

58th DIRECTING COUNCIL

72nd SESSION OF THE REGIONAL COMMITTEE OF WHO FOR THE AMERICAS

Virtual Session, 28-29 September 2020

CD58/INF/11
12 August 2020
Original: Spanish

STRATEGY FOR ARBOVIRAL DISEASE PREVENTION AND CONTROL: FINAL REPORT

Background

1. Arboviral diseases are a global public health threat (1-4). In the Region of the Americas, dengue is the most common and widely circulating arboviral disease, with case numbers increasing since its reintroduction in 1980 (5-7). After a decline in reported cases in 2017 and 2018, the virus circulated widely in 2019, reaching 3.1 million reported cases, the highest number in the history of this disease in the Americas. Notwithstanding, case-fatality from dengue has held steady at 0.049%, below the regional target of 0.05% (5). This epidemiological situation has become more complicated with the emergence of new arboviral diseases such as chikungunya in 2013 and Zika fever in 2015 (8-12). Since the arrival of chikungunya in the Region, more than 2.7 million cases have been reported to the Pan American Health Organization (PAHO), 177,469 of them in 2019. As for Zika fever, 853,463 cases have been reported since its introduction in the Hemisphere, with circulation continuing in 2019 with 33,896 reported cases.

2. The Strategy for Arboviral Disease Prevention and Control was developed for a comprehensive response to arboviral diseases in the Region and was approved by the Member States of PAHO in 2016 (Resolution CD55.R6) (13). This strategy, based on the already approved Integrated Management Strategy for Dengue Prevention and Control (Document CD43/12) (14, 15), consists of four strategic lines of action: 1) foster an integrated approach for arboviral disease prevention and control; 2) strengthen health services capacity for the differential diagnosis and clinical management of arboviral diseases; 3) evaluate and strengthen country capacity for surveillance and integrated vector control; and 4) establish and strengthen the technical capacity of the Arbovirus Diagnosis Laboratory Network in the Region of the Americas (RELDA) (16).

3. The purpose of this document is to report to the Governing Bodies of PAHO on progress and challenges in the implementation of this strategy in terms of each of its strategic lines.

Analysis of Progress Achieved

Strategic Line of Action 1: Foster an integrated approach for arboviral disease prevention and control

4. The Strategy for Arboviral Disease Prevention and Control has been implemented regionally and tailored to the needs and situation of each country. This strategy has ensured an integrated approach to these diseases when one or more arboviruses are circulating and to the risk of the introduction of new arboviruses.
5. In order to implement this strategy, the Pan American Sanitary Bureau (the Bureau) and the countries drew up the technical document for the integrated management strategy for arboviral disease prevention and control (IMS-Arbovirus), aligning it with Sustainable Development Goals (SDGs) (17). IMS-Arbovirus integrates six components in a multidisciplinary manner: management, epidemiology, patient care, laboratory, integrated vector management, and the environment, with social communication and operations research common to all. Moreover, the document clearly states the expected outcomes and indicators for each component, facilitating monitoring of the implementation process at the national level (18, 19).
6. As part of the strategy's implementation, the ministries of health in the countries have taken steps (at different levels and in different operational functions) to improve coordination in addressing these diseases. Brazil, for example, created the General Coordination Office for Arboviral Disease Surveillance, which carries out timely prevention and control activities. Bolivia, Colombia, Ecuador, Paraguay, and Peru, among other countries, have adopted ministerial resolutions to support their national strategies.
7. The countries, with Bureau support, have also launched external evaluation processes, guided by a standardized regional instrument that incorporates the Region's experience with the Integrated Management Strategy for Dengue Prevention and Control (IMS-Dengue) (20). After the Zika fever epidemic, for example, Grenada evaluated the effectiveness of planning, coordination, and management in its intersectoral response, with a view to improving national response capacity for prevention and control.
8. The countries are also promoting the strategic participation of key sectors and entering into interinstitutional partnerships. Ecuador has created a national IMS-Arbovirus Committee, and Paraguay has activated an interministerial commission chaired by the Minister of Health. Barbados, Martinique, and Puerto Rico have partnered with academia. El Salvador's Ministry of Health coordinates arboviral disease response measures through the National Civil Defense System, with the participation of public and private institutions.
9. The Bureau has formed an internal coordination and planning group to ensure sound and expeditious technical cooperation that enables countries and territories to mount an adequate response to dengue outbreaks and epidemics. This group, under the direction of the Assistant Director of PASB, is comprised of technical staff from the Departments of Health Emergencies (PHE) and Communicable Diseases and Environmental Determinants

of Health (CDE), as well as other technical units of the Bureau. In addition, an international technical group of PAHO arbovirus experts, known as the international GT-Arbovirus, provides continuing support for the response to outbreaks and epidemics in the countries and territories of the Region.

10. The Bureau has worked in concert with the Member States to introduce comprehensive multisectoral approaches to strengthen the surveillance and integrated vector control strategy, explicitly including the environmental dimension in the strategy, since interventions to improve safe water supply and storage, sanitation, hygiene, urban health, and comprehensive solid waste management are fundamental to reducing the breeding sites of the main vectors of arboviral diseases. Thus, a proposal was prepared jointly with Barbados, Costa Rica, Chile, the Dominican Republic, Ecuador, Guatemala, Jamaica, Mexico, Panama, Paraguay, and Peru for a regional roadmap and technical material for surveillance and integrated vector control with strategic lines of action for intersectoral and interprogrammatic work at the national and local levels (21, 22).

11. The highest number of dengue cases in the history of the Region of the Americas was in 2019 (5), generating an intense demand for technical cooperation. Chikungunya continues to cause a high burden of disease in the Region. The neurological sequelae of Zika virus infections were serious and unexpected enough to prompt the fourth declaration of a public health emergency of international concern. Paradoxically, however, donor interest in supporting activities to strengthen arboviral disease detection and response is waning and resources are scarce.

12. With regard to epidemiological surveillance, regional information systems have been strengthened through PAHO's Health Information Platform for the Americas (PLISA) (23). PLISA is not only a platform for accessing information but an online resource available to countries and territories in the Americas for the analysis of their real-time epidemiological data to improve prevention and control activities. Since 2019, the Executive Secretariat of the Council of Ministers of Health of Central America and the Dominican Republic (SE-COMISCA) has used PLISA to monitor the dengue epidemic. Work is also under way on the preparation of guidelines for integrated epidemiological surveillance of dengue, chikungunya, and Zika fever.

13. All the countries and territories share epidemiological information on PLISA. Brazil, Bolivia, Colombia, Costa Rica, Ecuador, Mexico, Nicaragua, Panama, Paraguay, Suriname, and Venezuela include subnational information, some of it disaggregated by age and sex (23).

Strategic Line of Action 2: Strengthen health services capacity for the differential diagnosis and clinical management of arboviral diseases

14. PAHO's second edition of clinical guidelines for dengue and the tool for the diagnosis and care of patients with suspected arboviral diseases were produced and published (24, 25). These publications provide valuable and necessary information on the definition of dengue, chikungunya, and Zika fever cases for differential diagnosis and

clinical management. They were distributed in the Region and are available free of charge in digital versions. Ten countries requested and received technical support from the Bureau for the review and adjustment of their national clinical guidelines for dengue, chikungunya, and Zika fever. Currently, work on the guidelines has expanded to the preparation of the first edition of the clinical guidelines for the care of patients with arboviral diseases in the Region of the Americas. Publication is expected in the second semester of 2020.

15. The preparation of clinical guidelines was accompanied by regional and national training and capacity-building for physicians and paramedical personnel at the different levels of care. Primary care was prioritized and the objective was to reduce the dengue case-fatality rate. Four subregional in-person workshops were held with participants from 39 countries and territories. This training has been replicated at the national level, often supported by international trainers, and has included both communication strategies to educate patients and their families in early recognition of the clinical signs requiring medical care and the transmission of key messages for the elimination of mosquito breeding sites in the home and surrounding area.

16. The countries of the Region generally have installed capacity for the proper management of arbovirus infections. However, monitoring activities and evaluations have revealed persistent challenges in the organization of services and the clinical management of patients with suspected arboviral disease.

17. Reorganization of the health services has been a pillar of the Bureau's technical cooperation in the Region, particularly in response to outbreaks and epidemics of Zika fever, chikungunya, and dengue, with a view to ensuring proper management of serious cases and preventing deaths from these diseases.

18. The Member States' efforts on this strategic line have reduced the regional dengue case-fatality rate by 12.5%: the ratio of deaths from dengue to the total number of dengue patients has fallen from 0.056% in 2015 to 0.049% in 2019 (5).

Strategic Line of Action 3: Evaluate and strengthen country capacity for surveillance and integrated vector control

19. In coordination with the Member States, entomological capacity in the Region has been strengthened, along with the ability to analyze, evaluate, investigate, and adequately disseminate information that complements data from the current epidemiological, clinical, and laboratory surveillance systems.

20. With the collaboration of experts, countries, and academia, a new operational model was developed for the control of *Aedes* spp., based on risk stratification, application of the integrated vector management strategy as a tool for control, and more effective community participation in the control of domestic breeding sites, thus increasing protection of the most vulnerable groups (26).

21. A regional network was created to monitor insecticide resistance, together with plans for such monitoring in Brazil, Bolivia, Costa Rica, the Dominican Republic, Ecuador, Guatemala, Guyana, Haiti, Honduras, Mexico, Nicaragua, Paraguay, Peru, and Venezuela. Planning is under way to begin expanding this monitoring to other countries in 2020.

22. To strengthen entomological virology surveillance, the Entomological Virology Laboratory Network of the Americas (RELEVA) was created. Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Ecuador, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, and Uruguay received training and have the technical capacity to detect the presence of virus in mosquitoes.

23. Technical guidelines and materials on vector surveillance and control were produced and published to standardize procedures in this activity in the Region (26-30).

24. A technical guide for the assessment of new technologies in *Aedes* spp. control was produced and an independent external evaluation group created (26). Projects related to the use of new technologies are under way in Brazil, Colombia, and Mexico (and evaluations have already been conducted in Brazil and Colombia).

25. A priority of the regional entomology and public health program was communication and community mobilization for self-care, especially in the case of pregnant women. Two subregional risk communication workshops were held for vector control program managers. Mosquito Awareness Week was first launched in 2016 as a community, family, and intersectoral social mobilization initiative for the control of disease vectors, with a focus on *Aedes aegypti*. In 2019, 27 countries were participating in this initiative (31).

26. The Plan of Action on Entomology and Vector Control 2018-2023 (Document CD56/11) was prepared. Aligned with the Sustainable Health Agenda for the Americas 2018-2030 (34) and the Sustainable Development Goals (SDGs) of the United Nations, it was approved by the 56th Directing Council of PAHO in 2018 (32, 33), guaranteeing continuity in the development of vector control programs in the Region.

27. The structuring of national vector control programs was supported by the mobilization of financial resources (US\$ 1.5 million), making it possible to perform updates, train public health personnel, procure laboratory supplies, and contribute to outbreak response. The recipients of these resources were Antigua and Barbuda, Barbados, Colombia, Dominica, Ecuador, Grenada, Guatemala, Haiti, Honduras, Paraguay, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago.

Strategic Line of Action 4: Establish and strengthen the technical capacity of the Arbovirus Diagnosis Laboratory Network in the Region of the Americas (RELDA)

28. Created by PAHO in 2008 to strengthen scientific and technical capacity and develop standardized protocols for dengue diagnosis in the Region, RELDA was expanded to include chikungunya and Zika fever and today is made up of 32 laboratories in 26 countries of the Region (35, 36). RELDA also receives technical support from three WHO collaborating centers for Arboviruses (CDC Fort Collins, United States of America; National Institute for Human Viral Diseases [INEVH], Argentina; Institute for Epidemiological Diagnosis and Reference [InDRE], Mexico) and one for dengue (Pedro Kouri Institute, Cuba). The Collaborating Centers have been essential for technical cooperation in the network. They are key actors in the organization of training courses and workshops, the development and validation of diagnostic methods, and the preparation and the distribution of materials and reagents not commercially available. Moreover, they have an important role in support and technical assistance to PAHO in the preparation and review of guidelines and diagnostic protocols.

29. RELDA has provided technical cooperation to the Region and guaranteed technology transfer to strengthen laboratory diagnosis of arboviral diseases and improve quality management, biosafety, and biosecurity systems. This is accomplished through subregional training and capacity-building workshops and on-site technical missions in countries and territories.

30. The distribution of critical diagnostic reagents was guaranteed. Without supplanting the Member States' financial commitment to monitoring, this enabled timely response to emergencies, harmonization of the protocols employed at the regional level, and access to reagents that are not commercially available.

31. Molecular diagnostic platforms—essential for arbovirus detection and characterization in the Region's current epidemiological context—have been created and strengthened through the procurement, installation, and repair of critical equipment for molecular detection and diagnosis (three countries with new platforms and four countries with strengthened platforms between 2016 and 2019).

32. Laboratory participation in external quality assessments has been promoted. Between 2016 and 2018, the number of RELDA laboratories increased by 57%, and the proportion of laboratories with outstanding results (above 90% concordance), by 15 percentage points.

33. RELDA is essential in the development of algorithms and technical recommendations for arbovirus detection and in the preparation of PAHO's regional guidelines (24, 25, 37-40).

Lessons learned and Best Practices

34. Implementation of the Strategy for Arboviral Disease Prevention and Control has given the countries and territories a sound methodological tool to address these diseases. Prevention and control in this area is not the exclusive responsibility of the health sector but must involve other government sectors, ministries, academia, the private sector, communities, and families, thereby guaranteeing an integrated response to the socioenvironmental determinants involved in transmission. Another lesson learned has been to take an integrated approach to training on the clinical diagnosis and management of dengue, chikungunya, and Zika fever cases, with the inclusion of social communication to encourage patients and their families to eliminate domestic breeding sites. With respect to vector control, the strategic entomological surveillance and *Aedes* control activities are being strengthened and optimized through integrated efforts among the entomology, arbovirus, emergency, and environmental health programs. Finally, the Health Information Platform for the Americas (PLISA) offers countries and territories not only a platform for accessing epidemiological information but an online tool for systematic analysis of their epidemiological data, both of which are necessary for planning prevention and control activities.

Measures Needed to Improve the Situation

35. The areas requiring continued efforts to improve the situation are presented below:
- a) Continue to consolidate the Strategy for Arboviral Disease Prevention and Control as the model tool and methodological guide for countries and territories to address these diseases.
 - b) Guarantee political support and financial and human resources for sustainable implementation of the Strategy for Arboviral Disease Prevention and Control.
 - c) Prioritize monitoring and evaluation of the strategy's implementation at the national and subnational level as part of the sustainability and evolution of this initiative.
 - d) Continue to promote and encourage the development and implementation of public policies that tackle the social and environmental determinants of arboviral disease transmission in order to minimize the risk of infection by these diseases.
 - e) Strengthen the capacity and improve the quality of medical care, focusing on preparedness in the services and on clinical case management in primary care to prevent progression to severe illness and death from dengue and other arboviral diseases.
 - f) Strengthen the Arbovirus Diagnosis Laboratory Network in the Region of the Americas (RELDA) and the PAHO/WHO collaborating centers in their work with the laboratories of the Region, especially in the areas of external quality assessment and the sustainability of laboratory surveillance, considering the multiplicity of pathogens that should be monitored, the complexity of the necessary techniques, and the potential emergence of other arboviruses.

- g) Forge partnerships with academic and training institutions to develop and expand course offerings in entomological surveillance and vector control in the Region.

Action by the Directing Council

36. Considering the extraordinary and unprecedented circumstances presented by the COVID-19 pandemic, and in accordance with Resolution CE166.R7, this report will be published for information purposes only, and will not be discussed by the Directing Council.

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