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Neglected tropical diseases: an emerging public health problem in the Eastern Mediterranean Region

Neglected tropical diseases have an enormous impact on developing countries in terms of the burden of disease, resulting in loss of productivity, aggravation of poverty and high costs for long-term care. Yet these diseases are rarely given high priority by decision-makers in endemic countries. A growing body of evidence shows that control, elimination or eradication of neglected tropical diseases would be a major contribution to poverty alleviation and to efforts to reach the Millenium Development Goals.

The Regional Committee is invited to discuss this situation and consider ways to improve control and prevention of neglected tropical diseases.

Contents

Executive summary

Neglected tropical diseases are diseases affecting mainly populations in developing countries, and for which health interventions, research and development are regarded as inadequate to the needs. The most affected are the poorest and most vulnerable populations, often living in tropical and subtropical areas of the world.

Neglected tropical diseases exhibit marked differences in epidemiology, distribution, modes of transmission and morbidity and mortality rates. Some affect millions of people, while others affect a few thousand, but in all cases the consequences are serious. Neglected tropical diseases share features that allow them to flourish under conditions of poverty, where they cluster and frequently overlap. Lack of access to health services, low levels of literacy, inadequate nutrition and poor personal hygiene increase vulnerability to the spread of infections. At the national level, these diseases are often out of sight, poorly documented and silent. Lack of reliable statistics hampers efforts to bring them out of the shadows. As a result, neglected tropical diseases are rarely given high priority by decision-makers in endemic countries. The description of these infectious diseases as neglected reflects the lack of attention given to them at the international level as well. With few exceptions, neglected tropical diseases have low priority in the agendas of development agencies and funds. Even when control interventions are available, they may fail to reach the populations in need because delivery systems are weak or unavailable.

Almost all neglected tropical diseases can be controlled using low-cost technologies that are safe, rapidly effective, and easy to administer in resource-poor settings. WHO with its partners has developed an integrated approach tackling selected neglected tropical diseases as a group. The integrated approach was introduced with the aim of making more efficient use of resources and staff, and combines delivery of interventions, mapping, training, procurement of medicines and equipment, surveillance and monitoring. Research also helps determine the operational feasibility of combined interventions and uncover the practical needs for implementation, including social acceptability and economic viability. Strategies that aim to reach all at-risk populations with preventive interventions can preclude a large number of permanent disabilities and effectively release health systems and families from the burden of chronic care. Improved control and prevention of neglected tropical diseases would be a major contribution to poverty alleviation and to efforts to reach the Millennium Development Goals.

Countries are therefore recommended to undertake an assessment of the activities of the neglected tropical diseases control programmes; strengthen capacity for prevention and control of neglected tropical diseases through allocation of resources and development of appropriately targeted programmes, integrated within the national health development agenda; develop plans of action to scale up prevention and control of neglected tropical diseases, taking into account existing global and regional targets for possible elimination or eradication of these diseases as well as existing strategies for poverty reduction and disease control; and strengthen partnerships at global, regional and national level, including the private sector, to take advantage of the increased interest in and commitment to poverty reduction.

1. Introduction

WHO defines neglected tropical diseases as those diseases affecting almost exclusively poor and powerless people living in rural parts and urban slums of low-income countries. Neglected tropical diseases consist of a diverse collection of diseases that have a major adverse impact on the health, well-being and socioeconomic development of many communities in developing countries, particularly in the world's low-income countries [1].

Approximately 1 billion people worldwide—or 1 person in 6—suffer from one or more neglected tropical diseases. These diseases, some of which are vector-borne, include Buruli ulcer, dracunculiasis (guinea-worm disease), foodborne trematode infections (such as fascioliasis), hydatidosis, leishmaniasis, lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiasis, dengue/dengue haemorrhagic fever, trachoma and trypanosomiasis [2]. The populations most affected are often also the poorest and most vulnerable, mainly living in tropical and subtropical areas of the world. These diseases have an enormous impact on developing countries in terms of the burden of disease, resulting in loss of productivity, aggravation of poverty and high costs for long-term care. The link between neglected tropical diseases and poverty is so strong that the prevalence of these diseases can serve as a proxy indicator of the level of a country's socioeconomic development and as a symptom of poverty and disadvantaged populations [3].

More than 70% of countries and territories that report the presence of neglected tropical diseases are low and low–middle income economies. 149 counties and territories are affected by at least one neglected tropical disease, more than 70% of them are affected by two or more diseases, 28 countries are afflicted by more than six diseases simultaneously [4].

Almost all neglected diseases can be controlled using low-cost technologies that are safe, rapidly effective and easy to administer in resource-poor settings. Control tools and strategies are sufficiently powerful to reduce the burden of disease or to interrupt transmission. Proper delivery of the available tools to the population at risk is most important. At the same time, research is needed to develop more efficient control tools and strategies against some neglected tropical diseases.

These diseases are considered neglected because of the failure of health systems to identify and address them and because of lack of political commitment and funding. The focus of health policy makers on HIV/AIDS, tuberculosis and malaria, as well as emerging or reemerging diseases caused reduced funding for neglected diseases with deleterious effects on the social and economic well-being of the poorest populations. Commercial markets for medicines and vaccines against the neglected tropical diseases are weak and the pharmacopoeia for these diseases has remained essentially unchanged.

Control of neglected tropical diseases has emerged as an important public health problem in the context of achieving the Millennium Development Goals (MDGs). A growing body of evidence shows that control, elimination or eradication of these diseases will make a major contribution to the achievement of health and poverty reduction objectives in the MDGs.

2. Global situation

An estimated 1.2 billion people in 83 countries live in areas endemic for lymphatic filariasis and about 120 million people are affected by the disease. Schistosomiasis affects around 200 million people worldwide, and more than 650 million people live in endemic areas. It is estimated that 100 million people are at risk of onchocerciasis while 37 million are estimated to be infected. Soil-transmitted helminthiasis affects more than 2 billion people worldwide. Recent estimates suggest that *Ascaris lumbricoides* infects 1.2 billion people, *Trichuris trichiura* 795 million, and hookworms (*Ancylostoma duodenale* and *Necator americanus*) 740 million. Trachoma affects about 84 million people, of whom about 8 million are visually impaired [5].

Comprehensive information about the distribution and prevalence of different neglected tropical diseases in countries is often incomplete or not available. Passive case detection continues to be the

main source of information. Many neglected tropical diseases cause chronic ill health and have insidious clinical presentation, preventing patients from seeking medical assistance and resulting in low reporting of cases. Some infections with “hidden” morbidities produce a large disease burden in terms of anaemia, diarrhoea, reduced physical fitness and malnutrition.

Epidemiological studies suggest extensive geographic overlap among neglected tropical diseases and with HIV/AIDS, tuberculosis and malaria, resulting in polyparasitism, especially among the poor. Co-infection with one or more neglected tropical diseases may significantly affect the outcome of malaria, tuberculosis and HIV/AIDS [6].

Some neglected tropical diseases cause chronic morbidity in millions of people, while others may affect a few thousand, but with a high mortality rate if not treated. The burden of disease resulting from neglected tropical diseases is huge. According to the World Health Report 2004, neglected tropical diseases resulted in 180 000 deaths and the loss of 19 million disability-adjusted life years (DALYs) in 2002. The burden of neglected tropical diseases is equivalent to approximately one quarter of the disease burden from HIV/AIDS and one half that of malaria [7].

However, new information suggests that neglected tropical diseases have a more substantial impact on health than initially thought. In particular, multifactorial disability such as anaemia, physical and cognitive development, work performance and malnutrition caused by chronic helminth infections, including schistosomiasis and soil-transmitted helminthiasis, should be considered. There is a need to look systematically at the human disease aspects of all diseases of this group (cysticercosis, hydatid disease, fascioliasis, rabies, scabies and others). The compound effects of co-infections, including the impact on HIV/AIDS, malaria and tuberculosis, should also be assessed [8].

Hotez et al [6] combined recently published burden of disease assessments for 12 tropical diseases (African trypanosomiasis, visceral leishmaniasis, ascariasis, trichuriasis, hookworm infection, schistosomiasis, lymphatic filariasis, onchocerciasis, dracunculiasis, trachoma, leprosy and Chagas disease) that result in a total of 534 000 deaths and 56.6 million DALYs lost annually. Considered together, these 12 neglected tropical diseases represent the fourth most important group of communicable diseases worldwide, based on DALYs, after lower respiratory tract infections (91.3 million), HIV/AIDS (84.5 million) and diarrhoeal diseases (62 million). The burden of neglected tropical diseases, as measured in DALYs, is much higher than the disease burden due to malaria (46.5 million), tuberculosis (34.7 million) and measles (21.4 million).

The major challenges in controlling neglected tropical diseases have been identified. They include: quantifying the burden of the neglected tropical diseases among populations; providing treatment and other interventions free of charge to communities in need; establishing a drug delivery system to cover the whole at-risk population; delivering multi-intervention packages; developing urgently-needed diagnostic tools, medicines and pesticides; producing more effective medicines and insecticides; promoting integrated vector management and an intersectoral, interprogrammatic approach to control of neglected tropical diseases; ensuring early protection of children; and establishing post-implementation surveillance and monitoring [9].

3. Regional situation

3.1 Burden of disease

Communicable diseases, including neglected tropical diseases, are the major cause of morbidity and burden of disease in the Eastern Mediterranean Region. Populations in the Region continue to suffer from a wide range of viral, bacterial and parasitic infections despite the availability of proven tools for interventions. The problem is much more acute in countries afflicted with poverty, civil strife and disasters.

In 2002, the estimated regional mortality and burden of disease due to tropical diseases, leprosy, dengue fever, Japanese encephalitis, trachoma and intestinal nematode infections was 20 000 deaths and 1.38 million DALYs lost [7]. In comparison, tuberculosis was responsible for 138 000 deaths and 3 million DALYs, malaria for 59 000 deaths and 2.25 million DALYs, sexually transmitted infections

excluding HIV for 23 000 deaths and 1.47 million DALYs, and HIV/AIDS for 44 000 deaths and 1.4 million DALYs lost.

3.2 Diseases targeted for elimination/eradication

The global and regional target for eradication of dracunculiasis is 2009. Dracunculiasis is still endemic in Sudan. The northern states in Sudan interrupted disease transmission in 2003 and are now reporting only cases that are imported from southern states. The challenges inherent in southern Sudan include the large number of villages to be covered and inaccessibility, particularly during the rainy season; the population dynamics and movement among the pastoral communities; influxes of returnees into endemic areas or from endemic to non-endemic areas; insecurity in some areas; and the lack of human resources. In 2006, 20 582 cases of dracunculiasis were reported.

All leprosy endemic countries achieved the elimination of leprosy as a public health problem at the national level by 2000. The present strategy is directed towards further reducing the leprosy burden and sustaining leprosy control activities, integrating leprosy control services within the health system and strengthening referral services. In 2006, only 3261 new cases of leprosy were reported in the Region, out of a total 259 017 cases worldwide. There is evidence for declines in case detection rates in all endemic countries. However, leprosy services have been seriously disrupted by civil unrest in Somalia and southern Sudan.

Egypt, Sudan and Yemen are endemic for lymphatic filariasis. The global target for lymphatic filariasis elimination is 2020 and the regional target is 2015. The national programme in Egypt achieved elimination of lymphatic filariasis in the majority of endemic foci by 2005. Yemen completed mass drug administration in all endemic foci and continued verification of elimination in formerly endemic areas. Due to technical problems and financial constraints, Sudan has not yet completed mapping of endemic areas, particularly in the southern states. It is estimated that around 15 million people are at risk of infection. The programme needs more attention and support from the government and international organizations to implement the elimination strategy.

3.3 Diseases for which disease-free areas can be expanded

Urinary and intestinal schistosomiasis caused by *S. haematobium* and by *S. mansoni* occurs in 10 countries of the Region. Population-based treatment or treatment for risk groups such as school-age children with praziquantel is the main component of national control programmes. The fundamental aim is to reduce morbidity by keeping the intensity of infection low. During the past 20 years, schistosomiasis was eliminated in the Islamic Republic of Iran, Jordan, Lebanon and Tunisia. Mortality, morbidity and transmission of the disease were greatly reduced in Egypt, Iraq, Morocco, Oman, Saudi Arabia and Syrian Arab Republic. The challenge for these countries is to move towards elimination of infection and transmission. The main technical difficulty lies in identification of remaining cases and pockets of infection through integrated surveillance and response systems. Schistosomiasis and soil-transmitted helminth infections remain a major public health problem in Sudan, Yemen and some areas of Somalia due to difficulties in implementing and sustaining chemotherapy-based control strategies.

Soil-transmitted helminth infections are widely distributed in countries of the Region. They affect mainly preschool children, children of school age and women of childbearing age. Morbidity is directly related to worm burden. Reducing the intensity of infection significantly reduces both the morbidity attributed to the infection and the occurrence of complications. Control efforts aim to produce a drastic reduction in the worm burden and keep the burden at low level through delivery of regular chemotherapy to high risk groups. Periodic treatment of school-age children through schools and community-based mass treatment have been identified as effective preventive measures. Integration of soil-transmitted helminth control with other public health programmes and interventions (IMCI, women’s health programmes, schistosomiasis control, vitamin A distribution) is cost-effective. More permanent control can be obtained by a massive effort to improve water supplies and sanitation, strengthened by health education. Successful countrywide deworming campaigns have been conducted in several countries, including Afghanistan, Egypt, Islamic Republic of Iran, Iraq and Yemen.

Sudan and Yemen are endemic for onchocerciasis. An estimated 2 million persons are at risk of onchocerciasis in Sudan, with 10 000 cases of onchocerciasis-related blindness. The Global 2000 River Blindness Program of The Carter Center estimates the total number of people in need of treatment in Sudan at 743 230. The control of onchocerciasis is through mass treatment with ivermectin coupled with vector control. Mass chemotherapy is carried out annually in high risk communities. Some clinical complications have been recorded in areas co-endemic with *Loa loa* infection. In Yemen, approximately 30 000 people are estimated to be infected with a particular dermal manifestation of onchocerciasis known as *sowda*. The strategy adopted in Yemen consists of passive distribution of ivermectin at 3-monthly intervals to control the clinical symptoms of *sowda*, and provision of one annual cycle of co-administered ivermectin and albendazole to all eligible community members in areas where onchocerciasis is co-endemic with lymphatic filariasis.

3.4 Diseases with difficult-to-manage control tools and strategies

Human African trypanosomiasis (HAT), or sleeping sickness, is endemic in southern Sudan. It is estimated that 1–2 million people are living in areas of high risk for HAT in southern Sudan. In certain villages, the prevalence of HAT was between 20% and 30% in 1997. Emergency actions to reduce the mortality and morbidity caused by HAT in southern Sudan started in 2004, after which the prevalence decreased to 1%–5%. The current challenge for the national programme is to achieve sustainability in control activities.

Leishmaniasis is one of the most neglected tropical diseases, in terms of the few tools available for control and the lack of clear criteria for methods of control. Two basic forms of leishmaniasis, namely cutaneous and visceral leishmaniasis, have wide distribution in the Region. In most countries, information on epidemiological factors, prevalence and incidence of the disease is not complete. Some countries of the Region have stable endemic foci, which can result in epidemics. Other foci may be silent, posing a constant threat of increased prevalence. New foci may erupt in areas where leishmaniasis has not been previously recorded, as a result of environmental changes. During the past few decades, considerable changes in the situation of leishmaniasis in countries were recorded in terms of geographical extent and incidence. Anthroponotic visceral leishmaniasis due to *Leishmania donovani* regularly causes severe outbreaks in Sudan with a high mortality rate. A varying proportion of visceral cases evolve into a cutaneous form known as post-kala-azar dermal leishmaniasis, which requires lengthy and costly treatment. Anthroponotic cutaneous leishmaniasis caused by *L. tropica* is a major problem in the Syrian Arab Republic and in some urban foci in Afghanistan, Islamic Republic of Iran and Pakistan. Outbreaks of zoonotic cutaneous leishmaniasis due to *L. major* continue to appear periodically in desert zones in Egypt, Islamic Republic of Iran, Iraq, Jordan, Libyan Arab Jamahiriya, Morocco, Pakistan, Saudi Arabia, Sudan, Syrian Arab Republic and Tunisia.

Buruli ulcer is endemic in southern Sudan. The disease is found mainly in the states of Western and Eastern Equatoria. The latter borders Uganda, where the epicentre of Buruli ulcer is located. Data on Buruli ulcer are incomplete; however, 23 cases were reported in Western Equatoria in 2005.

4. Strategic approaches

4.1 Global strategies

WHO and its partners have formulated over the past decades strategies and programmes to control, eliminate or eradicate several neglected tropical diseases. Some of these programmes have pioneered new global and national partnerships involving the private sector to deliver specific interventions against some tropical diseases, and have already brought benefit to millions of people in Africa, Asia and Latin America [4].

The strategies have been endorsed by various Health Assembly resolutions, particularly WHA44.9 on leprosy, WHA50.29 on elimination of lymphatic filariasis, WHA54.19 on schistosomiasis and soil-transmitted helminth infections, WHA57.02 on control of human African trypanosomiasis, WHA57.09 on eradication of dracunculiasis, WHA59.25 on prevention of avoidable blindness and visual impairment, WHA60.10 on control of leishmaniasis and other resolutions.

In recent years, WHO has developed a conceptual framework that moves from a purely disease-centred approach to an integrated approach tackling selected neglected tropical diseases as a group of diseases with shared operational and programmatic needs [9, 10]. The WHO Global Plan to Combat Neglected Tropical Diseases (2008–2015) was developed with the following targets: to eliminate or eradicate diseases targeted in the resolutions of the World Health Assembly and regional committees; to reduce significantly the burden of "tool-ready" diseases through current interventions and achieve optimal coverage; and to ensure that interventions with new innovative approaches are available, promoted and accessible for "tool-deficient" diseases [11]. WHO will concentrate activities in the following strategic areas: assessment of the burden of neglected tropical diseases; implementation of an integrated approach with multi-intervention packages for disease control; strengthening health-care systems and capacity building; preparing evidence for advocacy; ensuring timely and free access to diagnostic and preventive tools and high-quality medicines; securing access to innovation; strengthening integrated vector management; strengthening partnership and resource mobilization; and promoting an intersectoral, interprogrammatic approach to neglected tropical diseases control.

4.2 Preventive chemotherapy

Preventive chemotherapy is a main element of this new strategy. The majority of neglected tropical diseases, particularly leprosy, lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiasis and blinding trachoma, can be controlled using low-cost technologies that are safe, rapidly effective, and easy to administer in resource-poor settings. Effective, inexpensive or donated medicines are available for their prevention and control. Treatment with an effective multidrug therapy package including dapsone, clofazimine and rifampicin is leading to the elimination of leprosy. The main control tool for lymphatic filariasis elimination is mass distribution of a combination of medicines (diethylcarbamazine + albendazole, or albendazole + ivermectin) for at-risk populations. Regular mass treatment with ivermectin is the strategic approach to control onchocerciasis. Azithromycin is the first-line antibiotic for treatment of trachoma. Albendazole and mebendazole are used for prevention of soil-transmitted helminthiasis. Since many of these medicines are broad-spectrum, allowing several diseases to be tackled simultaneously, preventive chemotherapy interventions are a highly cost-effective tool for preventing morbidity due to helminth and other infections. For example, a package of the anthelminthic medicines albendazole/mebendazole, praziquantel, ivermectin or diethylcarbamazine is able to control over 15 helminthic and parasitic infections [12, 13].

The aim of preventive chemotherapy is to avert the widespread morbidity that invariably accompanies helminth and other infections. Evidence indicates that children acquire helminth infections early in life. Early and regular administration of the anthelminthic medicines albendazole, ivermectin and praziquantel reduces the occurrence, extent, severity and long-term consequences of morbidity due to soil-transmitted helminthiasis and schistosomiasis and in certain epidemiological conditions contributes to sustained reduction in transmission. In addition, a combination of these three medicines contributes to ectoparasite control and to control or elimination of lymphatic filariasis and onchocerciasis. Antenatal anthelminthic treatment reduces maternal morbidity and mortality, and improves birth weight and infant survival. Trachoma control through the SAFE strategy—combining treatment with hygiene and environmental management—can be linked to helminth control interventions to improve the overall health of affected communities. It is estimated that the "rapid-impact" package for simultaneously treating seven neglected tropical diseases—ascariasis, hookworm, trichuriasis, lymphatic filariasis, onchocerciasis, schistosomiasis and trachoma—will cost less than US$1 per person per year. In addition, praziquantel is available from various generic manufactures at low cost of US$0.2–0.24 per treatment [14].

The greatest challenge is to expand coverage to reach all those in need early enough, and to find opportunities to sustain control activities for at-risk groups. The community-based health care systems set up to deliver neglected tropical disease medicines could be well suited to administer antiretrovirals, directly observed tuberculosis treatment, MDT therapy for leprosy patients, antimalarials and bed nets. Other large scale interventions such as vaccination campaigns, distribution of vitamin A and

micronutrients directed to specific population groups, namely pre-school children and pregnant women, can be integrated with preventive chemotherapy [6].

Ideally, preventive chemotherapy should be delivered in childhood. Similar to the principle of immunization, whereby children receive early protection against a set of common infections according to a schedule of vaccinations and boosters, children can also be protected against a set of tropical diseases through a schedule of early systematic treatments that continue into adulthood. Multiple treatment protocols can be consolidated into a single schedule indicating drugs, target population and timing, thus simplifying drug administration for patients and staff [9, 11].

Surveillance and monitoring of diseases are fundamental for maintaining the success achieved against neglected tropical diseases. Post-implementation surveillance and constant monitoring activities should be carried out. Interventions need to be sustained over an extended period of time to produce significant long-term impact and protect new generations from infection. Mobilization of political and financial commitment at the international, country and district levels is the principal way to ensure sustainability. Community participation is also very important for enduring success.

4.3 Innovative and intensified disease management

Some groups of neglected tropical diseases, including human African trypanosomiasis, leishmaniasis and Buruli ulcer, rely on costly and difficult-to-manage tools. For most of these diseases, systematic case-finding and management at an early stage of the disease are vital to avoid irreversible disability or even death. Early clinical signs and symptoms of diseases are inconsistent and non-specific. Treatment relies on early detection but diagnosis may be difficult and surveillance in low prevalence areas can be expensive per case detected. Indirect diagnosis must be confirmed by evidence of the parasite before the drugs are administered. Most parasitological tests are either too complicated to perform in the field, too expensive, or not sensitive enough. Available treatments are costly and require long hospital stays, which have devastating effects on livelihoods in remote rural areas. The available drugs for African trypanosomiasis and leishmaniasis are dangerous, restricting their administration to highly trained professionals in highly specialized facilities. Apart from early detection, effective management of Buruli ulcer depends on ready access to surgical care. The clinical case management is currently severely limited to undertake at the most peripheral levels. Cost-effective control tools do not exist or their application is limited.

Control of these diseases can be immediately intensified by making better use of existing diagnostic and treatment tools. Increased training and capacity building must be undertaken to ensure sustainable intensified control of these diseases, whether using currently existing tools or new ones. Populations at risk of these diseases must be given access to appropriate health services.

Simple diagnostic tools and safe and effective treatment regimens urgently need to be developed for some of these diseases, particularly the diseases for which current methods are either inadequate or difficult to implement. Key control tools will drastically alter the existing control strategies. Specific strategies need to be developed to reach the entire population at risk, even in remote areas.

The national programmes are encouraged to monitor epidemiological trends and drug resistance, develop specific guidelines and strategies and provide support for research.

4.4 Integrated approach

Integration of control interventions for several related diseases and other health conditions is technically feasible and economically attractive. An integrated approach is also a powerful tool in terms of its ability to improve health and several other outcomes associated with better prospects for development at minimal cost to the health system. The neglected tropical diseases share many features that make integrated technical guidance both feasible and advantageous in terms of more efficient use of resources, delivery systems and opportunities. Packages of interventions should be flexible, allowing endemic countries to match options with specific diseases, needs, capacities and community priorities. Packages of health interventions need to be supported by guidelines covering technical issues and the practical management of programmes for integrated implementation. Social

mobilization and education of communities are needed and opportunities exist to combine these activities with those already in place in other sectors.

4.5 Vector control

Vector control often plays a vital role in control of vector-borne diseases. It can reduce or interrupt transmission when coverage is sufficiently high. For some diseases with deficient control tools, vector control has been the principal intervention and the key component of success. In addition, methods of vector control are well suited to integrated approaches, as some vectors are responsible for multiple diseases, and some interventions are effective against several vectors. Integrated vector management entails the use of interventions of proven efficacy as well as collaboration within the health sector and with other sectors such as agriculture, irrigation and the environment. Such an approach improves the efficacy, cost-effectiveness, ecological soundness and sustainability of disease control.

4.6 Support for research

There is growing recognition that research is critical in the fight against neglected tropical diseases. Identification of priorities is essential for health research, and considerable effort has to go into developing effective prioritization mechanisms. Changes in the needs of tropical disease control must be identified and new priority needs responded to thorough research in a timely manner. Strong and dedicated measures are required to ensure the development, availability and accessibility of essential medicines to combat infectious diseases. At the same time, the latest scientific and technological advances need to be continuously monitored to ensure that relevant breakthroughs or new technological approaches are incorporated into the strategic planning and interventions.

The principal output needed from research on these diseases is new and improved control tools and implementation strategies, with an emphasis on cost effective control strategies. There is great promise for the development of a new generation of control tools for some neglected tropical diseases, including new anthelminthic medicines, new vaccines and new diagnostics.

4.7 Emerging opportunities for control of neglected tropical diseases

There are several positive trends in recognition of the significance of neglected tropical diseases by the international community. Never before have so many neglected tropical diseases been targeted for actions with time-limited goals supported by stable and committed partnerships [15, 16, 17]. Funding policies of the World Bank and other donors have created new channels and opportunities for infectious disease control. The scale-up of control measures against neglected tropical diseases can be readily added to the ongoing initiatives. Many high-quality interventions have been made available at low or no cost. The control strategies are well suited to the reality of conditions in endemic communities and can be easily and logically combined with existing programmes. The global health partnerships and additional resources provide leverage to attain health and poverty-related international development targets, such as the Millenium Development Goals. In agreeing on these ambitious goals, world leaders committed the international community to a common set of development objectives for improving health, reducing poverty and protecting the environment. The control of neglected tropical diseases is a pro-poor initiative with benefits well beyond health. Control of these diseases has the further advantage of being able to produce visible and measurable results that improve well-being of people, promote economic productivity and build expertise at the community level.

5. Conclusions

Neglected tropical diseases constitute an important public health problem at the global and regional levels. They have strong association with poverty. These diseases frequently overlap geographically and cluster together in places with poor sanitation, unsafe drinking water, substandard housing and limited access to health care. The burden of these diseases is significant in terms of morbidity, mortality, lost productivity and impaired economic growth. These diseases are also a burden for health systems. The prospects for reducing the enormous burden caused by these diseases have changed dramatically in the past few years. The international community has realized that control and

prevention of neglected tropical diseases would be a major contribution to poverty alleviation and to reaching the Millennium Development Goals.

The use of an integrated approach to tackle neglected tropical diseases as a group provides opportunities for simplification, cost-effectiveness and streamlined efficiency of control interventions. It also creates opportunities for the sharing of innovative solutions. WHO is proposing that the control of neglected tropical diseases should be intensified by focusing on: broader coverage with already available powerful and cost-effective control tools (mass chemotherapy, community health information and education); strengthened vector control to simultaneously reduce the transmission of several vector-born diseases; and improved surveillance and quality care for diseases with limited control tools. Research and development, including operational research, would underpin activities in all three areas. The principal challenges are to increase population coverage and ensure sustainability.

The burden of neglected tropical diseases varies in countries of the Region. A growing realization in the struggle to reach the health-related Millennium Development Goals is the need for strengthening health systems. To map out the way forward, Member States will need to wrestle not only with the challenge of integrating interventions into an appropriate package, but also with integrating that package into appropriate delivery systems. Therefore each country should define approaches that address the burden of neglected tropical diseases within the specific country context, taking into consideration the strengths and weaknesses of the national control programme, the appropriateness of the interventions and the available means and resources for implementation and scaling up.

6. Recommendations to Member States

1. Undertake an assessment of neglected tropical disease control programmes with the view to determining their status, performance, resources needed (financial and human) and impact.
2. Establish surveillance systems for endemic neglected tropical diseases and develop regular monitoring and evaluation systems.
3. Strengthen health systems to provide and ensure necessary and early diagnosis and treatment for neglected tropical diseases, especially where control depends on early detection and treatment.
4. Integrate neglected tropical diseases within the national policies and planning for poverty alleviation programmes.
5. Where needed, implement integrated control approaches such as mass drug distribution, insecticide-treated bed nets, vector control, food and nutrition supplements or surveillance for disease.
6. Develop plans of action to scale up prevention and control of neglected tropical diseases, taking into account existing global and regional targets for elimination or eradication of these diseases as well as existing strategies for poverty reduction and disease control.
7. Strengthen cooperation with other sectors and partners at global, regional and national levels, including the private sector, to make use of the opportunities afforded by the increased interest in and commitment to poverty reduction.

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