular disease situation of each. Thus, some countries are incorporating vaccines for hepatitis B and Hib into the EPI package, while working to make the overall immunization programme an integral part of national primary health care systems.

Measles Immunization

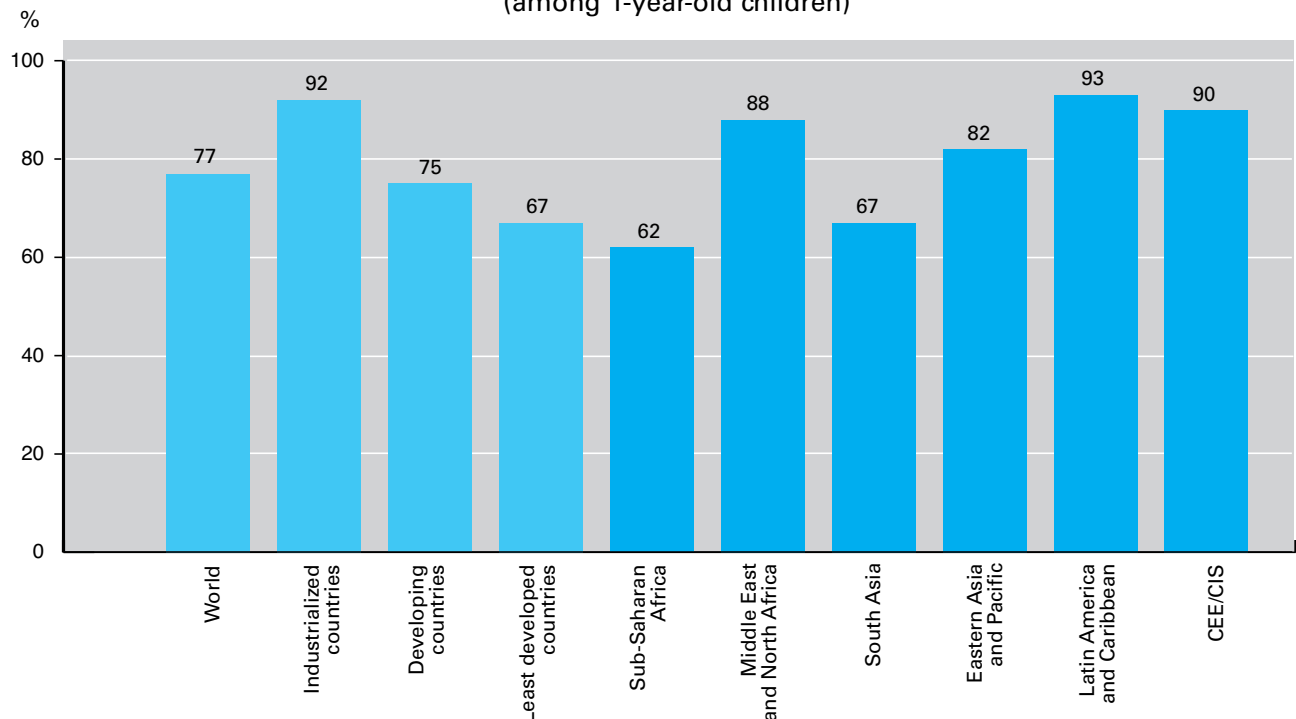
In the case of measles, current global immunization rates average 77 per cent, but they range from a low of 62 per cent in sub-Saharan Africa to 93 per cent in Latin America and the Caribbean. (For comparison, the rate is 92 per cent in the industrialized countries.)

Coverage rates in some individual countries are much lower. The lowest reported rates are 35 per cent in Central African Republic and Nigeria, both in West Africa and 40 per cent in Somalia. Canada's coverage is 95 per cent.⁶³

In most cases, coverage rates for the other vaccines in the EPI "package" are higher, partly because they are administered earlier in the child's life, at six, ten and fourteen weeks of age, at which stage a baby's weight makes it easier to be carried to a health centre. Vaccination against measles in most developing countries, on the other hand, normally begins when children are nine months old, when children are better able to develop their own antibodies to the vaccine. Up until this age, they are usually able to benefit from their mother's immunity, passed on to them while they were still in the womb. In situations with high levels of malnutrition among children, measles

Measles immunization coverage 2003

(among 1-year-old children)



Source: UNICEF, *The State of the World's Children 2005*

vaccination might be required at the age of six months. This is due to the fact that among the children below nine months of age who are no longer protected from maternal passive antibodies, many are at risk of dying.

Between 1990 and 1999 the annual reported incidence of measles worldwide declined by almost 40 per cent.⁶⁴ In 2001, UNICEF and WHO instituted a four-pronged global measles control strategy through the Measles Mortality Reduction and Regional Elimination Strategic Plan 2001–2005. This consisted of administering a first dose of measles vaccine at nine months of age through routine immunization services, an additional opportunity to receive a second dose of measles vaccine during a national immunization campaign, an increased surveillance of measles cases, and better management of each measles infection, including the provision of vitamin A.⁶⁵ As a result, between 2001 and 2004, approximately 200 million more children in sub-Saharan Africa were immunized against measles.⁶⁶ The number of deaths due to measles in Africa declined from an estimated 519,000 in 1999 to 282,000 in 2003 — a reduction of 46 percent.⁶⁷ During this same period, the number of children dying from measles on a global basis also dropped dramatically, by an estimated 39 per cent.⁶⁸

UNICEF and WHO report that the world is on target to meet the goal of cutting in half the number of under-five deaths from measles by the end of 2005.⁶⁹ This reduction in measles deaths is attributed to the interaction of several important factors: strong demand for the vaccine by parents in the affected countries; continued support from governments, including both those that are implementing the measles immunization programmes and donors; strong partnerships involving governments, international agencies, non-governmental organizations such as the Bill and Melinda Gates Children's Vaccine Program and the Rockefeller

Foundation, and the pharmaceutical industry to provide the resources and technical support needed; and the commitment of people at all levels to ensure the effective implementation of immunization services, including National Immunization Days and the incorporation of measles immunization into the regular delivery of basic health services.

Because measles is so highly contagious, vaccination coverage needs to be at least 95 per cent to ensure that the cycle of transmission and infection is broken. Attaining and maintaining such a high level of coverage is one of the challenges facing efforts to control measles worldwide.

Eradicating Smallpox

In 1979, WHO declared smallpox officially eradicated. This was a remarkable achievement — the first time any infectious disease had been totally eliminated. In this case, the disease had been particularly virulent and the source of considerable harm. In the twentieth century alone, it is estimated that smallpox killed some 300 million people.

The eradication of smallpox was possible because of two critically important factors. The first was that smallpox affected only human beings. There was no “reservoir” for the disease outside of human populations, so that if transmission from person to person could be stopped, the disease would be eliminated. The second factor was the existence of an effective vaccine, which conferred immunity from the disease and which could, therefore, make possible the interruption of transmission, especially if combined with the quarantine of anyone with an active case of the disease. The vaccine, developed by Edward Jenner in 1796, was based on the close relationship between smallpox and cowpox, a much milder disease which nevertheless made

the infected person immune to smallpox infections.

The World Health Assembly established its programme to eradicate smallpox in 1959. It was relatively easy to achieve near elimination of smallpox in the industrialized countries, but developing countries posed a more difficult challenge. Systems for delivering the vaccine in rural and isolated areas had to be put in place, and methods for tracking outbreaks had to be established before it became possible to say with certainty that the disease had been eradicated from specific areas.

In the end, the last case of smallpox caught as a result of natural transmission was recorded in Somalia in October 1977. The infected person was quarantined and everyone he had contacted within the period in which the disease could develop was tracked down and immunized. No one else became sick. Dr. H. Mahler, Executive Director of WHO at the time, announced the eradication of smallpox at a meeting in Kenya in 1978. The announcement, however, was a little premature. A medical photographer contracted smallpox in September 1978. The victim, who later died, was apparently infected by a virus stored in a university laboratory. WHO officially confirmed the eradication of smallpox in 1980, two years after the last infection.

The eradication of smallpox is estimated to have cost donor countries less than US\$125 million. The largest donor to the campaign, the United States, now saves the equivalent of its total contribution every 26 days, according to the What Works Working Group at the Center for Global Development.⁷⁰ On this basis, similar campaigns to eliminate specific diseases should also prove to be highly cost effective. The savings come not only from no longer having to spend money for immunization or for health care to treat people who contract the disease, but also from the general contribution

made to the country's economy by the people who are not killed or debilitated by the infection and who can, as a result, participate in worthwhile economic activity.

Eradicating Polio

The successful eradication of smallpox inspired governments and health experts to consider the possibility of eliminating another major scourge: polio. Like smallpox and measles, the polio virus only affects human beings, so eliminating all human cases of the disease and successfully blocking its transmission for a certain length of time to account for any wild viruses which may be in the environment (given that the polio virus is transmitted through human feces) is possible. However, the effort required to eliminate polio is somewhat more complicated than that for smallpox.

Poliomyelitis is an extremely contagious virus which affects the nervous system, causing paralysis or death. When it was at its peak, polio paralyzed or killed up to almost half a million people a year and every fever in a child inspired parental fear. It spread easily, usually through water or food contaminated with human waste. Dr. Jonas Salk's discovery of the first polio vaccine in 1955 not only relieved the fear with which so many people lived, but also made it possible to think of eliminating the disease entirely.

It is not Dr. Salk's vaccine, based on an inactivated (killed) virus that has been at the heart of global eradication efforts, however, but rather the Sabin vaccine made from live virus, which is administered orally. Although there are extremely rare cases of polio contracted from this vaccine, the risk is considered to be more than outweighed by the ease with which the vaccine can be administered. Whereas the Salk vaccine, which is injected, requires a professional health worker to administer it, the Sabin

vaccine can be given by anyone. Because it is made from a live virus, the Sabin vaccine also confers a more complete immunity. This is something that the Salk vaccine does not do.

The first step towards polio eradication was taken by Rotary International. In 1985, the organization launched its PolioPlus programme to protect children worldwide from polio. In 1988, the World Health Assembly challenged the world to eradicate polio. Following a unanimous “yes” from the global community, the Global Polio Eradication Initiative was born. Spearheaded by WHO, Rotary International, the U.S. Centers for Disease Control and Prevention (CDC) and UNICEF, this unique public-private partnership brings together national and donor governments, civil society, international agencies, non-governmental organizations, private sector organizations and over 20 million volunteers, all working toward a polio-free world.

Since 1988, the campaign to eradicate polio has been the largest and certainly one of the most successful public health drives in history, with over two billion children vaccinated with 10 billion doses of polio vaccines, thanks to an investment of US\$4 billion and the help of countless volunteers. As a result of this campaign, polio cases have fallen from almost 1,000 cases per day to fewer than 2,000 in the whole of 2005. Five million children are walking today who would otherwise have been paralyzed or killed by polio.

The motto of the polio drive is “reach every child”. This goal is being accomplished through mass immunization drives to protect every child under five years old in countries where polio is a risk and through intensified disease surveillance to identify new cases. As a result of these strategies, the Americas were certified polio-free in 1994, the Western Pacific followed suit in 2000 and the 51

countries of Europe were certified in 2002. Only six countries have yet to stop the transmission of the indigenous wild poliovirus: Afghanistan, Egypt, India, Nigeria, Niger and Pakistan.⁷¹

However, as long as there are places where polio continues to be endemic,

ROTARY INTERNATIONAL AND POLIPLUS

Rotary is a worldwide organization of business and professional leaders who work at the community, regional, national and global levels. They work to provide humanitarian services while both promoting high ethical standards in all aspects of working life and helping to build goodwill and peace in the world through fellowship and shared undertakings. There are approximately 1.2 million Rotarians in more than 31,000 Rotary clubs in 167 countries.

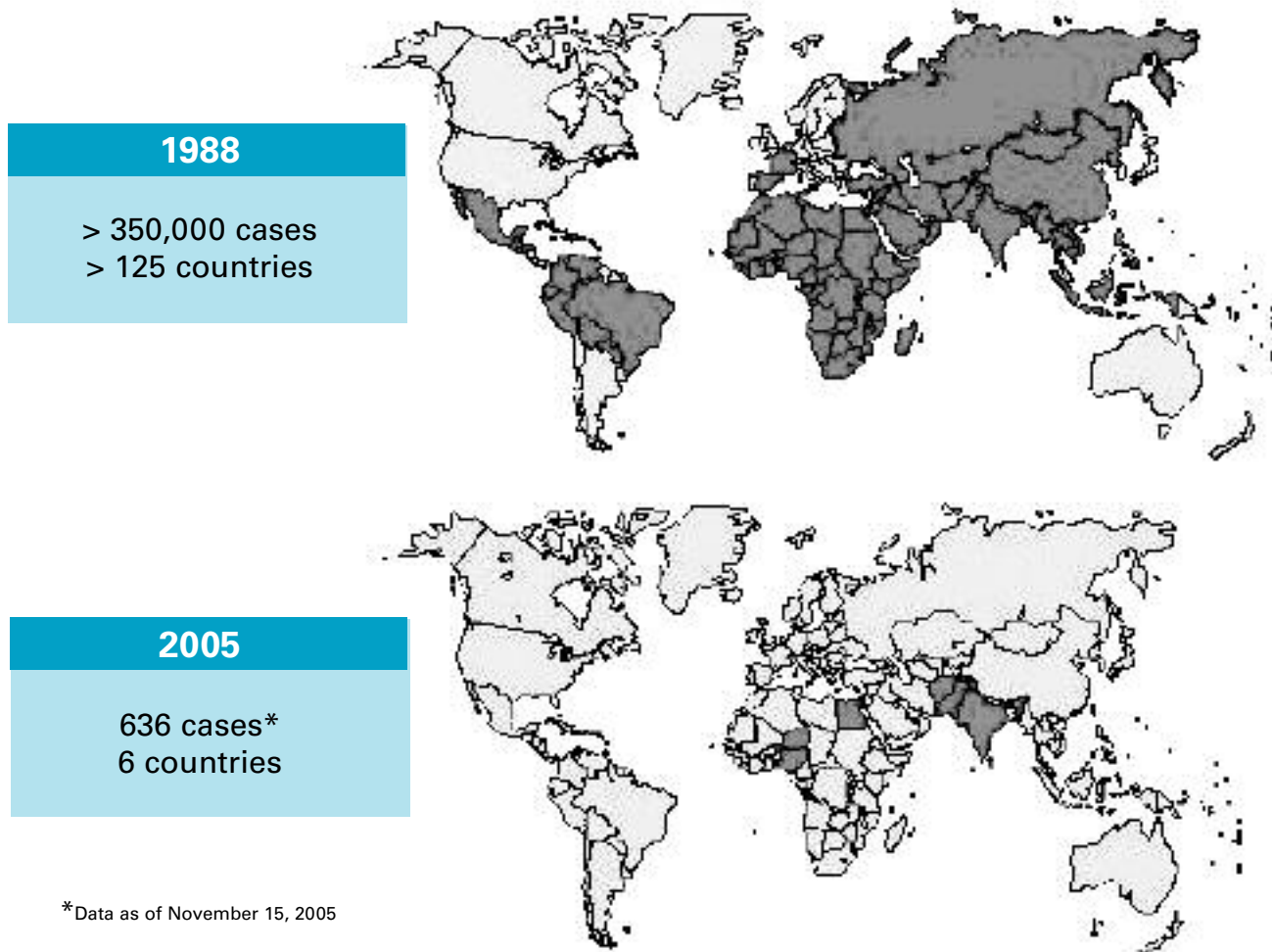
PolioPlus was launched by Rotary in 1985. Three years later, the World Health Assembly agreed on the goal of eradicating polio throughout the world, and Rotary joined with the WHO, UNICEF, the Centers for Disease Control and Prevention and governments in working to achieve this goal.

In 2002, as the world came so close to the complete eradication of this millennia old scourge that it seemed one final effort was all that was needed to achieve the target, Rotary launched a special additional Polio Eradication Fundraising Campaign to boost the global effort. Rotary’s goal was to raise US\$80 million by the end of June 2003. Instead, Rotarians around the world raised US\$111.5 million. Additional contributions since then have brought the total raised by Rotary for this campaign to US\$135 million. Contributions came in from all of the 529 Rotary districts worldwide, representing more than 20,000 clubs in 153 countries.

Rotary clubs have been encouraged to continue their fundraising efforts until polio has been successfully eliminated in the remaining six endemic countries. The Special Representative of the Director General of the World Health Organization, David Heymann, has said, “Rotarians have proven yet again that when there is a need, they will meet the challenge with enthusiasm and support. Rotarians can be proud that their hard work will contribute to conquering the last remaining remnants of polio.”

By the time the world is certified polio-free, Rotary’s contributions to the global polio eradication effort will exceed US\$600 million.

Polio eradication progress: endemic countries, 1988-2005



Source: Polio Eradication Initiative

there is a risk of the disease spreading to people who have not been immunized. The speed at which polio can travel was demonstrated in 2004, when an outbreak in northern Nigeria took only a few months to spread to 14 countries which had previously been considered polio-free. At least 17 polio-free countries have experienced outbreaks of polio from Nigeria since 2003, including countries as far a field as Indonesia and Yemen. In some of these countries, such as Sudan and Somalia, internal fighting and the

displacement of many thousands of people has made it more difficult to reach and vaccinate the vulnerable children. Many of these outbreaks have been stopped or contained by well-managed and well-financed mass immunization campaigns. But they highlight the need to stop polio transmission fast, in order to prevent the return of polio in force and safeguard the global investment in a polio-free world.

The Challenge of Vaccine Supply and Delivery

When the Expanded Programme on Immunization started in 1974, fewer than five per cent of children worldwide were immunized against the six target diseases. The achievement of increasing that coverage number to 78 per cent today represents an extremely high degree of organization and effort on the part of governments, non-governmental organizations and communities in every part of the globe.

In 1991, UNICEF and WHO established the Vaccine Independence Initiative, a revolving fund which is intended to help developing countries buy the vaccines they need at a relatively low cost, using their own currencies.⁷² As the major organization within the United Nations system with an expertise in procurement and delivery of supplies, ranging from heavy transport vehicles to delicate scientific equipment, UNICEF has become the world's single largest purchaser of vaccines, spending US\$374 million on 2.8 billion doses in 2004.

Since the early 1990s, there has been a problem with availability of vaccines themselves. Previously, those administered in developing countries had generally been the same ones used in industrialized countries. Because most vaccines, including those for DPT, polio, measles and tuberculosis, were produced in greater quantities than were actually needed by the industrialized countries, they were readily available for use elsewhere and usually at a fairly low price. Since UNICEF bought much of the vaccine supply in bulk, and then ensured that it got to the countries where it was needed, the cost was even better for governments with limited financial resources. Over the past decade, however, as vaccine production was increasingly taken over by smaller,



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private companies, as newer and more costly vaccines were developed and as demand in industrialized countries decreased, manufacturers no longer produced some of the vaccines, including a measles vaccine that used to be common. As a result, there have been occasional shortages of crucially needed vaccines, especially at times of major national immunization campaigns. However, as a result of concerted action on the part of UNICEF,



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WHO, national governments, donors and other partners, the amount of vaccines available for use in developing countries increased in 2004. Moreover, more manufacturers are seeking pre-qualification by WHO, with an interest in selling vaccines to UNICEF. Thus, the supply should continue to increase.⁷³

From the beginning, the greatest challenge was just to get the vaccines to the communities where they were needed and keep them in useful condition until they were administered. It is a long and entailed process, the combined elements of which are known as the “cold chain.” Most vaccines need to be kept at cold or freezing temperatures to keep them viable and most of the regions where the vaccines are to be used experience high temperatures. The vaccines must be transported and stored in refrigerators, freezers and anything that will keep them at their ideal temperature from the

point of manufacture all the way to the health facility at the scene of the vaccination. Because many rural areas, especially the most isolated parts of a country, lack electrical service to power refrigerators, equipment run by propane or kerosene is commonly used, leading to dependence on the availability of fuel and its distribution. Because of these challenges, UNICEF and WHO have supported the development of new vaccines which are better able to withstand high temperatures, so that they will be more stable in tropical climates.

The administration of the vaccines also requires special equipment, especially for highly focused “immunization days” as part of national or regional immunization campaigns. Of particular importance, especially with the spread of HIV/AIDS in many parts of the world, is the use of needles and syringes which cannot, in any way, be

reused. This challenge led to the development in the late 1980s of auto destruct or single use technology for inoculation syringes which cannot be used more than once.

Immunization Campaigns and Days of Tranquility

UNICEF has pioneered the practice of conducting broad national vaccination campaigns to expand coverage and educate the general public about the importance of childhood immunization. The first major national immunization campaign in Colombia in 1985 used newspapers, radio, television and thousands of volunteers to reach close to 90 per cent of young children. Innovative methods used to maintain the cold chain included delivering the vaccines in milk trucks and keeping the vaccines in soft drink coolers in local stores. These national campaigns not only served the practical purpose of increasing immunization levels, but also engaged political commitment to immunization from heads of government on down. The newspaper pictures and television stories showing the President or Prime Minister administering a polio vaccine to a young child were more than just a typical “photo op”. They helped to move immunization to the centre of the political agenda and assured it of getting greater attention, in both human and financial resources, from the government.

The civil war in El Salvador stopped for three days in 1985 to allow for the vaccination of children throughout the country and vehicles and staff designated as “UNICEF” travelled without hindrance between regions controlled by the warring factions. This set the pattern for other “Days of Tranquility” in regions of conflict. Although these were not always as

successful as the model in El Salvador, they did serve not only to ensure improved immunization coverage but also, in some cases, to open the door to broader peace negotiations and the eventual settlement of the conflict, as happened in El Salvador.

One of the great advantages of national immunization campaigns is that they provide an ideal opportunity to do more than merely vaccinate children. The focus of activity and the drawing together of large numbers of people from a broad area allows health workers to educate parents about the symptoms of acute respiratory infection and the need for immediate treatment if they appear, about oral rehydration therapy and basic sanitation to treat and prevent diarrhoeal disease, and about preventing malaria transmission, including through the use of treated mosquito nets, which can also be distributed at the same time. As well, micronutrient supplements, especially vitamin A capsules, can be administered and parents can be shown how to incorporate these essential elements into their children’s normal diets. Information about HIV/AIDS can be provided to adolescents and adults alike as part of efforts to educate those most vulnerable to infection, and also to improve the knowledge of the general public about both the causes of this infection and the correct treatment of those who live with the disease. This expanded use of vaccination campaigns is what UNICEF calls “Immunization Plus”, a key element of the overall child survival and development strategy.

Immunization in Emergencies

One area of concern is the immunization of children in emergency situations. In the crowded, deprived situation of a refugee camp or the chaos caused by floods or famines, children may be

exposed to more virulent infections, be less resistant to infections, especially if they are malnourished, and lack access to the necessary treatment to enable them to recover from the infection. In such situations, timely vaccination is crucial.

One risk in an emergency, because people tend to move long distances, live in crowded conditions and suffer from other infectious diseases, as well as malnutrition, is that there will be a mass measles outbreak, which can be both dangerous and hard to control. In such circumstances, it is necessary both to ensure that everyone who is in danger of infection is immunized and to have proper case management for the children who develop the disease. In all situations, infected children must be maintained on feeding programmes and be carefully monitored to prevent them from developing other serious infections to which measles makes them more vulnerable.

UNICEF has a basic commitment to children in emergency situations, which includes ensuring that they are all immunized fully against measles.

Between 2001 and 2004, this commitment meant conducting emergency measles vaccination programmes in 29 countries, including large-scale immunization campaigns in Afghanistan, Côte d'Ivoire, Chad, the Democratic Republic of Congo, Indonesia and Sudan. In Afghanistan, for example, more than 12 million children were vaccinated against measles, which helped to save the lives of over 35,000 children.⁷⁴ After the December 2004 tsunami, UNICEF helped begin measles immunization in India and Indonesia within weeks.

Whenever possible, UNICEF makes sure to involve the Government's National Immunization Programme in any measures taken to address measles immunization needs in an emergency situation. These usually require expanding or restructuring the national cold chain system to provide for timely delivery and safe storage of the vaccine where it is needed. Trained personnel also need to be available for the emergency vaccination while at the same time maintaining adequate coverage for regular programmes.

HIV/AIDS

HIV/AIDS

For the first time, at least in recent history, children in sub-Saharan Africa and especially in the southern part of the continent are unlikely to live as long as previous generations. Life expectancy in sub-Saharan Africa is just 46 years⁷⁵ — about what it was in the 1950s. If it weren't for the pandemic of AIDS, the life expectancy would be about 62 years.⁷⁶ Although sub-Saharan Africa has only 10 per cent of the world's total population, it is home to 60 per cent of all people infected with HIV⁷⁷ — the virus that causes AIDS — and 77 per cent of all AIDS-related deaths,⁷⁸ mainly among adults younger than 50.

Not surprisingly, as a consequence of this, the region also has more than 80 per cent of the world's children orphaned by AIDS.⁷⁹ This is the only part of the world where the number of orphans is increasing. If present trends continue, by 2010 there will be up to 25 million children orphaned by AIDS in the world, with the majority still living in sub-Saharan Africa.⁸⁰

Africa is not the only region that must deal with the consequences of HIV/AIDS, however. For people between the ages of 15 and 49, AIDS is the leading cause of death worldwide.⁸¹ Although Africa now dominates the discussion on accelerating action to prevent the further spread of HIV and ensuring wider access to care and treatment, other parts of the world are in serious danger of seeing massive increases in the levels of infection if preventive measures are not taken quickly. Asia, which currently has an estimated 8.3 million people living with HIV, is at risk of a major epidemic, with some 1.1 million new cases in 2005

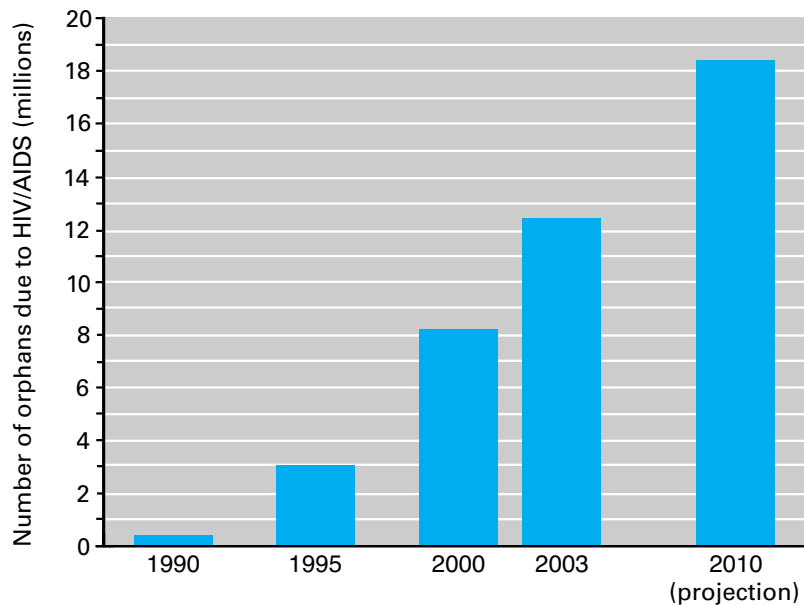


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alone.⁸² The number of infections has increased rapidly in China, India, Indonesia and Viet Nam, and has the potential to grow exponentially. Numbers are also increasing quickly in Eastern Europe and Central Asia, where about 1.6 million people live with HIV,⁸³ compared to an estimated 160,000 people ten years ago.⁸⁴ In Latin America and the Caribbean, there are tentative signs of progress as the overall HIV prevalence rate in 2005 showed no change compared to 2003.⁸⁵ This levelling off has not occurred equally across the entire region, however, and there is still great need for continuing prevention efforts.⁸⁶

HIV/AIDS first caught the world's attention when a group of homosexual men in the United States began showing symptoms of an illness which was suppressing their immune system. In 1981, the illness was identified as the acquired immune deficiency syndrome (AIDS). It was in 1983, that scientists pinpointed the virus which causes AIDS — the human immunodeficiency virus (HIV). While the disease was first identified in the United States, it soon became apparent that it could be found in other parts of the world, was continuing to spread, and was not limited to the homosexual community.⁸⁷

Children orphaned by AIDS in sub-Saharan Africa



Source: UNICEF, *The State of the World's Children 2005*

The first paediatric AIDS cases were identified in the early 1980s in sub-Saharan Africa.⁸⁸ Over the last 25 years, HIV has continued to spread throughout the world and has left no region untouched.

Efforts are under way around the world to develop effective vaccines against the virus, although the many types and subtypes of HIV, along with the virus' ability to mutate, make the search for a vaccine difficult. Once a vaccine is perfected, the crucial next step will be integrating immunization programmes as part of a broader prevention response. In addition, vaccination campaigns to ensure that the AIDS vaccine gets out to the people who need it will have to be coupled with continued communications to promote behavioural change. In the meantime, efforts must increase to prevent transmission of the disease by educating people — especially young people — and preventing mother-to-child transmission.

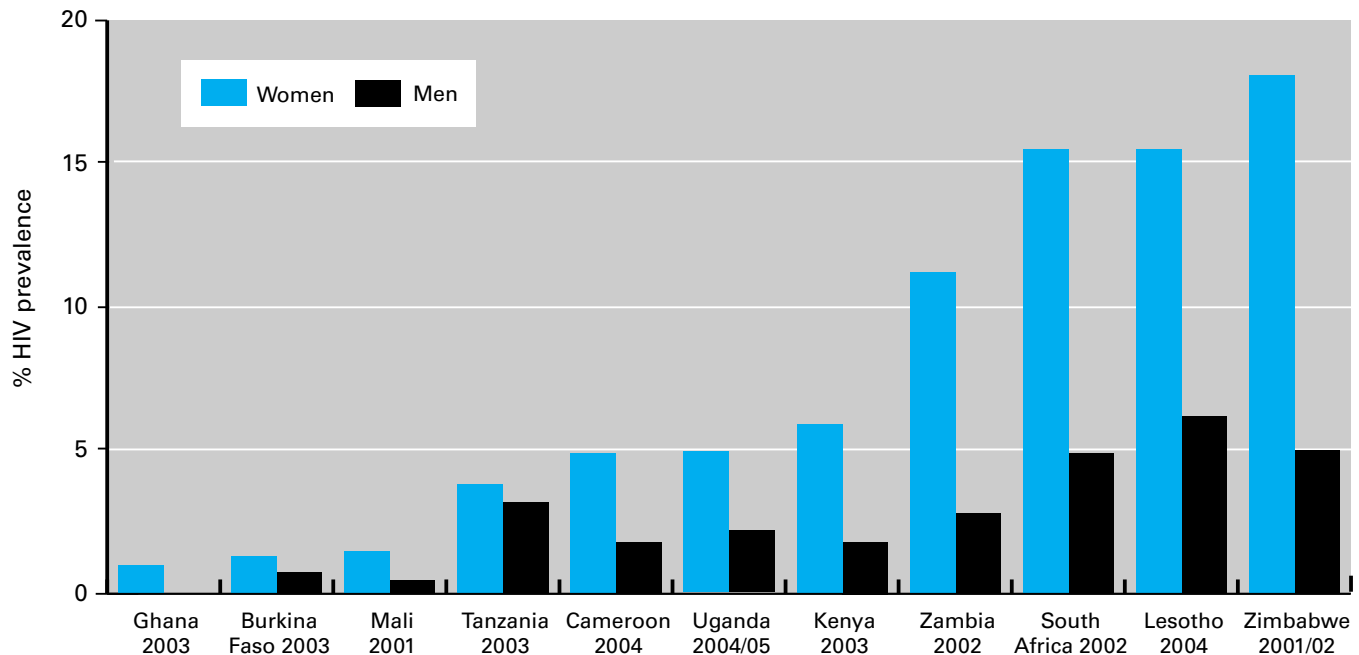
Prevention Among Young People

Adolescent girls and young women are the most seriously affected by the pandemic; they represent about 60 per cent of HIV-positive young people.⁸⁹ Half of all new HIV infections, approximately 6,000 every day, are among young people aged 15 to 24. In some parts of sub-Saharan Africa, adolescent girls are five times as likely as boys to have HIV/AIDS.⁹⁰ This also means that the number of babies at risk of being born with HIV or developing the infection soon after birth will probably increase as the proportion of women of child-bearing age infected with HIV increases. Adolescent girls and young women are, generally, among the most vulnerable to sexual exploitation and abuse. In many cases, they have little or no control over the choice of their sexual partners or the use of protective practices, such as condoms. They are likely to be the last ones to receive the information and guidance they need to make decisions about protecting themselves, even if they were able to assert some control over the nature of their sexual relations.

Surveys conducted with UNICEF support in 60 countries around the world between 1999 and 2001 showed, disturbingly, that the vast majority of young people do not have even basic knowledge about how HIV is transmitted from person to person and how to prevent it. In part, this is due to a general reluctance on the part of many societies to talk about AIDS or to discuss basic matters, such as sexuality, which are directly linked to the disease.

In order to address this ignorance, UNICEF and its partners are undertaking public health education programmes aimed at young people. Building not only on the vast experience of past public health education campaigns, but also on experience around the world with youth education programmes — particularly peer-to-peer initiatives —

HIV prevalence among 15-24 year-old men and women, selected countries in sub-Saharan Africa, 2001-2005



Source: UNAIDS, *AIDS Epidemic Update 2005*

these HIV/AIDS awareness programmes are providing young people with the age-appropriate life-skills education they need to make positive choices and stay healthy. Programmes are also supporting youth-friendly health services where young people can get voluntary testing, counselling and treatment for HIV and other sexually-transmitted infections.

In Namibia, the National Government partnered with UNICEF and the University of Maryland School of Medicine to develop the "My Future is My Choice" (MFMC) programme. MFMC is a peer education programme, which uses unemployed secondary school graduates as facilitators to provide young people between the ages of 14 and 24 with information and skills around reproductive health, HIV/AIDS, decision making and communication. The programme has been running on a national scale since 1998 and has reached 130,000 young people. An

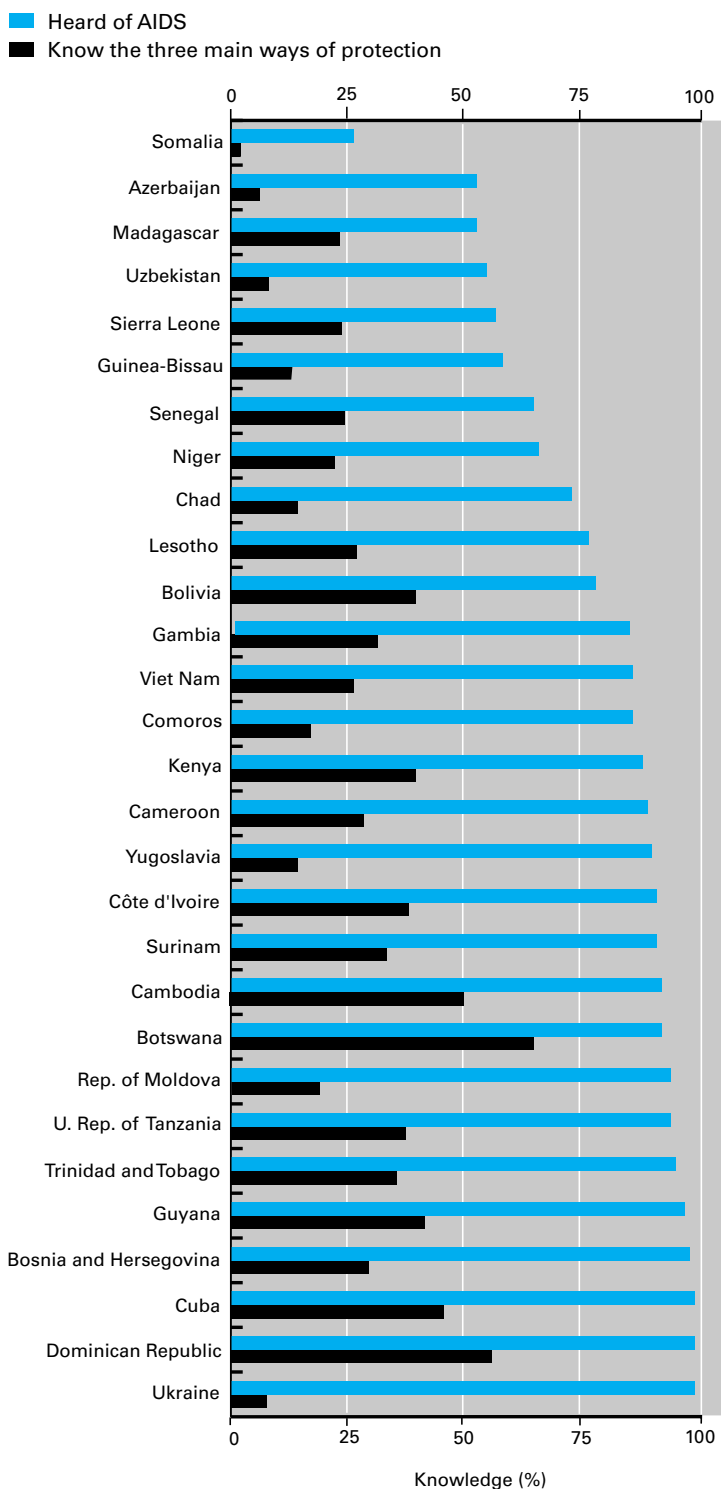
evaluation has shown that young people who have participated in the programme delay having sex longer and when they do become sexually active, they are more likely to use a condom.⁹¹ The challenge now is to bring to scale programmes that work in order to ensure that all young people have access to this important information and can make positive, informed decisions to stay healthy.

Prevention of Mother-to-Child Transmission

In 2005, an estimated 700,000 children below the age of 15 were newly infected with HIV and approximately 570,000 children died.⁹² It is estimated that 2.3 million children under 15 years of age around the world are infected with HIV,⁹³ with 1,800 new cases every day.⁹⁴ The majority of those are infants who are infected by their mothers, some

Knowledge among adolescent girls

Per cent of young women (aged 15-19) who have heard of AIDS and per cent who know the three primary ways of avoiding infection,* 1999-2001



*Three primary ways (ABCs):
Abstinence; **B**e faithful; **C**onsistent condom use

Source: UNICEF, *Young People and HIV/AIDS: Opportunity in Crisis*

through vertical transmission during late pregnancy or childbirth and others, from five to 20 per cent,⁹⁵ through breastfeeding. In most cases, mother-to-child transmission could be prevented. In industrialized countries, the use of antiretroviral drugs, combined with elective caesarean delivery and avoidance of breastfeeding, has reduced new infections in babies to less than one per cent. However, in developing countries, less than 10 per cent of pregnant women have access to services to prevent transmission of HIV to their babies. Prevention of Mother-to-Child Transmission (PMTCT) programmes include voluntary counselling and testing of the mother for HIV infection early in the pregnancy, timely administration of antiretroviral drugs during pregnancy and/or delivery and to the newborn within 72 hours of birth, and counselling and support for mothers around safe infant feeding practices. These combined interventions cut the risk of infection for the baby by half.⁹⁶

For women whose HIV status is unknown or negative, exclusive breastfeeding is recommended during the first months of life. This will increase overall child survival and may significantly decrease the risk of transmission of the virus, if it is present, in comparison with mixed feeding — relying upon both breastfeeding and breastmilk substitutes. While breastfeeding by HIV-positive mothers increases the risk of HIV-transmission, use of breastmilk substitutes in many developing world settings — where water is often untreated or unsafe — can significantly increase the risk of other deadly illnesses like diarrhoeal disease. For this reason, those who are HIV-positive should receive counselling that includes information on the risks and benefits of various infant feeding options in order to help them select the option that is best for both the mother and her infant — one that is acceptable, feasible, affordable, sustainable and



© UNICEF/HQ99-0789/Roger LeMoyné

safe. Once an HIV-positive mother has chosen the most appropriate feeding option, she should be supported so that she can carry out her decision safely and effectively.⁹⁷

In 1998, UN agencies through the UN Interagency Task Team (IATT) comprised of UNICEF, WHO, UNAIDS and UNFPA initiated the first pilot projects to demonstrate the feasibility of integrating interventions to prevent transmission of HIV from mothers to infants in 11 high-burden countries in sub-Saharan Africa, South Asia and Latin America. Since then the IATT has worked with national governments to scale up PMTCT programmes globally. A review of the last six years of PMTCT implementation clearly demonstrates that substantial progress has been made since the initiation of the first pilot projects. National governments have exercised considerable leadership resulting in over 100 countries globally implementing PMTCT programmes. Thirteen of these countries have achieved universal coverage.

Despite this progress, mainly in Eastern Europe and Latin America, access and utilisation of PMTCT services remains limited, as is evidenced by the

10 per cent of women who receive testing and counselling on PMTCT and nine per cent of HIV-positive mothers who receive antiretroviral preventive treatment globally in order to stop the transmission of HIV to their child. The glaring reality is that in regions where these services are most needed, sub-Saharan Africa in particular, PMTCT coverage is between under one per cent and 10 per cent with a few exceptions such as Botswana, Kenya, Rwanda and South Africa. At this rate of progress, the global target to reduce transmission to children will not be met by 2010.⁹⁸

Antiretroviral Therapy

Antiretroviral therapy is also critical to the goal of prolonging the lives of people infected with HIV and has served to enable many hundreds of thousands of people to continue to live productive lives. A healthy adult has a CD4+ T-cell count of 600-1200 cells/mm³. When the CD4+ T-cell count of an adult reaches 200 cells/mm³, he or she is at greater risk of opportunistic infection. It is at this point when antiretroviral therapy can begin.

Antiretrovirals (ARVs) are drugs that work to strengthen the immune system

THE TRANSMISSION AND EFFECTS OF HIV/AIDS

HIV is found in body fluids such as blood, semen, vaginal fluids and breastmilk. The most common form of transmission is through sexual contact, especially heterosexual intercourse. Other means of transmission are through blood transfusions, sharing of needles, and from mother to child during pregnancy, delivery and breastfeeding. In the most greatly affected regions of the world, women are at particular risk of infection mainly because of their limited knowledge about the disease and because of gender inequalities which result in their limited power to control their choice of sexual partner or negotiate safer sex. Women have a particular biological vulnerability as well. Because of particular attributes of the female reproductive system and the high concentration of HIV found in the semen of HIV-positive men, women are more likely than men to become infected during vaginal intercourse.

HIV is a virus which destroys the body's immune system by attacking CD4+ T-cells which are a specific type of white blood cell and an important part of the body's defence against infection. When HIV enters the body, it infects the CD4+ T-cells and becomes part of the cell's genetic material. In doing so, it prohibits the cell from carrying out its original immunological function. It also begins to make copies of itself, mutating throughout the process so that the body has trouble identifying and fighting it. As the virus multiplies, the number of CD4+ T-cells in the blood drops, compromising the body's ability to fight off other infections. Certain infections, which a healthy person could easily fight off, are not so easily attacked by a person infected with HIV, because of their damaged immune system. When a person infected with HIV begins to show symptoms of these "opportunistic infections" such as pneumonia, tuberculosis or some types of cancer, this is when a person is said to have AIDS.

There are two types of HIV found around the world. The most common is HIV-1. There are many subtypes of HIV-1, identified by a letter, with subtype C being the most deadly and being responsible for over 90 per cent of infections in southern Africa.¹ HIV-2 is found mainly in West Africa, Mozambique and Angola and is less virulent.

¹ African Network for the Care of Children Affected by AIDS, *Handbook on Paediatric AIDS in Africa*, 2004, p. 17.

and lower the amount of virus in the blood. Antiretroviral therapy requires that a patient take three or four antiretrovirals at the same time because the mutating ability of the virus increases its ability to become resistant to drugs. This "cocktail" of drugs is very effective in improving the health of people with AIDS by strengthening their immune systems and making them less susceptible to opportunistic infections, but it does not cure the disease. If a person stops taking the ARVs, the virus will become active and begin multiplying again, so a person on ARVs must take them for life.

Treatment for children is more complicated than for adults since the rapid growth of children requires that the amount of medication they receive be regularly changed and, therefore, regularly monitored. Indeed, children born to HIV-positive mothers require testing and regular monitoring to determine whether or not they have been infected and, if HIV-positive, when they should begin receiving treatment. Currently, however, there is a lack of simple, affordable tests for detecting and monitoring HIV in infants younger than 18 months of age. If left untreated, 50 per cent of infected children die by the age of two and 60 per cent die by age five.

Once it is determined that a child should begin antiretroviral therapy, the challenge is that paediatric ARV formulations appropriate for young children, especially infants, are not easily available. The paediatric formulations that do exist often come in the form of a foul tasting syrup which requires refrigeration. Due to the difficulty in obtaining paediatric formulations, children are often given adult medicines which are broken or crushed in an attempt to give the child the correct dosage. Because of the inexact nature of this method — often carried out by parents or caregivers — children are at risk of dangerous over-

dosing or of not receiving sufficient amounts of the medication due to under-dosing.

Whether for adults or children, a great challenge of ARV treatment is the high cost of the drugs. Although some governments have made significant advances in negotiating with pharmaceutical companies to obtain the ARVs they need, the cost is still prohibitive for most people. This is one area where UNICEF, with the purchasing skills and the relationships built with pharmaceutical companies for immunization activities, has been able to help.

In 2004, UNICEF supplied ARV medications to 39 countries and helped others procure the medications using their own resources. At present, UNICEF makes available 40 different ARV formulations, obtained both from generic drug manufacturers and the original pharmaceutical development companies. UNICEF procured US\$21.3 million worth of antiretroviral drugs, HIV testing kits and diagnostic equipment in 2004⁹⁹ on behalf of various partners, including other UN agencies, governments and non-governmental organizations. This represents a substantial increase over the total of US\$3.2 million spent on procurement of HIV/AIDS treatment and diagnostic supplies in 2003.¹⁰⁰

With the purchasing of large amounts of HIV/AIDS medications along with strong and persistent lobbying of the pharmaceutical industry, the cost of HIV/AIDS medicines is decreasing, but not at a rate which would make them accessible to most of the world's people currently living with HIV/AIDS.

In collaboration with the Joint United Nations Programme on AIDS (UNAIDS), WHO and Médecins Sans Frontières, UNICEF has produced *Sources and prices of selected medicines and diagnostics for people living with HIV/AIDS*, which provides

market information on more than 100 reviewed products for the treatment and management of HIV/AIDS from 84 manufacturers in 29 countries. This gives governments and NGOs the information they need to make the best choices for the purchase of good quality and affordable ARVs and test kits.¹⁰¹

UNICEF is also actively involved in promoting the development of a wider range of medications and more clearly defined administration regimes to simplify the use of the antiretroviral drugs. UNICEF is particularly encouraging the development of paediatric formulations.¹⁰²

Protection, Care and Support of Children

While AIDS does not kill as many children as the other diseases dealt with in this report, its impact on children's lives makes it one of the greatest threats to children's health and development today.

Fifteen million children below the age of 15 have seen one parent, or both, die as a result of AIDS.¹⁰³ Even when their parents are alive, the children are bearing the brunt of caring for their sick parents and younger siblings.

More and more households, especially in Africa, are being headed by children. Without adults to support them, these children are often forced to leave school because of school costs they cannot afford or in order to find work, sometimes at a very young age, just to survive. They are often unprotected and, therefore, especially vulnerable to exploitation, including sexual exploitation, and abuse. They are also at greater risk of malnutrition and illness. The longer the lives of parents with HIV can be extended, especially if they can be kept healthy enough to work, the better it will be for the health and well-being of their children.

UNITE FOR CHILDREN, UNITE AGAINST AIDS

A Global Campaign for Children Affected by HIV/AIDS

The Millennium Development Goals include the commitment to halt the spread of AIDS by the year 2015 and to begin to reverse the progress of the disease. In order to meet this goal, the nations of the world must urgently address the impact of HIV/AIDS on children. In October 2005, UNICEF launched its global campaign to support national efforts to ensure that this is the last generation of children that must bear the burden of AIDS. The campaign focuses on four priority areas of action:

Prevent Mother-to-Child Transmission:

- ensure the availability of voluntary testing and counseling services for women
- put HIV-positive pregnant women into care, support and treatment programmes
- ensure the availability of drugs that greatly reduce the risk of mother-to-child transmission of HIV

Paediatric treatment:

- ensure the availability of paediatric HIV/AIDS drug formulations, including cotrimoxazole to prevent opportunistic infections
- provide the necessary testing and treatment of children

Protection, care and support for children affected by HIV/AIDS:

- increase the proportion of orphaned and vulnerable children receiving quality family, community and government support, including education, health care, nutrition and psycho-social support

Prevention:

- reduce adolescent risks and vulnerability to HIV/AIDS by increasing access to and use of prevention information and life skills interventions

Support to families and children affected by HIV/AIDS comes from a growing number of community-based and national non-governmental organizations, responding to the growing needs around them. The challenge is to make HIV/AIDS part of the mainstream of concern and action,

not marginalized on the edges or left to last. Uganda has been a good example of how the combined factors of strong political commitment, active engagement of all sectors of society and public openness to discussing and learning about ways to prevent the spread of HIV and care for those living with AIDS can lead to a significant reversal of the pattern of infection, illness and death.

Although Uganda has managed to reduce its rate of HIV prevalence from 15 per cent in the early 1990s to seven per cent in 2005,¹⁰⁴ the number of children orphaned by AIDS has continued to increase, reaching almost seven per cent of all children in 2003.¹⁰⁵ Given the time lag between initial infection, the emergence of AIDS symptoms and the death of the person living with AIDS, the needs of children orphaned or made vulnerable by AIDS will continue to require significant attention for many years to come. Programmes for children orphaned or made vulnerable by AIDS are directed not only to ensuring that these children have all the opportunities and support that they would have had if their parents had lived, but also to protecting them from discrimination and abuse in the wider society. Measures taken include the following:

- strengthening families and providing resources to the caregivers — often grandparents — who take responsibility for the care of the children;
- mobilizing community resources and providing appropriate community-based care when primary caregiver support fails;
- increasing the children's access to the services they need, including health care, education, water supply and sanitation, and psychosocial support as required; and
- ensuring government protection of the rights of children orphaned

or made vulnerable by AIDS, including with regard to inheritance and protection from abuse and exploitation.

The resources needed to meet the special and growing needs of children orphaned or made vulnerable by AIDS have increased in recent years. The Global Fund to Fight AIDS, Tuberculosis and Malaria has made a marked difference in the attention paid to this situation, as has the creation in 2003 of the US President's Emergency Fund for AIDS Relief (PEPFAR). By 2004, 47 countries had adopted national strategies for the protection and care of orphans and other vulnerable children.¹⁰⁶ Even so, funding for programmes to care for and support these children remains considerably less than is required to meet the need, and political commitment on the part of

governments in countries afflicted with HIV/AIDS could also be improved.

The pervasive ignorance and fear with which so many societies in general view AIDS can lead to rejection of and discrimination against children who are living with, or whose parents are living with, HIV/AIDS. This means that public education programmes about HIV/AIDS need to focus not only on information about preventing the transmission of the disease but also on creating an understanding that people living with HIV/AIDS are not contagious in the sense that someone with measles or pneumonia is contagious and that they can, with proper treatment and support, continue to provide both the care that their children need and a worthwhile contribution to their community and country.

MICRONUTRIENT DEFICIENCIES

MICRONUTRIENT DEFICIENCIES

In 1955, one major concern of agencies like UNICEF was basic nutrition for children. There is no denying that this remains important — but the years have shown that, when child survival is at issue, some of the most significant steps that can be taken have to do with micronutrients. Micronutrients are substances like vitamin A and iodine that the human body cannot make itself but that are needed, often in only tiny amounts, to orchestrate a whole range of physiological functions.¹⁰⁷

This is a fairly recent recognition even for the well-nourished industrialized countries. The value of micronutrients was not fully understood until well into the twentieth century. Most remarkable of all was the realization that even when children are otherwise malnourished but have adequate sources of micronutrients, they may have a better chance of surviving infections and developing to their fullest potential than do children who seem otherwise well-nourished but whose diets may be lacking in essential vitamins or minerals. Furthermore, in 1998, it was estimated that vitamin and mineral deficiencies cost some countries as much as five per cent of their gross national product, in terms of lost lives, disability and productivity.¹⁰⁸

The visible signs of micronutrient deficiency — blindness, goitre or anaemia — do not have to be present for the lack of those vitamins and minerals to have adverse consequences. In fact, one of the most important discoveries in recent years is that, as tiny as our lifetime requirement for some of these micronutrients may be, it only takes a shortfall that is a small



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fraction of the amount needed for there to be a substantial increase in the risk of illness and death. It has now become apparent that one of the best ways to achieve the Millennium Development Goal of reducing child mortality rates by two-thirds by the year 2015 is to target the subtle micronutrient deficiencies that can be found virtually everywhere. As many as one-third of the world's population falls short of meeting its full physical and intellectual potential because of a dietary lack of sufficient quantities of particular vitamins and minerals.¹⁰⁹

At the World Summit for Children in 1990, there was explicit recognition of the importance of addressing micronutrient deficiencies, demonstrated by the leaders' agreement on the goal of eliminating both iodine deficiency disorder (IDD) and vitamin A deficiency by the year 2000. Although the goal was not achieved, it represented the start of a process by which micronutrient deficiency could be recognized as a key factor in concepts of development. In 2002, the United Nations General Assembly adopted a new goal at the Special Session on Children, to achieve the sustainable elimination of iodine deficiency disorders by 2005 and vitamin A deficiency by 2010, while also reducing the prevalence of iron deficiency by one-third by 2010 and accelerating progress toward the reduction of rates of other micronutrient deficiencies.

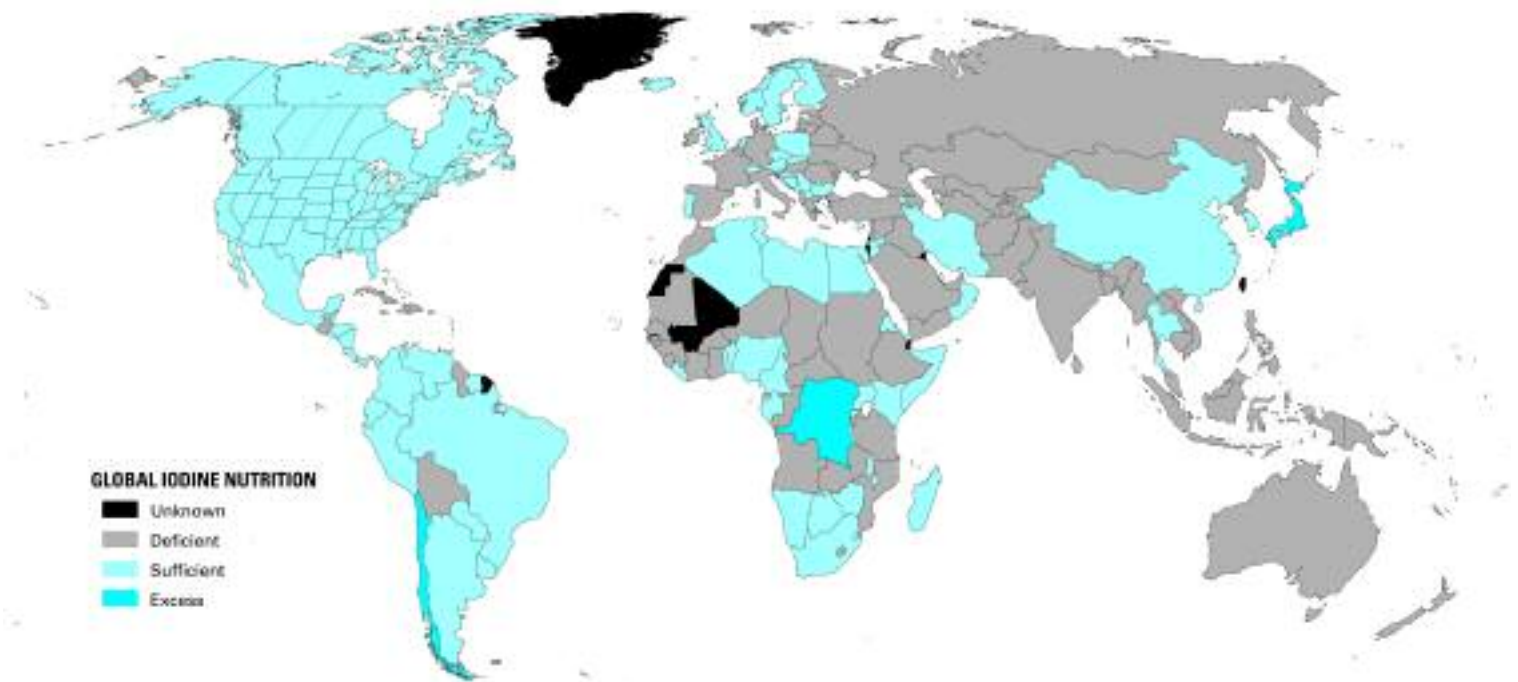
One result of the World Summit commitments on micronutrients was the establishment, with strong support from the Canadian International Development Agency (CIDA), of the Micronutrient Initiative, headquartered in Ottawa, originally under the International Development Research Centre, but since 2000 an independent, international, not-for-profit organization which is one of UNICEF's closest collaborators in the field of micronutrients. UNICEF, itself, has become one of the most important agents of innovation and change when it comes to the promotion, procurement and distribution of micronutrients, both as dietary supplements and as key elements in fortified basic foods.

Iodine Deficiency Disorders (IDD)

Canadians have known since the early part of the twentieth century that iodine was needed for both physical and mental development.

The importance of iodine asserts itself before birth. Even slight iodine deficiency on the part of a pregnant woman can cause her baby to be born with impaired mental and physical development. More serious deficiency may lead to miscarriage or stillbirth. Iodine deficiency can also result in "cretinism" (severe mental retardation), deafness, speech defects or dwarfism

Iodine Nutrition in the World



Source: International Council for the Control of Iodine Deficiency Disorders, 2003

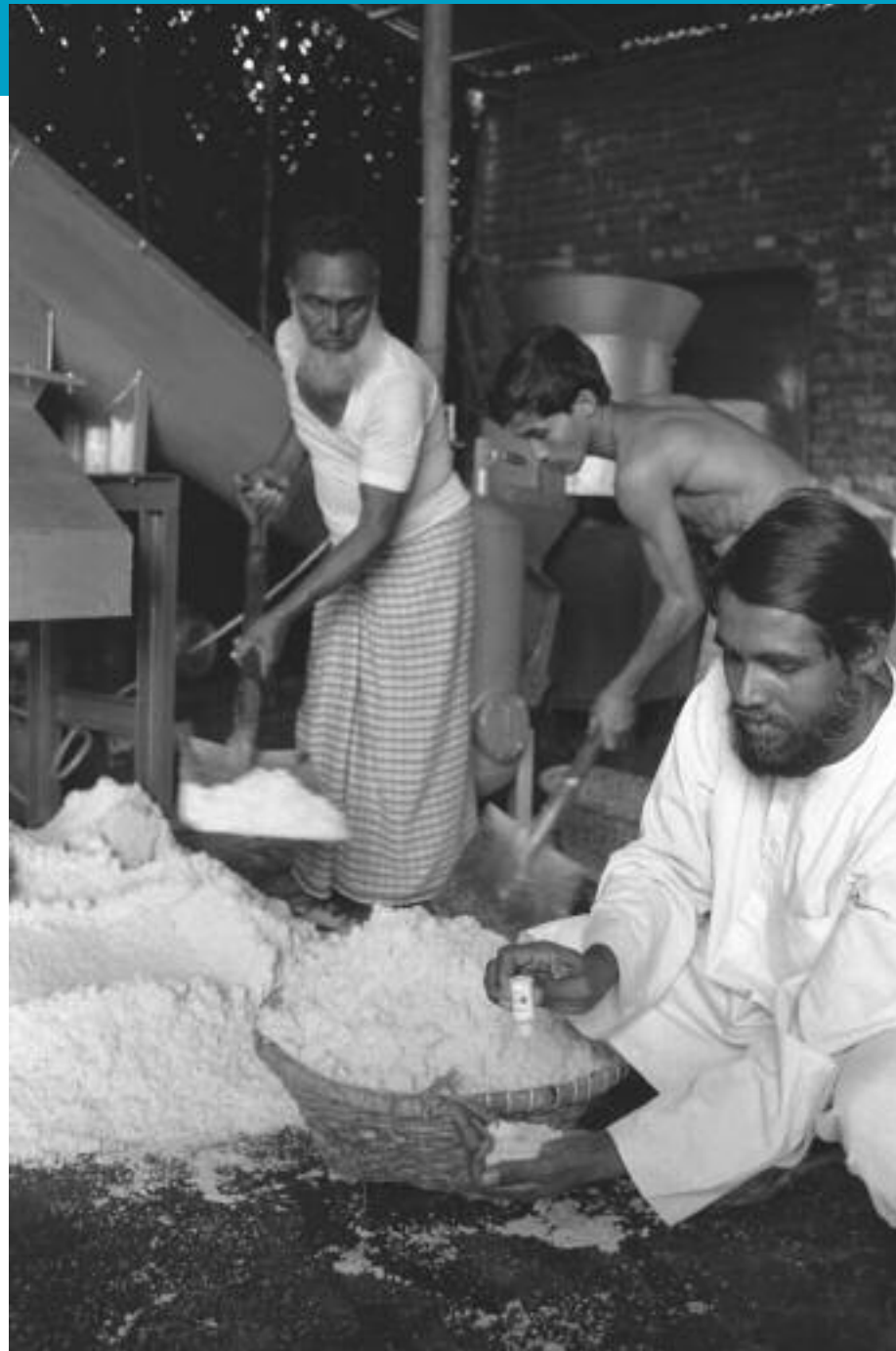
for the child of an iodine-deficient woman. Iodine deficiency in pregnancy is causing almost 18 million babies a year to be born mentally impaired.¹¹⁰

Where mild iodine deficiency is prevalent, the average intelligence quotient of a population can be lowered by as much as 13 points.¹¹¹ In both children and adults, chronic iodine deficiency causes goitre, a swelling of the thyroid gland which is dependent on iodine for its efficient functioning.

Iodine is naturally found in plants grown in iodine-rich environments and in animals feeding on these plants. However, in much of the world, especially mountainous and also riverine areas, most of the iodine has been leached from the soil over the millennia, leaving local diets inadequate in iodine. Iodine is also naturally found in most seafood and some seaweeds and is present in some soils, usually those near salt water.

Most of the world's population is unable to ingest all the iodine they need, even though it is not very much, through the normal components of their diet. In 1990, an estimated 1.6 billion people around the world were considered to be at risk of IDD. Approximately 750 million had goitre and an estimated 43 million suffered intellectual impairment or mental retardation.¹¹² Eleven million suffered from overt endemic cretinism.¹¹³ Even today, it is estimated that 15 per cent of all people in developing countries suffer from at least some degree of iodine deficiency.¹¹⁴

Since this problem generally cannot be solved merely by dietary changes, the solution has been to ensure that supplementary iodine is added to what people and animals normally eat. The easiest and most effective way to do this has been through the addition of iodine to salt. Virtually everyone uses salt to increase food's flavour and, in some cases, as a preservative. Decades of experience with salt iodization in



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industrialized countries, dating back to the 1920s in many cases, produced both a process which is relatively straightforward and inexpensive, and reliable methods for testing to ensure that the salt contains the correct amount of iodine. Prior to 1990, however, only a few developing countries had put in place programmes for large-scale iodization of salt. As a result, only about 20 per cent of the salt sold and used around the world was supplemented with iodine.¹¹⁵

Some of the first projects to iodize salt in developing countries, which were undertaken in the late 1970s and into the 1980s, were seen as experiments with the manufacturing and the distribution process. Initial results were positive, and UNICEF once again took the lead and moved to support the production and use of iodized salt on a broader scale. The organization worked in close partnership with the International Council for the Control of Iodine Deficiency Disorders, the World Health Organization, the World Bank, many donor governments, with Canada one of the pre-eminent funders, and later with Kiwanis International and the newly created Micronutrient Initiative. In 1995, UNICEF estimated that, thanks largely to Canada's contribution, more than seven million children who might otherwise

have suffered some form of impairment due to iodine deficiency had been given the chance for a healthy and productive life.¹¹⁶

In many ways, UNICEF's role in promoting the production and use of iodized salt resembled the role it played in global immunization efforts. Initially, there was the need to convince governments and salt producers that iodization was both necessary and feasible. UNICEF used its purchasing networks to provide both the equipment needed to add the iodine and also the iodine additive in a usable form. Additional investments were made to develop sustainability and build institutional capacity by assisting countries in establishing legislative frameworks, industrial standards,

KIWANIS INTERNATIONAL AND IDD CONTROL



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Founded with its first club in Detroit, Michigan in 1915, Kiwanis International is now a worldwide service organization of about 606,608 men and women who are members of 8,400 clubs in 96 countries. True to their slogan, "Serving the children of the world," the clubs undertake a variety of humanitarian and social activities, both in their own communities and globally, with a central focus on projects that benefit children.

The organization's focus led naturally to a partnership with UNICEF in the effort to control and eliminate iodine deficiency disorders (IDD), to prevent the problems of physical and mental impairment that are caused by mothers' lack of iodine while pregnant and the lack of iodine in the diets of young children.

When Kiwanis International undertook the IDD project in 1994, its members pledged to raise US\$75 million to support the production and promotion of iodized salt. Kiwanis members in every part of the world, many of them in countries where salt iodization is a novel idea, have not only raised awareness of IDD and the means to address it, but have surpassed their fundraising goal, raising US\$78 million for the iodization of table salt. Their contribution to the steady reduction in the numbers of children threatened by this micronutrient deficiency has been of enormous value.

shipping and handling guidelines, rigorous monitoring systems for proper quality control and essential training to support programme management.

Perhaps the most difficult of all the tasks undertaken in this process was public education, persuading the general public to use the iodized salt instead of their traditional choices. Here, UNICEF had to mobilize all the techniques of “social marketing” which had been developed to promote immunization, breastfeeding and hygiene. These advocacy efforts enlisted teachers, consumer groups, women’s groups, health professionals and children to spread the message from the halls of government to the playgrounds of village schools.

As a result of these combined efforts, UNICEF estimated in 1998 that 60 per cent of the world’s table salt was iodized,¹¹⁷ and many countries had attained much higher levels of coverage. By 2000, it was estimated that 72 per cent of households throughout developing countries as a whole regularly used iodized salt, and 90 million children who might otherwise have suffered the effects of IDD were born each year free from any significant loss in learning ability.¹¹⁸

Vitamin A Deficiency

It has been known for a long time that a certain amount of vitamin A is needed to prevent childhood blindness and night blindness, which affects children and pregnant women. In children, once the blindness takes hold, it is irreversible. Even decades ago it was recognized that children who did not receive adequate levels of vitamin A in their diet and who were, therefore, at risk of blindness due to vitamin A deficiency needed to receive supplementary vitamin A. The supplements were first administered as an oil-based syrup and then later in capsule form. There was, however, no

expectation that the supplements would do anything more than prevent blindness. Then, in 1986 a groundbreaking study in Indonesia changed everything.

The survey compared children in some villages who had received vitamin A supplements with those from nearby villages, living in almost exactly the same conditions, who had not. It found that there were 34 per cent fewer under-five deaths among the children who had received the vitamin A supplements over those who had not.¹¹⁹

The result was so staggering and unexpected that it had to be confirmed, and it was, in seven large studies over the next seven years. The studies, which involved 160,000 African and Asian children, showed significant reductions in both mortality and severity of illness when children were given vitamin A supplements. They concluded that vitamin A supplementation resulted in an average reduction of 23 per cent in mortality rates of children under five where the risk of deficiency was present.¹²⁰ Although vitamin A cannot prevent a child from catching an infectious disease, it makes the infections less severe and helps the child recover more quickly. This applies to everything from measles, with up to 75 per cent fewer deaths in a study conducted in South Africa in 1990,¹²¹ to malaria, with more than a 33 per cent reduction in fevers present with mild to moderate forms of the disease in a study in Papua New Guinea,¹²² to diarrhoea and pneumonia.

About 100-140 million children around the world are estimated to suffer from some form of vitamin A deficiency.¹²³ In many cases, although the deficiency is not serious enough to be reflected in night blindness or similar problems, it may still be enough to reduce a child’s ability to deal with and survive an infectious disease. It is this immune-system bolstering effect that UNICEF now refers to when it promotes

the incorporation of adequate quantities of vitamin A into the national health regimes for care of children. The goal is to ensure that every child likely to suffer from vitamin A deficiency receives one high dose vitamin A capsule approximately every four to six months until the age of five.

As with vaccines, UNICEF is one of the world's largest providers of vitamin A capsules. Between 1993 and 1996, for example, UNICEF purchased almost 500 million high dose vitamin A capsules, which were distributed in 136 countries.¹²⁴ Since 1997, Canada, through funding to the Micronutrient Initiative, has supplied over three billion vitamin A capsules to UNICEF. In 2005 alone, the Micronutrient Initiative provided UNICEF with over 500 million vitamin A capsules for use in more than 70 developing countries. This support from the Micronutrient Initiative has enabled UNICEF to meet nearly 100 per cent of the vitamin A needs in countries with high under-five mortality rates and/or a vitamin A deficiency problem.

To achieve high coverage of all children twice a year, the life-saving capsules are often distributed along with the vaccinations as part of National Polio Immunization Days, although these are coming to an end in most countries. At other times, the distribution of vitamin A capsules is incorporated directly into the normal course of regular check-ups for infants, young children and post-partum women, or as part of pre-school immunization. Increasing numbers of countries are adopting the practice of holding special "Micronutrient Days" during which they distribute the vitamin A capsules and also test salt for iodization and look for anaemia, a sign of deficiency in iron and some other micronutrients. In addition, as countries develop and/or renew their strategies to improve child survival, vitamin A is being included as part of the package of essential health services

necessary for children under five years of age, often delivered twice a year as part of "Child Health Days" or "Weeks".

UNICEF set a goal to double the number of countries with 70 per cent of children below five years of age receiving two annual rounds of vitamin A supplementation from 10 in 1999 to 20 in 2005, with the eventual goal of eliminating vitamin A deficiency by 2010.¹²⁵ By 2003, 14 countries had achieved the target of 70 per cent coverage with two doses of vitamin A. Approximately 40 countries were reaching more than 70 per cent of their young children with at least one high dose vitamin A capsule.¹²⁶

It would be best if children could derive the vitamin A they need from the food they eat. When a family can afford vitamin A-rich food in sufficient quantities, their children are likely to have adequate amounts of vitamin A in their diets to protect them from the worst effects of common infections. However, vitamin A-rich food may not be available everywhere, nor do all families have the resources to buy such food sources in sufficient amounts to feed their children adequately. One solution builds on both the experience with the iodization of salt and the practice in some industrialized countries, including Canada, of adding vitamin A to basic foods (in Canada it is usually milk) which are normally consumed by children. Food consumption patterns in Central America, led to a decision there to supplement sugar with vitamin A. In other parts of the world it was found to be more appropriate to add vitamin A to flour or edible oils.

Whatever the method of delivering the vitamin A, UNICEF estimates that more than one million children may have been saved between 2000 and 2003 from an early death due to infectious disease as a result of vitamin A supplementation.



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Zinc Deficiency

Recent research has strongly suggested that zinc is also effective in strengthening the immune system to enable young children to survive infections. Zinc is essential for cell growth and development and for ensuring the effective operation of the immune system. Severe zinc deficiency can manifest itself in growth retardation, diarrhoea, skin lesions, loss of appetite, hair loss and, in boys, slower sexual maturation.¹²⁷ For the most part, forms of zinc deficiency are difficult to identify and, until a few years ago, it was not a factor in programmes to promote child health and development. However, with the growing recognition of the importance of micronutrients, especially in providing increased protection against the effects of common infections, more attention has been paid to reinforcing children's intake of this mineral and it is now officially recommended by WHO and UNICEF in the treatment of diarrhoea.

In Bangladesh, India and Indonesia, research studies have demonstrated that

zinc can help reduce the duration and severity of bouts of diarrhoea in young children by as much as one-third. Zinc has also been shown to reduce the incidence of pneumonia by about 12 per cent. Similarly, research seems to indicate that zinc combined with vitamin A can mitigate the effects of malaria, making it much less deadly. A study in Papua New Guinea showed that vitamin A and zinc may be as important in saving children from the effects of malaria as insecticide-spraying and the use of insecticide-treated bed nets. Zinc supplementation has been shown to be so effective in reducing the incidence of diarrhoeal disease and pneumonia in developing countries that it is seen by some as being just as important in the prevention of diarrhoeal disease as improvements in water supply and sanitation. A study by the Johns Hopkins School of Public Health in Baltimore and the Instituto de Investigación Nutricional in Lima, Peru, determined that zinc supplementation can improve the immune system function of children even before they are born, providing them with immediate

protection from infection at birth. Zinc is also essential for proper use of iodine in the body, so it is important in the effort to overcome iodine deficiency disorders. On the other side of the coin, zinc deficiency can increase the risk of a child dying from pneumonia, diarrhoea and malaria by between 13 and 21 per cent.¹²⁸

With a normal diet, zinc is usually obtained from whole-grain cereals, legumes, meat, chicken and fish. It is also transmitted from mother to child in breastmilk. To obtain the full benefit of zinc, however, some form of supplementation seems to be most beneficial.

Increasingly, UNICEF is considering combining zinc supplements with other micronutrients in a multi-micronutrient supplement to enhance the benefit to the immune system and provide even greater protection against the death or disability that may result from severe infections. There is a recent WHO/UNICEF/World Food Programme recommendation to provide this multi-micronutrient supplement to infants, young children and pregnant and lactating women in emergencies, although this is somewhat more costly than vitamin A supplementation alone.

**TAKING ON
THE FUTURE**

TAKING ON THE FUTURE

Through its 50 year history, UNICEF Canada has seen extraordinary suffering and extraordinary progress for children. In 2005, the challenges remain daunting.

The mere fact of continued poverty prevents a great many families from acquiring even simple medicines and such things as insecticide-treated bed nets which could save their children's lives. Lack of government resources, or lack of will to use their resources in this way, means that basic health services, water supply and sanitation are not being brought to the people who need them most — those who live in isolated regions far from the centres of influence, or those in marginal urban areas.

Most challenging of all is the complicating factor of the new disease, the one not even dreamed of fifty years ago. In less than three decades, the world has seen HIV/AIDS expand from a marginal health issue affecting only a relative few to a pandemic threatening the survival of an entire continent, sub-Saharan Africa, with the potential to decimate other populations. AIDS not only directly threatens the lives of children, it also deprives them of the very people who should be caring for their health and development, especially their parents. The plight of 15 million children orphaned by AIDS presents a challenge unlike any this world has faced at any time in the past five decades.

But despite the challenges, there is reason to take an optimistic view of the future. In 50 years, Canadians have helped change the world from one in which 21 per cent of children died



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before they were even able to celebrate their fifth birthday¹²⁹ to one in which 92 per cent of children under five survive.¹³⁰ And many more of those who survive do so without physical or mental impairments caused by infectious diseases and micronutrient deficiencies.

There have been remarkable advances both in our understanding of the causes of illness and death among young children and in our knowledge of

the means to counteract the most common of those causes. Yaws, which once gave rise to so much suffering, now can be treated as a minor ailment. Smallpox has been eradicated. Polio, which terrified parents and caused the death and disability of millions of children, has virtually been eliminated. Some 80 per cent of the world's people have reliable access to safe water for drinking and household use, a fourfold increase in less than five decades.

In the course of the past five decades, we have learned how a simple mixture of salt, sugar and water or other home remedies can replace elaborate hospital equipment to save children from dehydration due to diarrhoeal disease. We have abundant low-cost antibiotics to treat pneumonia, and a vaccine that could prevent most cases from ever occurring. We discovered that the most effective way to protect children from malaria is not the use of environment-destroying chemicals, but simple bed nets treated with an insecticide that does not harm other forms of life. We know that immunization remains one of the most practical and cost-effective public health interventions. Most remarkably of all, we have seen that vitamin A and zinc, whether found in food or delivered through supplements, can literally keep children from dying and limit dramatically the adverse effects of a variety of infections.

New developments over the last fifty years have expanded child health care

beyond the sanctum of hospitals and the special knowledge of highly-trained medical staff to community health workers and parents themselves, thereby making it possible for even the poor and those who live in rural communities far from urban conveniences to take care of their children and help them to survive those perilous first five years.

The What Works Working Group of the Center for Global Development conducted a study in 2004 of the factors that made possible the significant reduction in the rate of child deaths since 1955.¹³¹ They found that success is possible in even the poorest of countries and that governments of those countries can often find the resources themselves to do what is needed, given sufficient political commitment. One key was changing basic behaviour. Another source of success was the formation of international coalitions based on common goals.¹³² These are elements which will continue to be crucial to the success of any programme to improve child health.

Every day, there are 29,000 children under five years of age who lose their lives from causes that are easily preventable. They lose any chance of growing up to contribute to the rest of the human race and realize their full potential. We have the means and the expertise needed to save their lives and give them back the future. This report shows that all it takes is the will to do so.

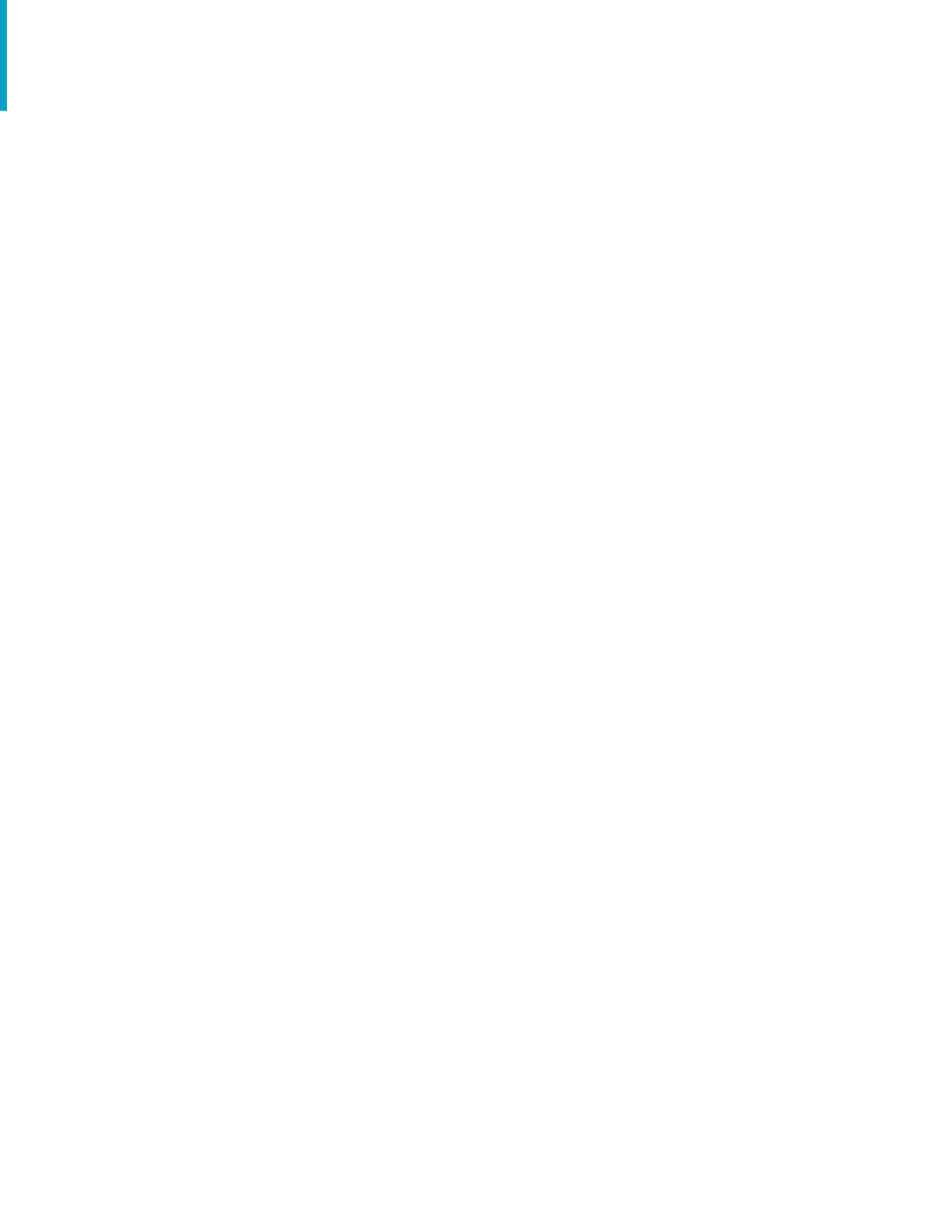
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