

THE 17 NEGLECTED TROPICAL DISEASES

Dengue is a mosquito-borne viral infection caused by a flavivirus that occurs in tropical and subtropical regions worldwide. There are four distinct, but closely related, serotypes of the virus that cause dengue (DEN-1, DEN-2, DEN-3 and DEN-4). This virus is transmitted mainly by female *Aedes aegypti* mosquitoes and, to a lesser extent, by female *A. albopictus* mosquitoes. Infection causes flu-like illness, and occasionally develops into a potentially lethal complication called severe dengue (previously known as dengue haemorrhagic fever).

Rabies is a preventable viral disease that is mainly transmitted to humans through the bite of an infected dog. Once symptoms develop, rabies is invariably fatal in humans unless they receive prompt post-exposure prophylaxis.

Trachoma is a bacterial infection caused by *Chlamydia trachomatis*. Transmission occurs through contact with eye discharge from infected people, particularly young children. Infection is also spread by flies that have been in contact with the eyes and nose of infected people. Untreated, this condition leads to the formation of irreversible corneal opacities and blindness.

Buruli ulcer is a chronic debilitating skin infection caused by the bacterium *Mycobacterium ulcerans*. Infection can lead to permanent disfigurement and disability. Patients who are not treated at an early stage of the infection suffer severe destruction of the skin, bone and soft tissue.

Endemic treponematoses – yaws, endemic syphilis (bejel) and pinta – are a group of chronic bacterial infections caused by treponemes that mainly affect the skin and bone.

Leprosy is a complex bacterial infection caused by the bacillus *Mycobacterium leprae*. The disease mainly affects the skin, peripheral nerves, mucosa of the upper respiratory tract and the eyes. Leprosy is cured easily using multidrug therapy.

Chagas disease is a severe illness caused by infection with the protozoa *Trypanosoma cruzi*. Transmission in humans usually occurs through contact with vector insects (triatomine or “kissing” bugs), ingestion of contaminated food, transfusion of infected blood, congenital transmission, organ transplantation or laboratory accidents.

Human African trypanosomiasis (sleeping sickness) is a protozoan parasitic disease spread by the bites of tsetse flies (*Glossina* spp.) in impoverished rural areas of sub-Saharan Africa. Without prompt diagnosis and treatment, the disease is usually fatal as the parasites multiply in the body, cross the blood–brain barrier and invade the central nervous system.

Leishmaniasis are protozoan parasitic infections transmitted through the bites of infected female sandflies. Visceral Leishmaniasis (also known as kala-azar) attacks the internal organs and is the most severe form. Cutaneous Leishmaniasis commonly causes ulcers of the face, arms and legs, leaving severe and permanently disfiguring scars and disability.

Taeniasis and cysticercosis are two different conditions, both caused by infection with the parasite *Taenia solium*. Taeniasis is a mild disease caused by the presence of the adult tapeworm in the human intestine, whereas cysticercosis is a severe disease that results when humans ingest the tapeworm’s eggs, which develop as larvae (cysticerci) in their tissues. Cysticerci may develop in muscles, skin, the eyes and the central nervous system. Neurocysticercosis, the most severe form of the disease, is a major cause of epilepsy.

Dracunculiasis (guinea-worm disease) is a crippling parasitic disease caused by infection with *Dracunculus medinensis*, a long thread-like worm. Transmission occurs exclusively by drinking water contaminated with parasite-infected water fleas.

Echinococcosis is a parasitic disease caused by infection with the larval stages of tapeworms of the genus *Echinococcus*, which form pathogenic cysts in humans. The two most important forms of the disease in humans are cystic echinococcosis (hydatidosis), caused by infection with *E. granulosus*, and alveolar echinococcosis, caused by infection with *E. multilocularis*. Humans become infected by ingesting *Echinococcus* eggs that are most commonly shed in faeces of dogs, wild canids and also foxes, wolves, jackals and coyotes.

Foodborne trematodiasis are zoonoses (that is, infections that are naturally transmitted from vertebrate animals to humans, and vice versa). Infection in humans is acquired through consumption of fish, vegetables and crustaceans (crabs and crayfish) contaminated with the larval stages of parasites (metacercariae). The diseases of most public-health importance are clonorchiasis (caused by infection with *Clonorchis sinensis*), opisthorchiasis (infection with *Opisthorchis viverrini* or *O. felinus*) and fascioliasis (infection with *Fasciola hepatica* or *F. gigantica*).

Lymphatic filariasis is a severely debilitating, disfiguring and stigmatizing disease caused by infection with one of three species of nematode (*Wuchereria bancrofti*, *Brugia malayi* or *B. timori*), which are transmitted by mosquitoes. Adult worms live almost exclusively in humans, lodging in the lymphatic system. The infection is commonly acquired during childhood but usually manifests during adulthood as abnormal enlargement of the limbs and the genitals.

Onchocerciasis (river blindness) is caused by infection with a filarial nematode (*Onchocerca volvulus*). Transmission in humans occurs from the bites of infected blackflies that breed in fast-flowing rivers and streams, mostly in remote rural villages located near fertile land where people rely on agriculture. The adult worms produce embryonic microfilarial larvae that migrate to the skin, eyes and other organs. Symptoms include severe itching and eye lesions that can lead to visual impairment and permanent blindness.

Schistosomiasis is a chronic parasitic disease caused by infection with several species of blood flukes (trematode worms) of the genus Schistosoma. Most cases of the disease result from infection with *S. haematobium* (which causes urogenital schistosomiasis) and *S. mansoni* and *S. japonicum* (which causes intestinal schistosomiasis). Infection occurs when the larval forms of the parasite – released by freshwater snails – penetrate human skin during contact with infested water.

Soil-transmitted helminthiasis, or intestinal worm infections, are transmitted to humans through soil contaminated by human faeces, mostly in areas where sanitation is poor. The most common nematode species that cause soil-transmitted helminthiasis are *Ascaris lumbricoides*, *Trichuris trichiura*, *Necator americanus* and *Ancylostoma duodenale*. Infection leads to anaemia, vitamin A deficiency, stunted growth, malnutrition, intestinal obstruction and impaired development.

PRACTICAL DEFINITIONS OF ERADICATION, ELIMINATION AND CONTROL FOR NEGLECTED TROPICAL DISEASES

The WHO roadmap set 2015 and 2020 as targets for the control, elimination and eradication of 17 neglected tropical diseases. The following definitions were recommended for use in relation to the roadmap’s targets.

Control is the reduction of disease incidence, prevalence, intensity, morbidity or mortality, or a combination of these, as a result of deliberate efforts. The term “elimination as a public-health problem” should be used only upon achievement of measurable targets for control set by Member States in relation to a specific disease. Continued intervention measures may be required to maintain this reduction.

Elimination (interruption of transmission) is the reduction to zero of the incidence of infection caused by a specific pathogen in a defined geographical area as a

result of deliberate efforts; continued actions to prevent re-establishment of transmission may be required.

Eradication is the permanent reduction to zero of the worldwide incidence of infection caused by a specific pathogen as a result of deliberate efforts, with no risk of reintroduction. In some cases, a pathogen may become extinct, but others may be present in confined settings, such as laboratories.

By December 2012, a single measurable indicator was recommended to be used for each disease targeted in the roadmap for eradication, elimination or control. Ideally, confirmation of eradication and elimination requires independent assessment; Member States have requested that WHO establish certification processes for smallpox, poliomyelitis and dracunculiasis.

Sustaining the drive to overcome the global impact of neglected tropical diseases

Second WHO report on neglected tropical diseases



World Health
Organization

SUMMARY

BACKGROUND

Sustaining the drive to overcome the global impact of neglected tropical diseases • Second WHO report on neglected tropical diseases



“With the publication of this report, the control of neglected tropical diseases enters a new phase ... We are moving ahead towards achieving universal health coverage with essential health interventions for neglected tropical diseases, the ultimate expression of fairness.”

Dr Margaret Chan
Director-General
World Health Organization

SUSTAINING THE DRIVE TO OVERCOME THE GLOBAL IMPACT OF NEGLECTED TROPICAL DISEASES¹ builds on the growing sense of optimism generated by the publication in 2012 of the WHO roadmap *Accelerating work to overcome the global impact of neglected tropical diseases*.² This second WHO report marks a new phase in the control, elimination and eradication of 17 neglected tropical diseases.³ The report further evaluates the concepts discussed in the roadmap, describes the need for sustainable progress, and examines the challenges in implementation encountered by Member States, WHO and partners.

The roadmap set targets for the prevention, control and elimination of 17 neglected tropical diseases, including the eradication of dracunculiasis (by 2015) and yaws (by 2020). It marked a major strategic advance since the publication in 2010 of WHO’s first report on neglected tropical diseases. The roadmap set a further 6 targets for the elimination of 5 neglected tropical diseases by 2015, and 10 elimination targets for 2020, either globally or in selected geographical areas, for 9 neglected tropical diseases. Targets for the intensified control of dengue, Buruli ulcer, cutaneous Leishmaniasis, selected zoonoses and helminthiasis were also set.

The roadmap inspired the *London declaration on neglected tropical diseases*,⁴ endorsed by partners and stakeholders in January 2012 who pledged to strengthen control, elimination and eradication programmes, and ensure a regular supply of medicines and other interventions.

The impact and wide dissemination of the London declaration demonstrate that the global public-health agenda now embraces neglected tropical diseases.

¹ *Sustaining the drive to overcome the global impact of neglected tropical diseases: second WHO report on neglected tropical diseases*. Geneva, World Health Organization, 2013 (ISBN 978 92 4 156454 0).

² *Accelerating work to overcome the global impact of neglected tropical diseases: a roadmap for implementation*. Geneva, World Health Organization, 2012 (ISBN 978 92 4 156409 0).

³ Dengue, rabies, trachoma, Buruli ulcer, endemic treponematoses, leprosy, Chagas disease, human African trypanosomiasis (sleeping sickness), leishmaniasis, taeniasis/cysticercosis, dracunculiasis (guinea-worm disease), echinococcosis, foodborne trematodiasis, lymphatic filariasis, onchocerciasis (river blindness), schistosomiasis, soil-transmitted helminthiasis.

⁴ *The London Declaration on Neglected Tropical Diseases* (available at: <http://www.unitingtocombatntds.org/endorsements> or http://www.unitingtocombatntds.org/downloads/press/london_declaration_on_ntds.pdf; accessed March 2013).

SUSTAINABLE PROGRESS

Since 2010, more than 710 million people worldwide have received preventive chemotherapy¹ treatment annually for at least one disease. The number of people treated for schistosomiasis almost tripled between 2005 and 2010, entirely due to expansion of programmes in the African Region. Coverage with treatment of populations at risk for soil-transmitted helminthiasis reached 31% between 2005 and 2010.

Global coverage with preventive chemotherapy is expected to further expand significantly in the next few years as a result of the increased availability of donated medicines, the development of national action plans for delivering preventive chemotherapy in all WHO regions, and the commitments by national governments with the support of donor agencies to strengthen efforts to overcome neglected tropical diseases.

Impressive progress is also being made in eradicating dracunculiasis. At the end of 2012, transmission was limited to four countries where the disease is endemic. The number of reported cases continued to decrease, with a total of 542² cases in 2012 compared with 1058 confirmed cases in 2011. Heightened community-based surveillance, combined with national integrated disease surveillance and response programmes such as for poliomyelitis, are expected to intensify case detection and further reduce transmission. Despite achievements and successes, operational challenges remain in Chad, Ethiopia, Mali and South Sudan.

Another disease targeted by WHO for eradication by 2020 is yaws. WHO’s new Morges strategy uses a new treatment policy designed to replace those developed in the 1950s, which mainly centred on delivering injections of benzathine benzylpenicillin. Published in January 2012, the findings of a study in Papua New Guinea show that a single dose of oral azithromycin is as effective as intramuscular benzathine benzylpenicillin in treating yaws, thus revitalizing prospects for eradication through the delivery of large-scale treatment to infected and at-risk populations in the estimated 14 countries where yaws is endemic. This new strategy of treating the entire community overcomes the limitations of penicillin injections, which require trained health-care personnel to deliver case-by-case treatment.

Management of diseases such as Buruli ulcer, Chagas disease, human African trypanosomiasis and the Leishmaniasis has significantly improved. New cases of human African trypanosomiasis have continued to drop, raising prospects for elimination of the disease. Early diagnosis and treatment of cases, prompt management of complications, systematic screening of patients and adoption of strategies that respond appropriately to different levels of endemicity and health-system capacity have all contributed to reducing infection and morbidity.

¹ In this context, preventive chemotherapy refers to the widespread delivery of quality-assured, single-dose medicines as preventive treatment against helminthiasis and trachoma.

² Provisional data.

OPPORTUNITIES AND CHALLENGES

This second report analyses the challenges and opportunities to providing public-health interventions globally after the decisive technical briefing on neglected tropical diseases chaired by the President of the Sixty-fifth World Health Assembly in May 2012. Convened at the behest of countries where these diseases are endemic, the technical briefing noted the “unprecedented force” characterizing the global effort against neglected tropical diseases, and exhorted Member States to increase cooperation with one another and strengthen their political commitment in order to sustain the goals and meet the targets of WHO’s roadmap.

The work of WHO in overcoming neglected tropical diseases builds on five public-health strategies:

preventive chemotherapy; intensified case-management; vector control; safe drinking-water, basic sanitation and hygiene; and veterinary public health. Although one approach may predominate for the control of a specific disease or group of diseases, evidence suggests that more effective control results when several approaches are combined and delivered locally.

Sustaining the drive to overcome the global impact of neglected tropical diseases emphasizes the need for national programmes to continue collaborating by developing a culture of integrated and coordinated planning and programme management to encourage commitment from governments and enable effective scale up of interventions.

DELIVERING INTERVENTIONS: OBSTACLES AND RISKS

In order to measure progress towards the roadmap’s targets, the second WHO report defines the concepts of elimination and eradication for some neglected tropical diseases, and expands that of universal health coverage, which prioritizes the public-health needs of poor people and delivers interventions through appropriate technology at sustainable costs.

Universal coverage of prevention and control interventions depends critically on strong and efficient health systems, access to essential medicines of assured quality at affordable prices, a well-trained and motivated work force, as well as the involvement of sectors other than health including finance, education, agriculture and veterinary public health, water and sanitation, and environmental management.

The report discusses the phased implementation of the roadmap, identifies associated challenges, and proposes plans to mitigate some of the challenges. Obstacles and risks to implementation are as diverse as the diseases themselves, and are invariably linked:

some include the effects of natural disasters and human conflicts that result in the displacement of millions of people, and disrupt public-health interventions and disease surveillance.

The transmission and persistence of pathogens responsible for neglected tropical diseases depend on vectors or intermediate hosts. Thus, there is the risk that sufficient access to medicines alone will not enable targets to be achieved if measures to control vectors or their intermediate hosts and species are inadequate.

In 2012, dengue ranked as the most important mosquito-borne viral disease with an epidemic potential in the world. There has been a 30-fold increase in the global incidence of dengue during the past 50 years, and its human and economic costs are staggering. The report makes the point that the world needs to change its reactive approach to dealing with dengue and, instead, implement sustainable preventive measures guided by entomological and epidemiological surveillance.

HUMAN RESOURCES, TOOLS AND TECHNICAL EXPERTISE

Innovative and intensified management for treating diseases that are difficult to diagnose and that cause severe complications requires specific approaches tailored to the features of each disease; to the various forms of infections; to available tools, medicines and technical abilities; and to the mobility and readiness of decentralized medical teams to detect patients and manage individual cases.

For dengue, Chagas disease, lymphatic filariasis, the Leishmaniasis and onchocerciasis – the vector-borne diseases that account for an estimated 16% of the burden of infectious diseases – vector control remains key to reducing transmission. Innovations in vector control deserve more attention as playing a key part in reducing transmission and disease burden.

Sufficient human resource capacity (both technical and managerial) is required to support the scaling up of interventions at all levels of national health-care systems as well as in the mobilization of

resources. With increased medicine donations and a scale-up of interventions WHO is prioritizing the strengthening of country-level capacity. Since December 2012, WHO’s new Working Group on Capacity Strengthening has been actively working to train national programme managers and health-care workers to sustain the implementation of effective control programmes.

Expertise in preventing and controlling some neglected tropical diseases, and managing the vectors responsible for their transmission, must be enhanced if the targets set by the World Health Assembly in many resolutions over the years are to be met. Notwithstanding global economic constraints, support from Member States and their partners must be expanded to ensure that new products are developed for preventing, diagnosing and controlling these diseases; that services continue to expand; and that much-needed improvements to health systems are made towards achieving universal health coverage.

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