

A faint, light blue map of the Americas is visible in the background, showing the outlines of North and South America. The map is centered on the continent and serves as a backdrop for the text.

Addressing the environmental
determinants of health in vector
surveillance and control strategies:
promoting key interventions

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ISBN: 978-92-75-12130-6

eISBN: 978-92-75-12131-3

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Suggested citation. Pan American Health Organization. *Addressing the environmental determinants of health in vector surveillance and control strategies: promoting key interventions*. Washington, D.C.: PAHO; 2019.

Cataloguing-in-Publication (CIP) data. CIP data are available at <http://iris.paho.org>.

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Acknowledgements

This publication was prepared using input received from the countries that attended the regional workshop *Addressing the Environmental Determinants of Health in Vector Prevention and Control Strategies*, which took place in Panama City on August 1-2, 2019. The results of the situation analysis on this subject in six countries of the Region of the Americas were also used.

Special recognition goes to professionals in the environmental health and vector management departments of the Ministries of Health of Barbados, Chile, Costa Rica, the Dominican Republic, Ecuador, Guatemala, Jamaica, Mexico, Panama, Paraguay, and Peru, as well as the PAHO/WHO focal points in those countries, who participated in this process.

This publication is part of an interprogrammatic initiative between the Climate Change and Environmental Determinants of Health (CE) unit and the Neglected, Tropical, and Vector-borne Diseases (VT) unit of PAHO's Department of Communicable Diseases and Environmental Determinants of Health (CDE). We are grateful to Haroldo Bezerra (CDE/VT), Élide Vaught (CDE/CE), and Henry Hernández (CDE/CE) for the joint coordination of this initiative.

This publication was produced with financial support from the United States Agency for International Development (USAID), under Agreement No. AID LAC IO 16-00002. The opinions expressed by the authors do not necessarily reflect the views of USAID or the government of the United States of America.

Graphic Design: Carlos Acosta

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Introduction

Climate change and other environmental changes are among the main factors that have led to the emergence or reemergence of vector-borne diseases. These factors may increase the geographical distribution of these diseases and extend the transmission season, which influences the morbidity and mortality they cause.

Infectious diseases have a significant impact on public health in the Region of the Americas. For example, in 2017 a total of 483,208 cases of dengue causing 253 deaths were reported to the Pan American Health Organization (PAHO). That same year, more than 180,000 cases of chikungunya were also reported, and there were 583,451 suspected and 223,477 confirmed cases of Zika between 1 January 2015 and 4 January 2018, with 20 confirmed deaths and 3,720 confirmed cases of congenital Zika syndrome.

Given this impact, a number of integrated multisectoral approaches must be incorporated into vector surveillance and control strategies. These approaches should include initiatives that promote healthy environments, such as better and safer management of solid waste, water, and sewage to ensure the continuity and quality of service, and the proper management of chemical residues from vector control activities.

This publication offers key interventions to promote vector surveillance and control activities that emphasize environmental health, using interprogrammatic and intersectoral approaches.

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PAHO and vector surveillance and control strategies

The PAHO Plan of Action on Entomology and Vector Control 2018-2023 is aimed at strengthening regional and national capacity for the surveillance and control of key vectors, and reducing the transmission of vector-borne diseases.

The Plan of Action consists of proven, innovative strategies focused on the use of integrated vector management (IVM), enhanced monitoring, the evaluation of insecticide resistance and its management, and training and capacity-building to improve entomological practice.

The integrated vector management approach considers the environmental variable, since interventions for the supply and safe storage of water and for sanitation, hygiene, urban health, and the comprehensive management of solid waste are all essential for reducing breeding sites and preventing arboviral diseases.

In this regard, PAHO is helping to identify and promote key environmental health actions that should be incorporated into surveillance and control strategies, fully convinced that the environment is a solid platform for achieving good public health. For this reason, the Organization advocates for the implementation of immediate measures aimed at reducing the burden of disease attributable to the environmental determinants of health.

Strategic lines of action:

- 1 Allocate resources for integrated vector surveillance and control strategies and environmental health interventions.
- 2 Integrate the environmental determinants of health into vector surveillance and control strategies.
- 3 Promote an intersectoral approach to vector surveillance and control.
- 4 Promote safe management of water, sanitation, and hygiene services as protective factors for health.
- 5 Strengthen health programs as part of healthy environment initiatives.
- 6 Build the capacities of health personnel and workers in other sectors to implement integrated vector surveillance and control actions.
- 7 Consider vector control actions in disaster or emergency health situations when planning activities.
- 8 Document the lessons learned and good practices related to addressing environmental determinants and vector control.

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Targeting resources for integrated vector surveillance and control strategies and environmental health interventions

When allocating resources, it is important to have conducted a diagnostic assessment and formulated a strategic plan that identifies specific actions to strengthen epidemiological, entomological, and environmental health surveillance, and to build capacities and develop acceptable and safe environmental interventions that consider the strategic and practical integrated vector management model.

To optimize the use of resources, the different sectors should be coordinated through work groups that can target and prioritize resources and additional capacities in other sectors (health, environment, housing, water and sanitation, agriculture, tourism, etc.). This will help to implement effective interventions for the supply and safe storage of water, sanitation, hygiene, solid waste, urban health, and healthy environments.

It is necessary to have information systems on the epidemiological and entomological aspects of the vector in order to focus the use of resources. Also, the surveillance of environmental indicators must be integrated through regular, timely reports used to monitor progress, inform decision-making on program development, and efficiently target the resources allocated at the subnational and national level.

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Key actions:

- 🦟 Formulate a national and subnational strategic plan that defines the allocation of human, financial, and technological resources to integrated vector surveillance and control strategies.
- 🦟 Allocate resources through intersectoral work groups, prioritizing the areas that are the most highly vulnerable to vector infestation due to inadequate environmental health conditions.
- 🦟 Establish or enhance epidemiological, entomological, and environmental health surveillance systems in order to optimize the resources earmarked for vector surveillance and control and for environmental health interventions.

- 🦟 Advocate for the inclusion of integrated vector management and environmental health interventions in the national agendas of other sectors in order to increase political will, enhance the sustainability of these interventions, and ensure the allocation of resources.



Photo: PAHO/WHO

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Link between the environmental determinants of health and integrated vector management



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The environmental determinants of health that affect the wellbeing of an individual or a community include the availability and quality of water, sanitation, solid waste management, hygiene, healthy environments, and urban planning. Consequently, if those are not favorable to human health, conditions are created that are conducive to the transmission of disease, including vector-borne diseases.

Climate change leads to environmental shifts and ecological disturbances that may entail changes in vector distribution and the transmission patterns of vector-borne diseases. Moreover, climate change may significantly exacerbate the impact of vector-borne diseases on health.

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Key actions:

-  Map vulnerable areas, identifying current conditions associated with environmental and vector risks. It is important to consider variables related to water and sanitation services, management and disposal of solid waste (e.g. used tires), health and hygiene conditions of households, public spaces, and commercial infrastructure, among others.
-  Include environmental health monitoring indicators in entomological and epidemiological surveillance systems in order to identify risks associated with health and environmental conditions in the epidemiological profile of vector-borne diseases.
-  Conduct a diagnostic assessment of the storage, management, and final disposal of chemical packaging and

spraying equipment used in vector control activities. This assessment will facilitate sound decision-making to reduce environmental impact and prioritize environmental health activities in risk reduction.

-  Design innovative strategies or enhance existing strategies based on integrated surveillance (entomological, epidemiological, and environmental) in order to promote interventions that have a greater impact on vector control and facilitate the targeting of resources.
-  Build knowledge in different sectors (health, environment, housing, water and sanitation, and agriculture and livestock, among others) on how the environmental determinants of health affect vector surveillance and control strategies.



Intersectoral approach to vector surveillance and control

The multidimensional nature of vector control problems is increasingly being recognized in different sectors. These problems are characterized by a complex array of sociocultural, political, biological, environmental, and health considerations that are in continuous interaction.

It is increasingly clear that actions need to be based on an intersectoral approach that should encompass different perspectives, competencies, and capacities, and should also be the primary consideration in the formulation and implementation of vector control policies, strategies, and surveillance activities.

The challenges addressed when implementing intersectoral actions include the need for a paradigm shift, identifying opportunities to facilitate inclusive concepts, promoting spaces for negotiation and agreement, and complementing strengths and weaknesses. This will help identify areas of common interest as a preliminary step before setting joint objectives leading to enhanced effectiveness, efficiency, and sustainability in interventions for more effective and sustainable vector control. A theoretical and practical example of the use of this approach is the Integrated Management Strategy for Arboviral Diseases (IMS-Arbovirus) promoted by PAHO to prevent and control these diseases. The basic premise of this strategy is intersectoral and interprogrammatic work on the different components, crosscutting themes, and facilitating factors.

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Key actions:

-  Advocate to ensure that decision-makers in the different sectors implement plans linking the environmental determinants of health to the implementation and strengthening of integrated vector management.
-  Promote the formation of a thematic working group on the environmental determinants of health in vector surveillance and control strategies, as part of the activities of intersectoral working groups.
-  Sensitize other sectors to the impact of arboviral diseases on public health and to the fact that environmental risk factors significantly contribute to these diseases, so that the importance of implementing integrated interventions is recognized.



A man wearing a straw hat, glasses, and a light blue tank top is pushing a large blue plastic water barrel on a wooden cart. He is in a narrow, sunlit alleyway with buildings in the background. The scene is bright and clear.

Availability and safe management of water, sanitation, and hygiene (WASH) services

The safe management of water, sanitation, and hygiene (WASH) services—which includes the coverage, access, availability, and quality of these services for the entire population—is essential for reducing the risk of transmission of a significant number of diseases and eliminating the breeding sites that lead to the presence of vectors.

Ensuring that communities do not have to store water can have a major impact on reducing breeding sites. Providing continuous service (24 hours a day, 7 days a week) has a positive effect on integrated vector control strategies. The availability of conventional or alternative options for the proper disposal of wastewater and the integrated management of solid wastes reduces the risk factors associated with the vector. And actions that promote hygiene are essential to ensure that health facilities are properly used and maintained.

Focusing on the environmental determinants of health—particularly interventions that promote the safe management of water, sanitation and hygiene—will improve hygiene and health conditions in the communities, and this will have a positive effect on public health.

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Key actions:

-  Create collaborative spaces for urban planning that ensures that the general public—and the most vulnerable populations in particular—have access to safely managed WASH services.
-  Advocate for intersectoral work groups to prioritize joint interventions that will improve the delivery of WASH services, especially in the most vulnerable areas, allocating the necessary financial and human resources.
-  Establish indicators for monitoring water, sanitation, and hygiene and make them part of the surveillance of vector-borne diseases, so that effective decisions are made at the local level.

-  Promote the development of water, sanitation, and hygiene investment projects, and the acquisition of data on the health impact of environmental interventions.



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Promoting healthy environments

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Healthy environments are conducive to health and protect people from threats to health by developing their capacity and autonomy in this area. Promotion of healthy environments includes the places where people live, the local community, homes, educational facilities, the workplace, and recreational areas, and involves providing access to health resources and opportunities for personal empowerment.

Initiatives for the creation of healthy environments provide an opportunity to maximize the outcomes and the sustainability of integrated vector management actions, contribute significantly to the reduction or elimination of vector-borne diseases, and create spaces for intersectoral coordination and social participation.

When addressing the social determinants of health in healthy environment initiatives, promotional activities play an essential role, as do environmental health actions, creating favorable conditions to promote factors that protect health. This is where vector control and prevention strategies can be easily integrated.

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Key actions:

-  Strengthen actions that help disseminate the benefits of the healthy environments strategy at the national and subnational level, with the participation and commitment of the different sectors involved in the country's human and social development.
-  Encourage community participation and social empowerment in the area of vector-borne disease prevention.
-  Strengthen local healthy environment programs that cover communities, households, commercial and health establishments, workplaces, public markets, and other public spaces, among others, and that stress environmental health and vector management interventions.

-  Facilitate processes aimed at ensuring that environmental and vector-related issues are included in the agendas of existing healthy environment networks, focusing on the formulation of measures such as municipal ordinances that regulate activities to prevent and control vectors and promote citizen participation.



Photo: PAHO/WHO

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Building human resource capacities

One of the fundamental components of vector surveillance and control is the labor force and the ability of workers to take an integrated approach to identifying the risk factors of vector-borne diseases in the community. This requires providing comprehensive training in vector surveillance and control and in environmental health, so that workers understand the importance of joint actions to achieve greater impact and optimize resources.

Ongoing capacity-building and training programs are needed for all public health professionals, including employees of municipal public services that work in public areas and health professionals in other sectors. This should be done in order to form a network of professionals that constitute a learning community.

In addition, communication programs using various types of media are key to the prevention of communicable diseases and the creation of environments conducive to health, since they lead to behavioral change and ultimately reduce morbidity and mortality from epidemic outbreaks of communicable diseases. It is essential to disseminate information in different types of media and distribute physical and digital informational materials to the general public and certain specific groups, such as educational institutions, in order to promote good practices in vector control. Furthermore, it is important to include places that sell tires in order to promote the proper management and final disposal of these items.

Key actions:

- 🦟 Identify professionals and operational staff in various functions, who should be trained to carry out activities in the framework of interventions on the determinants of health that are harmonized with vector prevention and control strategies.
- 🦟 Establish educational and training programs on how to address the environmental determinants of health in vector prevention and control strategies. The programs should be geared to public health workers and professionals in other sectors who work in a health-related area.
- 🦟 Promote the development of technical and educational materials that provide consolidated information on the

environment and vector prevention and control. These educational materials are intended for professional and operational personnel.

- 🦟 Create virtual materials such as online courses on the environment and vector management in order to extend the reach of the information.



Photo: PAHO/WHO

Vector control in disasters and health emergencies

In general, emergencies or disasters such as hurricanes, floods, earthquakes, and volcanic eruptions should not mean an increase in outbreaks and epidemics. However, these situations can change the environmental conditions in an area due to the destruction of water supply systems, the collapse of sanitation service, damage to homes, and restricted cleanup efforts, etc. Such conditions force the population to live in inadequate conditions. Without suitable shelters, prevention measures, well-formulated response plans, and health surveillance and control systems that can deal with these types of situations, the risks to public health may increase.

In this regard, it is critical to have an adequate prevention and response system to control vectors at the local, regional, and national levels. The community, healthcare personnel, civil servants, and civil society organizations must be involved in this system prior to the occurrence of disaster situations in order to control the spread of potential epidemic outbreaks.

These prevention or contingency systems should provide an adequate and timely response focused on risk factors and on developing local capacity to deal with a disaster or health emergency. There should also be an emphasis on designing instruments and tools that will help implement vector management measures and supervision mechanisms, for example, to prevent inappropriate or indiscriminate use of insecticides in such situations.

These measures should be aimed at building capacities to prevent, detect, monitor, and respond to a disease outbreak caused by a disaster or health emergency.

Response measures such as distributing water bottles to the community in the first few days could help create breeding sites if there is no proper waste management or if final disposal is not taken into account. For this reason, it is important that the response include appropriate actions that do not create new risks.



Photo: PAHO/WHO

Key actions:

-  Form multidisciplinary and intersectoral work teams that plan activities and make good decisions.
-  Establish contingency plans for vector control, as well as adverse event warning systems (for disasters or health emergencies).
-  Form technical committees within civil society organizations to take immediate action in the event of a health emergency. Include the implementation of health situation rooms where actions are assessed in light of the environmental determinants of health.
-  Define public communication strategies for vector surveillance and control measures before, during, and after an emergency or disaster.

-  Establish oversight mechanisms to ensure the correct and rational use of insecticides during emergencies or disasters.
-  Build local, regional, and national capacity to respond to communicable disease outbreaks caused by the proliferation of vectors.
-  Design technical tools to guide the implementation of vector prevention and control measures in the event of disasters or health emergencies.
-  Document or systematize integrated environmental health and vector management interventions in order to identify good practices and lessons learned during emergency response.



Lessons learned and good practices related to the integration of environmental health and vector management

Photo: PAHO/WHO

Lessons learned and good practices must be disseminated and shared to improve future interventions and make them sustainable. It is also essential to measure the effectiveness and efficiency of integrated environmental health interventions and vector prevention and control strategies.

When systematizing these experiences, it is important to consider issues such as sectoral and intersectoral coordination, operational interventions, civil sector participation, the communication strategies implemented, the resources mobilized, and the impact of the interventions.



Photo: PAHO/WHO

Key actions:

-  Ensure that the planning of integrated environmental health and vector management activities includes documenting the interventions and implementing the lessons learned and the good practices identified.
-  Compile and analyze information on the interventions that have achieved different levels of success in order to assess the different components of the actions carried out.
-  Create spaces where those in charge of the interventions can exchange information and experiences and where the different institutions can participate, with a view to identifying lessons learned and good practices.

-  Promote the creation of a physical or virtual informational product that shows how the interventions are systematized and that can be shared with others.



Photo: PAHO/WHO



Pan American
Health
Organization



525 Twenty-third Street, NW
Washington, D.C., 20037
United States of America
Tel.: +1 (202) 974-3000
www.paho.org

