



World Health
Organization

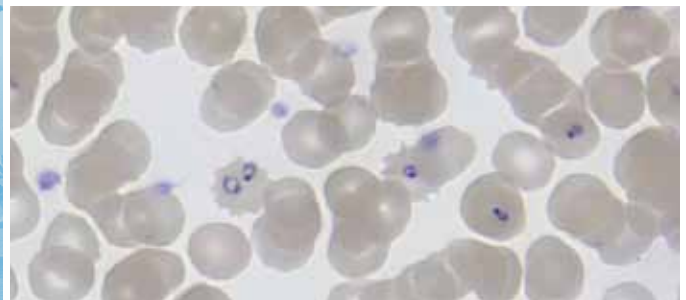
REGIONAL OFFICE FOR
Europe

REGIONAL COMMITTEE FOR EUROPE
SIXTY-THIRD SESSION

Çeşme Izmir, Turkey, 16–19 September 2013



© İZKA/ Tamer Hartevioğlu



Regional Framework for surveillance and control of invasive mosquito vectors and re-emerging vector-borne diseases



World Health
Organization

REGIONAL OFFICE FOR

Europe

Regional Committee for Europe

Sixty-third session

EUR/RC63/9

+ EUR/RC63/Conf.Doc./6

Çeşme Izmir, Turkey, 16–19 September 2013

30 July 2013

131465

Provisional agenda item 5b

ORIGINAL: ENGLISH

Regional Framework for surveillance and control of invasive mosquito vectors and re-emerging vector-borne diseases

The introduction and spread of *Aedes* mosquito species into the WHO European Region is a growing problem driven by the globalization of trade and travel, continuous urbanization and environmental challenges, including climate change. *Aedes albopictus* and *Aedes aegypti* mosquitoes are effective vectors of potentially severe diseases such as dengue and chikungunya fever. Travellers returning from disease-endemic countries are increasingly introducing dengue and chikungunya viruses into the WHO European Region.

A much rarer event is the introduction of the yellow fever virus, which can also be successfully transmitted by *Aedes* mosquito species. In areas where these invasive mosquitoes have been established or re-established, there is a genuine risk of local transmission of these diseases. Indeed, increasing indigenous transmission and outbreaks of dengue and chikungunya in the WHO European Region are being reported.

A Regional partnership between WHO, the European Mosquito Control Association (EMCA) and the European Centre for Disease Prevention and Control (ECDC), with involvement of the VBORNET network of medical entomologists and public health experts, has been set up to increase awareness and understanding about this growing threat and to assist countries in early detection and timely response.

This document provides an update on the Regional situation of invasive mosquito vectors with a focus on *Aedes* mosquito species and the related dengue and chikungunya fever. It sets out the Regional Framework for action, which has been prepared to respond to the health threats posed by the spread of invasive *Aedes* mosquito species (*Aedes albopictus* and *Aedes aegypti*) and re-emerging vector-borne diseases, with a particular focus on dengue and chikungunya fever.

The Regional Framework aims to assist Member States in their activities at national level to detect and respond promptly to the spread of invasive *Aedes* mosquito species, as well as related diseases: dengue and chikungunya fever. It also aims to create a Regional platform for facilitating and coordinating activities, including cross-border actions.

A draft resolution is presented, for consideration by the Regional Committee.

Introduction

1. Although in the WHO European Region the number of diseases transmitted by insect vectors is much lower than in tropical, developing countries, a substantial number of these infections remain in or are being brought to the Region. The incidence of many of these diseases has also risen hand in hand with increasing globalization of travel and trade, continuous urbanization and climate change, which have been conducive to the spread of invasive mosquitoes, especially *Aedes* species, in the Region.

2. Dengue is a mosquito-borne infection of growing international public health importance, found in tropical and subtropical regions alike, predominantly in urban and semi-urban areas. 3.6 billion people living in more than 125 endemic countries and territories are at risk of dengue. Between 70 million and 500 million cases of dengue, with 21 000 deaths, are reported annually. Severe dengue (dengue haemorrhagic fever, dengue shock syndrome), a potentially lethal complication, affects most Asian and Latin American countries and has become a leading cause of hospitalization and death among children in these regions. At one time, dengue fever was endemic in the countries of southern Europe when the vector *Aedes aegypti* was present. In 1927–1928, a large dengue epidemic caused significant morbidity and mortality in Athens, Greece. The vector and disease subsequently disappeared from Europe.

3. The threat of dengue fever in Europe has increased in recent years. The recent locally-transmitted dengue cases reported in Croatia and France in 2010 and in the Autonomous Region of Madeira, Portugal, in 2012–2013 have shown that dengue transmission is possible in different areas of the WHO European Region where *Aedes albopictus* or *Aedes aegypti* are present. The outbreak in Madeira has led to reports of the spread of cases into 14 other European countries. Although the cost of the response and its burden on the health system in Madeira, as well as the implications of increased surveillance in all other countries where imported cases were detected, are unknown, they are thought to be substantial.

4. The outbreak of chikungunya fever in Italy in 2007 and sporadic cases in France in 2010 have proven that Europe remains vulnerable to the transmission of other “tropical” arboviruses and confirmed that indigenous transmission of such diseases can be established. The occasional occurrence of imported cases of yellow fever, such as in Belgium in 2001, further underlines the risk posed by invasive mosquito vectors. Yellow fever, also effectively transmitted by *Aedes* mosquito species, has been increasingly active in endemic areas (sub-Saharan Africa, South America) over the past decade. A recent outbreak of yellow fever in the Darfur region of Sudan affected over 700 people, and more than 165 deaths were recorded (2012). In this context it is important to recall the historical outbreaks of yellow fever that occurred in southern Europe in the nineteenth century, such as the Barcelona outbreak in 1821.

5. Climate change, particularly temperature increases and repeated flooding, as well as large-scale urbanization, may contribute further to the spread and sustainable establishment of mosquitoes, including *Aedes*, *Culex* and *Anopheles* species as well as other insect vectors such as *Phlebotomus* species (sand flies) responsible for the re-emergence of foci of leishmaniasis in the southern part of the Region. This occurs in geographic areas newly suitable for insect breeding and their complete life cycle. Entomological surveillance, which remains insufficient in most parts of the WHO European Region, currently does not allow for a proper picture of the distribution of the populations of insect vectors and consequently it does not allow for an accurate assessment of the risk posed by invasive mosquito species in all countries of the Region.

Framework for action

6. The Regional Framework addresses the threat posed by the spread of insect vectors in the Region with a focus on *Aedes* mosquito species. It is intended to support Member States in their activities at national level to detect and promptly respond to the spread of invasive *Aedes* mosquito species (*Aedes albopictus* and *Aedes aegypti*) and re-emerging diseases, particularly dengue and chikungunya fever. It also aims to create a Regional platform for facilitating and coordinating activities, including cross-border actions.

7. The Regional Framework is aimed at policy- and decision-makers, programme managers, research institutes, national and international partners, and other stakeholders who could be involved in the prevention, surveillance and control of invasive mosquito species and relevant mosquito-borne diseases. The Framework is expected to be used as a guide for developing or updating national action plans, especially in countries most at risk.

8. In order to achieve the objectives on prevention, surveillance and control of *Aedes* mosquito populations and re-emerging dengue and chikungunya fever, the Framework focuses on raising awareness at all levels for intersectoral action to prevent the introduction and ensure the early detection and prevention of local transmission of these diseases. Where invasive *Aedes* mosquitoes have become established and can no longer be eliminated, the emphasis is on ensuring integrated surveillance, preventing disease outbreaks and reducing mosquito populations.

9. Since mosquito spread and re-emergence of vector-borne diseases are a cross-border problem, a mechanism for Regional and bilateral coordination is crucial for harmonizing methods and procedures, as well as for preventing the further spread of this health threat. Entomological and surveillance capacity, including adequate human resources, particularly entomologists, must be strengthened and adequate resources allocated at country and Regional levels in order to ensure proper control of invasive mosquitoes and re-emerging vector-borne diseases. Applied research is also required to better recognize and treat the diseases, as well as to understand the behaviour of introduced mosquitoes and improve methods for their control. The objectives, as identified in the Regional Framework, are to:

- prevent the introduction and establishment of invasive mosquitoes in the Region;
- prevent and control outbreaks of dengue and chikungunya fever and reduce the risk of transmission in areas where invasive mosquitoes have become established;
- improve entomological surveillance and monitoring of invasive species of mosquitoes;
- improve integrated surveillance and control of dengue and chikungunya viruses; and
- improve disease management and thus reduce morbidity and mortality due to dengue and chikungunya.

Raising awareness for action

10. Concerns over invasive mosquitoes and their role in local transmission and outbreaks of dengue and chikungunya have prompted WHO, European Centre for Disease Prevention and Control (ECDC), European Mosquito Control Association (EMCA) and the European Commission (EC) to work together to raise awareness and advise countries on surveillance and control activities. This partnership has also engaged VBORNET, a network of entomologists and public health experts established and financed by the ECDC. VBORNET's main tasks are to produce and distribute maps of the major arthropod disease vectors (all insect and arachnid vectors, such as ticks), conduct related surveillance activities and define priority strategic topics on the public health perspective of vector-borne diseases and vector surveillance.

11. The call for greater advocacy for prevention, surveillance and control of invasive mosquito vectors and re-emerging vector-borne diseases, especially dengue and chikungunya, is timely and pertinent, given the public health concerns in some Member States and the inherently cross-border nature of the problem. Governments, institutions and the general public should become more aware of invasive mosquitoes and the diseases they transmit so that intersectoral actions can be taken and resources for surveillance, control, communication, and research purposes can be adapted to this re-emerging threat. Government and public health authorities should comply with the existing policy agenda on vector-borne human diseases, in particular the WHO Global Strategy for dengue prevention and control, 2012–2020.¹

12. Political commitment to tackle invasive mosquitoes and re-emerging vector-borne diseases must be advocated at country and Regional levels. Advocacy should be based on up-to-date surveillance data, risk analysis and the latest information on the effectiveness of control measures and should take into consideration the registration of biocides authorized for professional use in mosquito control. To facilitate the implementation of surveillance and control, countries should explore options for incorporating surveillance and control into existing preparedness plans for cross-border health threats.

Integrated surveillance

13. National surveillance systems must be strengthened in order to ensure that cases are detected early, epidemic alerts are issued in a timely manner, vector populations are monitored and risks are assessed. Epidemiological surveillance of vector-borne diseases, as well as entomological surveillance, should be part of the national health information system. Standardization is required to enable consistent Regional surveillance and data aggregation.

14. Entomological parameters (for example, mosquito biting behaviour), human factors and environmental conditions can assist in identifying high risk situations and triggers for action.

Preventing the introduction of Aedes mosquito species

15. Identifying the sources of invasive *Aedes* mosquito species, such as the international trade in used tyres and “Lucky bamboo”, would allow for the prevention of accidental introductions. Mosquito detection at points of entry and high-risk sites, actions for prompt elimination of foci of colonization and potential breeding sites and prevention of the spread of established populations are among the key actions.

16. Intersectoral collaboration is required, particularly with the environment sector, and could also include trade or import restrictions on high-risk goods and the preventive use of biocides (for example, fumigation of suspect shipments). Also, the conditions under which goods are shipped could be modified to reduce the presence or survival of different mosquito stages. When importing high-risk goods, further preventive measures, such as dry storage, could prevent introduced eggs or larvae from developing into adult mosquitoes. The strict implementation of the International Health Regulations (IHR) (2005), particularly with regard to

¹ *Global Strategy for dengue prevention and control, 2012–2020*. Geneva, World Health Organization, 2012 (<http://www.who.int/denguecontrol/9789241504034/en/>, accessed 2 July 2013).

conveyance and conveyance operators at points of entry, will also effectively contribute to preventing introductions.

Preventing disease transmission

17. Countries in which *Aedes albopictus* or *Aedes aegypti* have been established must have national preparedness plans to respond to early signs of outbreaks. Such plans – covering hospitalization, emergency vector control, advocacy, community mobilization, logistics and monitoring and evaluation – should be intersectoral and often require close collaboration with municipal authorities and community involvement, including nongovernmental organizations. On request, WHO, together with its collaborating centres and partners, such as ECDC, will provide technical support to countries for national outbreak preparedness and response.

18. A large number of WHO resources for prevention, control and outbreak response, particularly in the areas of diagnosis and clinical management of dengue and dengue hemorrhagic fever, are available. WHO will also be able to assist countries in need through its alert and response operations programme both at the Regional Office for Europe and WHO headquarters, and when necessary, by mobilizing its partners through the Global Outbreak Alert and Response Network (GOARN).

Capacity building at national and Regional levels

19. The efficiency and effectiveness of activities for surveillance and control depend on reliable and timely services for mosquito identification, pathogen diagnostic tests and outbreak investigation. For example, the identification of mosquito specimens using morphological and molecular techniques is critical for differentiating between indigenous and introduced species and for determining the origin of strains of introduced species. Although Regional networks for pathogen investigations (such as the European Network for Diagnostics of "Imported" Viral Diseases - ENIVD) exist, they are still lacking for mosquito vectors.

20. Key actions to be taken include developing the required human capacity, particularly entomologists and laboratory specialists, and mobilizing resources for prevention, surveillance and control of vectors and diseases alike, as well as establishing a network of reference centres to provide required technical knowledge assistance to countries.

21. Laboratories selected as national reference centres should function well and share their expertise in Regional networks in order to make it available to all countries in the Region. Regional organizations, such as WHO and ECDC, will play an important role in providing support to reference centres and establishing or strengthening regional networks.

Basic and applied research

22. In order to achieve the objectives of the Regional Framework, it is essential that national and regional institutes conduct studies on basic aspects of vector ecology and disease occurrence, as well as on methods for early detection and control of invasive mosquito species and re-emerging vector-borne diseases.

Regional and bilateral coordination

23. Invasive mosquito species and re-emerging vector-borne diseases are a cross-boundary problem. Therefore, cross-border coordination between countries and within the Region is necessary to prevent the spread of vectors and diseases. It is therefore recommended that

countries and institutions across the Region adopt, as far as possible, standard methods of surveillance, risk assessment, vector control, case detection and outbreak response. The harmonization of methods for epidemiological and entomological surveillance will facilitate data exchange and data management. Regional organizations, particularly WHO, ECDC and EMCA, play an important role in providing countries with technical assistance on standards and methods of surveillance and control of invasive mosquito vectors and related re-emerging diseases. For instance, the registration of selected biocide products with appropriate formulations for mosquito control should be coordinated and harmonized across the Region.

The role of WHO

24. The WHO Regional Office for Europe, together with WHO headquarters, relevant regional offices, WHO collaborating centres and European partners, will support Member States in developing their national action plans for the control of *Aedes albopictus* and *Aedes aegypti* and the prevention of and preparedness for outbreaks of dengue and chikungunya fever. WHO will establish a Regional platform for facilitation and coordination of activities, including analysis of surveillance data, cross-border interventions and exchange of information, knowledge and experiences among Member States.