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## INTEGRATED VECTOR CONTROL: A COMPREHENSIVE RESPONSE TO VECTOR-BORNE DISEASES

### Justification

1. Vector-borne diseases such as malaria, dengue, Chagas, leishmaniasis and filariasis continue to be a major public health problem in the Americas. These diseases disproportionately affect the health of the poor and marginalized populations, cause suffering and further economic hardship and are a serious impediment to development of many countries. For important diseases such as dengue and Chagas, vector control is the only means of protecting populations from infection. However, national capacities to implement vector control programs have been severely weakened[1]. National Vector control programs often lack specialists in vector control and as a result, routine entomological activities such as surveillance or monitoring and evaluation of control activities are not conducted.

### Background

2. The concept of Integrated Vector Management (IVM) is based on the lessons learned from Integrated Pest Management in the agriculture sector and aims to optimize and rationalize the use of resources and tools for vector control. IVM is defined as "A rational decision-making process for the optimal use of resources for vector control,"[2] it aims to improve effectiveness and efficiency of the national vector control programs, in order to provide countries with a sustainable, ecologically sound long-term approach to vector management which will reduce dependency on insecticides and protect the population from vector-borne diseases. Implementation of IVM requires institutional arrangements, regulatory frameworks, decision-making criteria and procedures that can

[1] Towson H. Nathan M. et al. Exploiting the potential of vector control for disease prevention. Bull. World Health Organization 2005; 83: 942-7.
[2] IVM Definition. (WHO position paper on IVM- HTM/NTD/VEM, January 2008).

be applied at the lowest administrative level. It also requires the decision-making skills to support intersectoral action and to establish sustainable vector control and health-based targets.

3. Vector-borne diseases continue to be an important public health problem in the Region with epidemics of increasing severity of dengue occurring[3] and old diseases such as Yellow Fever reoccurring for the first time in over 50 years in urban settings.[4] Vector populations of *Aedes aegypti* remain a threat and the introduction and spread of *Aedes albopictus* presents possible new opportunities for the transmission of dengue, Yellow Fever and Chikungunya. Epidemics of malaria have occurred in Jamaica (2006-2007) and the Bahamas (2006) that have had no transmission for decades.[5]

4. Climate changes and increased climate variability, especially flooding, presents an increased risk of mosquito-borne disease epidemics. Increasing average temperatures and greater variation in precipitation facilitate vector production and parasite transmission which could change the temporal and spatial distributions of vector-borne disease.[6] Increased population mobility and migration due to political or economic instability facilitate vector-borne disease transmission through the introduction of new diseases into areas where vector populations exist at uncontrolled levels. Strengthening existing control programs can make a critical contribution to protection against these risks. IVM provides an opportunity to address these changes effectively in an intersectoral context as part of a broader public health management plan.

5. Recognizing the need to increase support for vector control, improve national capacities to implement effective vector programs and reduce national reliance on pesticides to control vector-borne disease, the World Health Assembly (WHA) adopted resolutions to strengthen Member States' capacity to implement effective vector control measures (1989, WHA 42.31)[7] and to support the development and adaptation of viable alternative methods of disease vector control (1997, WHA 50.13).[8] In 2004, the Global Strategic Framework for integrated vector management was prepared (WHO/CDS/CPE/PVC/2004.10) and sets out new, broad principles and approaches to

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[3] 2007: Number of Reported Cases of Dengue & Dengue Hemorrhagic Fever (DHF), Region of the Americas (by country and subregion) http://www.paho.org/ english/ad/dpc/cd/dengue-cases-2007.htm.

[4] Boletín Epidemiológico Semanal Ministerio de Salud Publica y Bienestar Social-MSPBS Dirección General de Vigilancia de la Salud-DGVS Semana Epidemiológica Nº 7 10 al 16/02/08. http://www.mspbs.gov.py/boletines/2008/ BOLETIN%207.pdf.

[5] Malaria Surveillance Summary Report April 8-14, 2007, Ministry of Health Jamaica.
Malaria—Great Exuma, Bahamas, May-June 2006 MMWR September 22, 2006 /55(37);1013-1016.

[6] Dengue Transmission Dynamics: assessment and Implications for Control. Focks, DA and Barrera, R. Report of the Scientific Working Group on Dengue 2006 TDR/SWG/08 pp. 92-109.

[7] World Health Assembly WHA 42.31 1989.

[8] World Health Assembly WHA 50.13 1997.

vector control that are applicable to all vector-borne diseases.[9] At the WHO consultation on integrated vector management, a call was made to tap the preventive power of vector control, given the serious risks of increasing transmission of vector-borne diseases related to climate change, population movement and environmental degradation, and the major opportunities for financial support (WHO/CDS/NTD/VEM/2007.1).[10] As part of the global plan to combat neglected tropical diseases, 2008–2015, WHO has called for the strengthening of integrated vector management and capacity building as one of the strategic areas for action. (WHO/CDS/NTD/2007.3).[11]

**Analysis**

6. Vector-borne diseases result in ill health, death, and economic hardship for the affected communities, and are a serious impediment to economic development. Vector control has a proven track record of successfully reducing or interrupting disease transmission when coverage is sufficiently high. Thus, it has an important role to play in the reduction of vector-borne disease burdens, adding resilience to the public health gains achieved through disease management and giving high priority to prevention. However, vector control in its current form has also proven weaknesses especially in technical and managerial deficiencies and obstacles. An amalgamation of different types of vector control interventions is not simply a matter of adding them up. It requires careful consideration of synergies and obstacles to achieve vector control goals in specific settings. It also requires reconsideration of these combinations over time, as contexts change and needs evolve. Vector control is well suited for integrated approaches as some vectors are responsible for multiple diseases, and some interventions are effective against several vectors.

7. Although vector control has proven to be highly effective in preventing disease transmission, resources, trained personnel, and technical support for these programs have diminished in the past several decades, thereby increasing the risk of continued transmission and future epidemics. National vector control programs have often been reduced to area spraying applications in response to epidemics, with limited evaluation or monitoring to determine the effectiveness of the control measures. Such strategies are expensive and are often ineffective and environmentally unsound. Concerns over the environmental impact of over-reliance on chemical control methods continue to haunt policymakers. The World Health Assembly and the Stockholm Convention on Persistent

[9] Global Strategic Framework for Integrated Vector Management (WHO/CDS/CPE/PVC/2004.10).
[10] Report of the WHO consultation on integrated vector management (IVM). Geneva, 1-4 May 2007. (WHO/CDS/NTD/VEM/2007.1).
[11] Global plan to combat neglected tropical diseases, 2008–2015. Geneva, World Health Organization, 2007. WHO/CDS/NTD/2007.3.

Organic Pollutants (POPs) advocate a reduction of reliance on pesticides for vector control.[12]

8. The arsenal of insecticides is very limited, and few prospects for new candidate compounds are coming on the market. At the same time, there is a growing problem of insecticide resistance. The application of IVM principles to vector control will contribute to the judicious use of available insecticides and extend their useful life.

**IVM relevance to country and PAHO priorities**

9. IVM supports and strengthens the medical-entomological capacity to improve countries' response capabilities to vector-borne diseases. With limited financial resources in national health budgets, countries cannot afford to spend money ineffectively on insecticides and methodologies that are ineffective. Implementation of the IVM strategy will render control programs more cost-effective with the coordination and combination of activities involving disease control programs that serve a common population and optimal use of available resources.

10. In the Americas, the most significant vector-borne diseases include malaria, dengue and Chagas' disease. Malaria is a significant public health problem with an estimated 41 million persons living in areas of moderate to high-risk of infection in 21 PAHO Member States. Approximately a million cases have been reported annually since 1987. Dengue and Dengue Hemorrhagic Fever (DHF) affect 34 Member States and territories in the Region where over 900,000 clinical cases of Dengue, over 26,000 cases of DHF and 317 deaths were reported in 2007. Almost the entire population of Latin America and the Caribbean live in close proximity to the domesticated mosquito vector *Aedes aegypti* and as such are at risk for dengue transmission. Chagas' disease produces chronic complications in two to three million people throughout the Americas where an estimated 120 million persons are reported at risk. While Chagas' disease in Brazil and the Andean countries has been the focus of most control programs, the problem has largely been under reported in Mexico and Central America.[13]

[12] Reducing and Eliminating the use of Persistent Organic Pesticides Guidance on Alternative Strategies for Sustainable Pest and Vector Management, Johan Mörner, Robert Bos and Marjon Fredrix Inter-Organization Programme for the Sound Management of Chemicals (IOMC). 2002.

[13] Pan American Health Organization. Health in the Americas: Regional Volume. Washington DC: PAHO; 2007. [Online] [Consulted 2008 April 15]. Available at: http://www.paho.org/hia/vol1regionalingcap2.html.

11. The lack of effective medication for the treatment of Chagas' disease and the lack of vaccines for dengue and malaria make vector control a key component in the reduction of the burden of these and other vector-borne diseases.

12. IVM will allow countries to better respond to their specific needs and have results with long-term impact. It will employ new modalities of technical cooperation and support the capacity building of national institutions, promote horizontal cooperation between the ministries of health and national and international learning institutions, and share advances and best practices among countries. It will also provide a forum for the development of practical new ideas, methodologies and technologies for vector control.

**Proposal**

13. A regional and national situation analysis and needs assessment with national and international participants is needed to determine the optimal course of action, gain national approval and determine potential intersectorial partners and participants. IVM Guidelines prepared in other WHO regions are examples to be reviewed, adapted and used to assist IVM application in the Americas. To achieve economical and sustainable long term prevention of vector-borne diseases, collaboration within the health sector and with other public and private stakeholders needs to materialize along with community involvement. Partnership and collaboration between the National Vector Control Program and national and international universities are crucial to conduct operational research in order to achieve these objectives. A regional strategy will be presented to guide the implementation of integrated vector management in the Americas.

14. Among challenges to be addressed are:

(a) The need for countries to develop their capacity for the planning, implementation, monitoring, and evaluation of vector control interventions based on the IVM approach.

(b) The need to develop and strengthen multi-disease prevention and control approaches by addressing key surveillance issues, advocacy, social mobilization and the rational use of available resources.

(c) Commitment by Member States to mobilize internal and external financial resources which will permit implementation of Integrated Vector Management activities.

(d) The need for staffing, training, and other human resource management issues which complement program development.

(e) The need for strengthening and enforcement of legislative frameworks and regulatory mechanisms to promote of IVM among Member States.

(f) The need for the development and strengthening of alliances among various sectors to achieve a coordinated response to vector-borne diseases within the framework of Primary Health Care-based Health Systems.

(g) The need for inter and intra-country coordination in the prevention and control of vector-borne diseases.

**Action by the Executive Committee**

15. The Executive Committee is requested to note this document, provide orientation to the Secretariat, and foster consensus among Member States on the preparation of the Regional Strategy on Integrated Vector Management in the Americas to improve the effectiveness of the vector-borne disease control programs.

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