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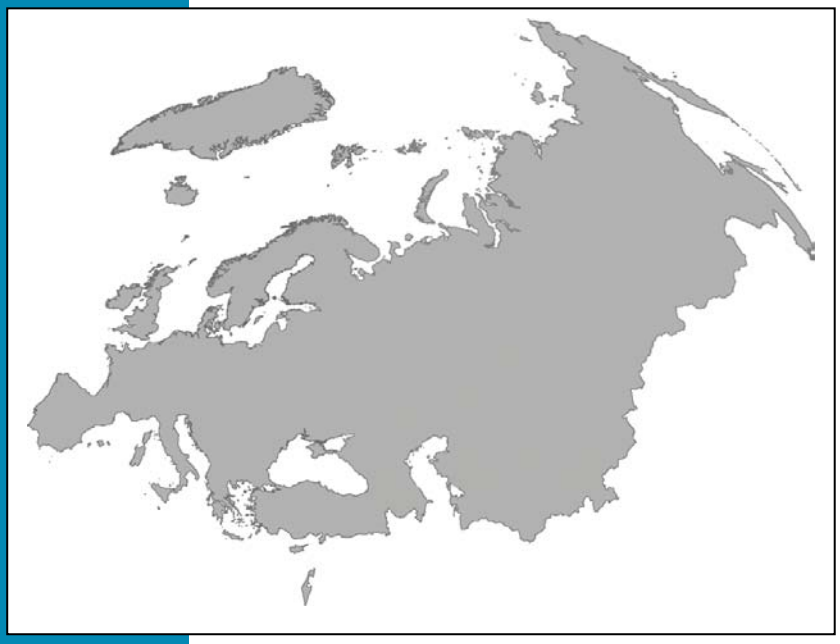

Strategic framework for leishmaniasis control in the WHO European Region 2014–2020

By: Mikhail Ejov
Daniel Dagne

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ABSTRACT

Leishmaniasis is a neglected and poorly reported disease with an underestimated or undetermined burden in most countries of the WHO European Region. This strategic framework for leishmaniasis control was developed in close collaboration with all stakeholders in order to improve the surveillance, control and prevention of leishmaniasis. The framework outlines the regional goal and objectives to be achieved by 2020 together with the recommended strategic approaches and priority interventions, with special attention to programme management, case detection and management, disease surveillance, control of reservoir hosts, integrated vector control, environmental operational research, capacity-building, community participation and health education, cross-border cooperation, intersectoral collaboration, partnership action and monitoring and evaluation.

Keywords

CAPACITY BUILDING
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Prof. Vladimir P Sergiev, Director, Martsinovsky Institute of Medical Parasitology and Tropical Medicine, Russian Federation.

This document was drafted, revised and finalized by Dr Mikhail Ejov, Programme Manager, Malaria and other Vector-Borne and Parasitic Diseases, WHO/Europe, in close consultation with Dr Daniel Dagne, Programme Manager and Dr Jose Postigo from Leishmaniasis Control Programme, Department of Control of Neglected Tropical Diseases at HQ WHO.

Abbreviations

CL	cutaneous leishmaniasis
ELISA	enzyme-linked immunosorbent assay
IRS	indoor residual spraying with insecticides
TDR	Special Programme for Research and Training in Tropical Diseases
VL	visceral leishmaniasis

Summary

Leishmaniasis is a neglected and poorly reported disease with an underestimated or undetermined burden in most countries of the WHO European Region. The regional incidence of visceral leishmaniasis (VL) and cutaneous leishmaniasis (CL) is estimated at less than 2% of the global burden of leishmaniasis according to the WHO recent estimate of leishmaniasis incidence.

Cases of VL, which is due to *L. infantum,* are reported in countries of western and south-eastern Europe, central Asia, south Caucasus and Turkey, with the overwhelming majority (nearly 75%) found in Albania, Georgia, Italy and Spain. Since the mid-1990s, the number of reported VL cases in children aged under five years has increased more than nine-fold to reach, in Georgia, more than 180 in 2007. In recent years, however, the number of adults with VL has been rising as co-infections with HIV before the scale-up of antiretroviral therapy. Human (and canine) leishmaniasis is a re-emerging problem in some parts of southern Europe, with a steady increase in VL prevalence.

Almost 80% of the total number of CL cases reported in the Region are in Israel, Turkey, Turkmenistan and Uzbekistan. Cases of anthroponotic CL, which is caused by *L. tropica,* have been reported from Azerbaijan, Greece, Israel, Turkey and Uzbekistan. The disease is endemic predominantly in densely populated settlements, where person-to-person transmission is maintained by *Ph. sergenti*. Cases of zoonotic CL caused by *L. major* have been registered in central Asia, the south Caucasus, Israel and Turkey, and the disease is prone to epidemics. Cases of CL caused by *L. infantum* have been reported in some south Caucasian, central Asian and European countries, with proved and suspected vectors the same as those for VL.

The desperate need for updated information on the extent of the problem of leishmaniasis in the Region has been highlighted by World Health Assembly resolution WHA60.13 and by the WHO Expert Committee Report on Control of Leishmaniasis. Such information is necessary to pave the way towards the development of adequate policies and strategies to deal with leishmaniasis at regional and country levels.

The framework given in this report outlines the regional goal and objectives to be achieved by 2020, and the recommended strategic approaches and priority interventions with special attention to: programme management, case detection and management, disease surveillance, control of reservoir hosts, integrated vector control, environmental management and personal protection, epidemic preparedness and response, operational research, capacity-building, community participation and health education, cross-border cooperation, intersectoral collaboration, partnership action, and monitoring and evaluation.

Disease burden and current trends

Leishmaniasis is a parasitic disease transmitted by the bite of blood-sucking sandflies that have previously fed on an infected reservoir host. There are two clinical forms of leishmaniasis: visceral leishmaniasis (VL) or *kala-azar*, the most severe and fatal in almost all cases if left untreated, and cutaneous leishmaniasis (CL) which has a tendency towards spontaneous resolution.

Leishmaniasis is endemic in over 98 countries with more than 350 million people at risk. It is estimated that 1.3 million new cases of leishmaniasis (0.3 million VL and 1.0 million CL) occur every year. As a neglected tropical disease, leishmaniasis shares the characteristics of a typical poverty-related disease, that is, a lack of recognition, political prioritization, visibility of its burden, national strategies for its control and accurate information on its extent and distribution. Although it is estimated to cause the ninth largest disease burden of all infectious diseases, leishmaniasis is largely ignored due to its complex epidemiology and ecology, the lack of easily applied tools for case management and the inadequacy of current incidence data.

Leishmaniasis is a neglected and poorly reported disease with an underestimated or undetermined burden in most countries of the WHO European Region. The regional incidence of VL and CL is estimated at less than 2% of the global burden of leishmaniasis, according to the recent WHO estimate of leishmaniasis incidence.

Cases of VL, which is due to *L. infantum,* are reported in countries of south-eastern and western Europe, central Asia, the south Caucasus and Turkey, with the overwhelming majority (nearly 75%) found in Albania, Georgia, Italy and Spain. The reservoir hosts include domestic dogs, foxes, gerbils and jackals. The main proven and suspected vectors for VL and CL due to *L. infantum* in the Region include *Ph. alexandri, Ph. kandelakii, Ph. balcanicus, Ph. turanicus, Ph. halepensis, Ph. syriacus, Ph. longiductus, Ph. perfiliewi, Ph. perniciosus, Ph. ariasi, Ph.tobbi, Ph. transcaucasicus and Ph. neglectus.* Since the mid-1990s the number of VL cases reported in children aged under five years has increased more than nine-fold reaching, in Georgia, more than 180 in 2007. In recent years, however, the number of adults with VL has been rising as co-infections with HIV before the scale-up of antiretroviral therapy. Human (and canine) leishmaniasis is a re-emerging problem in some parts of southern Europe, with a steady increase in VL prevalence.

Almost 80% of the total CL cases reported in the Region are in Israel, Turkey, Turkmenistan and Uzbekistan. Cases of anthroponotic CL, which is caused by *L. tropica*, have been reported from Azerbaijan, Greece, Israel, Turkey and Uzbekistan. The disease is endemic predominantly in densely populated settlements, where person-to-person transmission is maintained by *Ph. sergenti*. Cases of zoonotic CL caused by *L. major* have been registered in central Asia, the south Caucasus, Israel and Turkey, and the disease is prone to epidemics. *Ph. papatasi* is the principal vector. CL caused by *L. infantum* is reported in some south Caucasian, central Asian and European countries and the proven and suspected vectors are the same as those for VL.

WHO commitment and action

In May 2007, the Sixtieth World Health Assembly adopted resolution WHA60.13 on the control of leishmaniasis, urging Member States where leishmaniasis is a public health problem to: reinforce efforts to set up national control programmes; establish systems for surveillance, data collection and analysis; strengthen prevention and active detection and improve access to appropriate and affordable diagnosis and treatment of cases of both CL and VL; conduct epidemiological assessments of local situations and support studies on surveillance and control of leishmaniasis; promote the sustainability of leishmaniasis control; raise awareness and improve preventive practices at community level; and strengthen collaboration between countries that share common foci or disease threats. The resolution calls for WHO to take the lead in establishing effective control programmes in affected

countries and providing technical assistance on issues of direct relevance to leishmaniasis control. Based on the above-mentioned resolution, WHO convened the Expert Committee on Leishmaniasis in March 2010, which subsequently issued the first updated technical report on leishmaniasis in more than 20 years.

Resolution WHA60.13 and the WHO Expert Committee report highlighted the desperate need for updated information on the extent of the problem on leishmaniasis within the Region, which could pave the way for developing adequate policies and strategies to deal with leishmaniasis at regional and country levels.

In November 2009, a WHO intercountry meeting on leishmaniasis in the European Region, organized in close collaboration with WHO headquarters, was held in Istanbul, Turkey *(1)*. The objectives of the meeting were to:

- revisit the area-specific disease-related strategies focused on updating information on the impact of leishmaniasis in each country and review the status of activities and existing problems in controlling the disease in the Region;
- formulate the needs of and recommendations to each country or sub-region for increasing the alert for the disease and implementing appropriate control measures; and
- contribute to the preparation of leishmaniasis country profiles.

Representatives from Albania, Armenia, Azerbaijan, Croatia, France, Georgia, Greece, Israel, Italy, Kazakhstan, Kyrgyzstan, Portugal, the Russian Federation, Tajikistan, Turkey, Ukraine and Uzbekistan attended the Meeting together with WHO staff and international experts. The participants concluded that leishmaniasis was a highly neglected disease in most countries of the Region, and the lack of political commitment was a major drawback in developing an appropriate strategy on leishmaniasis control at regional, subregional and national levels. There was a lack of updated information on current local epidemiological situations, disease management and control, especially in the countries of central Asia and the south Caucasus. It was agreed that technical support from WHO was needed to address these problems.

In April 2013, a further WHO regional meeting was organized in collaboration with WHO headquarters in Tbilisi, Georgia on outlining a strategic framework on leishmaniasis control *(2)*. The specific objectives of this meeting were to:

- describe and discuss the current situation regarding leishmaniasis at the regional and national levels;
- analyse the challenges to control of leishmaniasis;
- review the practical approaches and modalities for leishmaniasis control in countries participating in the meeting; and
- develop strategic approaches to leishmaniasis control in countries of Europe, the south Caucasus, central Asia, Israel and Turkey.

The meeting was attended by representatives of the state epidemiological service responsible for leishmaniasis control in all 12 invited countries where leishmaniasis poses a serious public health problem (Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, Turkmenistan, Ukraine and Uzbekistan), together with experts from Armenia, Georgia,

Italy, the Russian Federation and Spain and technical experts from WHO headquarters and the Regional Office for Europe.

A regional collaborative programme for 2012–2014 has been developed with the financial support of the Control of Neglected Tropical Diseases programme at WHO headquarters, and is being successfully implemented.

Regional goal, programme objectives and timetable

The regional goal is, by 2020, to eliminate mortality due to VL, significantly reduce morbidity due to VL and CL, contribute to improving the health status of populations at risk and minimize the socioeconomic losses provoked by the disease in countries where leishmaniasis is a public health problem.

The objectives of the programme are to:

- strengthen public health services' institutional capacities and enhance the capacity for decision-making related to leishmaniasis and its control;
- improve capacities for early detection as well as access to appropriate and affordable diagnosis and treatment of VL and CL cases;
- reinforce disease surveillance;
- improve capacities for the prompt response to and prevention of leishmaniasis outbreaks;
- strengthen appropriate vector and reservoir control interventions;
- strengthen research capabilities;
- increase community awareness and participation in leishmaniasis prevention;
- build and scale up partnership action to leishmaniasis control;
- enhance intersectoral collaboration, and
- strengthen cross-border coordination and cooperation.

The following timetable is proposed for implementation of the strategic framework aimed at leishmaniasis control.

By the end of 2014

Programme guidance and coordination

- Ensure that a strategic framework for leishmaniasis control is developed, published and translated into Russian.
- Ensure that regional guidelines for diagnosis and treatment of leishmaniasis are developed, published and translated into Russian.
- Ensure that intercountry and/or subregional cross-border collaboration and cooperation are initiated.

By the end of 2015

Capacity-building

- Ensure that national guidelines for leishmaniasis control are developed/updated and published in local languages.
- Ensure that all public health staff engaged in leishmaniasis control at all levels are trained.

Surveillance

- Set up reliable reporting and information systems to detect and report VL and CL cases, particularly in populations at risk.
- Build national capacities and mechanisms to collect, process and analyse data relevant to leishmaniasis control and prevention.
- Identify and establish surveillance of reservoir hosts.
- Set up entomological monitoring.

Case management

- Ensure that national guidelines for diagnosis and treatment of leishmaniasis are developed/ updated and published in local languages.
- Ensure that all public health staff responsible for diagnosis and treatment of leishmaniasis at all levels are trained.
- Ensure the availability of quality-assured and WHO-recommended anti-leishmania medicines in all endemic countries.

Outbreak preparedness and response

- Build a rapid response capability to cope with emergency and abnormal situations related to leishmaniasis.

By the end of 2017

Surveillance

- Enhance surveillance for active case detection of VL.
- Detect and report all VL cases.
- Define reservoir hosts.
- Identify/incriminate sandfly species/vectors, and their ecology and biology.
- Stratify affected areas with definition of all leishmaniasis foci on the basis of GIS-based mapping.

Case management

- Provide full access for reported VL cases to appropriate diagnosis and treatment.

Control of sandfly vectors and reservoir hosts

- Plan and implement control measures guided by consideration of technical and operational feasibility, effectiveness and sustainability in leishmaniasis foci.

By the end of 2020

Surveillance

- Detect and report all CL and VL cases.

Case management

- Provide full access for reported CL and VL cases to appropriate diagnosis and treatment.

Evaluation

- Evaluate the impact of measures applied against leishmaniasis at national level.
- Verify that mortality due to VL is eliminated.

In countries where leishmaniasis is a public health problem, epidemiological surveys, operational studies and leishmaniasis stratification should be conducted so as to improve understanding of the disease burden and its distribution and trends; partnership action should be established and scaled up to address issues related to leishmaniasis; cross-border coordination and cooperation should be established with neighbouring countries on issues of leishmaniasis and its control; and intersectoral collaboration should be enhanced with non-health sectors on issues of leishmaniasis and its control within a given country. In order to monitor the evolution of the leishmaniasis situation and to evaluate outcomes of control measures implemented at national level, baseline surveys to assess problems and needs related to leishmaniasis and impact surveys to measure progress and assess achievements should be carried out regularly.

Strategic approaches and priority interventions

Programme management

The national strategy and plan of action against leishmaniasis should be developed by each country where leishmaniasis is a public health problem and implemented through properly organized and managed specialized and/or general health services. Some important aspects of planning, implementing and evaluating leishmaniasis control programmes should be clearly defined and periodically reviewed, in particular the goals, objectives and targets of the programme; the responsibility, authority and accountability for work done; the resources used and the outputs/outcomes achieved at all levels. The strategic framework for leishmaniasis control and regional guidelines for diagnosis and treatment of leishmaniasis should be developed, published and translated into Russian. Decision-makers and senior staff of specialized health services should be trained in programme management at national level and abroad in order to provide technical and operational guidance in a satisfactory manner. WHO should be asked to provide strategic guidance and technical assistance to ensure the success of national programmes in leishmaniasis control.

Case detection and management

The fundamental elements of a leishmaniasis control programme comprise an established and properly functioning system for early detection of cases, reliable diagnosis and appropriate and affordable treatment of reported VL and CL cases, and follow-up of treatment results.

Passive case detection, consisting of screening for leishmaniasis cases at a health facility, and active case detection, consisting of screening for leishmaniasis cases by health staff through home visits or outreach to the local community (house-to-house searches, index case approach, incentive-based approach) can be used to search for cases.

Although clinical signs and symptoms, alone or in combination, are not specific enough to differentiate the diseases from some other infections, a standard case definition is essential for early detection of cases. Visualization of the amastigote form of the parasite by microscopic examination of tissue aspirates from spleen, bone marrow and lymph node is the classical confirmatory test for VL. The detection of parasite DNA by polymerase chain reaction in bone marrow aspirates is substantially more sensitive than microscopic examination, although its use is currently restricted to referral hospitals and research centres. Serological tests based on the indirect fluorescent antibody technique, enzyme-linked immunosorbent assay (ELISA) or western blot have shown good diagnostic accuracy. The rK39-based test is easy to perform and cheap and can be used for early diagnosis of VL at peripheral and central levels. Antibody-based tests must always be used in combination with a standardized clinical case definition for VL.

The clinical spectrum of CL is broad and may mimic that of other skin conditions, such as fungal infections, leprosy, cancer or other skin infections. Parasitological diagnosis remains the reference standard in diagnosis of CL because of its high specificity, and multiple parasitological diagnostic tests should be performed on each patient to increase the sensitivity of this method. The material obtained for parasitological diagnosis can be used for microscopic examination of Giemsa-stained smears, culture and molecular diagnostic techniques. Molecular techniques should be used to identify the parasite species in order to differentiate between *L. tropica* and *L. major*.

Ideally, treatment should be given only after confirmation of the disease. At the same time, the extent of concomitant infection should be assessed, as this may influence the choice of therapy or supportive treatment. The treatment of VL and CL should be in line with national and regional treatment policies. Treatment should be given under the supervision of medical personnel. The first-line drug for VL treatment should be liposomal amphotericin B. Alternatively, pentavalent antimonials or amphotericin B deoxycholate can be used. Ideally, treatment for VL should cure the patient and reduce the risk for relapse.

CL is not a life-threatening disease and severe complications are not frequent. CL caused by L. tropica should be treated with pentavalent antimonials or local treatment options that include thermotherapy, cryotherapy and topical ointments. As regards CL caused by L. major, superficial secondary infections may complicate ulcerated lesions so it is important to clean them. The treatment decision is based on the risk–benefit analysis of the intervention for each patient. In patients with mild disease, a safer treatment should be preferred, even if the level of evidence for efficacy is weak.

Local wound care with careful follow-up are indicated for patients with:

- fewer than four lesions requiring immediate treatment
- lesions less than five cm in diameter
- no potentially disfiguring or disabling lesion (face, joints, toes and fingers)
- no immunosuppression
- a possibility for follow-up.

National guidelines for leishmaniasis control and for diagnosis and treatment of leishmaniasis based on regional policies and norms should be developed, updated and published in local languages. Public health staff engaged in diagnosis and treatment of leishmaniasis at all levels should be trained. Diagnostic supplies and anti-leishmania drugs should made available for populations at risk.

Disease surveillance

Development of reliable and sensitive surveillance is vital to the success of any public health programme. Leishmaniasis surveillance, defined as the systematic collection, analysis and interpretation of specific data essential for planning, implementing and evaluating leishmaniasis control programmes, aims to provide relevant data and information to decision-makers promptly. Establishing good surveillance with an adequate case notification system and reporting and information systems is a key priority (Annex 1). Mechanisms should be built in for the regular collection, processing and analysis of epidemiological, operational and socioeconomic data relevant to planning, implementation, monitoring and evaluation of the programme. The Regional Office will prepare standard reporting formats for endemic countries to adapt to their local context.

Mechanisms for surveillance of sandfly vectors and reservoir hosts should also be set up and put into operation.

GIS-based mapping enables health authorities to trace the evolution of the leishmaniasis problem, identify affected areas and map out old and new active foci of VL and CL where targeted and site-specific anti-leishmaniasis measures should be applied. Surveys to assess local situations, problems and needs related to leishmaniasis should be carried out at regular intervals, and the survey data together with routine monitoring could provide a systematic way to determine whether approaches and interventions are appropriate and sufficient to achieve the stated objectives and targets.

Both passive and active disease surveillance should be implemented depending upon the local epidemiological situation with an established mechanism for the regular flow and exchange of information. Standardized notification with flow charts and reporting forms should be developed to ensure proper reporting.

Marked seasonal and interannual fluctuations in incidence are major characteristics of the epidemiology of leishmaniasis in many settings. Fluctuations are driven by climate factors, population dynamics of the vector and reservoir host, and human behaviour and movements. Leishmaniasis is a climate-sensitive disease and is strongly affected by changes in rainfall, atmospheric temperature and humidity. Global warming and land degradation together are

expected to affect the epidemiology of leishmaniasis by a number of mechanisms. Monitoring of the effect of climate change and the link with seasonal fluctuations in incidence of the disease is, therefore, important to control the emergence or re-emergence of the disease.

Control of reservoir hosts

An effective strategy for disease management is a central pillar for anthroponotic leishmaniasis. Humans are the proven reservoir of *L. tropica* infection in some countries of the Region. Active case detection, early detection and effective treatment, accompanied by measures for prevention of re-infection, should reduce the parasite load and transmission or even eliminate the disease. The use of insecticide-treated bednets by patients with chronic *L. tropica* skin lesions may also decrease the likelihood that sandflies will feed on infected individuals.

Control of reservoir hosts is mainly recommended for zoonotic VL and CL. Control of the canine reservoir of leishmaniasis is a complex undertaking, which should be tailored to the local situation. The distribution and frequency of the infection in stray and feral dogs should be determined from the outset. Mass screening of domestic dogs is usually done by serological examination. At the same time, each dog can be examined clinically. The anti-leishmania drugs used primarily for treatment of the human disease should not be used for treatment of canine leishmaniasis because of their low efficacy in the canine host and the potential for promoting parasite resistance. Use of topical insecticides with proven efficacy against sandfly bites could be effective in reducing the incidence of VL in dogs and its transmission to humans. A few canine *Leishmania* vaccines are under development or have been licensed, designed primarily to reduce severe manifestations of VL in dogs. Some legal measures can also help to control the diseases, including compulsory certification by veterinarians and the registration and licensing of pet dogs. Control of canine VL could be linked with campaigns against rabies.

The great gerbil is readily identified by its burrow system and distinctive morphology. Burrows can be found by combined aerial and ground surveys. An inexpensive, effective and economically viable approach is to destroy the burrow systems by ploughing with a subsoil plough followed by planting. Another approach is to poison the gerbils with zinc phosphide mixed with wheat grains and vegetable oil. The total elimination of great gerbils can only be achieved in areas where reinvasion can be prevented by physical barriers, such as canals or large agricultural fields. Temporary control, by clearing rodents from part of an area, can be achieved in non-irrigated territories but not in oases or irrigated areas. Sound environmental planning and sanitation of foci should be prerequisites of agricultural development projects.

Integrated vector control

The aim of vector control is to reduce or interrupt transmission of the disease. An effective strategy for reducing human leishmaniasis is to control sandfly vectors, especially in domestic and peridomestic transmission habitats. Leishmaniasis control has often been integrated with that of other vector-borne diseases, including attempts to eradicate malaria. A number of control methods are available including chemicals, environmental management and personal protection. Although some methods can have a strong independent effect on the sandfly population, it is highly advisable to involve more than one method in an integrated manner. Such an approach requires the proper knowledge of local epidemiology (including whether transmission is anthroponotic or zoonotic) and the vector species involved, their habitats (peridomestic, rural or wild), flight range, host-feeding preferences, resting sites, circadian rhythms and seasonality.

Sandfly control depends on the behaviour of the target vector, which could be strongly endophilic, peridomestic or both.

Endophilic and peridomestic species can be targeted by indoor residual spraying with insecticides (IRS), and all localities and households with ongoing transmission should be sprayed. When peridomestic or exophilic sandfly species are involved, the outer surfaces of domestic animal shelters and structures close to such dwellings as potential resting sites must be sprayed. Different classes of insecticides can be used for this purpose, although the spectrum of susceptibility of sandflies to insecticides is not completely known. Insecticide-impregnated bednets are an effective, relatively cheap and sustainable method of sandfly control, which has demonstrated protective efficacy against CL and even VL. Acceptability and sleeping behaviour are critical to the effectiveness of insecticide-impregnated bednets. Another method for control of CL and VL is the use of dog collars impregnated with pyrethroid insecticides, which could reduce the incidence of the disease.

It is logical to assume that a combination of different vector control methods may compensate for deficiencies of each individual option. The integrated vector control approach can suit local conditions and ensure the maximum cost-effectiveness and benefit. The application of vector control measures and their combinations should be guided by consideration of their technical feasibility, operational applicability, cost-effectiveness and sustainability.

A well-designed scheme for monitoring and evaluating an integrated vector management programme should be prepared before any sandfly control operations are launched, with clear definitions of the process, output and outcome indicators of the programme. The scheme should include methods to assess both the short- and long-term effects of control measures on vector populations. A set of standard indicators is included in the toolkit prepared by the Special Programme for Research and Training in Tropical Diseases (TDR).[1]

Routine indicators of quality include the following:

- the performance of staff conducting IRS or involved in the distribution of insecticide-treated nets, by observation;
- the coverage and quality of IRS;
- the bioassay of the effectiveness of IRS or insecticide-treated nets, as outlined in the TDR toolkit;
- the vector density monitored by knock-down catches of sandflies resting indoors, light-trapping, quantitative sticky-paper traps or standardized active catches of day-resting sandflies; and
- acceptability, as outlined in the TDR toolkit.

Evaluation of the effectiveness of interventions and their effect on local transmission should include entomological and epidemiological studies.

[1] Sponsored by the United Nations Children's Fund, the United Nations Development Programme, WHO and the World Bank.

Environmental management and personal protection

Environmental management may result in a reduction in sandfly-human contact or sandfly populations. It could be relocation of human settlements away from sandfly habitats and physical modification of the habitats. Environmental management measures should be preceded by careful studies of local ecology and the environmental impact. Physical modification of *Ph. papatasi* sandfly breeding and resting sites by destruction of the burrows of the great gerbil was used successfully in the republics of central Asia. Actual or potential sandfly breeding sites, such as rubble and rubbish tips, can be eliminated in sanitation programmes involving the local community, especially in urban areas. It is important that any modification of vector habitats take into account environmental conservation and does not create local ecological conflicts.

It is recommended that people entering or living in highly endemic areas use personal protective measures to avoid bites by sandfly vectors of leishmaniasis. These measures include avoiding times and places of sandfly activity and applying insect repellents on exposed skin.

Epidemic preparedness and response

Localized outbreaks of CL caused by *L. major* could occur in some countries. The emergence of an outbreak is difficult to predict; the factors that can be involved include changes in vector habitat, mass movements of people and decreased immunity. It is important to place a particular emphasis on the establishment of mechanisms to predict an outbreak, detect one at early onset, rapidly respond to outbreak situations and prevent any abnormal situations related to leishmaniasis. Basic preparedness and rapid response mechanisms should be in place in epidemic-prone areas of the countries in question, which should be able to detect leishmaniasis cases early and react quickly to emergencies. In epidemic-prone areas and before the anticipated outbreak season, the responsibilities of outbreak task force members should be defined; the necessary needs for response, surveillance and control should be assessed; the surveillance system should be reinforced; criteria for epidemic alert should be set up; and all health facilities should be provided with minimum stocks of basic diagnostic and treatment supplies.

Operational research

A research effort should be made, with assistance from research institutions, to define countries' burden of leishmaniasis and the population at risk. Extremely important aspects include:

- an assessment of risk factors;
- a study of the local burden and epidemiology;
- leishmaniasis stratification, incrimination of vectors and reservoir hosts, and identification of parasites' species from reservoir hosts in new foci and foci of leishmaniasis where they are unknown;
- clinical research to evaluate drugs and treatment regimens, measures for vector and reservoir control and surveillance tools and methods;
- sociobehavioural research on the use of health-care services and health care-seeking behaviour;
- research addressing efficacy and effectiveness of applied control measures.

Capacity-building

Training is a key component of any programme dealing with leishmaniasis. Health staff, including physicians, entomologists, parasitologists, veterinarians and other categories engaged in leishmaniasis control, need special training to become familiar with the epidemiological and biological characteristics of the diseases, risk factors, diagnosis and treatment of leishmaniasis, and preventive and control measures applied against leishmaniasis. Laboratory staff require training in the use of different diagnostic methods, including parasite isolation by culture and molecular biology tools. National guidelines for leishmaniasis control and for diagnosis and treatment of leishmaniasis should be developed, updated and published in local languages. Basic training should be supplemented by regular supervision and refresher training courses. Such training should be practical and directed towards updating knowledge and developing skills and competence. Although training can take place at country level, some professional health staff may require additional training abroad in regional training centres. The Regional Office will coordinate and facilitate the training needs and conduct of short training courses in collaboration with WHO collaborating centres and other qualified centres.

Community participation and health education

The involvement of communities and their partnerships with the formal and informal health sectors to empower them in their own health development is crucial. Leishmaniasis prevention must go hand-in-hand with community participation. Unless individuals in communities see the merits of preventing the illness, even the best-designed preventive strategies might not be used. There is a desperate need to understand how a local community perceives the disease and why it is important for them, and what existing patterns of behaviour may complement or hinder preventive measures.

People should be educated about leishmaniasis and its control and prevention, and have access to adequate health care facilities. Existing practices to detect, diagnose and treat leishmaniasis should be improved through the development and dissemination of clear messages about the disease and its diagnosis and treatment. Community and family care and preventive practices should be strengthened through the provision of information, education and communication materials, local capacity-building, the traditional/mass media and community support. Assessments of knowledge, attitude and practice should be carried out to find out ways to promote the compatibility of practices, customs and beliefs among various social groups and minorities with existing options for leishmaniasis control and prevention, and to develop effective information, education and communication strategies and targeted materials at national level.

Community leaders, teachers and local communities themselves should be educated and trained to identify early signs and symptoms, and they should have clear information on referral of suspected leishmaniasis cases. Awareness-raising sessions about potential risk factors associated with the disease and preventive measures should be conducted as part of health education.

Cross-border cooperation

A risk factor that poses a challenge to countries in Region is the importation of cases from neighbouring and other endemic countries either through migration or tourism.

In order to tackle this problem, cross-border collaboration on leishmaniasis control should be set up and promoted. In collaboration with WHO and other partners, a functional mechanism should

be established for regular and prompt exchange of relevant information, joint epidemiological surveys and assessments should be conducted and joint action plans should be developed to synchronize and harmonize activities to control and prevent leishmaniasis in border areas. In view of the many similarities in eco-epidemiological settings related to vector-borne diseases, including leishmaniasis, in certain countries in the WHO European and Mediterranean Regions, it is important that closer coordination should be promoted.

Intersectoral collaboration

Intersectoral collaboration is best developed from a shared understanding of the underlying problems to be addressed. The Ministry of Health should stimulate non-health sectors, including national and local veterinary services and the environmental, agricultural and other sectors for active collaboration in leishmaniasis control.

Partnership action

International and political attention to leishmaniasis control should be translated into real commitments and action. Partnership action to mobilize urgently needed external resources should be established and sustained at regional and country levels. WHO should play a proactive role in this process. Interaction, information exchange and collaborative activities should be designed and implemented with various actors in the Region working on leishmaniasis, including academia, research institutes, leishmaniasis networks and WHO collaborating centres in the Region. The collaborating centres can play a major role in supporting operation studies, assessments, high-level training and capacity-building activities, networking laboratories and exchange of highly qualified experts.

Monitoring and evaluation

Countries should monitor and evaluate their leishmaniasis control programmes at regular intervals for compliance with the targets and objectives to be achieved. Parameters should be established to monitor and evaluate all programme areas, including case management, control of sandfly vectors and reservoir hosts, capacity-building, community participation and intersectoral collaboration. Information on coverage and quality of operations, mapping out old and new active foci of leishmaniasis, mortality and morbidity incidence rates, relevant eco-epidemiological data and therapeutic responses to medicines is particularly important. This type of information is usually collected through a national information system for disease surveillance and health management.

Monitoring involves the routine tracking of programme performance by record-keeping, regular reporting, surveillance and periodic surveys. The objectives of monitoring are to verify the progress or status of implementation, ensure accountability, detect problems and constraints, promote evidence-based planning and provide prompt feedback so that adjustments can be made as needed. Monitoring indicators include those for input, process and outputs.

Evaluation involves the periodic assessment of changes in targeted outcomes or results that can be attributed to a programme. The objectives of evaluation are to relate a particular outcome or health impact directly to a particular intervention after a certain time, determine the value or worth of a particular project or programme, link any two parts of the monitoring and evaluation framework (input, process, output, outcomes and impact), measure the effectiveness of the

programme and provide reliable information on progress in controlling leishmaniasis that can be used at local, national or international level.

The main objectives of monitoring and evaluating a leishmaniasis control programme are to:

- collect, process, analyse, report and disseminate information relevant to leishmaniasis and its control;
- verify that activities have been implemented as planned to ensure accountability and address problems promptly;
- provide feedback to relevant authorities to improve future planning;
- document whether the planned strategies and approaches have achieved the expected objectives and goals.

The report of a meeting of the WHO Expert Committee on the Control of Leishmaniases in 2010 *(3)* and the WHO document on indicators for monitoring and evaluation of the *kala-azar* elimination programme *(4)* provide lists of indicators (numbers of CL and VL cases diagnosed and treated, cure rates, treatment failure rates, number of serious adverse events reported in patients treated and case fatality rates) that can be adapted to the individual national programme target and context.

The way forward

The strategic framework for leishmaniasis control, which focuses on countries of the south Caucasus, central Asia, eastern and south-eastern Europe, Israel and Turkey should assist the Member States and partners concerned in developing their own technically sound national strategies and plans of action. The Regional Office and WHO headquarters will provide strategic guidance and technical assistance to countries in need in developing and implementing their national strategies and action plans, strengthening institutional capacities, improving capacities for disease management and prevention, reinforcing disease surveillance and strengthening research capabilities. Countries are requested to report back on progress made with their implementation on a regular basis.

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Annex 1 WHO recommended case definition

Visceral leishmaniasis

Clinical description
The main symptoms of VL are: prolonged irregular fever, splenomegaly and weight loss. In endemic malarial areas, VL should be suspected when fever lasts for more than two weeks and no response has been achieved with anti-malarial medicines (assuming that drug-resistant malaria has also been considered).

The *laboratory criteria for diagnosis* are:

- positive parasitology (stained smears from bone marrow, spleen, liver, lymph node, blood or culture of the organism from a biopsy or aspirated material); and
- positive serology (indirect fluorescence antibody, ELISA, rK39, direct agglutination test).

Case classification by WHO operational definition[1]
A case of VL is a person showing clinical signs (mainly prolonged irregular fever, splenomegaly and weight loss) with serological and/or parasitological confirmation.

Cutaneous leishmaniasis

Clinical description
There is appearance of one or more lesions, typically on uncovered parts of the body. The face, neck, arms and legs are the commonest sites. At the site of inoculation, a nodule appears which may enlarge to become an indolent ulcer. The sore remains in this stage for a variable time before healing and typically leaves a depressed scar. Other atypical forms may occur. In some individuals, certain strains can disseminate and cause mucosal lesions. These sequelae involve nasopharyngeal tissues and can be disfiguring.

The *laboratory criteria for diagnosis* are:

- positive parasitology (stained smear or culture from the lesion);
- mucocutaneous leishmaniasis only: positive serology (indirect fluorescence antibody, ELISA).

Case classification by WHO operational definition[1]
A case of cutaneous leishmaniasis is a person showing clinical signs (skin or mucosal lesions) with parasitological confirmation of the diagnosis (positive smear or culture) and/or, for mucocutaneous leishmaniasis only, serological diagnosis.

[1] *Recommended surveillance standards,* 2nd ed. Geneva: World Health Organization; 1999 (http://www.who.int/csr/resources/publications/surveillance/whocdscsrisr992.pdf, accessed 22 February 2014).

The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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World Health Organization
Regional Office for Europe

UN City, Marmorvej 51, DK-2100 Copenhagen Ø, Denmark
Tel.: +45 45 33 70 00 Fax: +45 45 33 70 01 Email: contact@euro.who.int
Website: www.euro.who.int