



# MESOAMERICAN MASTER PLANS

**TECHNICAL COOPERATION AGREEMENT  
BETWEEN THE MINISTRY OF FOREIGN AFFAIRS OF MEXICO  
AND THE PAN AMERICAN HEALTH ORGANIZATION**





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**Pan American  
Health  
Organization**



**World Health  
Organization**  
REGIONAL OFFICE FOR THE **Americas**

Washington, D.C., 2016

## PAHO HQ Library Cataloguing-in-Publication Data

\*\*\*\*\*

Pan American Health Organization

Mesoamerican Master Plans. Technical Cooperation Agreement between the Ministry of Foreign Affairs of Mexico and the Pan American Health Organization = Planes Maestros Mesoamericanos. Acuerdo de Cooperación Técnica entre la Secretaría de Relaciones Exteriores de México y la Organización Panamericana de la Salud. Washington, DC: PAHO; 2016.

1. Technical Cooperation. 2. International Cooperation. 3. Public Health Policies. 4. Universal Coverage. 5. Communicable Diseases. 6. Healthy City. 7. Mexico. I. Title.

Document Number: PAHO/AD/16-005 (bilingual edition)

(NLM Classification: WA 100)

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# Acknowledgements

The content of this publication has been made possible by the work and technical contributions of the ministries of health of the member countries of the Mesoamerican Public Health System (SMSP), other specialized institutions of the subregion, universities, and research centers of the Americas and Spain, as well as the technical units and country offices of the Pan American Health Organization/World Health Organization (PAHO/WHO).

The Mesoamerican Master Plans (MMPs) were drafted under the general coordination of Dr. Francisco Becerra, Assistant Director of PAHO/WHO; Gustavo Iturralde Arriaga and Daniela Fernandes Da Silva Cracel were responsible for the operational coordination of the process.

**We are also grateful for the participation of the following personnel from the ministries of health and other specialized institutions of the Mesoamerican subregion, universities, and research centers of the Americas and Spain:**

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**This publication has been made possible with funding from the Mexican Agency for International Development Cooperation (AMEXCID), a decentralized agency of the Ministry of Foreign Affairs of Mexico. We are especially grateful to the following individuals for their efforts and contributions to this document:**

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**The following personnel from the PAHO/WHO regional and country offices were responsible for providing technical cooperation to the countries for the preparation of the four plans:**

**Primary health care:** *James Fitzgerald, Amalia Del Riego, Reynaldo Holder, Ricardo Fábrega, Claudia Pescetto, Carlos Ayala, Mario Cruz-Peñate, Laura Ramírez, Hernán Luque, Benjamín Puertas, Osvaldo Artaza, Roger Montes Flores, Hilda Leal, Armando Guemes, Sonia Quezada.*

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**Finally, we would like to acknowledge the active cooperation of the Secretariat of the Public Health Mesoamerican System (SMSP), which maintained ongoing coordination with the political authorities of the Mesoamerican countries in order to ensure the development of the master plans. The Secretariat is headed by:**

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---

*This document is the result of a regional and inter institutional coordination efforts and its timely implementation will support development processes to improve the quality of lives of 226 million inhabitants of Mesoamerica.*

---

# Preface

At the V Meeting of the Council of Ministers of the Public Health Mesoamerican System (SMSP for its acronym in English),<sup>1</sup> held in Panama in December 2013, the parties agreed to prepare and/or update the MMPs for dengue, road safety, and primary health care. During the VI Meeting, held in Washington, D.C. on October 1, 2014, the critical route for their preparation was presented, and the topic of malaria was added. For this purpose, on October 17 and November 3, 2014, respectively, PAHO/WHO and AMEXCID signed the Technical Cooperation Agreement for the preparation of the MMPs for Dengue/Chikungunya, Malaria, Road Safety, and Primary Health Care of the SMSP.

The MMPs reflect the political will of the 10 countries of the subregion, coordination of the Mesoamerica Project, financial support of AMEXCID, and technical cooperation of PAHO/WHO, to reduce national and intra-subregional inequalities and promote the capacity of every country to improve the quality of health for the people of Mesoamerica, accelerating progress toward the Millennium Development Goals, vector-borne disease elimination and control, universal access to health and universal health coverage, and road traffic injury prevention.

The efforts made by the countries are maximized when they are extended to the regional or subregional level through articulation of policies and sharing experiences and knowledge. The MMPs reflect this joint effort, and have been based on national and subregional technical capabilities and supported by the agreements, resolutions, and action plans to which the 10 countries have acceded throughout history at the global (WHO), regional (PAHO), and subregional (SMSP) levels. The process included on-site and virtual meetings among the different national health entities, related specialized institutions, universities, collaborating research centers, and PAHO/WHO.

PAHO/WHO presents these MMPs with the certainty that they will be appropriate and effective documents for the improvement of health in the subregion, complementing other efforts and projects in Mesoamerica.

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<sup>1</sup> Composed of Belize, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama.



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*The Mesoamerican Master Plans reflect the joint work and policies, and exchange of knowledge and experiences in the 10 countries of the subregion.*

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# Prologue

The Mesoamerican Master Plans are the product of the Mesoamerican Public Health System (SMSP), a cabinet-level collegial body of the Mesoamerican region (Belize, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama) that seeks to generate regional public goods to address common health challenges.

The System originated with a proposal formulated by the Mexican Ministry of Health and the Council of Ministers of Health of Central America and Dominican Republic (COMISCA) of the Central American Integration System (SICA), and is part of the Mesoamerican Integration and Development Project (Mesoamerica Project), a high-level political dialogue mechanism to build consensus, coordinate cooperative efforts, and obtain resources for strengthening the Mesoamerican development and integration processes.

The Mesoamerica Project is one of the pillars of the Tuxtla Dialogue and Consensus Mechanism, a permanent political consensus-building forum in which the region's heads of state and government participate. This mechanism began in 1991 and operates through annual summits of heads of state and government. To date, a total of 15 regular summits and two special summits have been held.

At the VI Meeting of the Council of Ministers of the SMSP, held in October 2014, the parties agreed that the public health priorities for the Mesoamerican region were: road safety, malaria, dengue/chikungunya, and primary health care, for which they agreed to draft the Mesoamerican Master Plans (MMPs) in order to have a regional assessment with specific objectives and actions.

For this purpose, the Mexican Agency for International Development Cooperation (AMEXCID) signed a technical cooperation agreement with the Pan American Health Organization/World Health Organization (PAHO/WHO) in 2014, whereby it provided financial support to PAHO to coordinate the preparation of the MMPs with the countries' national technical entities.

The final version of the MMPs was presented in June 2015 at the XV Summit of the Tuxtla Dialogue and Consensus Mechanism, with the backing of the region's leaders, through the following resolutions:

- *Fifth: Present the Mesoamerican Master Plans of the SMSP on road safety, malaria, dengue/chikungunya, and primary health care and instruct the Ministries of Health and Finance to seek, with the support of the Inter-institutional Technical Group (GTI), the necessary resources for the implementation of actions and the achievement of goals established in those documents.*
- *Sixth: Coordinate with those institutions that, within the scope of their functions, contribute to the attainment of the objectives set forth in the approved Master Plans through intersectoral work mechanisms for their implementation.*

This document is the result of regional and interinstitutional coordination efforts, and its timely implementation will support the development processes designed to improve the quality of life of the 226 million inhabitants of Mesoamerica.

# Acronyms

ADC	Andean Development Corporation
Ae.	Aedes
AIDS	acquired immunodeficiency syndrome
AMET	Metropolitan Transit Authority—Dominican Republic
AMEXCID	Mexican Agency for International Development Cooperation
AMI	Amazon Malaria Initiative
An.	Anopheles
APASIT	Association for Comprehensive Traffic Safety—Guatemala
BRT	bus rapid transit
CDC	Centers for Disease Control and Prevention (United States)
CENAPRECE	National Center for Disease Control and Prevention Programs— Secretary of Health of Mexico
CENCET	National Center for Tropical Diseases – Dominican Republic
CHA/VT	Neglected, Tropical, and Vector Borne Diseases Unit (PAHO)
CHAI	Clinton Health Access Initiative
CHIK	chikungunya virus
CHIKV	chikungunya virus
CLAIM	Latin American Center for Malaria Research and Control
CMS	comprehensive management strategy
CM-SMSP	Council of Ministers of Health of the Mesoamerican Public Health System
Col-Vol	volunteer collaborator
COMBI	Communication for Behavioral Impact
COMISCA	Council of Ministers of Health of Central America and Dominican Republic
CONAPRA	National Council for Accident Prevention—Mexico
CONASEVI	National Road Safety Council of El Salvador
CRP	C-Reactive Protein
CRUE	Emergency Control Center— Secretary of Health of Bogotá
CS	civil society
DC	Directing Council
Dengue/CHIK MMP	Mesoamerican Master Plan for the Integrated Management of Dengue and Chikungunya Prevention and Control
DGPLADES	Department of Health Planning and Development— Secretary of Health of Mexico
DPHL	departmental public health laboratories
ECLAC	Economic Commission for Latin America and the Caribbean
EMMIE	Initiative for the Elimination of Malaria in Mesoamerica and the Island of Hispaniola
EQAP	External Quality Assurance Program
EU	entomological unit
EW	epidemiological week
FETA	field epidemiology program
FLC	first level of care
GIS	geographic information systems
GSMC	Global Strategy for Malaria Control
GTI	Inter-institutional Technical Group of the Mesoamerica Project
GTI-Dengue	International Technical Group of Experts on Dengue
GTN-dengue/CHIK	National Technical Group of Experts on Dengue and Chikungunya
GTS	Global Technical Strategy



HaMEC	Haiti Malaria Elimination Consortium
HAPT	Health Accounts Production Tool
HIV	human immunodeficiency virus
IHR	International Health Regulations
IHSDN	Integrated Health Service Delivery Network
IMS-dengue	Integrated Management Strategy for Dengue Prevention and Control in the Americas
IRS	indoor residual spraying
ISGlobal	Barcelona Institute for Global Health
IVM	integrated vector management
KAPB	knowledge, attitudes, practices, and behaviors
L	long-term (used in tables for activities/tasks/implementation schedules and responsible parties)
LLITN	long-lasting insecticide-treated [mosquito]nets
M	medium-term term (used in tables for activities/tasks/implementation schedules and responsible parties)
M&E	monitoring and evaluation
MDG	Millennium Development Goals
MMP	Mesoamerican Master Plan/s
National IMS Dengue/CHIK 2015	National Strategy for the Integrated Management of Dengue and Chikungunya Prevention and Control 2015 (Strategy based on MMP for Dengue/CHIK)
NGO	nongovernmental organization
NLC	National Liaison Center
NRL	national reference laboratories
OAS	Organization of American States
OHP	Operational Health Plan
<i>P</i>	Plasmodium
PAHO	Pan American Health Organization
PCR	polymerase chain reaction
PHC	primary health care
RAVREDA	Amazon Network for the Surveillance of Antimalarial Drug Resistance
RBM	Roll Back Malaria [Partnership]
RDT	rapid diagnostic test
RELDA	Dengue Laboratory Network of the Americas
S	Short-term (used in tables for activities/tasks/implementation schedules and responsible parties)
SHA	System of Health Accounts
SICA	Central American Integration System
SINAVE	National Epidemiological Surveillance System—Department of Epidemiology— Secretary of Health of Mexico
SISED	Institutional Health System for Emergencies and Disasters—Panama
SIVIEN	System for Entomological Surveillance
SMSP	Mesoamerican Public Health System
SWOT	strengths, opportunities, weaknesses, and threats
UN	United Nations
USAID	United States Agency for International Development
VBD	vector-borne diseases
ETV/DRPAP	National Vector-borne Disease Program / Department of Regulation of Individual Care Programs— Ministry of Public Health and Social Welfare of Guatemala
WHA	World Health Assembly
WHO	World Health Organization
WHOCC	WHO Collaborating Centers



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*The Mesoamerican Master Plans are tools for the implementation of policies of the Mesoamerican Public Health System in strengthening primary health care, prevention and control of dengue and chikungunya, malaria control towards its elimination, and road safety in cities in Mesoamerica.*

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# Executive Summary

The SMSP was implemented in 2008 to reduce the health gaps among the populations of the 10 Mesoamerican countries (Belize, Costa Rica, Colombia, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, and Dominican Republic). It is one of the components of the Mesoamerican Integration and Development Project.

The MMPs are the tools used for the implementation of the System's policies. At the V Meeting of the Council of Ministers of the SMSP, the parties agreed to prepare and/or update the MMPs for Dengue/Chikungunya, Road Safety, and Primary Health Care. At the VI meeting, held in 2014, the critical route for their preparation was presented and the issue of malaria was added. With this mandate, PAHO/WHO and AMEXCID signed a Technical Cooperation Agreement for October-November 2014 for the preparation of the following MMPs:

- Strengthen the first level of care for universal access to health and universal health coverage.
- Integrated the management of dengue and chikungunya prevention and control.
- Improve malaria control with the goal of elimination.
- Road safety in Mesoamerican cities.

The activities undertaken for this purpose included an analysis of the current situation and regulatory frameworks at the regional, subregional, and national levels, as well as on-site and virtual meetings among the technical personnel from PAHO/WHO and the ministries of health, universities, strategic partners, and other related institutions to establish the priorities, indicators, goals and outcomes of the master plan. In addition, visits were made to the different countries for technical assistance and the hiring of consultants to support the process. Finally, the process of drafting the plans reflects the directives, resolutions, mandates, and action plans signed by the 10 countries at both the regional and subregional levels, and are designed to be carried out within a three-year period (2016-2018).

## Chapter 1: Mesoamerican Master Plan to Strengthen the First Level of Care for Universal Access to Health and Universal Health Coverage

This plan was devised to address the common challenges currently faced by the countries of Mesoamerica: inequity, barriers to access, and excluded groups; changes in health needs; inefficient models of care and service networks whose first level of care has a limited response capacity; segmented systems and fragmented health services; shortcomings and/or inefficiencies in health funding, and weak health authority leadership and governance. The reference documents for the preparation of the plan included mainly the Strategy for Universal Access to Health and Universal Health Coverage, adopted by the 53rd Directing Council of PAHO, and the PAHO publications "Integrated Health Service Delivery Networks: Concepts, Policy Options and a Road Map for Implementation in the Americas," and "Renewing Primary Health Care in the Americas: A Position Paper of the Pan American Health Organization."

The purpose of the plan is to aid progress toward universal health access and coverage in the countries of the Mesoamerican system by strengthening the first level of care. Its objectives are:

- To strengthen the first level of care for the delivery of comprehensive, high-quality, universal and progressively expanding health services.
- To increase investment in the first level of care in order to enhance response capacity, increase access, and progressively expand the supply of services.
- To strengthen the capacity of countries to formulate and implement national plans.

This plan is expected to contribute to:

- Reduction of preventable hospitalizations for conditions sensitive to ambulatory care by at least 10%.
- Country support for implementation of strategies to fund universal access and coverage.
- Improvement in countries' abilities to develop national policies, strategies, and/or plans, with an emphasis on strengthening the first level of care to improve access to health and universal health coverage.

The monitoring and evaluation of the plan will be carried out in accordance with the monitoring and evaluation system of the PAHO Strategic Plan for 2014-2019.

## Chapter 2: Mesoamerican Master Plan for the Integrated Management of Dengue and Chikungunya Prevention and Control

The situation of dengue and chikungunya in Mesoamerica is troubling. After the Southern Cone, Mesoamerica is the region of the American hemisphere that reports the greatest number of cases of dengue (26% of the total of cases in the hemisphere between 2011 and 2014), with a higher incidence in Costa Rica, El Salvador, and Nicaragua. Case-fatality has been higher than that of the rest of the Americas Region, and is trending upward, Dominican Republic being the country that faces the greatest challenges.

At the regional level, the chikungunya virus presented its first case of indigenous transmission in St. Martin (December 2013), after which it spread rapidly through the Caribbean (including Dominican Republic), Mesoamerica, Brazil, and the Andean countries. By epidemiological week 7 of 2015, a cumulative incidence of 462.2 cases/100,000 inhabitants had been reported for Mesoamerica, Dominican Republic, and Haiti.

The background documents for this plan included the “2009 Integrated Management Strategy for Dengue Prevention and Control,” the “2005 IMS-dengue for Central America and Dominican Republic,” the “2015 Regional IMS-dengue,” the “2014 Generic Integrated Protocol for Dengue Surveillance in the Americas,” and the 2014 meeting report entitled “State of the Art in the Prevention and Control of Dengue in the Americas.”

The plan aims to contribute to the reduction of the social and economic burden of dengue and chikungunya in Mesoamerica. Its purpose is to reduce the dengue case-fatality rate by at least 30% by 2020 and to keep the case-fatality rate of chikungunya below 1% through the implementation of its different components.

The strategy sets forth the comprehensive nature of the components of management, epidemiology, laboratory, patient care, integrated vector management, environmental management, and vaccines. The expected outcomes are:

- Implementation of the integrated management strategy for dengue and chikungunya prevention and control.

- Implementation of an integrated surveillance system for dengue and chikungunya prevention and control.
- Establishment of laboratory surveillance of dengue and chikungunya in each country of Mesoamerica.
- Improved clinical diagnosis and case management of dengue and chikungunya in the countries of Mesoamerica.
- Reduction of dengue and chikungunya entomological transmission risk in the countries of Mesoamerica.
- Specific multisectoral environmental management actions to reduce entomological risk of dengue and chikungunya.

Monitoring and evaluation will be conducted by the National and International GT-Dengue, based on the assessment of structure, process, and outcome indicators.

## Chapter 3: Mesoamerican Master Plan to Improve Malaria Control with the Goal of Elimination

The malaria situation in Mesoamerica has improved, and seven countries of the subregion (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, and Nicaragua) have seen reductions of over 75% in malaria morbidity; Colombia and Dominican Republic have seen 50-75% reductions, and while Panama has reduced rates by less than 50%, it is trending in the right direction. The process of drafting this MMP included the preparation of a strengths, opportunities, weaknesses, and threats (SWOT) analysis for each national program, focusing on the most vulnerable populations (indigenous communities, rural settlements, persons of African descent, border populations and pregnant women). The results of the analysis demonstrated a need to improve the quality of the surveillance systems among these populations.

The PAHO documents “Strategy and Plan of Action for Malaria” in its different editions and the “Initiative to Eliminate Malaria in Mesoamerica and the Island of Hispaniola,” were used in the preparation of this plan, and assistance was also provided by different mechanisms and organizations of the Americas Region, including the Amazon Malaria Initiative, the Haiti Malaria Elimination Consortium, the U.S. Centers for Disease Control, the Carter Center, and the Clinton Health Access Initiative.

The purpose of the plan is to improve malaria control with the goal of elimination in vulnerable populations, complementing other efforts and projects in the Mesoamerican subregion. It includes five components,

each of which has clearly defined targets, goals, indicators, and activities:

- Malaria prevention, surveillance, and early detection and containment of outbreaks.
- Integrated vector management.
- Malaria diagnosis and treatment.
- Advocacy, communication, and partnerships and collaboration.
- Health systems strengthening; strategic planning, monitoring, and evaluation; operational research; and country-level capacity-building.

Monitoring will be carried out through visits and periodic communications with countries, the annual analysis of proposed targets and goals achieved, and the results-based evaluation of the activities conducted.

#### **Chapter 4: Master Plan for Road Safety in Mesoamerican Cities**

Road traffic injuries are a growing problem in Mesoamerica. The economic development of the subregion has produced an increase in motor vehicle traffic, and a corresponding increase in traffic accident injuries. It is estimated that there were some 150,000 traffic-related deaths in the region in 2010, 79% of which were men. Pedestrians, motorcyclists, and cyclists accounted for 23%, 15% and 3% of the deaths, respectively.

The plan was formulated by specialists from the ministries of health and transportation, representatives of national and local governments, universities, organized civil society groups and other relevant entities, along with PAHO/WHO technical advisors. The documents that served as the basis for its preparation included the “Global Plan for the Decade of Action for Road Safety 2011-2020,” the “2011 PAHO Road Safety Action Plan,” the “2012

Mesoamerican Road Safety Program,” and the results of the seminar “Toward a Master Plan for Strengthening Road Safety in the Cities.”

The plan is basically aligned with the pillars of the Decade of Action. Its goal is to have road safety plans implemented in at least 10 cities in Mesoamerica by the end of 2018. The following objectives are proposed:

- Promote city leadership in road safety with special emphasis on the preparation of city plans.
- Improve legislation on risk factors (speed, alcohol consumption, drugs and/or psychoactive substances, distracted driving) and protectors (use of helmets, seat belts, and child restraints) in cities, and implementation of that legislation.
- Improve information systems about road safety in cities and improve the coverage and quality of data on victims and on the risk factors and protectors in cities.
- Promote sustainable mobility through the development of safe infrastructure and a system of safe and sustainable public transportation.
- Develop and implement comprehensive pre-hospital and hospital services for victims.

The plan underscores that successful road safety models are those that are based on national-level work that is complemented, reciprocally, by the work of the cities. Although the processes may be differentiated, national and city-level efforts can be coordinated; the national level proposes general guidelines for intervention that can be adapted to local city conditions and resources.

The monitoring and evaluation of the plan will be aligned with the results-based management frameworks of PAHO/WHO and AMEXCID, as well as with their monitoring and performance evaluation processes.



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*In Mesoamerica, a region consisting of 10 countries (Belize, Costa Rica, Colombia, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama and Dominican Republic), health conditions of the population has improved in recent years. However, inequalities persist in health services access, health care and the quality of those services.*

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# Introduction

Mesoamerica, a region made up of 10 countries (Belize, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama), has seen improvement in the health of its population in recent years. Nevertheless, inequality still persists in access to services, medical care, and the quality of those services. These countries have implemented several mechanisms to address the different focal points of development in the subregion, including health. One such mechanism is the Mesoamerican Integration and Development Project (Mesoamerica project), established on June 28, 2008 during the X Presidential Summit of the Tuxtla Dialogue and Consensus Mechanism<sup>2</sup>. This project enhances the physical integration of the subregion and includes social impact processes in the fields of health, environment, housing, and risk management, building consensus among countries and facilitating the investment of local resources and those of donor agencies for the consolidation of regional priorities.

In order to comply with the health mandates set forth in the presidential declarations issued at the X, XI, and XII Summits of the Tuxtla Dialogue and Consensus Mechanism, and based on a proposal submitted by the Ministry of Health of Mexico, the functional structure of governance of the SMSP was approved on May 28, 2010 at the XXXII Regular Meeting of the Council of Ministers of Health of Central America and Dominican Republic (COMISCA), and the operating regulations of the SMSP were approved on June 24, 2011 at the XXXIV Regular Meeting of the COMISCA. Finally, on December 2, 2011, the SMSP Charter was signed, providing an opportunity

<sup>2</sup> The Tuxtla Dialogue and Consensus Mechanism is an initiative that aims to “political dialogue and consolidate peace, democracy and promote regional cooperation.” The Mechanism was formally created during the “Summit Tuxtla Gutierrez II,” held on 15 and 16 February 1996, in San Jose, Costa Rica, signed as a Joint Statement by the Heads of State and Government of Central America and Mexico. The Declaration agreed to “establish a Mechanism for Dialogue and Coordination among the eight countries in the region to analyze on a regular and systematic basis, the multiple regional, hemispheric and global issues that are of common interest; arrange common positions in various multilateral forums; move towards the establishment of a free trade area; promote joint economic projects and agree on actions of regional cooperation in all areas, in support of sustainable development of the area”. To founding members (Costa Rica, El Salvador, Guatemala, Honduras, Mexico and Nicaragua), Belize and Panama were incorporated in 1996; and in 2009, Colombia and Dominican Republic became part of the Mechanism.

for dialogue and horizontal cooperation on health issues within the framework of the Mesoamerican Integration and Development Project, which makes it possible to produce regional public goods that, due to their scale and complexity, require the commitment and joint action of all the countries of the Mesoamerican Region.

The tools used for their implementation are the MMPs. Thus, at the V Meeting of the Council of Ministers of the SMSP held in Panama in December 2013, the parties agreed to devise the MMPs for dengue, road safety, and primary health care. During the VI Meeting of the Council of Ministers of the SMSP, held in Washington, D.C. on October 1, 2014, the critical route for their preparation and/or updating was presented, and the topic of malaria was added.

With this mandate, PAHO/WHO, a member of the Mesoamerica Project’s Inter-institutional Technical Group (GTI), and AMEXCID, an agency of the Ministry of Foreign Affairs of Mexico responsible for participating and monitoring the work and agreements of the Mesoamerica Project, signed technical cooperation agreements on October 17 and November 3, 2014, respectively, for the preparation of the master plans for dengue, road safety, and primary health care; the subject of malaria was added in December.

The agreement establishes terms of cooperation among the aforementioned entities for preparing the master plans and includes criteria to help reduce inequality in the subregion and promote national capacities. Both AMEXCID and PAHO/WHO assumed the following commitments in the aforementioned agreement:

- AMEXCID: Financial contribution for the implementation of the agreement.
- PAHO/WHO: Technical assistance in developing the MMPs on dengue/chikungunya, malaria, road safety, and primary health care; implementing consultation mechanisms with countries, and hiring consultants to develop the process.

The joint effort among countries, PAHO/WHO, and AMEXCID received valuable contributions from the Technical Secretariat of the SMSP, consisting of the Executive Secretariat of the Mesoamerican Integration and Development Project, the Executive Secretariat of COMISCA, and representatives of the highest health

authorities of Mexico and Colombia. The Secretariat coordinated policy issues with the countries, through the project's national coordinators and presidential commissioners, in order to support the development of the planned activities and obtain the countries' approval of the plans.

Once it took effect in November 2014, the technical cooperation agreement followed the process outlined below:

- In December 2014, the PAHO/WHO technical units presented the activities timetables and budgets for the preparation of the plans.
- In January 2015, a consultant was hired for the operational coordination of the MMPs.
- From February to April, the various activities were conducted in accordance with the established timetable.
- Between May and June, the countries validated and approved the MMPs.
- On June 10, the VII Meeting of the Council of Ministers of the SMSP was held, during which it was resolved to approve the MMPs for dengue/chikungunya, malaria, and road safety, and to maintain the roadmap for the approval of the Master Plan for Primary Health Care.
- On June 22, the ministries of health approved the Master Plan for Primary Health Care.
- On June 26, the XV Summit of Heads of State and Government of the Tuxtla Dialogue and Consensus

Mechanism resolved to present the SMSP's MMPs for road safety, malaria, dengue/chikungunya, and primary health care, and to instruct the ministries of health and finance to seek, with the support of the GTI, the necessary funds to implement the actions and achieve the goals established in these documents.

The process of devising the plans included an analysis of the current situation and regulatory framework at the regional, subregional, and national levels; on-site and virtual meetings to establish the priorities, indicators, goals and outcomes of the master plan, and PAHO/WHO country visits to provide technical support.

The outcomes of the agreement were consistent with the MMPs:

- Strengthen the first level of care for universal access to health and universal health coverage;
- Road safety in Mesoamerican cities;
- Improve malaria control with the goal of elimination;
- Integrated management of dengue and chikungunya prevention and control.

The plans were delivered at the agreed-upon time and are aligned with the directives, mandates, resolutions, and regional and subregional plans of action signed by the 10 countries; and the networks of cooperation were strengthened among the countries of the SMSP, as well as with PAHO and AMEXCID.



# **Chapter 1**

## **Mesoamerican Master Plan to Strengthen the First Level of Care for Universal Access to Health and Universal Health Coverage**

## 1.1 BACKGROUND

Universal access to health and universal health coverage are the objectives that guide health systems to ensure that all people and communities, including the poorest and most vulnerable groups have equitable access to comprehensive, quality health services (epidemiological surveillance, promotion, prevention, treatment, and rehabilitation), throughout life and without barriers.

The Mesoamerican Public Health System has put forth goals that back efforts by the region's governments to close the gap in health coverage and quality. PAHO provided technical support for development of a master plan that facilitates the mobilization of resources to strengthen work on a basic and fundamental component of the strategy for universal access to health and universal health coverage: strengthening the first level of care organized into Integrated Health Services Delivery Networks (IHSDNs). This was included in the PAHO-AMEXCID agreement due to the priority it was given in the PAHO/WHO Strategic Plan for 2014-2015.

The strategy for universal access to health and universal health coverage adopted by the PAHO Directing Council in October 2014 reaffirms the need for transforming and/or strengthening health systems and services to fight health inequities in the Region and to achieve health and well-being for all. Resolution CD53.R14, which adopts the Strategy, expresses the commitment acquired by the PAHO Member States on this issue, and it is included in PAHO's strategic planning, with a set of impact indicators, outcomes, and outputs agreed upon by the States. The strategy is based on the right to health (its core value), equity, and solidarity, in the spirit of the Declaration of Alma-Ata (USSR, 6-12 September, 1978)<sup>3</sup> and primary health care (PHC). A PHC-based health system is made up of a set of essential structural and functional elements that guarantee universal coverage and access to services that are acceptable to the population and equity-enhancing. Furthermore, it:

- Provides comprehensive, integrated, and appropriate care over time.
- Emphasizes prevention and promotion.
- Assures first-contact care, with planning and actions focused on families and communities.
- Requires a solid legal, institutional, and organizational framework, as well as adequate and sustainable human, economic, and technological resources.

- Employs optimal organization and management practices at all levels to achieve quality, efficiency, and effectiveness.
- Develops active mechanisms to maximize individual and collective participation in health.
- Promotes intersectoral action to address other determinants of health and equity.

On this point, it is important to make the distinction between PHC and health services at the first level of care. PHC constitutes the strategic approach to the organization of the entire health system; i.e., essential health care based on practical, scientifically sound, and socially acceptable methods and technologies made universally accessible to individuals in the community through their full participation and at a cost that the community and the country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. In turn, the first level of care refers specifically to a level of organization of the direct provision of health services to people and communities.

An Integrated Health Services Delivery Network (IHSDN) is defined as *"a network of organizations that provides, or makes arrangements to provide, equitable, comprehensive, and integrated health services to a defined population and is willing to be held accountable for its clinical and economic outcomes and for the health status of the population that it serves."* IHSDNs are one of the principal operational expressions of the PHC approach at the health services level; i.e., they constitute the organizational model that enables comprehensive and integrated health service delivery over time (continuum of care).

As a result, this plan seeks to support implementation of the strategy to transform systems into PHC-based IHSDNs through strengthening the first level of care, the basic component of the strategy for universal access to health and universal health coverage.

The strategy for universal access to health and universal health coverage identifies the following common challenges to the countries of Mesoamerica:

- Inequity, barriers of access (geographical, economic, cultural, organizational), and excluded and/or vulnerable groups.
- Changes in health needs and epidemiological patterns (demographic changes, chronic non-communicable diseases, violence, and road traffic injuries, in addition to communicable diseases).
- Inefficient models of care and service networks that

<sup>3</sup> Declaration of Alma-Ata. International Conference on Primary Health Care, Alma-Ata, USSR, 6-12 September 1978.

do not appropriately respond to current needs, with a first level of care with limited response capacity and inefficient management models.

- Segmented systems and fragmented health services.
- Health funding deficits and/or inefficiencies.
- Weak leadership and governance of the health authority in coping with new challenges, including social and intersectoral participation.

All this results in undesirable and/or unacceptable health outcomes, an exponential increase in costs, and challenges for the sustainability of systems.

Hence, the Strategy for Universal Access to Health and Universal Health Coverage is not limited to establishing impact objectives. Rather, it points out those actions that evidence indicates are necessary for achieving the desired impact. It promotes actions that encompass a broad range of interventions that should be considered as a whole; in some countries, this involves important transformations in the way things are currently organized. One of the aspects included in strategic line 1 of the strategy is the pressing task of strengthening the first level of care in the Region's health systems. In turn, strategic line 3 addresses several financing issues that are fundamental to development of the first level of care and that are included in the indicators of this Master Plan.

The Master Plan presented here constitutes an opportunity to jointly address these common challenges and to move forward with reforming and strengthening the first level of care in PHC-based health systems in the Mesoamerican context. Notwithstanding that this strengthening requires a number of measures that should be implemented according to specific local conditions (with many years of sustained implementation), the present framework selects several indispensable tasks based on the priorities expressed by the countries, with a three-year horizon for implementation.

## 1.2 PLAN

### 1.2.1 Purpose

Help advance the goal of universal access to health and universal health coverage in Mesoamerican countries by improving the first level of care.

### 1.2.2 Objectives

1. Strengthen the first level of care for providing comprehensive, integrated, quality, universal, equitable, and progressively expandable health services.
2. Increase investment in the first level of care to boost response capacity, increase access, and progressively expand the supply of services.
3. Build country capacity to develop and implement national plans.

### 1.2.3 Results, activities, and indicators

**Objective 1:** Strengthen the first level of care for providing comprehensive, integrated, quality, universal, equitable, and progressively expandable health services.

**Indicator:** Number of countries that have reduced avoidable hospitalizations for ambulatory care-sensitive conditions by at least 10%.

**Table 1.1 Expected outcomes, activities and outcome indicators, objective 1**

Expected Outcome	Activity	Outcome Indicator
1.1 Definition and implementation of the attributes of a people-, family-, and community-centered model of care	1.1.1 Develop guidelines to operationally define: a) territory–population, setting (school, homes, public spaces, institutions); b) network of facilities; c) multidisciplinary first level of care; d) specialized services in the right place; e) care coordination mechanisms; f) people-, family-, and community-centered health care based on a country’s epidemiological profile.	Number of countries and territories implementing integrated services network strategies according to established parameters
	1.1.2 Define recommendations for intra- and extrasectoral care coordination mechanisms.	
	1.1.3 Create participatory definition of proposals for intra- and extrasectoral care coordination appropriate to each country’s situation.	
	1.1.4 Take actions for implementing intra- and extrasectoral care coordination mechanisms.	
1.2 Strengthened capacity for results-based management in Integrated Health Services Delivery Networks (IHSDN), emphasizing the first level of care	1.2.1 Design performance evaluation methodology for the first level of care and for the impact of results-based management on IHSDNs.	Countries that implement results-based management models in IHSDNs
	1.2.2 Conduct performance analyses, including proposals for changes based on expected results, and prepare case studies of strategies to strengthen the first level of care and the resulting impact on the operation of IHSDNs.	
	1.2.3 Develop action plan for implementing the results-based management model in IHSDNs and the contribution of the first level of care.	
1.3 Development of differentiated strategies to increase the response capacity of the first level of care and definition of progressively expandable quality service	1.3.1 Conduct baseline measurement of response capacity that identifies gaps in capacity with respect to the definition of progressively expandable quality services.	Number of countries that have drafted an action plan to implement differentiated strategies that increase response capacity at the first level of care
	1.3.2 Delineate expected response capacity at the first level of care, with defined quantity and quality requirements for infrastructure, human resources, health technologies, information and communications technologies, and economic resources.	
	1.3.3 Prepare guidelines for closing gaps in infrastructure, human resources, and health technologies, based on epidemiological and demographic needs and IHSDNs.	
	1.3.4 Design strategies for closing gap with emphasis on the first level of care.	
	1.3.5 Develop training in proposed strategies to obtain progressively expandable quality services.	
	1.3.6 Increase the supply of services by including traditional indigenous medicine and complementary medicine.	

**Table 1.1 Expected outcomes, activities and outcome indicators, objective 1 (cont.)**

Expected Outcome	Activity	Outcome Indicator
1.4 Processes underway on the Toronto Call to Action 2006-2015 <sup>4</sup> and the 2013 Recife Declaration, <sup>5</sup> aligned with the strategy for universal access to health and universal health coverage	1.4.1 Prepare final report on the 20 regional goals of the Toronto Call to Action.	Strategic human resources plan prepared according to the final report on the Toronto Call to Action and the strategy for universal access to health and universal health coverage
	1.4.2 (Proposed) Review the regional human resources goals in relation to the strategy for universal access to health and universal health coverage.	
	1.4.3 Develop or strengthen inter-institutional competencies for health human resources management and planning in countries.	

**Table 1.2 Expected outcomes, activities and outcome indicators, objective 2**

**Objective 2:** Increase investment in the first level of care to boost response capacity, increase access, and progressively expand the supply of services.

**Indicator:** Number of countries that have implemented funding strategies for universal access and coverage (OPT 4.1.2 PB).

Expected Outcome	Activity	Outcome Indicator
2.1 Availability of standardized, up-to-date health expenditure and financing information	2.1.1 Training in System of Health Accounts (SHA 2011) methodology and in use of the Health Accounts Production Tool (HAPT).	Number of countries that set up health accounts using SHA 2011 methodology
	2.1.2 Support development and implementation of work plans for the institutionalization of monitoring and set-up of health accounts with SHA 2011 methodology.	
	2.1.3 Determine first-level spending with an expected increase gradient.	

<sup>4</sup> Toronto Call to Action. 2006-2015 Towards a decade of Human Resources in Health for the Americas. Regional meeting of the Observatories for Human Resources in Health, 4-7 of October 2015.

<sup>5</sup> The Recife Political Declaration on Human Resources for Health: renewed commitments towards universal health coverage. 3rd Global Forum on Human Resources for Health. Recife, Brazil, from 10 to 13 of November 2013.

<sup>6</sup> Output indicator 4.1.2. PAHO Program and Budget 2014-2015.

**Table 1.3 Expected outcomes, activities and outcome indicators, objective 3**

**Objective 3:** Build country capacity to develop and implement national plans that include PHC-based health systems, with an emphasis on strengthening the first level of care.

**Indicator:** Countries strengthened in the development of national policies, strategies, and plans with emphasis on strengthening the first level of care, thereby strengthening access to health and universal health coverage.

Expected Outcome	Activity	Outcome Indicator
3.1 Strengthened leadership capacity of the national health authority	3.1.1 Design and implement communication and advocacy strategies linked to strengthening the first level of care. 3.1.2 Evaluate national health authority leadership capacity. 3.1.3 Implement plans to strengthen national health authority leadership, based on the framework of “health in all policies.”	Number of countries that implement actions to strengthen leadership capacity of the national health authority
3.2 Strengthened capacity to design, implement, monitor, and evaluate action plans to advance toward universal access to health and universal health coverage	3.2.1 Assist with carrying out a situation analysis on effective access and coverage. 3.2.2 Identify areas of intervention for development of action plans with broad participation by stakeholders. 3.2.3 Implement, monitor, and evaluate action plans.	Number of countries that include universal health access and coverage in their national plans or develop and implement action plans

### 1.3 TIMETABLE

The plan will be implemented in three years in accordance with the following timetable:

**Table 1.4 Activities and year of implementation, according to objective**

Objectives	Activity	Year 1	Year 2	Year 3
1. Strengthen the first level of care for providing comprehensive, integrated, quality, universal, equitable, and progressively expandable health services	1.1.1 Develop guidelines to operationally define: a) territory– population, setting (school, homes, public spaces, institutions); b) network of facilities; c) multidisciplinary first level of care; d) specialized services in the right place; e) care coordination mechanisms; f) people-, family-, and community-centered health care based on a country’s epidemiological profile.	X		
	1.1.2 Define recommendations for intra- and extrasectoral care coordination mechanisms.	X		
	1.1.3 Create participatory definition of proposals for intra- and extrasectoral care coordination that is appropriate to each country’s situation.	X	X	X
	1.1.4 Develop actions for implementing intra- and extrasectoral care coordination mechanisms.	X	X	X
	1.2.1 Design performance evaluation methodology for the first level of care and the impact of results-based management on IHSDNs.	X		
	1.2.2 Conduct performance analyses, including proposals for changes based on expected results, and prepare case studies of strategies to strengthen the first level of care and the resulting impact on the operation of IHSDNs.		X	X
	1.2.3 Develop action plan for implementing the results-based management model in IHSDNs and contributing to the first level of care.		X	X
	1.3.1 Conduct baseline measurement of response capacity that identifies gaps in capacity with respect to the definition of progressively expandable quality services.	X		
	1.3.2 Delineate expected response capacity at the first level of care, with the definition, in quantity and quality, of requirements for infrastructure, human resources, health technologies, information and communications technologies, and economic resources.	X		
	1.3.3 Prepare guidelines for closing gaps in infrastructure, human resources, and health technologies based on epidemiological and demographic needs and IHSDNs.	X		
	1.3.4 Design strategies for closing gap with emphasis on the first level of care.	X		
	1.3.5 Conduct training in proposed strategies to obtain progressively expandable quality services.		X	X
	1.3.6 Strengthen the service supply by including traditional indigenous and complementary medicine.		X	X

**Table 1.4 Activities and year of implementation, according to objective (cont.)**

Objectives		Activity	Year 1	Year 2	Year 3	
	1.4.1	Prepare final report on the 20 regional goals of the Toronto Call to Action.	X			
	1.4.2	(Proposed) Review the regional human resources goals in relation to the strategy for universal access to health and universal health coverage.	X			
	1.4.3	Develop or strengthen inter-institutional competencies for health human resources management and planning in countries.		X	X	
2.	Increase investment in the first level of care to boost response capacity, increase access, and progressively expand the supply of services	2.1.1	Conduct training in System of Health Accounts (SHA 2011) methodology and in use of the Health Accounts Production Tool (HAPT).	X	X	X
		2.1.2	Support development and implementation of work plans for the institutionalization of monitoring and establishing health accounts with SHA 2011 methodology.	X	X	X
		2.1.3	Determine first-level spending with an expected increase gradient.		X	X
3.	Build country capacity to develop and implement national plans that include PHC-based health systems, with an emphasis on strengthening the first level of care	3.1.1	Design and implement communication and advocacy strategies linked to strengthening the first level of care.	X	X	X
		3.1.2	Evaluate national health authority leadership capacity.	X		X
		3.1.3	Implement plans to strengthen national health authority leadership, based on the framework of “Health in all policies.”		X	X
		3.2.1	Assist with carrying out a situation analysis on effective access and coverage.	X	X	X
		3.2.2	Identify areas of intervention for developing action plans with broad participation by stakeholders.	X	X	X
		3.2.3	Implement, monitor, and evaluate action plans.	X	X	X



## 1.4 MONITORING AND EVALUATION

Monitoring and evaluation of the plan will be based on the monitoring and evaluation system in the PAHO Strategic Plan 2014-2019. In this system, which includes ongoing monitoring at the national level through the country offices, as well as at the regional level, Member States report annually on their progress and prepare biennial progress reports. They also use indicators in other binding agreements signed by the Region's Member States, in

particular those that belong to the Mesoamerican Public Health System.

The Mesoamerican Plan to strengthen the first level of care has a three-year duration during the same period. The plan has a set of indicators organized around the expected outcomes, presented in the following table.

**Table 1.5 Expected results and related indicator, according to objective**

**Objective 1:** Strengthen the first level of care for providing comprehensive, integrated, quality, universal, equitable, and progressively expandable health services

**Indicator:** Number of countries that have reduced avoidable hospitalizations for ambulatory care-sensitive conditions by at least 10%

Expected outcome	Indicator
1.1 Definition and implementation of the attributes of a people-, family-, and community-centered model of care	Number of countries and territories that are implementing integrated services network strategies according to established parameters
1.2 Strengthened capacity for results-based management in IHSDNs, emphasizing the first level of care	Countries that implement results-based management models in IHSDNs
1.3 Development of differentiated strategies to increase the response capacity of the first level of care and definition of progressively expandable quality services	Number of countries that have drafted an action plan to implement differentiated strategies that increase response capacity at the first level of care
1.4 Processes underway on the Toronto Call to Action 2006-2015 and the 2013 Recife Political Declaration, aligned with the Strategy for Universal Access to Health and Universal Health Coverage	Strategic human resources plan prepared according to the final report on the Toronto Call to Action and the Strategy for Universal Access to Health and Universal Health Coverage

**Objective 2:** Increase investment in the first level of care to boost response capacity, increase access, and progressively expand the supply of services

**Indicator:** Number of countries that have implemented funding strategies for universal access and coverage (OPT 4.1.2 PB)

2.1 Availability of standardized, up-to-date health expenditure and financing information	Number of countries that set up health accounts using SHA 2011 methodology
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**Objective 3:** Build country capacity to develop and implement national plans that include PHC-based health systems, with an emphasis on strengthening the first level of care

**Indicator:** Countries strengthened for developing national policies, strategies, and/or plans with emphasis on improving the first level of care, and enhancing access to health and universal health

3.1 Strengthened leadership capacity of the national health authority	Number of countries that implement actions to improve leadership capacity of the national health authority
3.2 Improved capacity to design, implement, monitor, and evaluate action plans to advance toward the universal access to health and universal health coverage	Number of countries that include universal access to health and universal health coverage in their national plans or develop and implement action plans

## 1.5 BUDGET

The following is an estimate of the financial resources needed to carry out the proposed activities. These resources are aimed at building capacity and implementing programs not regularly included in Ministry of Health operating budgets (training, consultants, workshops, communication, etc.). Operating costs, infrastructure,

human resources, technology, and other items associated with providing and managing services have not been included, since they are part of national budgets. The following table contains estimates by objective and expected outcome, along with budget subtotals and grand total. The budget is in US dollars.

**Table 1.6 Budget by objective and expected result (in USD), 2016-2018**

Objective	Expected Result	2016	2017	2018	Total
Objective 1	1.1	400,000	1,000,000	600,000	2,000,000
	1.2	250,000	250,000	200,000	700,000
	1.3	200,000	200,000	300,000	700,000
	1.4		500,000	500,000	1,000,000
<b>Total</b>					<b>4,400,000</b>
Objective 2	2.1	300,000	750,000	750,000	1,850,000
	<b>Total</b>				
Objective 3	3.1	600,000	700,000	700,000	2,000,000
	3.2	1,000,000	1,000,000	500,000	2,500,000
<b>Total</b>					<b>4,500,000</b>
<b>Total budget</b>					<b>10,750,000</b>

# **Chapter 2**

## **Mesoamerican Master Plan for the Integrated Management of Dengue and Chikungunya Prevention and Control**

## 2.1 BACKGROUND

Within the framework of the 53rd session of the Directing Council held in September 2014, PAHO/WHO and AMEXCID signed the technical cooperation agreement for the preparation of MMPs for dengue/chikungunya, malaria, road safety, and primary health care in the Mesoamerican Public Health System. Through the Regional Dengue Program, the PAHO/WHO Neglected, Tropical, and Vector Borne Diseases Unit (CHA/VT) spearheaded the preparation of the MMP for the Integrated Management of Dengue and Chikungunya Prevention and Control (Dengue/CHIK MMP). The development of this plan has been a participatory process among the technical delegates of the Mesoamerican countries, with technical support from PAHO/WHO and the International Technical Task Force on Dengue (GTI-dengue).

Using the logical framework methodology, and with the assistance of technical experts from Colombia, Dominican Republic, Guatemala, Mexico, Nicaragua, and Panama, the GTI-dengue and PAHO/WHO staff members analyzed the strengths, opportunities, weakness and threats (SWOT) submitted by all mesoamerican countries, which allowed them to determine the priorities and content of each component of the plan (See Annex).

Preparation of the Dengue/CHIK MMP document was launched during an expert workshop held in Panama from January 27-30, 2015. Subsequently, through virtual meetings, staff from the Mesoamerican countries, the GTI-dengue and PAHO/WHO technical staff, edited, updated, adjusted, and approved the document, creating the final version of the MMP of Management Integrated for the prevention and control of dengue and chikungunya.

## 2.2 POLICIES, STRATEGIES, AND PLANS

### Dengue

During the 43rd Directing Council in September 2001, PAHO/WHO adopted Resolution CD43.R4, a political declaration that, in light of the sustained increase in cases of dengue, recommended strengthening the response of the region's national ministries of health and promoted a new generation of programs for dengue prevention and control to encourage prevention and control through community participation and health education.

Implementing this political framework required a practical methodological model and, in September 2003, the 44th Directing Council of PAHO/WHO passed Resolution CD44.R14, which proposed that the member countries adopt the Integrated Management Strategy

for Dengue Prevention and Control (IMS-dengue). IMS-dengue is a regional working tool designed by experts from the national ministries of health and the PAHO/WHO International Technical Group of Experts on Dengue (GTI-dengue), with a view to strengthening national programs for multidisciplinary and intersectoral interventions by targeting the social and environmental factors associated with transmission. Since its creation in 2003, IMS-dengue has focused on addressing the following components: epidemiology, integrated vector management (IVM), laboratory, patient care, vaccines, environment management, and mass communication.

IMS-dengue aims to integrate key areas of action in the practice of dengue prevention and control, through a horizontal, intersectoral, and inter-programmatic approach. It seeks to shift national prevention and control responses toward the inclusion of community groups, especially families, in order to achieve behavioral changes and sustainable actions with respect to the social and environmental factors associated with dengue transmission (Figure 2.1).

In addition, Directing Council Resolution CD44.R14 promoted the creation of the regional working group of dengue experts known as GTI-dengue, a group of experts who, based on regional analysis, travel to the countries to provide technical support and assistance: 1) preparing and evaluating the national IMS-dengue; 2) drafting national preparedness plans and responses to dengue outbreaks and epidemics; 3) supporting the design of the national response to dengue outbreaks and epidemics, and 4) training national technical teams in each component of IMS-dengue, in country visits and at regional or subregional events.

By December 31, 2013, four subregions of the Americas (Central America, Caribbean, Southern Cone, and Andean), and 26 countries and territories had national or regional IMS-dengue programs and were in the implementation phase. Earlier, in 2007, the 27th PAHO/WHO Pan American Sanitary Conference had passed Resolution CSP27.R15 for purposes of monitoring and evaluating IMS-dengue, and urged the countries to conduct a performance evaluation of national IMS-dengue with the support of GTI-dengue. This process started in 2008, and 22 national IMS-dengue programs have been evaluated since then. In some countries, such as Mexico and Brazil, a second evaluation has been done.

**Figure 2.1 Integrated Management Strategy for Dengue Prevention and Control in the Americas, 2015—IMS-Dengue (2015)**



Source: PAHO/WHO Regional Dengue Program

## Chikungunya

In close collaboration with strategic partners such as the United States CDC, the Dengue Laboratory Network of the Americas (RELDA), and others, PAHO has made efforts to prepare the countries of the region in light of the introduction of the CHIK virus. It has assisted with the preparation of clinical and laboratory guides, trainings, and regional workshops, and has facilitated the availability and distribution of supplies and reagents necessary for the early laboratory detection and surveillance of the virus.

In 2011, at the initiative of PAHO/WHO, the guidelines on Preparedness and Response for CHIK Virus Introduction in the Americas were drafted in a joint effort with the CDC and several regional experts. This document consolidates and systematizes recommendations for the surveillance components, including epidemiological strategies, vector management, laboratory diagnosis, clinical case management, and risk communication.

In order to confirm viral circulation, PAHO/WHO created an algorithm for laboratory diagnosis with recommendations for virological and serological identification, including biosafety. This was done with support from technical and expert partners in the region, in particular the RELDA. Clinical trainings have also been conducted with instructors who are experts in the field, with special emphasis on developing early detection capabilities and the proper clinical management of the disease. In addition, clinical management support material and frequent updates of the available scientific material have been published.

Based on the epidemiological surveillance guidelines proposed by PAHO/WHO according to experience in

other countries outside the region, and given the new epidemiological scenario presented by the establishment of the CHIK virus, the affected countries have developed their own national guidelines and protocols for surveillance and management. However, and for purposes of maximizing existing resources, the integration of CHIK surveillance with the platforms available for IMS-dengue must be examined and discussed at the national level.

## 2.3 CURRENT STATUS OF DENGUE AND CHIKUNGUNYA IN THE MESOAMERICAN REGION

### Dengue

Dengue is a disease that has been evolving for more than 400 years, and WHO considers it to be the most important vector-borne viral disease, with some 50 to 100 million new infections occurring in more than 125 endemic countries each year. Of the 30 countries with the greatest incidence of dengue worldwide, 18 (60%) are located in the Americas (WHO, 2012).

### Epidemiology of dengue in the Americas

The history of dengue in the Americas dates back to 1780, when Dr. Benjamin Rush made the first written report of a case of dengue fever in Philadelphia, in the US.. Since then, the disease has been present throughout the entire continent. Only Canada, continental Chile, and Uruguay have not had indigenous dengue transmission, although the vector (*Aedes aegypti*) is present in Uruguay.

Epidemiological surveillance of dengue in the Americas has been improved and strengthened in the

last three decades, resulting in better and more frequent case reporting in the Region. Between the years 2010 and 2014, a total of 7.47 million cases of dengue have been reported in 50 countries and territories that systematically report their data. The increased incidence of dengue was reflected in an upsurge in the number of severe cases and a corresponding rise in the number of fatalities; however, the revised WHO dengue classification (2009) was adopted in the region in 2010, and a decline in the case-fatality rate was observed after its implementation (Figure 2.2).

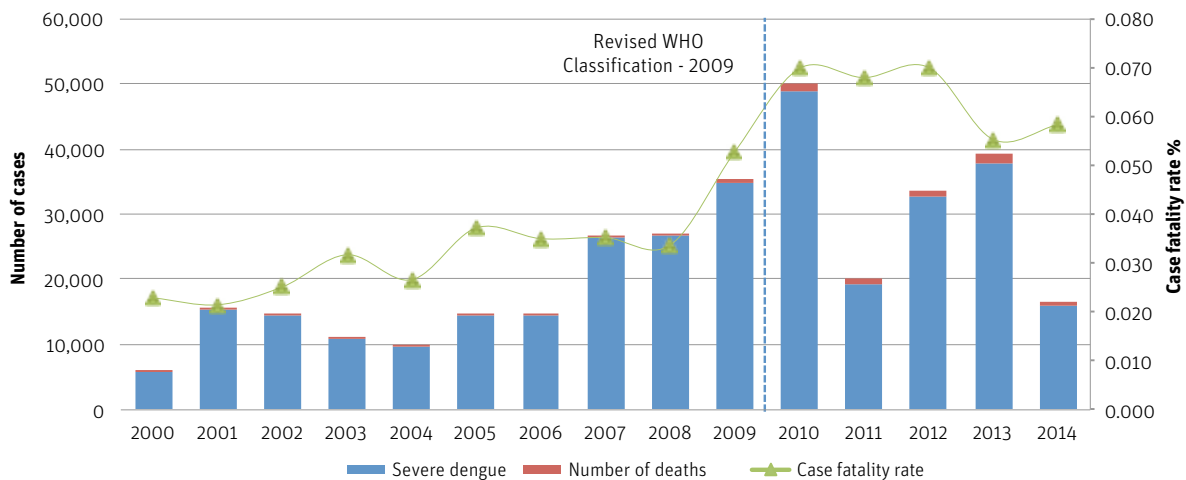
### Epidemiology of dengue in Mesoamerica, 2011-2014

After the Southern Cone, Mesoamerica is the region of the American hemisphere that reports the greatest number of suspected cases of dengue. Between 2011 and 2014, it has had 1.5 million cases of dengue (2011: 165,255 cases; 2012: 346,886 cases; 2013: 588,355 cases; and 2014: 410,393 cases), or 26% of all dengue cases in the hemisphere during that period. The incidence of dengue has increased in Mesoamerica, as well as in the rest of the hemisphere. In 2011, the incidence was 91.6 cases/100,000 inhabitants, increasing to 190.4 cases in 2012 and 322.6 cases in 2013. 2014 saw a decline in incidence (181.9 cases/100,000 inhabitants) from the previous year. Mexico and Colombia are the

countries with the greatest number of cases due to their geographical size. However, the countries with the highest incidence during this period have been Belize, Costa Rica, El Salvador, and Nicaragua (Table 2.1).

Deaths from dengue for the same period (2011-2014) reached 1,166, for an annual average of 292. The case-fatality rate for dengue in Mesoamerica has been higher than the regional rate. From 2011 to 2012, it increased from 0.069% to 0.089%. However, between 2012 and 2014, the case-fatality rate fell to 0.073%. It is important to emphasize that a more detailed analysis at the country level shows that Dominican Republic is the nation facing the greatest challenges with respect to its case-fatality rate for dengue, presenting not only the highest rate in the subregion and in the hemisphere, but also a clear upward trend. This situation in Dominican Republic has a major impact on the overall case-fatality rate in the Mesoamerican subregion. An analysis excluding deaths in Dominican Republic shows a significant downward trend, from 0.069% in 2011 to 0.059% in 2014. The countries that contribute the greatest number of dengue fatalities are Mexico, Colombia, and Dominican Republic. Belize has been the only country without dengue fatalities in the subregion. Table 2.2 shows the number of deaths from dengue and its case-fatality rates.

**Figure 2.2 Severe cases, deaths, and case-fatality from dengue in the Americas, 2000-2014**



Source: PAHO/WHO Regional Dengue Program.

**Table 2.1 Number of suspected cases and incidence of dengue (per 100,000 inhabitants) in Mesoamerica, per country and year, 2011-2014**

Mesoamerica		Year			
		2011	2012	2013	2014
		Number of suspected cases (Incidence x 100 inhabitants)			
Mesoamerican Countries	Belize	469 (145.7)	1,948 (605.0)	2,690 (788.9)	5,026 (1,478.2)
	Colombia	33,207 (144.8)	49,361 (215.2)	127,219 (476.2)	105,356 (215.3)
	Costa Rica	13,854 (303.6)	22,243 (487.5)	49,868 (1,092.9)	11,140 (225.6)
	Dominican Republic	2,339 (27.5)	9,665 (113.8)	16,658 (196.1)	6,274 (63.5)
	El Salvador	20,836 (325.7)	41,793 (653.3)	28,877 (451.4)	53,460 (844.8)
	Guatemala	2,565 (21.9)	9,547 (81.7)	11,860 (101.5)	19,791 (122.7)
	Honduras	8,297 (126.2)	15,554 (185.5)	39,271 (459.0)	43,456 (498.1)
	Mexico	67,918 (61.4)	164,947 (149.1)	231,498 (209.3)	124,943 (104.3)
	Nicaragua	11,888 (228.3)	30,499 (585.6)	77,179 (1,481.9)	35,430 (571.6)
	Panama	3,882 (109.1)	1,329 (37.4)	3,235 (90.9)	5,517 (141.0)
Mesoamerican Region	<b>Total number of cases</b>	<b>165,255</b>	<b>346,886</b>	<b>588,355</b>	<b>410,393</b>
	<b>Average number of cases</b>	<b>16,526</b>	<b>34,687</b>	<b>58,836</b>	<b>41,039</b>
	<b>Average incidence</b>	<b>91.6</b>	<b>190.4</b>	<b>322.6</b>	<b>181.9</b>

Source: PAHO/WHO Regional Dengue Program.

**Table 2.2 Number of deaths and case-fatality rate (%) for dengue in Mesoamerica, per country and year, 2011-2014**

Mesoamerica		Year			
		2011	2012	2013	2014
		Number of deaths (Case-fatality %)			
	Belize	0	0	0	0
	Colombia	42 (0.13)	51 (0.10)	161 (0.13)	166 (0.16)
	Costa Rica	0	0	1 (0.00)	0
	Dominican Republic	2 (0.09)	71 (0.73)	111 (0.67)	62 (0.99)
<b>Mesoamerican Countries</b>	El Salvador	7 (0.03)	6 (0.01)	3 (0.01)	6 (0.01)
	Guatemala	9 (0.35)	17 (0.18)	8 (0.07)	13 (0.07)
	Honduras	0	4 (0.03)	29 (0.07)	5 (0.01)
	Mexico	36 (0.05)	153 (0.09)	104 (0.04)	39 (0.03)
	Nicaragua	1 (0.01)	5 (0.02)	20 (0.03)	0
	Panama	17 (0.44)	0	8 (0.25)	9 (0.17)
	<b>Total number of deaths</b>	<b>114</b>	<b>307</b>	<b>445</b>	<b>300</b>
	<b>Average number of deaths</b>	<b>11</b>	<b>31</b>	<b>45</b>	<b>30</b>
<b>Mesoamerican Region</b>	<b>Average case-fatality rate</b>	<b>0.069</b>	<b>0.089</b>	<b>0.076</b>	<b>0.073</b>
	<b>Average case-fatality rate without Dominican Republic</b>	<b>0.069</b>	<b>0.070</b>	<b>0.058</b>	<b>0.059</b>

Source: PAHO/WHO Regional Dengue Program.

All four dengue serotypes are circulating in Mesoamerica. Since 1995, when systematic reporting of dengue serotypes circulating in the Americas began, six Mesoamerican countries have at some time reported the simultaneous circulation of all four serotypes. In 2014, four Mesoamerican countries (Colombia, Guatemala, Mexico, and Nicaragua) reported simultaneous circulation of all of the dengue serotypes, a situation that increases the risk of epidemics and severe cases of the disease.

### Chikungunya

Chikungunya (CHIK) is an alphavirus (Togaviridae family) transmitted through different vector mosquito species *Aedes* (*Ae*). Humans are the principal amplifier host of the virus, and the infection is manifested by the sudden onset of fever and polyarthralgia. Joint pain is usually bilateral and symmetrical and can become severe and incapacitating. Mortality is infrequent and occurs mainly in older adults or in patients who present some underlying clinical condition (comorbidity). The virus



was first identified in 1952 in present-day Tanzania, and some sporadic outbreaks of the disease were detected in Africa during the 1960s and 1970s. Nevertheless, activity increased beginning in 2004 when an outbreak originating on the coast of Kenya quickly spread to the Comoro Islands and other islands of the Indian Ocean. By the summer of 2006, around 500,000 cases had been reported, additionally affecting Australia and Asia (India, Indonesia, the Maldives, Myanmar, Sri Lanka, and Thailand). In 2007, there was an outbreak of the virus transmitted through *Aedes albopictus* in Italy, in the region of Emilia-Romagna. Recent outbreaks of CHIK fever have had a significant impact on public health, both in the short- and long-term.

### Epidemiology of chikungunya in the Americas

Imported cases had been reported previously in the Americas (United States, Canada, French Guiana, Martinique, Guadeloupe, and Brazil), but it was not until December 6, 2013 that the local transmission of the CHIK virus was reported in the Western Hemisphere to PAHO/WHO. Indigenous cases were confirmed in the French territory of Saint Martin and subsequently in Martinique, Guadeloupe and Saint Barthélemy. The virus spread rapidly to several Caribbean islands (Anguilla, Antigua and Barbuda, British Virgin Islands, Dominica, Dominican Republic, Haiti, Martinique, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, St. Maarten (Dutch section), and Saint Vincent and the Grenadines) followed by its introduction into continental territory (French Guiana and Guyana), Mesoamerica, Brazil, and countries of the Andean Region. In total, for epidemiological week 10 (EW 10) of 2015, more than 1,200,000 suspected cases of CHIK had been

reported, with 25,400 laboratory-confirmed indigenous cases and 183 CHIK-related fatalities.

Within the Member States affected by the CHIK outbreak, the situation in Dominican Republic undoubtedly represents the most intense transmission in the Region recorded to date. The indigenous circulation of the virus in the country was officially reported during EW 09 of 2014; for EW 17, 8,058 suspected cases had already been reported nationally, with an incidence of 5,182 cases/100,000 inhabitants.

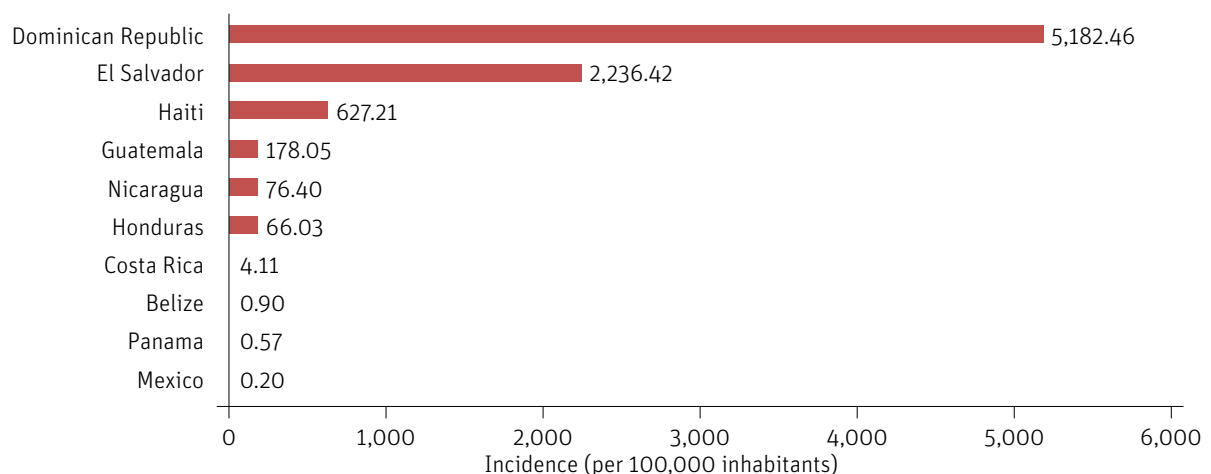
### Epidemiology of chikungunya in Mesoamerica

For Mesoamerica, a total of 719,157 suspected cases had been reported by EW 7 of 2015, with 2,832 laboratory-confirmed cases and 6 deaths. Figure 2.3 shows the cumulative incidences up to EW 7. As of that date, the average cumulative incidence for Mesoamerica, Dominican Republic, and Haiti was 426.2 cases/100,000 inhabitants; the broad differences among countries primarily reflect the degree of epidemiological evolution in each country.

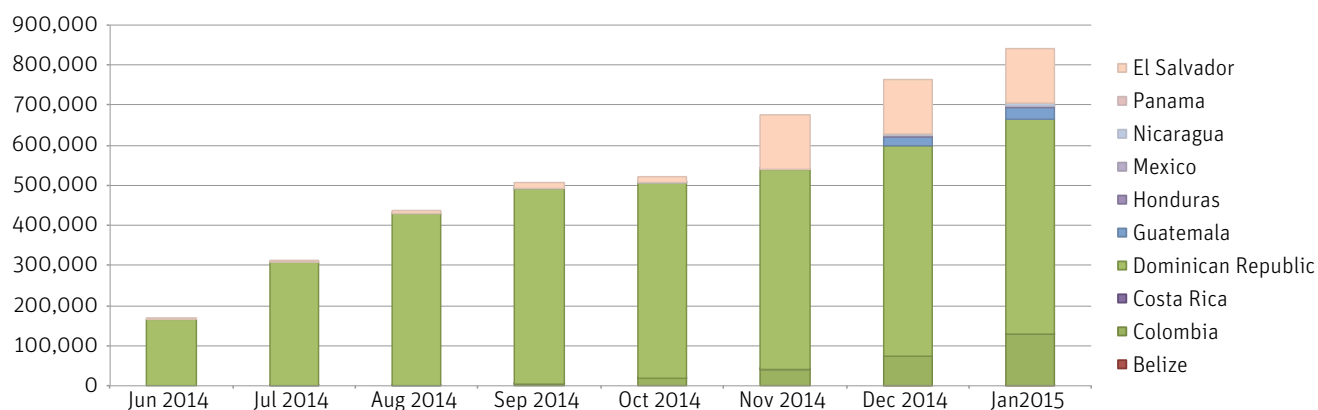
With regard to epidemiological surveillance, it bears noting that CHIK was a new disease in the region and that it was not included in the epidemiological information systems. Therefore, the countries adapted existing tools and reported the information on suspected and confirmed cases according to the PAHO/CDC definitions. The national focal points (NFP) for the International Health Regulations (IHR) made possible timely reporting of the establishment of indigenous circulation in a given country.

Figure 2.4 shows the epidemiological curve, by month, from the introduction of the CHIK virus into the

**Figure 2.3 Cumulative incidence of cases of CHIK in Mesoamerica, per country, as of February 2015**



Source: PAHO/WHO, CHA chikungunya.

**Figure 2.4 Epidemic curve of cases of CHIK in Mesoamerica, per year and month of notification, 2014-2015**

Source: PAHO/WHO, CHA chikungunya.

**Table 2.3 Summary of expected outcomes by MMP component**

Component	Expected Outcomes
Management	Implementation of the Integrated Management Strategy for Dengue and CHIK Prevention and Control based on the MMP
Epidemiology	Implementation of an integrated surveillance system for dengue and CHIK prevention and control
Laboratory	Establishment of laboratory surveillance for dengue and CHIK in all Mesoamerican countries
Patient care	Better clinical diagnosis and case management of dengue and CHIK in Mesoamerican countries
Integrated vector management	Reduction of dengue and CHIK entomological transmission risk in Mesoamerican countries
Environmental management	Specific multisectoral environmental management actions to reduce the risk of entomological dengue and CHIK
Vaccines	

Mesoamerican isthmus. Most of the cases correspond to Dominican Republic followed by El Salvador. Given the characteristics of the reported and published data, it is impossible to know or estimate the proportion of atypical or severe cases, or the occurrence of mother-to-child transmission.

The epidemiological situation arising from the dengue transmission season plus the introduction and sustained transmission of CHIK in the region calls for integrated efforts to prevent and control both diseases. The rapid spread of the CHIK virus, together with the simultaneous occurrence of cases or outbreaks of dengue, may cause a significant spike in the demand for medical care. For this reason, health networks and services must be prepared to meet the demand without sacrificing quality of care, and should be guided mainly by the PAHO/WHO recommendations on the clinical approach to patients with dengue or CHIK.

## 2.4 PLAN

### 2.4.1 Purpose and objectives

The purpose of the Dengue/CHIK MMP is to help reduce the social and economic effects of dengue and chikungunya in Mesoamerica, and its objective is to reduce the dengue case-fatality rate by at least 30% by 2020 and to keep the CHIK case-fatality rate below 1% through implementation of the MMP's different components.

Within the framework of the MMP, the Integrated Management Strategy for Dengue and CHIK Prevention and Control provides a comprehensive list of the components: surveillance, laboratory, patient care, integrated vector management, environment, and vaccines, as well as the promotion of scientific research and the key elements of mass communication across all of the components. The new model also emphasizes that these factors should be taken into account during implementation. Next,

the logical framework includes the different results, activities, and actions to be implemented at all levels within countries and at the subregional level.

## 2.4.2 Cross-cutting components

Every IMS-dengue and CHIK component should include the cross-cutting components of communication and health promotion and operations research.

### 2.4.2.1 Communication and health promotion

Communication and health promotion encourage individual and collective responsibility for preventing and controlling dengue and CHIK. They are linchpins in all the components of the Dengue/CHIK MMP; communication is indispensable for conveying physical, verbal, and written messages that influence public behavior, and health promotion is an essential public health function and a determining factor in quality of life.

### 2.4.2.2 Operations research

Operations research is fundamental for “discovery, development, and the realization of interventions”

(PAHO/WHO 2013) directed and/or targeted according to the spaces and conditions of each situation encountered in the dengue and CHIK prevention and control programs. It is a cross-cutting issue, given the importance of conducting operations research to generate evidence, such as: systematizing experiences; identifying new tools and work techniques; validating behaviors and educational materials; measuring the impact of interventions; and determining the cost/benefit of interventions.

## 2.4.3 Management component

The integrated management of dengue and CHIK prevention and control is the planning, organization, management, execution, evaluation and monitoring mechanism of a work strategy designed to reduce dengue and CHIK transmission factors through an approach that must be integrated and multidisciplinary (inter-institutional and cross-sectoral), and that contributes to political, strategic, and operational decision-making. Tables 2.4 and 2.5 management component expected results, indicators, activities and tasks are disaggregated.

**Table 2.4 Management Component: Expected Outcomes—Indicators—Sources of Verification—Assumptions**

Expected Outcomes	Indicators	Sources of Verification	Assumptions
Adjustment and implementation of the 2015 National IMS-Dengue/CHIK based on the Dengue/CHIK MMP	<ol style="list-style-type: none"> <li>100% of the countries of Mesoamerica with their 2015 National IMS-Dengue/CHIK implemented by the end of 2017 based on the Dengue/CHIK MMP</li> <li>70% of municipalities with the greatest risk of transmission of dengue and CHIK with the 2015 National IMS-Dengue/CHIK implemented by 2018</li> </ol>	<ul style="list-style-type: none"> <li>2015 National IMS-Dengue/CHIK document, based on the Dengue/CHIK MMP</li> <li>Reports from countries and GTI-dengue monitoring and evaluation reports</li> </ul>	Political commitment and availability of technical and financial resources from countries and other sources

**Table 2.5 Management Component: Activities—Tasks—Implementation Schedule—Responsible Parties**

Activity	Task	Implementation Schedule			Responsible Party
		S	M	L	
1. Update the 2015 National IMS-Dengue/CHIK based on the Dengue/CHIK MMP.	Keep the comprehensive situation analysis of dengue and CHIK up-to-date for stratification.	X	X	X	GTN-dengue/CHIK and health surveillance
	Define prevention and control objectives and actions according to the prioritization/targeting of risk.	X			GTN-dengue/CHIK
	Standardize criteria and competencies in the functional integration of the components of the 2015 National IMS-Dengue/CHIK.	X			GTN-dengue/CHIK
	Devise mechanisms for the implementation of the 2015 National IMS-Dengue/CHIK at all levels.	X			Parties responsible for 2015 IMS-dengue/CHIK
	Reorient/ readjust/adjust the technical, operational, and programmatic capacities of the national and subnational response team.	X	X		GTN-dengue/CHIK GTI-dengue
	Prepare and execute the monitoring and evaluation plan for implementing MMP at the regional level and within each country.	X	X		GTN-dengue/CHIK GTI-dengue
	Develop and conduct national workshops to bring the 2015 National IMS-dengue/CHIK in line with the Dengue/CHIK MMP.	X			GTN-dengue/CHIK GTI-dengue
2. Authorize the formation and operation of the multidisciplinary (inter-institutional and cross-sectoral) National Technical Group on dengue and CHIK.	Define the actors and functions using the legal framework and the approach of health determinants for dengue and CHIK.	X			GTN-dengue/CHIK proposes and decides the high-level authority, extra-sectoral commission or health council of the country
	Set a work timetable for the National Technical Group that includes a follow-up, monitoring, and evaluation plan.	X	X		National Technical Group on Vector-borne Disease (VBD)
	Prepare proceedings and technical recommendations.	X	X	X	
3. Keep political authorities informed of the epidemiological situation, its progress, and the requirements of the 2015 National IMS-Dengue/CHIK.	Prepare a managerial report with pertinent technical recommendations for managers or responsible municipal or local authorities.	X	X	X	Party responsible for the 2015 National IMS-dengue/CHIK
	Use the managerial report for political accountability of the results obtained.		X	X	High-ranking political authorities
	Hold managerial follow-up meetings at the regional level with respect to the 2015 National IMS-dengue/CHIK.	X		X	GTN-dengue/CHIK GTI-dengue PAHO/WHO

**Table 2.5 Management Component: Activities—Tasks—Implementation Schedule—Responsible Parties (cont.)**

Activity	Task	Implementation Schedule			Responsible Party
		S	M	L	
4. Update the communication strategies in the 2015 National IMS-Dengue/CHIK designed to improve the behaviors of key audiences.	Update formative <sup>7</sup> research on behaviors and practices.	X	X		Social scientists, academics, research groups, GTN-dengue/CHIK, and GTI-dengue
	Identify behavioral objectives for the target audiences.	X	X		Social scientists, academics, research groups, GTN-dengue/CHIK, and GTI-dengue
	Identify socially and culturally acceptable communication strategies.		X		Media group of the GTN-dengue/CHIK and GTI-dengue
	Implement and systematize the communication strategies identified by the GTN-dengue/CHIK.		X	X	GTN-dengue/CHIK and operational levels

#### 2.4.4 Epidemiology component

Epidemiological surveillance is a fundamental component of the integrated management of national strategies for preventing and controlling dengue and CHIK that will make it possible to provide timely, reliable, and quality information to design targeted interventions during and between epidemics.

This process should be part of the national health information system and should include monitoring and evaluating all the IMS-dengue/CHIK components through a set of standardized indicators. The generic integrated

surveillance model for dengue is currently being used, and for the first time it includes the real-time reporting of key indicators of the different IMS-dengue components. The model is presented with a general or national surveillance system and a surveillance subsystem in sentinel areas; it will make it possible to fill many information gaps that persist regarding dengue. Countries such as Mexico and El Salvador are currently making major progress and will play a key role in supporting the rest of the Region in its implementation. Indicators and expected results of this component are listed in Table 2.6 and activities and tasks in Table 2.7.

<sup>7</sup> Formative research is key to developing an evidence-based communication and mobilization strategy. It includes: search and analysis of the scientific bibliography; analysis of entomological indices of key recipients, epidemiological, clinical, and laboratory data; Identification of key social actors; qualitative research on health beliefs and practices; quantitative surveys on knowledge, attitudes, practices, and behavior (KAPB); surveys to determine media use and types of available communication channels; and prior testing of specific materials, messages, and behaviors.

**Table 2.6 Epidemiology Component: Expected Outcomes—Indicators—Sources of Verification—Assumptions**

Expected Outcomes	Indicators	Sources of Verification	Assumptions
Implementation of an integrated surveillance system for dengue and CHIK prevention and control	<ol style="list-style-type: none"> <li>100% of the Mesoamerican countries implement an integrated surveillance system for dengue and CHIK prevention and control by the end of 2019</li> <li>100% of the countries issue periodic epidemiological bulletins that contain an integrated analysis of the situation of dengue and CHIK as of 2017</li> </ol>	<ul style="list-style-type: none"> <li>National epidemiological bulletins</li> <li>Reports to PAHO/WHO</li> <li>Evaluation reports on GTI-dengue and GTN-dengue</li> <li>IMS-dengue progress reports from the countries</li> </ul>	Changes to the national regulatory structure

**Table 2.7 Epidemiology Component: Activities—Tasks—Implementation Schedule—Responsible Parties**

Activity	Task	Implementation Schedule			Responsible Party
		S	M	L	
1. Update the national surveillance standards for dengue and CHIK.	Integrate dengue and CHIK surveillance programs. Use the generic model of an integrated epidemiological surveillance system proposed for dengue as the basis.	X	X		GTN-dengue/CHIK
	Review and adjust operational definitions, indicators, integrated information flows, and the information technology platform.		X		GTN-dengue/CHIK
	Review and adjust the risk stratification criteria with an integrated approach.		X		GTN-dengue/CHIK
	Review and adjust the organization and operation of the situation rooms, especially in emergencies.		X		GTN-dengue/CHIK
2. Adapt the national surveillance systems and platforms with an integrated approach.	Develop workshop to standardize the methodologies of analysis and epidemiological surveillance indicators of dengue and CHIK in line with the regional generic integrated surveillance protocol.	X	X		GTN-dengue/CHIK
	Identify the technological requirements of the integrated system.		X		GTN-dengue/CHIK, Information technology department
	Establish the system's information outputs and command boards (dashboard).		X		Information technology department
	Plan the prevention and control response based on the analysis of information generated by the integrated surveillance system.		X	X	Information technology department
3. Lead Mesoamerican coordination and monitoring meetings on the implementation of integrated dengue and CHIK surveillance, taking advantage of the regional and subregional forums (COMISCA, SICA, Mesoamerican)	Submit the issue from the new surveillance system for political approval in regional and subregional forums.	X			Ministries of Health PAHO/WHO AMEXCID
	Devise Mesoamerican coordination and monitoring mechanisms.	X	X		Ministries of Health PAHO/WHO AMEXCID

## 2.4.5 Laboratory component

It is necessary to identify the viruses circulating in the different countries, which means that the laboratory plays a key role in the surveillance of dengue and CHIK. The subregion has prioritized the strengthening of national laboratories and quality management systems to ensure proper laboratory surveillance, standardized diagnostic algorithms and the classification of cases.

The Dengue Laboratory Network of the Americas (RELDA) has emphasized the role of the PAHO/WHO Collaborating Centers in implementing IMS-Dengue, working jointly with the National Reference Laboratories (NRL). There is a PAHO/WHO RELDA website that allows for constant interaction among the members of the network, especially for disseminating information

([http://www.paho.org/hq/index.php?option=com\\_content&view=article&id=4497&Itemid=39306&lang=en](http://www.paho.org/hq/index.php?option=com_content&view=article&id=4497&Itemid=39306&lang=en)).

The co-circulation of various arboviruses, the vaccination against yellow fever, the possible introduction of a vaccine for dengue in the Region of the Americas, and the emergence of the CHIK virus create a highly complex scenario for the etiological diagnosis of the disease and for research activities, and this should be taken into account by the national teams. It may be necessary to strengthen partnerships and step up the search for partners who support research development and allocating resources to this component.

Tables 2.8 and 2.9 show a disaggregation of the laboratory component: expected results, indicators and activities and tasks.

**Table 2.8 Laboratory Component: Expected Outcomes—Indicators—Sources of Verification—Assumptions**

Expected Outcomes	Indicators	Sources of Verification	Assumptions
Establishment of dengue and CHIK laboratory surveillance in every country of Mesoamerica	<ol style="list-style-type: none"> <li>100% of national laboratories or reference laboratories with productive capacity for serological, virological, and molecular diagnosis.</li> <li>100% of national laboratories or reference laboratories participate in an external quality assurance program (EQAP)</li> </ol>	<ul style="list-style-type: none"> <li>■ Surveillance system</li> <li>■ Results analysis and reports</li> <li>■ Report on capacity of national laboratories (RELDA)</li> <li>■ Reports on the quality review process</li> <li>■ Proficiency test results</li> <li>■ Budgetary reports</li> <li>■ Inventory of reagents/ supplies</li> </ul>	<ul style="list-style-type: none"> <li>■ Ensure a budget for laboratory</li> <li>■ Compliance with PAHO/WHO algorithms</li> <li>■ Trained HR</li> </ul>

**Table 2.9 Laboratory Component: Activities—Tasks—Implementation Schedule—Responsible Parties**

Activity	Task	Implementation Schedule			Responsible Party
		S	M	L	
1. Establish epidemiological and laboratory criteria for biological sampling according to surveillance protocols.	Create and update the algorithm for sampling and laboratory diagnosis, based on surveillance protocols.	X			Epidemiological Surveillance and Laboratory
	Disseminate and implement the diagnostic algorithm in the domestic networks of each country.	X			Epidemiological Surveillance and Laboratory
	Hold regional meeting with experts in order to review and adjust the diagnostic algorithm.	X			Epidemiological Surveillance and Laboratory PAHO/WHO (RELDA)
2. Strengthen the surveillance and response capacity of the region's laboratory network.	Promote implementation of reference techniques (serological, virological, and molecular) for diagnosing dengue and other arboviruses in the national laboratories.	X	X	X	WHOCC NRL PAHO/WHO (RELDA)
	Hold workshops to arrange transferring new technologies for the genomic characterization of the dengue strains and their patterns of circulation.	X	X	X	WHOCC NRL PAHO/WHO (RELDA)
	Arrange for the distribution of critical supplies and reagents for the support and continuity of laboratory surveillance. (Create an annual strategic fund of US \$50,000.)	X	X	X	NRL WHOCC PAHO/WHO (RELDA)
	Achieve systematic laboratory interactions with epidemiological surveillance, clinical management, and vectors components to ensure the adequate flow of information.	X	X	X	Epidemiological Surveillance Laboratory
3. Guarantee the quality of processes associated with laboratory diagnosis.	Promote development and implementation of quality control policies in national laboratories and domestic networks (proficiency tests).	X		X	NRL Ministries of Health
	Maintain a continuing education and training program for national laboratory network personnel, to include the latest scientific advances in the field.	X		X	NRL WHOCC
	Regularly review the quality processes and operations of the national laboratories and domestic networks.	X	X	X	NRL WHOCC PAHO/WHO
	Arrange for national laboratories to participate in an external quality assurance program (EQAP).	X	X	X	WHOCC NRL PAHO/WHO



**Table 2.9 Laboratory Component: Activities—Tasks—Implementation Schedule—Responsible Parties (cont.)**

Activity	Task	Implementation Schedule			Responsible Party
		S	M	L	
4. Develop research in response to epidemiological surveillance.	Identify research lines or priorities.	X	X	X	Epidemiological Surveillance and Laboratory
	Present and disseminate research findings.	X	X	X	Epidemiological Surveillance and Laboratory
	Lead, forge partnerships, and identify funding sources for operations research development (management).	X	X	X	Ministries of Health
5. Draft budget.	Prepare annual budget.	X	X	X	National Reference Laboratory
	Keep up-to-date inventory of supplies and reagents.	X	X	X	National Reference Laboratory

### 2.4.6 Patient care component

There is currently no specific treatment to prevent dengue and CHIK infections. However, prompt diagnosis, identification of warning signs, and treatment of symptoms following a differential diagnosis and identification of the epidemiological link are all key to patient care. Both infections have a wide spectrum of clinical manifestations that range from asymptomatic to severe forms that can lead to death, especially if they are not properly handled. In cases of CHIK, improper handling can also lead with much greater frequency to sub-acute and chronic forms of the disease.

To respond to outbreaks early, standardized case definitions are crucial. Decisive factors in managing both diseases are training for staff that see patients and reorganizing health services into different levels. It is also necessary to identify communication strategies directed at the person, family, and community that will help them identify the clinical signs so that they promptly seek health care services.

To help reduce the case-fatality rate of both diseases, it is necessary to:

- Improve the capacity of healthcare workers and ensure quality in both public and private health services.
- Have contingency plans that include reorganizing health services during outbreaks/epidemics.
- Optimize the response capacity of primary and secondary services.
- Adequately monitor sick patients at all times and, when the patient is going to remain at home, provide health care instruction to the patient and/or appropriate family member.

Table 2.10 details expected outcomes and indicators, and Table 2.11 shows activities and tasks.

**Table 2.10 Patient Care Component: Expected Outcomes—Indicators—Sources of Verification—Assumption**

Expected Outcomes	Indicators	Sources of Verification	Assumptions
Better clinical diagnosis and case management of dengue and CHIK in Mesoamerican countries	100% of the countries implement a training plan for diagnosing and managing patients	<ul style="list-style-type: none"> <li>■ Reports on training plans that have been devised</li> <li>■ Country guides implemented in each country</li> <li>■ Disseminated contingency plans</li> </ul>	<ul style="list-style-type: none"> <li>■ Political backing of health authorities for the implementation of the Dengue/CHIK MMP</li> <li>■ Availability of human, material, and financial resources at all levels of care</li> </ul>
	100% of the countries include the PAHO/WHO clinical management recommendations in their guides		
	85% of the countries' public and private health facilities have and apply contingency plans for the reorganization of health services		

**Table 2.11 Patient Care Component: Activities—Tasks—Implementation Schedule—Responsible Parties**

Activity	Task	Implementation Schedule			Responsible Party
		S	M	L	
1. Improve healthcare workers' capacity to ensure quality care in both public and private health services.	Print, distribute, and implement national guides on dengue and CHIK that are in line with PAHO/WHO recommendations.	X			Ministries of Health
	Conduct triage training, timely diagnosis, and clinical epidemiological criteria, mainly for personnel at the first and second levels of care.	X	X		Ministries of Health
	Perform quality-of-care audits with emphasis on dengue/CHIK fatalities and patients in serious condition.	X	X	X	Committee for the review of cases from local and national primary, secondary, and tertiary care units
	Implement, validate, and disseminate courses for training and updating HR in patient care.	X	X	X	HR training and education units
	Develop training workshops for public and private personnel on health services organization, including outbreak response.	X			Ministries of Health and GTN-dengue/CHIK
	Advocate to promote including dengue/CHIK issues in the curriculum used by healthcare human resources training entities.	X	X		Ministries of Health Academia

**Table 2.11 Patient Care Component: Activities—Tasks—Implementation Schedule—Responsible Parties (cont.)**

Activity	Task	Implementation Schedule			Responsible Party
		S	M	L	
2. Improve the response capacity of services at the first and second levels of care to reduce saturation of specialized hospitals.	Provide training to health facilities managers in management and organization of health services.	X	X	X	Ministries of Health GTN-dengue/CHIK
	Review and adjust the hospital contingency plan annually.	X	X	X	Ministries of Health GTN-dengue/CHIK
	Strengthen the capacity to manage patients with dengue (warning signs) in primary care units.	X	X	X	Ministries of Health GTN-dengue/CHIK
3. Finalize a classification of fatalities in suspected cases of dengue/CHIK and in patients with a fever but without a specific diagnosis, in both the public and private sectors.	Establish a mortality audit committee at the local, regional, and national levels.	X			Ministries of Health
	Refer deceased patients suspected of dengue/CHIK co-infection and fever patients without a specific diagnosis to pathology.	X	X	X	Ministries of Health
4. Comprehensively systematize educational messages on dengue and CHIKV with health promotion aimed at users of health services during care.	Contribute technical information for the preparation of educational material to be provided to patients and their family members.	X	X	X	Ministries of Health
	Provide educational talks, videos, and other forms of communication and education in the health units.	X	X	X	Ministries of Health
5. Develop clinical research.	Identify high-priority research needs.	X	X	X	Ministries of Health
	Include academia in research development.	X	X	X	Ministries of Health
	Plan and carry out operations research that makes it possible to evaluate key aspects of medical care at different levels.	X	X	X	Ministries of Health PAHO/WHO Academia

### 2.4.7 Integrated vector management component

The purpose of integrated vector management (IVM) is to improve the effectiveness and achieve the sustainability of vector prevention and control actions through rational decision-making that optimizes the use of resources. It should include the following processes:

- Selection of methods based on knowledge of vector biology, disease transmission, and morbidity
- Synergistic and synchronized utilization of multiple interventions
- Collaboration between the health sector and other public and private sectors involved in environmental management whose work can have an impact on vector reduction.
- Integration of families and other key partners (from the areas of education, finance, etc.) for prevention and control activities, particularly at the local level.

- Establishment of a legal framework conducive to an integrated and intersectoral approach.

The public has an important role in helping to implement sustainable vector control measures, but often fails to assume shared responsibility in helping to control breeding sites because of the structural history and paternalistic role of control programs. Furthermore, in cases where control measures are supported by an adequate legal framework, it is often not observed. The vector is found mainly inside residences, which makes it necessary to share responsibility for controlling mosquito breeding sites among individuals and their families,

leaving the programs to establish guidelines for specific activities such as entomological surveillance, chemical control, and resistance evaluation.

The results, obtained through implementation of the national IMS-dengue and the presence of the CHIK virus in the hemisphere, reveal the urgent need for the effective implementation of the IVM as a way to lower the entomological transmission risk of dengue and CHIK in our Region.

Logic framework of this component is detailed in Tables 2.12 and 2.13.

**Table 2.12 Integrated Vector Management Component: Expected Outcomes—Indicators—Sources of Verification—Assumptions**

Expected Outcomes	Indicators	Sources of Verification	Assumptions
Reducing the risk of entomological transmission of dengue and CHIK in the countries of Mesoamerica	1. 100% of countries implement a standardized entomological surveillance system in 2017	<ul style="list-style-type: none"> <li>■ Reports from countries (survey indicators and entomological verification)</li> </ul>	<ul style="list-style-type: none"> <li>■ Sustained political and technical commitment to entomological monitoring and vector control</li> </ul>
	2. 100% of countries execute the training plan on communication and community organization techniques for professional staff and entomology technicians in 2016	<ul style="list-style-type: none"> <li>■ Training plan and reports on execution and evaluation</li> </ul>	<ul style="list-style-type: none"> <li>■ The necessary resources—material, financial, and human (trained, and sufficient in number)—are available for entomological surveillance and vector control</li> </ul>
	3. 100% of countries implement the plan for monitoring and managing the resistance of vectors to insecticides in 2017	<ul style="list-style-type: none"> <li>■ Reports from countries (insecticide resistance and management plan)</li> </ul>	<ul style="list-style-type: none"> <li>■ Individual and community participation in physically eliminating breeding sites</li> </ul>

**Table 2.13 Integrated Vector Management Component: Activities—Tasks—Implementation Schedule—Responsible Party**

Activity	Task	Implementation Schedule			Responsible Party
		S	M	L	
1. Implement a standardized entomological surveillance system in the countries of Mesoamerica.	Experts meet to standardize the criteria for entomological surveillance (entomological indices, periodicity, and information system) across Mesoamerica.	X			National technical group IVM component GTI-dengue PAHO/WHO
	Prepare and implement an ongoing entomology training plan at the Mesoamerican level and within each country for professional and technical staff (Include needs assessment, training content, training program, etc.).	X	X	X	GTN-dengue/CHIK IVM component GTI-dengue PAHO/WHO
	Create, review, or update national guidelines on integrated vector management (IVM) in line with PAHO/WHO recommendations.	X	X		GTN-dengue/CHIK IVM component GTI-dengue PAHO/WHO
	Conduct a comprehensive analysis and issue reports on standardized entomological surveillance.	X	X	X	GTN-dengue/CHIK IVM component GTI-dengue PAHO/WHO
2. Train vector control personnel in communication and organizational techniques to encourage individual and community participation in controlling vector breeding sites.	Prepare and implement an ongoing entomology training plan for facilitators to teach communication and community organizational techniques to professional and technical staff (Include needs assessment, training content and training program).	X	X		GTN-dengue/CHIK IVM component and the GTI-dengue health promotion program PAHO/WHO
	Monitor and evaluate the impact in local areas served by vector personnel who are trained in communication and organizational techniques for individual and community participation.	X	X	X	GTN-dengue/CHIK IVM component Health promotion program
3. Participate in designing communication and education programs.	Conduct a situational assessment of the area where an intervention is planned (Assess social context, availability of household water, garbage collection, and type of breeding sites).	X	X		GTN-dengue/CHIK Area of health involved
	Develop communication and educational programs aimed at behavioral changes and sustainable environmental improvements that are consistent with the situational assessment of the area where an intervention is planned.	X	X		National health promotion with GTN-dengue/CHIK

**Table 2.13 Integrated Vector Management Component: Activities—Tasks—Implementation Schedule—Responsible Party (cont.)**

Activity	Task	Implementation Schedule			Responsible Party
		S	M	L	
4. Ensure efficient and effective vector control, and rational use of insecticides.	Promote development of new vector control strategies under an IVM approach and incorporate new, proven, validated, and approved tools.	X	X	X	GTN-dengue/CHIK GTI-dengue PAHO/WHO
	Establish a system to monitor the quality and effectiveness of insecticide applications (Assess personnel, equipment, insecticides, resistance, and standards).	X	X	X	PAHO/WHO GTN-dengue/CHIK
	Hold training workshop on insecticide management and application (covering equipment calibration, discharge rate, droplet size, preparation of field formulations, and technique for applying insecticide).	X	X	X	GTN-dengue/CHIK IVM component GTI-dengue PAHO/WHO
	Supervise and evaluate the control operations and their impact.	X	X	X	GTN-dengue/CHIK IVM component

### 2.4.8 Environmental management component

The transmission of dengue and CHIK is affected by several social and environmental factors that cannot be changed exclusively by health sector interventions. For this reason, both IMS-dengue and the WHO Global Strategy for 2012-2020 emphasize an intersectoral and inter-institutional approach for their proper implementation.

Cooperation is needed from actors outside the health sector—from the ministries of agriculture, the environment and water resources, and from municipal authorities and private corporations. Their cooperation is based on the conviction that investments in health are worthwhile and will result in greater opportunities for success and sustainability and, ultimately, that their projects will be financially profitable. These actors are part of a community that is collectively responsible for taking daily measures to implement healthful domestic and local habits to control breeding sites.

It is important to create and put in place a legal framework that makes it possible to reduce the number of the most common breeding sites created by private

industry and at private residences—such as discarded plastic containers and discarded tires, household barrels/storage tanks with inadequate screening, and other household containers that serve as breeding sites.

Several countries in the Region (Brazil, Costa Rica, El Salvador, Panama and Paraguay) have laws to encourage the elimination of breeding sites. However, issues such as climate change, uncontrolled and unplanned urbanization, inadequate solid waste collection, and unreliable water supplies (which force people to store water unsafely) require political and financial support at the highest level and the collaboration of all actors, including international cooperation.

Another important issue is that individuals and families may make only limited efforts to physically control breeding sites on their property and around their home. A multidisciplinary team is needed to investigate the causes, with a view to the culture and special features of each area within every country.

Tables 2.14 and 2.15 detail expected results, indicators, activities and tasks of this component.

**Table 2.14 Environmental Management Component: Expected Outcomes—Indicators—Sources of Verification—Assumptions**

Assumptions	Indicators	Sources of Verification	Supuesto
Execution of specific cross-sectoral environmental management actions to reduce the risk of entomological dengue and CHIK	<ol style="list-style-type: none"> <li>100% of countries with working groups officially formed in 2017</li> <li>100% of countries execute cross-sectoral plans in 2017</li> </ol>	<ul style="list-style-type: none"> <li>Reports from countries (participating entities, management agreements and compliance)</li> <li>Plans drafted</li> <li>Monitoring and supervisory visits</li> </ul>	<ul style="list-style-type: none"> <li>There is ongoing political commitment at the highest level.</li> <li>Entities working on issues of environmental management and transmission risks actively participate in the working groups.</li> <li>A legal framework on environment and health, and management agreements with the involved institutions, are observed.</li> </ul>

**Table 2.15 Environmental Management component: Activities—Tasks—Implementation Schedule—Responsible Parties**

Activity	Task	Implementation schedule			Responsible Party
		S	M	L	
1. Form the cross-sectoral group based on the mapping of public and private sector actors involved in environmental management at the national and subnational levels.	Identify social actors and establish responsibilities in accordance with the sphere of activity, for its execution.	X	X		Ministry of Health GTN-dengue/CHIK and Departmental (Municipal) GT-dengue/CHIK
	Plan and carry out cross-sectoral activities of environmental management in order to reduce entomological risk.	X	X	X	GTN-dengue/CHIK and Departmental (Municipal) GT-dengue/CHIK
	Monitor and evaluate actions.	X	X	X	GTN-dengue/CHIK and Departmental (Municipal) GT-dengue/CHIK
	Hold regional inter-sectoral meeting with entities responsible for water, waste management, and housing.	X			Those responsible for the environmental component of the GTN-dengue/CHIK and GTI-dengue
2. Apply environmental management laws and regulations that reduce entomological risk and help prevent dengue and CHIK.	Implement a program with these three basic components:				
	<ul style="list-style-type: none"> <li>Safe water management (free from breeding sites).</li> <li>Final waste disposal (for tires, plastics, and refuse).</li> <li>Safe housing (with protective measures that keep residents from coming into contact with the vector).</li> </ul>	X	X	X	GTI-dengue/CHIK GTN-dengue/CHIK and Departmental (Municipal) GT-dengue/CHIK

### 2.4.9 Vaccine component

This component has been added to the Dengue/CHIK MMP based on the recommendations made at the state of the art meeting on implementing IMS-dengue. It was noted at that meeting that a dengue vaccine is expected to become available in the medium term, and it was suggested that regional and national strategies bear in mind that the vaccine's introduction should occur within the framework of IMS-dengue (2015), and that it should be a future component of that strategy. The vaccine will be an additional component that will contribute to achieving the Dengue/CHIK MMP objectives.

WHO criteria should be considered when introducing the vaccine and it is crucial to have solid scientific and technical evidence of its efficacy. It is expected that every vaccine available on the market will be effective, efficacious, and safe for the four serotypes of dengue, as well as accessible and affordable.

Each country should determine its own strategy for introducing the vaccine. However, it is recommended that they have the necessary epidemiological information and relevant scientific evidence, including but not limited to: disease burden; review of the national legal framework; adjustments to immunization programs; improvements in the epidemiological information system; operations research; and health economics studies.

It was agreed not to develop tasks for this component; once some of the vaccines are available, a workshop can be held with immunization experts and personnel from the countries of the different GTI-dengue areas, and an integrated strategy can be followed.

### 2.4.10 Facilitating factors

During the most recent years of implementation of IMS-dengue in the Region, and as a result of the monitoring and evaluation processes, it was noted repeatedly that different factors facilitated the level and degree of progress in every country or territory. These factors were not directly targeted as key elements of the IMS-dengue process; however, they were included permanently in different parts of the document. The operational model of the WHO global strategy for dengue prevention and control for 2012-2020 subsequently identified these factors as key elements in the implementation process. Finally, during the adjustment and review process of IMS-dengue for the Region of the Americas, these elements were included as facilitating factors that strongly determine the degree of progress that can be achieved in each country or territory.

The facilitating factors of the current Dengue/CHIK MMP include:

#### 2.4.10.1 Advocacy

Advocacy has been critical since the initial preparation of the integrated management strategies for dengue and CHIK prevention and control. To be effective, advocacy must convey the importance and potential success of the strategy through communication, dissemination of information, and persuasion at all levels. Advocacy should start with national technical resources, which, to be effective, must show the country the importance and benefits of implementing the new methodological approach.

Where the Dengue/CHIK MMP will be implemented, the advocacy process should involve the decision-making and managerial levels of the health sector and should continue with increasing strength and conviction until the efforts expand beyond the sector. Extra-sectoral advocacy efforts must include governmental, nongovernmental, national, and local actors, and even the private sector. To ensure that community-based interventions are sustainable, the general public must also be included as a key participant.

The advocacy process is not limited to a single component of the Dengue/CHIK MMP; rather, it should be inherent in all components and included at the highest managerial level. This item should be constantly on our agenda to ensure that the process of implementing the strategy can be sustained.

#### 2.4.10.2 Partnerships

Dengue is a problem of such magnitude and the response to it is of such technical complexity that it cannot be the sole responsibility of the health sector. Even with the best, most perfectly developed technical strategies, it would be impossible to have an impact on many of the indicators of this disease. Morbidity is one such indicator, due to the tremendous adaptability of the vector transmitter—the *Ae. aegypti* mosquito—to domestic life and the diversity of breeding sites found within and around residential housing. Currently, controlling the disease depends primarily on vector control, so strategic partnerships are needed to increase and improve interventions on domestic mosquito breeding sites. Schools, workplaces, ministries, churches, and the general public should join forces in combatting the vector to achieve greater physical and/or chemical control. (Chemical control entails complex specialized measures that include the use of pesticides that must be handled in a controlled fashion by the health sector.) The problem requires a comprehensive response, not one that is just sector-



based; all types of partnerships are key for preventing and controlling vector transmission.

#### 2.4.10.3 Resource mobilization

Major historical problem with vector control strategies has been the resource gap. Some programs currently have the resources necessary for surveillance and vector control activities, but none have resources sufficient to address the complexity of the transmission factors. Within the framework of the current Dengue/CHIK MMP, resource needs must be substantially met to improve technical activities in the short- and medium-term. Vector control experts often remark that dengue outbreaks are controlled with surplus resources, not with resources that are lacking. We should modify this remark: Adequate planning for all types of resources (human, material, and financial) is necessary for appropriate surveillance and control of the disease, and we must acknowledge that if we are to permanently rid ourselves of these diseases through public policies and sustainable development strategies, it will require major investments in both the social and environmental sphere.

#### 2.4.10.4 Capacity-building

Permanently strengthening and developing national capacities is one mission of our organization, as well as a permanent mission of our countries' health systems. The operational model of IMS-dengue/CHIK requires us to be very proactive in training personnel within each component of each country. In order to improve the response to the disease and achieve greater impact, personnel must have a technical background in their area of expertise and must be skilled in interacting and integrating scientific thought with the other components.

For some components, such as the IVM component, there are few new tools for the work; ongoing research is needed for new tools, technologies or methodologies that can improve the current levels of control. The search for partnerships with other sectors, including academia and prominent scientific institutions or centers, should be ongoing. Good planning efforts should go beyond the daily work and allow us to plan and carry out research that ultimately provides us with better abilities in prevention and control.

## 2.5 MONITORING AND EVALUATION

During the initial efforts in Latin America to implement an IMS-dengue, the monitoring and evaluation process was carefully planned. In the last five years of implementation, 22 countries were externally evaluated and the logical frameworks of the national IMS-dengue intervention included the different process indicators or impact that would be monitored by the national teams and the GTI-dengue.

It should be noted that in the current national IMS-dengue/CHIK interventions, managing the indicators of impact on control is quite difficult. Furthermore, the indicators will be imprecise due to the transmission dynamic of both diseases and the diversity of environmental and social transmission factors. Accordingly, a great deal of importance will be placed on the process indicators and on monitoring the quality of the technical work, which is something that can and should be improved.

It is crucial that countries have good national indicators and internal evaluation and monitoring processes at the subnational levels, regardless of the degree to which the work performed within the components is integrated. The level of responsibility should be very clear, to ensure the measures needed to continually promote the implementation process are taken. The GTI-dengue will continue to conduct comprehensive external evaluations in each Mesoamerican country.

## 2.6 BUDGET

The following budget includes the funding gap broken down by component for the Dengue/CHIK MMP project, which will be implemented over three years. To develop this budget, tasks that require funding have been extracted; the rest will be financed with funds from the 10 Mesoamerican countries, demonstrating their commitment to reducing the social and economic burden of dengue and CHIK in Mesoamerica. A funding gap of US \$2,282,600 is estimated for executing all the activities of the MMP during these three years. Budget details are shown in Table 2.16.

**Table 2.16 Regional Budget for the Dengue/CHIK MMP by Component, Tasks, and Implementation Schedule (In USD)**

Component	Tasks	Description	Implementation Schedule			Cost
			Year 1	Year 2	Year 3	
Management Component	Prepare and execute the monitoring and evaluation plan for implementing the MMP at the regional level and within each country.	Technical assistance to each country with the participation of 5 experts	X	X		125,000
	Develop and implement national workshops to bring the 2015 National IMS-dengue/CHIK into line with the Dengue/CHIK MMP.	Training in each Mesoamerican country	X			150,000
	Hold regional managerial follow-up meetings on the 2015 National IMS-dengue/CHIK.	Two meetings with representatives of the Mesoamerican countries	X		X	80,000
<b>TOTAL Management Component</b>						<b>355,000</b>
Epidemiology Component	Standardize the methodologies of analysis and dengue and CHIK epidemiological surveillance indicators in accordance with the regional generic integrated surveillance protocol.	Regional technical assistance with the participation of representatives of the Mesoamerican countries	X	X		240,000
<b>TOTAL Epidemiology Component</b>						<b>240,000</b>
Laboratory Component	Review and adjust the diagnostic algorithm.	Technical meeting with 8 experts to adjust algorithms	X			40,000
	Cooperate to ensure that new technologies for the genomic characterization of the dengue strains and their patterns of circulation are transferred.	A regional workshop with participation of representatives of the Mesoamerican countries	X	X	X	120,000
	Arrange for the distribution of supplies and critical reagents for the support and continuity of laboratory surveillance.	Creation of a strategic fund. Annual expenditures of \$50,000 for 3 years	X	X	X	150,000
	Promote the development and implementation of quality control policies in the national laboratories and domestic networks.	Administration of proficiency tests	X		X	40,000
	Maintain a training and continuing education program for national laboratory network personnel and include the latest scientific advances in the field.	National training in all the Mesoamerican countries	X	X	X	200,000
	Regularly review the quality and operational processes of the national laboratories and domestic networks.	Technical missions to each country	X	X	X	75,000
<b>TOTAL Laboratory Component</b>						<b>625,000</b>

**Table 2.16 Regional Budget for the Dengue/CHIK MMP by Component, Tasks, and Implementation Schedule  
(In USD) (cont.)**

Component	Tasks	Description	Implementation Schedule			Cost
			Year 1	Year 2	Year 3	
Patient Care Component	Implement national dengue and CHIK guidelines consistent with PAHO/WHO recommendations.	Printing, translation, and distribution of guides	X			50,000
	Perform quality-of-care audits with emphasis on patients in serious condition and on dengue/CHIK fatalities.	External evaluation missions to each country	X	X	X	50,000
	Implement, validate, and disseminate courses for the training and updating of HR in patient care.	Annual regional workshops with all Mesoamerican countries	X	X	X	240,000
	Plan and conduct operations research that makes it possible to evaluate key aspects of medical care at different levels.	Multi-centric regional research	X	X	X	80,000
<b>TOTAL Patient Care Component</b>						<b>420,000</b>
Integrated Vector Management Component	Standardize the entomological surveillance criteria (entomological indices, periodicity, and information system) across Mesoamerica.	Meeting with experts in entomology	X			40,000
	Prepare and implement a plan of ongoing entomology training for professional and technical staff within each country and at the Mesoamerican level.	Regional technical assistance in entomology	X	X	X	130,000
	Prepare and implement an ongoing training plan for professional and technical staff on communication and community organization techniques.	Annual regional facilitators' course	X			40,000
	Hold human resources training workshop on insecticide management and application.	One regional workshop per year	X	X	X	120,000
<b>TOTAL Integrated Vector Management Component</b>						<b>330,000</b>
Environmental Management Component	Hold intersectoral regional meeting with entities responsible for water, waste, and housing.	Regional meeting with experts and entities responsible for water, waste management, and housing in Mesoamerican countries				50,000
<b>TOTAL Environmental Management Component</b>						<b>50,000</b>
<b>SUBTOTAL</b>						<b>2.020.000</b>
<b>13% PSC</b>						<b>262.600</b>
<b>TOTAL</b>						<b>2.282.600</b>

## 2.7 CONSOLIDATED SWOT DIAGRAMS DEVELOPED WITH THE COUNTRY TEAMS

As part of the preparation of the Dengue/CHIK MMP, meetings were coordinated with the PAHO/WHO

representation offices in the Mesoamerican countries. The national teams responsible for developing a SWOT analysis for dengue and CHIK provided input for preparation of the plan. The comprehensive findings of these analyses are as follows:

### Strengths

- All countries have national IMS-dengue plans.
- National regulations exist for clinical management, organizing services, and monitoring dengue and CHIK patient care.
- Most countries provide political backing and budgetary support for IMS-dengue plans.
- At least one staff member is trained in each IMS-dengue component (laboratory, patient care, surveillance, vector control, risk communication), and International Health Regulations (IHR).
- Mexico and El Salvador have national epidemiological surveillance systems with recent, significant advances and real-time systems that serve as a reference point for other countries.
- Data about the status of dengue is analyzed weekly throughout the country.
- New health models (organization and functions) have been established that make it possible to improve national IMS-dengue agencies.
- Most countries have a consolidated national laboratory network that monitors viral circulation, with quality control supported by RELDA.
- Some countries of the subregion (e.g., Colombia and Mexico) have adequate human and financial resources to support the development of operations research.
- In Mexico, work is underway to evaluate insecticide resistance—work that could involve other Mesoamerican countries.

### Opportunities

- Growing support of high-ranking government authorities.
- Existence of intersectoral committees in all countries.
- Development of policies that facilitate multisectoral coordination.
- Other potential funding sources that make it possible to support less-developed components of the IMS-dengue, such as IVM.
- Stronger intersectoral interventions to address dengue and CHIK with increased support from private business and the media.
- Local governments with participatory health budgets.
- Existing legal framework that supports the actions.
- Legislative proposals to modify construction standards of public housing in areas where vector-borne diseases are endemic.
- Availability and development of technological infrastructure, such as GIS, in countries.
- Regional projects to standardize operational definitions and indicators of structure, process and outcome (Generic Integrated Protocol for Dengue Surveillance in the Americas).
- Institutions, in some countries, with experience in education, operational resource training, and research.
- Development and strengthening of primary health care (PHC).
- Experience, in some countries, of working under an approach of epidemiological/entomological risk-stratification.
- Technical PAHO/WHO assistance with support from WHO Collaborating Center (WHOCC) and GTI-dengue.
- Possibility of obtaining resources for the intensification of national and international CHIK and dengue training programs.

## Weaknesses

- Financial resources are limited and available primarily during outbreaks/epidemics.
- There are too few trained personnel, particularly in IVM (entomologists) and in mass communication.
- Managers' workload is excessive.
- Staff turnover at all levels is high.
- CHIK has no budget.
- National standards for some components, such as IVM, are outdated.
- Monitoring compliance to standards is not systematic, nor are the evaluations of actions.
- There is duplication of efforts among health ministries and other institutions of the sector.
- At the local level, there is no IMS-dengue implementation plan.
- The technical components of IMS-dengue are disjointed.
- Operations research is limited.
- Administrative processes prevent financial resources from reaching programs and services for which they are allocated and in a timely way.
- Media campaigns are not systematic and the director of health promotion participates only minimally.
- Educational programs for professional healthcare personnel are not adapted to the countries' epidemiological needs.
- Physicians and paramedics do not have clinical management experience with CHIK patients.
- Lessons learned during outbreaks are not taken into account for future contingent situations.
- Leadership in the health sector is insufficient to effectively guide the different institutional and societal efforts.

## Threats

- Public participation is limited.
- When operational personnel leave, they are not replaced.
- The approach to dealing with social determinants (water, sanitation, uncontrolled urbanization, etc.) is inadequate.
- Government budget policies make it difficult to fill staff vacancies that are created by funding cuts (national and cooperation funds).
- Authorities change periodically following state and municipal elections.
- National intersectoral committees become disjointed after a change of political authorities.
- Program components are disjointed.
- Populations migrate abroad and to the interior of the countries, from endemic to non-endemic areas.
- The possibility of a new vaccine being introduced generates exaggerated expectations.
- Insecticide manufacturers and distributors thwart rational insecticide management by contesting the findings of resistance studies.
- The public demands the use of insecticides but does not participate in eliminating vector breeding sites at residential housing.
- Irrational management of insecticides for agricultural and urban use continues to foster vector resistance since few options are currently available.
- Unsafe conditions in neighborhoods and communities hinder work in those areas.
- During major outbreaks (CHIK), hospitals are stretched beyond capacity.
- Market availability of rapid tests is not recommended by health authorities.
- Climate change presents additional environmental hurdles.



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*PAHO's regional mandate to combat malaria is guided by existing global, regional, and country goals.*

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# **Chapter 3**

## **Mesoamerican Master Plan to Improve Malaria Control with the Goal of Elimination**

## 3.1 BACKGROUND

### Policies, strategies, and plans implemented

PAHO's regional mandate to combat malaria is guided by existing global, regional, and country goals. In 2005, PAHO brought together representatives of several sectors with partners working in the field of malaria for consultation and wide-ranging discussion. The focus: developing and consolidating policy and programming guidelines for the member countries and institutions to use in malaria prevention and control in the Region. The result of this effort was the 2006–2010 Regional Strategic Plan for Malaria in the Americas.

This strategic plan was updated in 2011 in the Strategy and Plan of Action for Malaria (2011-2015), and approved unanimously by the PAHO Directing Council in Resolution CD51.R9 dated 09/26-30/2011. The strategy and plan of action is consistent with the Global Technical Strategy (GTS) of the WHO Global Malaria Program. Currently, the Global Technical Strategy is under development for the 2015-2025 period, which will be adapted for the next PAHO Strategy and Plan of Action for Malaria (2016-2020).

In addition to developing the Strategy and Plan of Action for Malaria in the Americas, this period saw significant progress and new policies providing additional guidelines for malaria work in the Region:

- CD49/9: Elimination of Neglected Diseases and other Poverty-related Infections (September 2009), which includes malaria among the list of diseases that can be eliminated in some areas.
- The Global Malaria Action Plan (2008).
- CD48/13: Integrated Vector Management: A Comprehensive Response to Vector-Borne Diseases (September 2008), which promotes integrated vector management as an essential part of managing vector-borne diseases in the Region.
- CSP27.R11: The 27th Pan American Sanitary Conference: Malaria in the Americas (July, 2007) dictated the mandate to commemorate Malaria Day in the Americas on November 6 of every year.
- CSP27.R10: The 27th Pan American Sanitary Conference: Regional Policy and Strategy for Ensuring Quality of Health Care, including Patient Safety.
- WHA60.18: Malaria, including the proposal for establishment of World Malaria Day.
- WHA60.25: Integrating gender analysis and actions into the work of WHO: draft strategy.

- CD47.R18: Health of the Indigenous Peoples of the Americas.

Other objectives and initiatives relevant to the global malaria problem that continue to reaffirm the role of PAHO in the challenge posed by malaria in the Americas also include:

- The United Nations (UN) Millennium Development Goals (MDG) (September 2000), especially MDG 6: combat HIV/AIDS, malaria and other diseases.
- World Health Assembly Resolution WHA58.2 operationally defined the UN - MDG goal for malaria as a reduction of at least 50% (i.e., reducing malaria by half) by 2010, and a 75% reduction in malaria cases by 2015.
- The Roll Back Malaria Partnership (RBM) (October 1998) to reduce malaria by half in 2010.
- The Global Malaria Control Strategy (GMCS) (October 1992).
- Resolutions issued at the last World Health Assembly and at several WHO and PAHO meetings and conferences:
  - Resolution of the 46th Directing Council of PAHO: Malaria and the Internationally Agreed-Upon Development Goals, Including Those Contained in the Millennium Declaration (CD46.R.13; September 30, 2005).
  - 58th World Health Assembly: Malaria control (WHA58.2; May 23, 2005)/ 115th Session of the Executive Board: Malaria (EB115.R14; January 24, 2005).
  - CD45.R3: Millennium Development Goals and health targets.
  - CD44.R6: Primary health care in the Americas: the lessons learned during 25 years and the future challenges.
  - 26th Pan American Sanitary Conference: Acquired Immunodeficiency Syndrome (AIDS) in the Americas (CSP26.R12; September 23–27, 2002).
  - Resolutions of the 42nd Directing Council of PAHO: Roll back malaria in the Region of the Americas (CD42.R15; September 25–29, 2000).
  - 52nd World Health Assembly: Roll Back Malaria Partnership (WHA52.11; May 24, 1999).

In implementing the Strategic Plan for Malaria (2011-2015) in Mesoamerica, the PAHO/WHO Regional Malaria Program is supported by the Amazon Malaria Initiative (AMI), financed by the United States Agency for International Development (USAID); the Initiative



to Eliminate Malaria in Mesoamerica and the Island of Hispaniola (EMMIE), funded by the Global Fund against HIV, TB, and Malaria; and the Haiti Malaria Elimination Consortium (HaMEC), funded by the Bill and Melinda Gates Foundation, which supports Dominican Republic.

The PAHO/WHO partners for the implementation of those initiatives include the U.S. Centers for Disease Control (CDC), the Carter Center, and the Clinton Health Access Initiative (CHAI).

### 3.2 CURRENT STATUS OF MALARIA IN THE MESOAMERICAN REGION

A closer look at the group of 10 countries in this subregion shows that the reduction is even sharper in Mesoamerica. A total of 66,380 cases of malaria were reported in 2013, 78% of them by Colombia. This represents a 75% reduction in morbidity since the year 2000.

The principal vectors for the transmission of malaria are *Anopheles darlingi*, *An. albimanus*, and *An. pseudopunctipennis*, and the two main parasitic species are *Plasmodium vivax* (69%) and *P. falciparum* (30%).

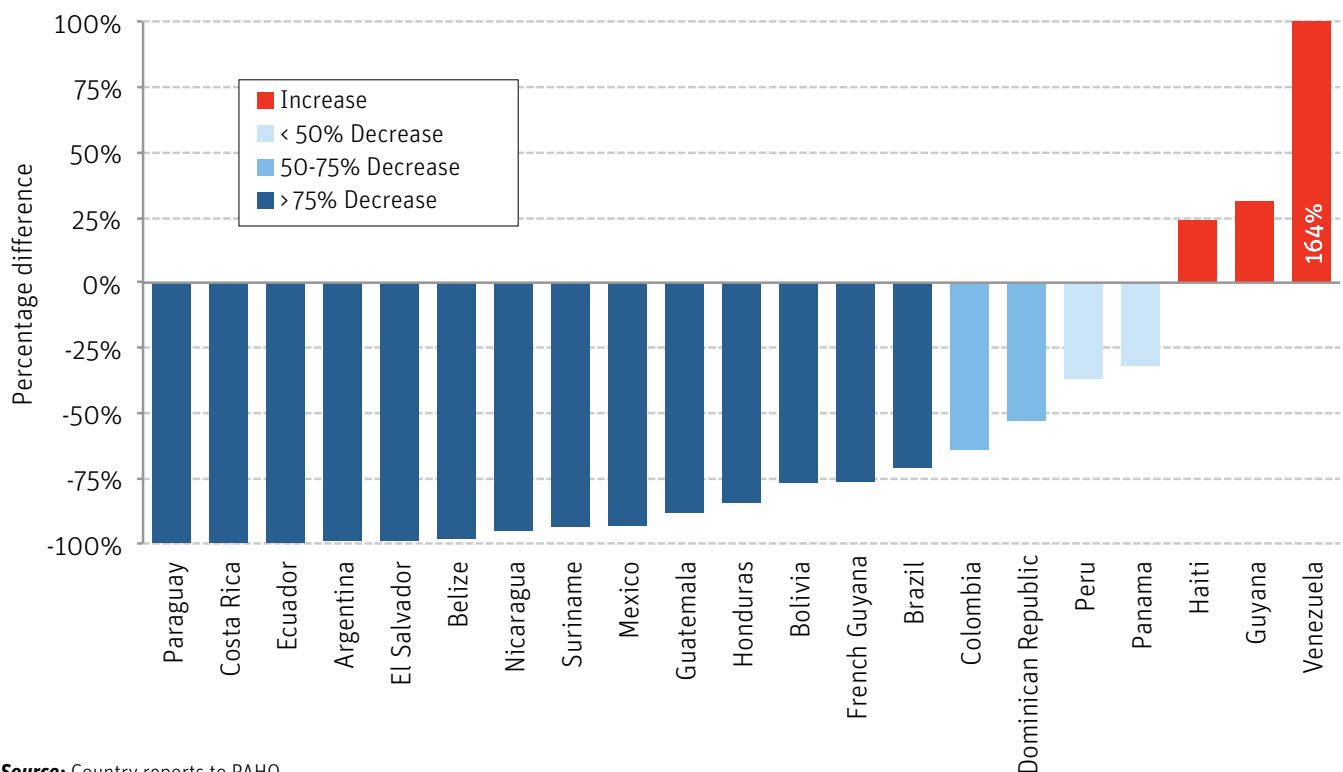
Due to the sharp reductions and the advances that are evident in this subregion, 4 of the 10 countries

(Belize, Costa Rica, El Salvador, and Mexico) are currently considered by PAHO/WHO to be in the pre-elimination phase. The rest of the countries are currently in the control phase, reorienting their actions toward pre-elimination and eventual elimination.

Malaria patterns in Mesoamerican countries have particular characteristics that should be considered in designing and implementing strategies to improve control and seek elimination. In Mesoamerica, the countries with the highest malaria burden are Honduras and Guatemala. However, the last decade has seen a notable decline in the transmission of the disease throughout the Region.

If we analyze the situation in the countries of Central America at the municipal level during 2010, 2011, and 2012, and if we classify the information into three specific strata—stratum 1 (municipalities without indigenous cases in these 3 years), stratum 2 (< 1 case per 1,000 inhabitants in the three years), and stratum 3 (>1 case per 1,000 inhabitants in one or more of those years)—the results show that the majority of municipalities (66%) in the countries of this subregion fall within stratum 1, followed by 27% in stratum 2, and 8% in stratum 3. In the case of Mexico, 96% of municipalities are in stratum 1 (Table 3.1).

Figure 3.1 Percentage of reduction in confirmed cases in the Americas, per country, 2000-2013



Source: Country reports to PAHO.

**Table 3.1 Number of municipalities by stratum and by country, 2010-2012**

Country	Stratum 1 (without indigenous cases)	Stratum 2 (< 1 case per 1000 inhabitants)	Stratum 3 (>1 case per 1000 inhabitants)	Total
Belize*	1	4	1	6
Costa Rica	71	9	1	81
El Salvador	249	13	0	262
Guatemala	167	128	37	332
Honduras	153	107	38	298
Nicaragua	105	39	9	153
Panama	45	24	6	75
<b>Central America</b>	<b>791 (66%)</b>	<b>324 (27%)</b>	<b>92 (8%)</b>	<b>1,207</b>
Mexico	2,357 (96%)	87 (3.54%)	13 (0.52%)	2,457

**Source:** Country reports to PAHO.

\*National division by districts (administrative level).

Using the current PAHO reporting system, the stratification of cases of malaria in the vulnerable populations identified by each country was analyzed, with findings as follows:

### 3.2.1 Cases of malaria in indigenous populations

Cases among indigenous populations in countries of the subregion are concentrated in Colombia, Guatemala, Honduras, Mexico, and Panama, as shown in Figure 3.2.

In the last six years (2008-2013), Belize, Costa Rica, and El Salvador did not report any cases of malaria in indigenous populations; Guatemala only reported cases in 2008; Honduras has reported cases in these populations since 2011 and Nicaragua since 2013 (Annex 1).

### 3.2.2 Cases of malaria in pregnant women

The cases of malaria in pregnant women are concentrated in Colombia, Honduras, Nicaragua, and Panama, as shown in Figure 3.3.

Belize and Costa Rica did not report any cases of malaria in pregnant women in recent years; El Salvador and Guatemala have irregular reports; Mexico has no available data; and Dominican Republic does not provide data (See Annex 1). Under-reporting of cases cannot be ruled out in the countries that did not provide data.

### 3.2.3 Cases of malaria in border areas

The following countries report cases in border areas: Colombia, Dominican Republic, El Salvador, Mexico, and Panama, as shown in Figure 3.4 (See Annex 1).

Under-reporting of cases cannot be ruled out in the countries that did not provide data.

Figure 3.2 Cases of malaria in indigenous populations Mesoamerica, by country and by year, 2008-2013

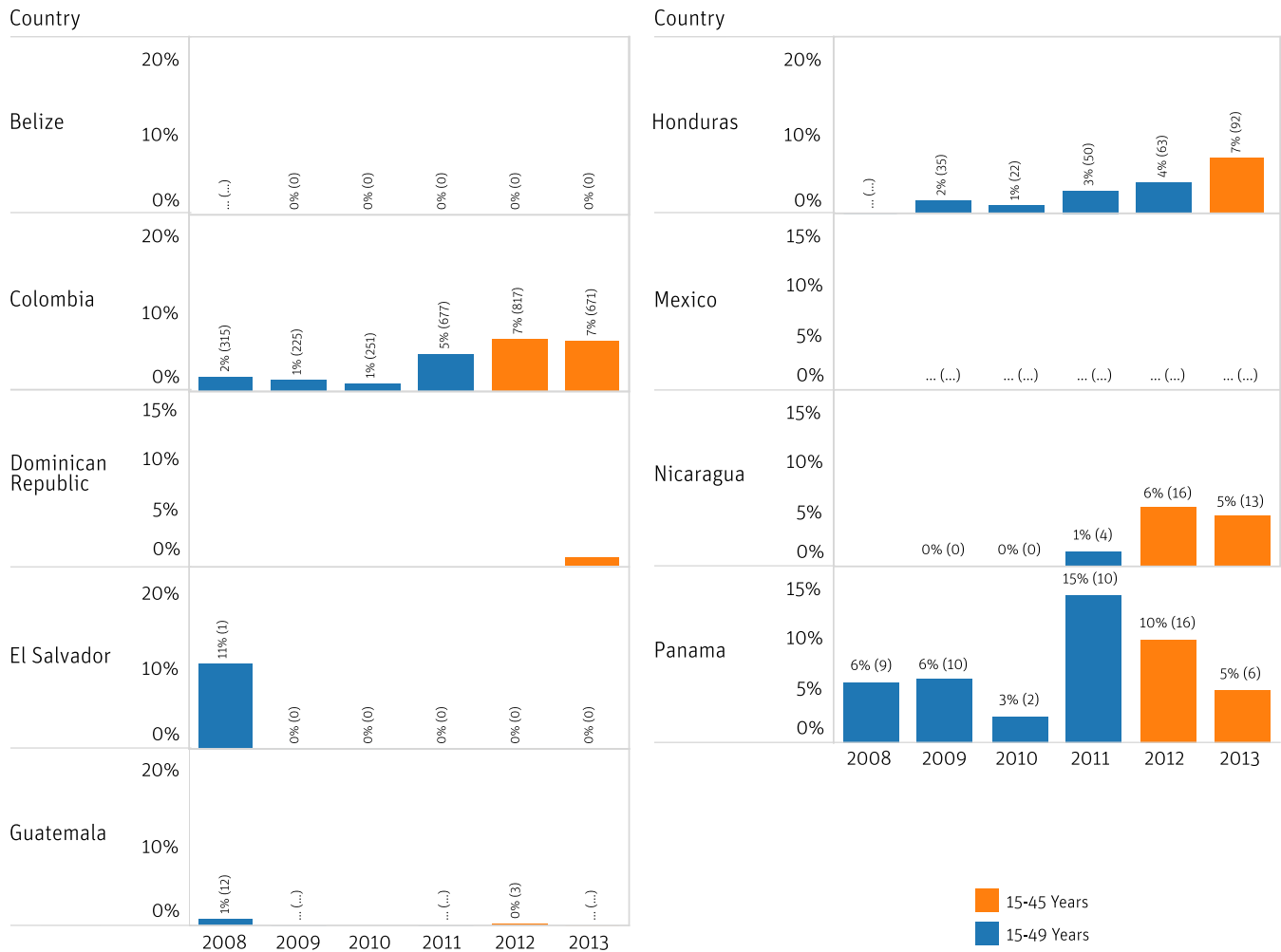


**Source:** Country reports to PAHO.

... No available data.

\* The data provided by Mexico (2015) are by municipalities with indigenous populations, not individual cases reported in indigenous persons or other ethnic groups.

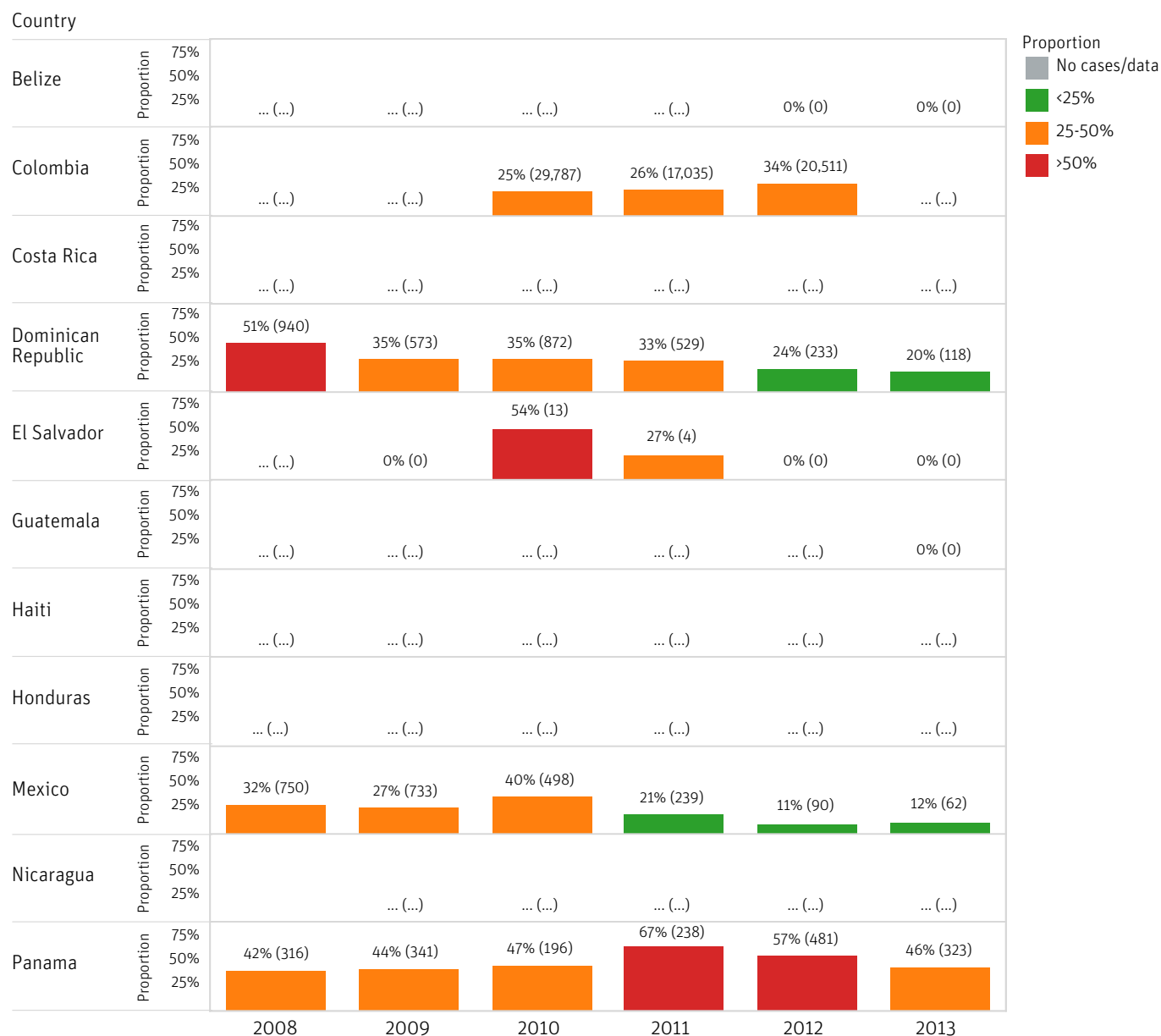
Figure 3.3 Cases of malaria in pregnant women by country, 2008-2013



Source: Country reports to PAHO.

... No available data.

Figure 3.4 Cases of malaria in border areas of Mesoamerica, by country and by year, 2008-2013



**Source:** Country reports to PAHO.

... No available data.

\*Data provided by Mexico (2015).

**Figure 3.5 Cases of Malaria in Other At-Risk Groups, Colombia and Dominican Republic, by Year, 2008-2013**

**Source:** Country reports to PAHO.

### 3.2.4 Other risk groups

To date, two countries have reported cases of malaria in other groups that they considered to be at risk (Afro-Colombians and Haitians), as shown in Figure 3.5 (See Annex 1).

There are no reports from any countries that are part of the Mesoamerican Project for the following special populations: miners, woodcutters, plantation workers, or inhabitants of areas of conflict.

The situation reflects the lack of data on vulnerable populations, which limits the analysis. There is a need to improve the quality of the surveillance systems and nominal case reporting, including information conducive to the collection of these data.

## 3.3 PLAN

The objective of this plan is to improve malaria control with the intent to eliminate the disease in vulnerable populations, complementing other efforts and projects in the Mesoamerican subregion.

Preparation of the plan included (a) reviewing the scope of work, (b) identifying the strengths and weaknesses of the national malaria programs (internal analysis) (c) identifying the opportunities and existing threats (external analysis) in addressing malaria in these

vulnerable populations, while (d) taking into account the strategic lines and the region's approach to malaria elimination. All the countries in the Mesoamerican Project participated. The results varied by country, due to the heterogeneity of the status of malaria and the national programs. The results of this SWOT analysis (see Annex 2) were used to outline the targets, goals, and proposed activities in the MMP for malaria.

Documents prepared by countries to address public health in the vulnerable populations were also reviewed. The countries have made significant efforts in recent years to adopt an intercultural approach to public health, taking into account different national contexts, multiple ethnic groups, cultures, and languages. In some countries, such as Guatemala, this has resulted in ministerial agreements and national regulations for providing healthcare to indigenous populations. In other cases, such as Panama and Nicaragua, specific studies have been conducted on an intercultural approach to malaria control.

However, at the regional level, we continue to see a concentration of malaria in these populations and face difficulties in addressing the disease. This plan will complete the efforts made to date, giving the Mesoamerican Region the opportunity to coordinate efforts for an intercultural approach to malaria in these populations, thereby accelerating regional progress toward elimination.

The goals established for the MMP have been defined by lines of action. The groups considered to be vulnerable populations are different in each country, and this is reflected in the goals and in the national plans. The five components of the 2011-2015 Strategy and Plan of Action for Malaria in the Americas are:

3.3.1 Malaria prevention, surveillance, and early detection and containment of outbreaks.

3.3.2 Integrated vector management.

3.3.3 Malaria diagnosis and treatment.

3.3.4 Advocacy, communication, partnerships, and collaboration.

3.3.5 Health systems improvements; strategic planning, monitoring and evaluation; operational research; and country-level capacity-building.

## Goals, objectives, indicators and activities for the five components of malaria MMP

**Table 3.2 Malaria prevention, surveillance, and early detection and containment of outbreaks**

Goals	Objectives	Indicators	Activities
Improve the epidemiological surveillance systems and nominal reporting of malaria cases with analysis of specific sites or foci and vulnerable groups.	<ol style="list-style-type: none"> <li>1. Improve malaria case reporting and information analysis.</li> <li>2. Efficiently break the chain of malaria transmission, prevent outbreaks, and contain the disease when detected.</li> </ol>	<ol style="list-style-type: none"> <li>1. Number of cases reported annually among vulnerable groups by country.</li> <li>2. Number of epidemiological surveillance products/instruments adapted to the needs of each country/area of transmission.</li> </ol>	Provide country support to: <ol style="list-style-type: none"> <li>1. Update existing case reporting and notification systems.</li> <li>2. Improve information flow systems.</li> <li>3. Draft weekly reports and malaria situation analyses to plan activities, based on epidemiological data, to control and prevent the reintroduction of the disease.</li> </ol>
Stratify malaria risk areas by municipalities, towns, or foci, with special attention to the areas of influence inhabited by vulnerable populations.	<ol style="list-style-type: none"> <li>1. Stratify malaria risk areas to prioritize municipalities/towns and facilitate actions that prevent and contain malaria outbreaks.</li> </ol>	<ol style="list-style-type: none"> <li>1. Number of municipalities by strata.</li> <li>2. Number of foci identified in project areas.</li> </ol>	Provide country support to: <ol style="list-style-type: none"> <li>1. Identify transmission foci and areas inhabited by vulnerable populations and performing the stratification.</li> <li>2. Hold workshops to reorient efforts toward elimination.</li> </ol>

Table 3.3 Integrated vector management (IVM)

Goals	Objectives	Indicators	Activities
Improve the competence of human resources by training local personnel.	1. Train local personnel (preferably personnel belonging to the communities of the vulnerable populations/ areas of transmission), with the aim of overcoming cultural barriers (including language, beliefs, and worldview that exist among some populations) to help ensure that IVM efforts are sustainable.	1. Number of trainings held for staff members working on IVM.	1. Provide technical support to the countries for developing IVM training sessions. 2. Provide technical support to the countries for organizing training sessions for healthcare workers on the intercultural approach to vulnerable populations.
Adapt vector control activities through use of indoor residual spraying (IRS) and utilization of long-lasting insecticide-treated nets (LLITNs), taking into account the special cultural features of the different vulnerable populations.	1. Successfully implement malaria prevention activities by adapting the activities to the special features of each population, identifying and addressing existing cultural barriers.	1. IRS and LLITNs coverage by strata and/or vulnerable groups.	1. Assess IRS and LLITN coverage in the areas inhabited by vulnerable populations. 2. Provide technical support to the countries that require it in order to analyze the vector control measures currently in place and the possible cultural barriers that affect their implementation in vulnerable populations. 3. Provide technical support to the countries for information, education, and communication (IEC) activities.
Monitor and improve entomological surveillance.	1. Know the status of insecticide resistance in high-risk areas of malaria (inhabited by vulnerable populations) and vector behavior, to apply locally appropriate measures that improve vector control. 2. Improve entomological surveillance in order to adapt IVM measures.	1. Status of resistance in foci of transmission and/or areas where vulnerable groups live. 1. Entomological indicators implemented.	1. Monitor entomological indicators in areas inhabited by vulnerable populations. 1. Support countries in the identification of vector patterns in the country and/or specific foci.



Table 3.4 Malaria diagnosis and treatment

Goals	Objectives	Indicators	Activities
Improve coverage of the parasitological diagnosis of malaria among mobile and migrant populations in rural areas and in remote towns inhabited by vulnerable populations.	1. Improve coverage of malaria diagnosis in rural and remote areas and among mobile and migrant populations to break the chain of malarial transmissions with timely diagnosis and quality treatment; to achieve early diagnosis, avoid treating suspected cases of malaria (without parasitological diagnosis), provide timely and quality treatment efficiently and interrupt the chain of transmission of malaria.	1. Number of people treated within 72 hours of the onset of symptoms.	<ol style="list-style-type: none"> <li>1. Provide support (through human resources and infrastructure) to the country in adapting the microscopy network in areas where feasible.</li> <li>2. Support the country in implementing rapid diagnostic tests (RDTs) in remote groups/ areas to ensure that all cases of suspected malaria receive a diagnostic test.</li> <li>3. Provide support for preparing and implementing malaria diagnosis and treatment standards in accordance with PAHO/WHO guidelines.</li> </ol>
Guarantee quality control of the diagnosis.	1. Ensure accurate diagnosis through quality control—using panel tests for performance evaluation and rapid diagnostic tests (RDT) assessments.	<ol style="list-style-type: none"> <li>1. Number of countries with functioning quality control management programs.</li> <li>2. [Countries in the pre-elimination phase]: % of laboratories participating in quality control management programs.</li> </ol>	<ol style="list-style-type: none"> <li>1. Support countries in quality control of the microscopic diagnosis.</li> <li>2. Provide technical assistance for improving diagnosis by training of microscopists and volunteers or technical personnel responsible for taking samples (thin and thick blood film and RDT).</li> </ol>
Guarantee appropriate, timely, and quality treatment of all confirmed cases of malaria.	1. Guarantee appropriate, timely, and quality treatment of all confirmed cases of malaria through drug supply chain management, drug quality control, and adoption of supervised treatment consistent with PAHO/WHO treatment guidelines.	1. Number of countries that report stock-outs of first-line drugs for the treatment of malaria in a year.	<ol style="list-style-type: none"> <li>1. Support improvement of the antimalarial drug supply chain and inputs.</li> <li>2. Provide support for the evaluation of drug quality.</li> </ol>
Improve adherence to treatment regimens to reduce relapses and the resurgence of malaria.	1. Improve adherence to treatment regimens to reduce relapses and the resurgence of malaria caused by incomplete treatments and the persistence of parasitemia.	1. Number of countries with strategies to improve adherence to the treatment (e.g., supervised treatment, post-treatment thick blood film monitoring, hospitalization, or others).	<ol style="list-style-type: none"> <li>1. Provide technical assistance to improve the forms used to monitor malaria cases.</li> <li>2. Provide technical assistance for adapting malaria norms and implementing them.</li> </ol>

Table 3.5 Advocacy, communication, partnerships, and collaboration

Goals	Objectives	Indicators	Activities
Improve community participation.	1. Empower communities to participate in malaria prevention through activities that increase their knowledge of the disease and their understanding of transmission risk.	1. Number of meetings held.	<ol style="list-style-type: none"> <li>1. Organize meetings with malaria program representatives, primary care physicians (ministries of health), volunteers, and representatives of vulnerable populations (traditional physicians and key community representatives) to evaluate current prevention measures, and public acceptance and adherence to the measures.</li> <li>2. Support strengthening the volunteer network.</li> <li>3. Support the country in organizing “community participation days” through advertising campaigns using radio and other culturally appropriate media.</li> </ol>
Increase malaria advocacy activities (education, prevention, and behavioral changes) that are culturally appropriate and adapted to vulnerable groups and/or areas of transmission.	1. Improve malaria risk awareness, adherence to proposed preventive measures, and acceptance of interventions.	1. Number of documents adapted with an intercultural approach and/or with a view toward the eliminating the disease.	1. Support countries in designing culturally appropriate information, education, and communication (IEC) strategies with the participation of the education sector, health sector (including traditional and western physicians), and representatives of the affected communities.
Increase intersectoral participation and coordinate actions with the private sector for managing malaria.	1. Increase intersectoral participation (agriculture, construction, tourism, etc.) and coordinate with the private health sector to involve all related sectors in management of malaria so that actions will be consistent.	1. Number of health institutions and other public or private entities that report cases of malaria to the national system.	1. Hold meetings with the sectors involved in managing malaria (health, infrastructure, environment), companies that hire migrant workers from malarious areas (agriculture, construction, tourism), the public sector, and members of vulnerable communities, to discuss and align (the dissemination of standards/ the coordination of reporting systems) to ensure these actions are consistent with the provisions of each country’s national plan.
Increase trans-border work for conducting joint activities in countries where mobile populations have been identified as vulnerable, or where the borders have high transmission rates of malaria.	1. Coordinate activities in these areas, paying particular attention to migrant and vulnerable populations residing there to improve existing malaria control measures.	1. Number of countries with trans-border activities for the management of malaria.	1. Hold trans-border meetings in the countries that share malaria transmission areas, with participation of representatives of the affected sectors.

**Table 3.6 Health systems strengthening; strategic planning, monitoring and evaluation; operational research; and country-level capacity-building**

Goals	Objectives	Indicators	Activities
Generate scientific evidence on malaria prevention and control measures applied in the vulnerable populations (indigenous populations, pregnant women, migrants, and others).	1. Direct and invest efforts and resources more efficiently by generating scientific evidence on the measures applied in vulnerable populations to provide support for replicating those activities in other communities.	1. Reports and/or scientific publications on the work carried out in vulnerable populations.	1. Provide technical support to the countries for the preparation of reports and/or scientific publications on the work carried out in vulnerable populations.
Improve access to health care in mobile or remote populations.	1. Adapt existing health systems to improve coverage in mobile or vulnerable populations in remote areas.	1. Number of people treated for malaria within 72 hours of the onset of symptoms.	1. Evaluate health systems through visit from the Regional Malaria Program (RMP) together with the country to priority sites or areas where there are vulnerable groups and transmission foci.
Improve existing monitoring and evaluation systems.	1. Evaluate the impact of malaria control and prevention interventions.	1. Number of visits made by the RMP to areas with vulnerable groups and transmission foci.	1. Monitor and evaluate visits by the RMP to priority sites or areas where there are vulnerable groups and transmission foci.

### 3.4 MONITORING AND EVALUATION

The Mesoamerican Master Plan for malaria will be monitored through visits to and periodic communications with countries, annual analysis of proposed targets

and achieved goals, and by evaluating the outcome of activities.

### 3.5 BUDGET

**Table 3.7 Budget by line of action and year (in USD), 2016-2018**

Line of Action	Goals	Activities	2016	2017	2018
Malaria prevention, surveillance, and early detection, and containment of outbreaks	1. Improve the System for Epidemiological Surveillance (SIVIEN) and nominal reporting of malaria cases with analysis of specific sites or foci and vulnerable groups.	<ol style="list-style-type: none"> <li>1. Support the countries of the Mesoamerican Project in updating existing case reporting and notification systems.</li> <li>2. Improve information flow systems.</li> <li>3. Draft weekly reports and malaria situation analyses; use the epidemiological analyses to plan activities to prevent and control the disease and prevent its reintroduction.</li> </ol>	35,000	35,000	35,000
	2. Stratify malaria risk areas by municipalities, towns, or foci, with special attention to the areas inhabited by vulnerable populations.	Provide support to countries to: <ol style="list-style-type: none"> <li>1. Identify transmission foci and areas inhabited by vulnerable populations and perform stratification.</li> <li>2. Hold workshops on reorienting efforts toward elimination.</li> </ol>	10,000	10,000	10,000
Integrated vector management	1. Improve the competence of existing human resources.	<ol style="list-style-type: none"> <li>1. Provide technical support to countries for developing IVM training.</li> <li>2. Provide technical support to countries for organizing workshops to train health workers on the intercultural approach to vulnerable populations.</li> </ol>	20,000	20,000	20,000
	2. Adapt vector control activities, indoor residual spraying (IRS), and the use of long-lasting insecticide-treated nets (LLITNs), taking into accounts the special cultural features of different populations.	<ol style="list-style-type: none"> <li>1. Assess IRS and LLITN coverage in areas inhabited by vulnerable populations.</li> <li>2. Provide technical support to countries that require it in order to analyze vector control measures currently in place and possible cultural barriers affecting their implementation in vulnerable populations.</li> <li>3. Provide support to countries for information, education, and communication (IEC) activities.</li> </ol>	20,000	20,000	20,000
	3. Monitor and improve entomological surveillance.	<ol style="list-style-type: none"> <li>1. Monitor entomological indicators in the areas inhabited by vulnerable populations.</li> <li>2. Support countries in the identification of vector behavior in the country and/or specific foci.</li> </ol>	15,000	15,000	15,000

Table 3.7 Budget by line of action and year (in USD), 2016-2018 (cont.)

Line of Action	Goals	Activities	2016	2017	2018
Malaria diagnosis and treatment	1. Improve coverage of the parasitological diagnosis of malaria in rural areas, among mobile and migrant populations, and in remote towns inhabited by vulnerable populations.	1. Provide support (through human resources and appropriate infrastructure) to countries to adapt the microscopy network in areas where it is feasible. 2. Support countries in implementing rapid diagnostic tests (RDTs) in remote groups/areas to ensure that all cases of suspected malaria receive a diagnostic test. 3. Provide support for preparing and implementing malaria diagnosis and treatment standards in accordance with PAHO/WHO guidelines.	10,000	10,000	10,000
	2. Guarantee quality control of the diagnosis.	1. Support countries in quality control of the microscopic diagnosis. 2. Provide technical assistance for improving diagnosis by training of microscopists and volunteers or technical personnel responsible for taking samples (extended and thick blood film and RDT).	30,000	30,000	30,000
	3. Guarantee appropriate, timely, and quality treatment of all confirmed cases of malaria.	1. Support improvements of the supply chain for antimalarial drugs and inputs. 2. Provide support for the evaluating drug quality.	20,000	20,000	20,000
	4. Improve adherence to treatment regimens in order to reduce relapses and the resurgence of malaria.	1. Provide technical assistance to improve the forms used to monitor malaria cases. 2. Provide technical assistance for adapting and implementing malaria standards.	10,000	10,000	10,000

Table 3.7 Budget by line of action and year (in USD), 2016-2018 (cont.)

Line of Action	Goals	Activities	2016	2017	2018
Advocacy, communication, partnerships, and collaboration	1. Improve community participation.	<p>1. Organize meetings with malaria program representatives, primary care physicians (ministries of health), volunteers, and representatives of vulnerable populations (traditional physicians and key community representatives) to evaluate current prevention measures, public acceptance, and adherence to those measures.</p> <p>2. Support the countries in strengthening their volunteer networks.</p> <p>3. Support the countries in organizing community participation days through advertising campaigns that use radio and other culturally appropriate media.</p>	40,000	40,000	40,000
	2. Increase malaria advocacy activities (education, prevention, and behavioral changes) that are culturally appropriate and adapted to vulnerable groups and/or areas of transmission.	1. Support countries in designing culturally appropriate information, education, and communication strategies with participation from the health sector (traditional and western physicians), education sector, and representatives of the affected communities.	10,000	10,000	10,000
	3. Increase intersectoral participation and coordinate actions with the private sector for the management of malaria.	1. Hold meetings with the sectors involved in the management of malaria (health, infrastructure, environment), companies that hire migrant workers from malarious areas (agriculture, construction, tourism), the public sector, and members of vulnerable communities, in order to discuss and align their actions (dissemination of standards/coordination of reporting systems), ensuring that they are consistent with the provisions of each country's national plan.	10,000	10,000	10,000

Table 3.7 Budget by line of action and year (in USD), 2016-2018 (cont.)

Line of Action	Goals	Activities	2016	2017	2018
Advocacy, communication, partnerships, and collaboration (cont.)	4. Increase trans-border work in order to conduct joint activities in those countries where mobile populations have been identified as vulnerable populations, or where the borders are malarious areas with high transmission rates.	1. Hold trans-border meetings in the countries that share malaria transmission areas, with participation of representatives of the affected sectors.	10,000	10,000	10,000
Health systems strengthening, strategic planning, monitoring, and evaluation; operations research; and country-level capacity-building	1. Generate scientific evidence on malaria prevention and control measures applied in the vulnerable populations (indigenous populations, pregnant women, migrants, and others).	1. Provide technical support to countries for preparing reports and/or scientific publications on the work carried out in vulnerable populations.	10,000	10,000	10,000
	2. Improve access to health care in mobile or remote populations.	1. Evaluate health systems through visits from the Regional Malaria Program (RMP) together with the country to priority sites or areas where there are vulnerable groups and transmission foci.	20,000	20,000	20,000
	3. Improve existing monitoring and evaluation systems.	1. Conduct monitoring and evaluation by the RMP to priority sites or areas where there are vulnerable groups and transmission foci.	15,000	15,000	15,000
Others		Administrative costs of the project	37,050	37,050	37,050
<b>TOTAL</b>			<b>322,050</b>	<b>322,050</b>	<b>322,050</b>

## ANNEX 1. malaria cases in indigenous populations, pregnant women, border areas, and in other risk groups, by country and by year, 2008-2013

### Indigenous populations

Country	2008	2009	2010	2011	2012	2013	Total
Belize	0	0	0	0	0	0	0
Colombia	6,893	7,778	9,349	5,461	7,721	7,902	45,104
Costa Rica	0	0	0	0	0	0	0
El Salvador	0	0	0	0	0	0	0
Guatemala	4,679	-	-	-	-	-	4,679
Honduras	-	-	-	999	739	1,334	3,072
Mexico*	2,321	2,626	1,189	1,006	733	475	8,305
Nicaragua	-	0	0	0	-	565	565
Panama	405	417	188	250	585	479	2,324
Dominican Republic	0	0	0	0	0	0	0
<b>Total</b>	<b>11,977</b>	<b>8,195</b>	<b>9,537</b>	<b>6,710</b>	<b>9,045</b>	<b>10,280</b>	<b>55,744</b>

### Pregnant women

Country	2008	2009	2010	2011	2012	2013	Total
Belize	-	0	0	0	-	0	0
Colombia	-	225	251	677	817	671	2,641
Costa Rica	0	0	0	0	0	0	0
El Salvador	1	-	-	-	-	-	1
Guatemala	12	-	-	-	3	-	15
Honduras	-	35	22	50	63	92	262
Mexico	-	-	-	-	-	-	-
Nicaragua	0	0	0	0	16	13	29
Panama	9	10	2	10	16	6	53
Dominican Republic	-	-	-	-	-	-	-
<b>Total</b>	<b>22</b>	<b>270</b>	<b>275</b>	<b>737</b>	<b>915</b>	<b>782</b>	<b>3,001</b>

### Border areas

Country	2008	2009	2010	2011	2012	2013	Total
Colombia	-	-	29,787	17,035	20,511	-	67,333
El Salvador	-	-	13	4	-	-	17
Mexico*	750	733	498	239	90	62	2,372
Panama	316	341	196	238	481	323	1,895
Dominican Republic	940	573	872	529	233	118	3,265

### Other risk groups

Country	2008	2009	2010	2011	2012	2013	Total
Colombia	-	-	-	18,471	17,123	17,093	52,687
Mexico	-	-	-	-	-	-	-
Dominican Republic	460	480	903	799	457	213	3,312

Source: country reports to PAHO.

- No available data.

\* Information provided by the country (2015).



## ANNEX 2. SWOT analysis of malaria by component of the plan

### Malaria prevention, surveillance, and early detection, and containment of outbreaks

STRENGTHS	WEAKNESSES
<ol style="list-style-type: none"> <li>1. National malaria programs with funding from the Ministry of Health</li> <li>2. Mexico reports budgetary sufficiency to carry out program activities through three funding sources (one state and two federal)</li> <li>3. Malaria is one of the three priorities among vector-borne diseases</li> <li>4. Permanent staff on the Vector-borne Disease program (VBD)</li> <li>5. The network of local personnel consisting of a supervisor, evaluators, and laboratory staff in some provinces</li> <li>6. Human resources: entomologist, microbiologist</li> <li>7. Active network of volunteer community reporters</li> <li>8. Vector-borne disease program staff, some of whom are part of the indigenous population, receive training on malaria</li> <li>9. Protocols for the entomology network</li> <li>10. Protocols for research and outbreak control</li> <li>11. Real-time electronic notification system</li> <li>12. A central malaria laboratory, entomology unit, diagnostic and treatment unit, statistics unit, and epidemiological surveillance unit</li> <li>13. Availability of a manual on epidemiological surveillance</li> <li>14. National surveillance laboratory</li> </ol>	<ol style="list-style-type: none"> <li>1. Weak surveillance system</li> <li>2. Communication problems (inadequate reporting)</li> <li>3. Lack of timely detection of outbreaks (Information is not reported in a timely manner, delaying the identification of outbreaks.)</li> <li>4. Delay in parasitological diagnosis</li> <li>5. Poor implementation of comprehensive actions for outbreak control</li> <li>6. At-risk populations not identified by region</li> <li>7. Lack of inputs and economic resources for logistics (means of transportation), for timely intervention of outbreaks</li> <li>8. Little monitoring and evaluation of interventions</li> <li>9. Lack of training</li> <li>10. Information systems not aligned with the national system of the Ministry of Health</li> <li>11. Current information system fails to include variables related to the process of eliminating malaria (cases and foci)</li> </ol>
OPPORTUNITIES	THREATS
<ol style="list-style-type: none"> <li>1. Financial and technical resources from international cooperation</li> <li>2. WHO manuals are available</li> <li>3. The timely allocation of federal resources to the states improves every year</li> <li>4. Epidemiology personnel being trained in field epidemiology (Field Epidemiology Training Program or FETP-CDC)</li> <li>5. External funding from the Andean Development Corporation (CAF), the EMMIE Initiative, the Global Fund, AMI/RAVREDA (USAID) and national partners</li> <li>6. Existing capacity in the institutions and academia</li> <li>7. Institutions have begun to work jointly, with political support, indicating that information should be shared</li> </ol>	<ol style="list-style-type: none"> <li>1. Popular perception of low malaria risk</li> <li>2. Lack of culturally appropriate prevention activities</li> <li>3. Little community participation</li> <li>4. Mobile populations</li> <li>5. Health services inaccessible or under-utilized by specific populations (indigenous population, farmers, migrants, day laborers)</li> <li>6. Principal recipient must purchase equipment and supplies abroad and give them to the country as a donation</li> <li>7. Administrative problems related to personnel hiring processes</li> </ol>

### Integrated vector management

STRENGTHS	WEAKNESSES
<ol style="list-style-type: none"> <li>1. Financial resources of the national programs</li> <li>2. Mexico reports budgetary sufficiency to carry out the program activities through three funding sources (one state and two federal)</li> <li>3. Permanent staff of the vector-borne disease program</li> <li>4. Experienced staff that able to organize and advise incoming personnel</li> <li>5. Department with entomology professionals and technicians at the central level</li> <li>6. Trained personnel</li> <li>7. Entomology network protocols</li> <li>8. Methodology for the implementation of mosquito netting</li> <li>9. System for Entomological Surveillance System (SIVIEN)</li> <li>10. Technical guides available</li> <li>11. Entomological surveillance manual available</li> <li>12. Existing coordination with the General Directorate of Epidemiology, the National Institute for Epidemiological Reference, Health Promotion, and the National Centers for Disease Control and Prevention Programs</li> <li>13. Operation of the entomological bio-assay units has been standardized</li> <li>14. Entomology laboratory</li> <li>15. Central entomological unit</li> <li>16. 18 local and departmental entomological units</li> <li>17. Adaptation of entomological unit infrastructure 50% complete</li> <li>18. A manual on IVM for community health workers recently completed; several workshops planned for the coming months</li> </ol>	<ol style="list-style-type: none"> <li>1. Lack of personnel trained in vector control (HR training). (Essential human resources are not replaced on a timely basis; highly trained personnel are at retirement age.)</li> <li>2. Absence of biological control strategies</li> <li>3. Lack of activities for the management of anopheline breeding sites and habitats (i.e., rational use of chemical control)</li> <li>4. Lack of equipment for the organization of indoor residual spraying (IRS) activities; insufficient inputs, out-of-time purchase and distribution</li> <li>5. Few up-to-date entomological studies</li> <li>6. Sustaining the activities in the current context of malaria elimination</li> <li>7. Need for methodology for the implementation of long-lasting insecticide-treated nets (LLITNs)</li> <li>8. Need for improvement of entomological surveillance, including identification, description, geo-referencing, and management of breeding sites</li> <li>9. Information flow problems</li> <li>10. Lack of training in IVM</li> <li>11. Need for improved entomological monitoring at the local level</li> <li>12. Lack of funding for infrastructure and transportation</li> <li>13. Insufficient resources for community forums and meetings</li> <li>14. Lack of funding for purchasing long-lasting insecticide-treated nets (LLITN)</li> <li>15. No KAPB (knowledge, attitudes, practices, and behaviors) study</li> <li>16. Lack of funding for workshops, gatherings or meetings with employers in agricultural and construction sectors</li> <li>17. Lack of funding for entomological research</li> <li>18. Lack of funding for the procurement of geo-referencing equipment</li> <li>19. Lack of funding for the purchase of insecticides, biolarvicides, and entomological equipment</li> <li>20. Insufficient training of local teams in entomological surveillance</li> <li>21. Need to establish entomological units at the provincial level</li> <li>22. Field staff trained in the basic concepts of IVM in recent years, but many do not have a full understanding of it, and the program's regional health managers and supervisors lack experience to manage their programs using this approach</li> <li>23. Community participation not widely used in the surveillance of vector-borne diseases or in prevention and control activities</li> </ol>

### Integrated vector management (cont.)

OPPORTUNITIES	THREATS
<ol style="list-style-type: none"> <li>1. Financial and technical resources from international cooperation (European Union, EMMIE)</li> <li>2. WHO manuals are available</li> <li>3. Financial support with external funding from the Global Fund</li> <li>4. Universities have existing capacity</li> <li>5. Scheduled staff meetings as part of a reorientation effort through the Malaria Elimination Project</li> </ol>	<ol style="list-style-type: none"> <li>1. Resistance to insecticides</li> <li>2. Limited use of LLITN</li> <li>3. False beliefs and lack of awareness about the importance of using mosquito netting</li> <li>4. Lack of knowledge on the part of employers in the agriculture and construction, leading to the creation of environments conducive to the formation of breeding sites</li> <li>5. Lack of public awareness about importance of maintaining proper sanitation</li> </ol>

### Diagnosis and treatment

STRENGTHS	WEAKNESSES
<ol style="list-style-type: none"> <li>1. Primary health care model</li> <li>2. National and departmental programs to assess sample quality</li> <li>3. Health Operations Plan</li> <li>4. National network of public health laboratories with microscopists</li> <li>5. The State public health laboratories meet quality standards, delivering results within a week of receiving samples</li> <li>6. Laboratory network coordinated with vector control and epidemiology</li> <li>7. Central diagnosis and treatment department</li> <li>8. Local structure made up of field chiefs (regional supervisors), provincial supervisor, and evaluators</li> <li>9. National reference laboratory for microscopic malaria diagnosis</li> <li>10. Diagnosis of the country's management processes and drug supply as well as evaluation of regional warehouses</li> </ol>	<ol style="list-style-type: none"> <li>1. Inadequate maintenance of microscopes</li> <li>2. Weak antimalarial management and supply system.</li> <li>3. Inadequate drug storage and untimely procurement of antimalarial drugs (shortage)</li> <li>4. Lack of supplies, other than drugs, for treatment</li> <li>5. Lack of inputs for microscopic diagnosis of malaria</li> <li>6. Lack of transportation resources for field staff to go out and take thick blood film samples (logistical issue)</li> <li>7. Little availability and poor storage of rapid diagnostic tests (RDT) in remote areas</li> <li>8. Inadequate diagnostic coverage in rural and geographically remote regions</li> <li>9. Delay in obtaining timely diagnosis</li> <li>10. Little personnel training in rural areas</li> <li>11. Inadequate quality control of diagnosis</li> <li>12. Improper treatment regimens (not consistent with PAHO/WHO standards)</li> <li>13. Detection and management of asymptomatic patients and patients with low parasitemia. The test used to detect asymptomatic patients (thick blood films) is not very sensitive. C-reactive protein (CRP) required</li> <li>14. Trained personnel ready to retire but provisions have not been made for their replacement</li> <li>15. Lack of resources for monitoring and evaluation</li> <li>16. Lack of funds for health and community human resources training</li> <li>17. Standardization of the staining technique for thick blood film diagnosis in all the network's laboratories</li> <li>18. Supervision of treatment a continuing problem; supervising a 14-day treatment is expensive and there are not enough staff members. (The staff is responsible for dengue, chikungunya, Chagas disease, and malaria.)</li> </ol>

### Diagnosis and treatment (cont.)

OPPORTUNITIES	THREATS
<ol style="list-style-type: none"> <li>1. International cooperation projects (AMI/RAVREDA, Partners from EMMIE, CLAIM, and Mesoamerican System).</li> <li>2. Technical tools for updating guides</li> <li>3. Increase participation of volunteers and community health workers to help supervise the full treatment</li> <li>4. Workshops have been scheduled with these groups (volunteers and community health workers)</li> </ol>	<ol style="list-style-type: none"> <li>1. Limited access to diagnosis and treatment in mobile populations (e.g., migrants)</li> <li>2. Little adherence to treatment regimens (supervised treatment) in some populations</li> <li>3. Private system not integrated into quality control programs</li> <li>4. Need to include other health sectors (including the Institute of Social Security, the Teachers' Welfare Institute, the Military Health Service, and the private sector) in the malaria diagnosis network</li> <li>5. Management and supply of antimalarial drugs is decentralized—not always under the responsibility of the national malaria programs, which hinders the process</li> <li>6. Uninformed population that does not seek prompt medical attention upon presenting symptoms</li> </ol>

### Advocacy, communication, and partnerships and collaboration

STRENGTHS	WEAKNESSES
<ol style="list-style-type: none"> <li>1. Implementation of the 10-year Public Health Plan, intersectoral public health committees</li> <li>2. Methodology available for the implementation of malaria Communication for Behavioral Impact (COMBI) strategy and its corresponding educational material</li> <li>3. Resources from “Seguro Popular” for health promotion in personnel contracts and for the preparation of printed materials</li> <li>4. Research funds</li> <li>5. Consultancies</li> <li>6. Work proposal for the development of strategic partnerships to strengthen the public’s cooperation on the issue of malaria</li> </ol>	<ol style="list-style-type: none"> <li>1. Few malaria advocacy activities (education, prevention, and behavioral changes)</li> <li>2. Sustainability of the COMBI strategy</li> <li>3. Absence of an information, education, and communication program with an intercultural and comprehensive approach aimed at the entire population</li> <li>4. Lack of materials written in native languages for malaria advocacy and prevention</li> <li>5. Lack of specific communication strategies for rural areas (cooperation with the formal education sector and work education programs)</li> <li>6. Absence of information on the degree of civil society organization and its ability to support efforts to eliminate malaria</li> <li>7. No civil society organizations conducting specific activities related to malaria prevention and control</li> </ol>
OPPORTUNITIES	THREATS
<ol style="list-style-type: none"> <li>1. Mexico-Guatemala binational plan and willingness on part of PAHO to support joint activities for foci control</li> <li>2. Panama-Colombia joint effort for border areas</li> <li>3. WHO manuals available to confirm the pre-elimination of malaria transmission</li> <li>4. Partnerships with NGOs, government institutions, and international organizations (AMI RAVREDA and EMMIE initiatives)</li> </ol>	<ol style="list-style-type: none"> <li>1. New partners and actors from the private sector, public sector, civil society, and academia need to be included</li> <li>2. Lack of involvement of key actors from the communities such as traditional physicians, teachers, clergy, and local authorities</li> <li>3. Need for a national technical advisory group to advance the certification process for areas free of malaria transmission</li> <li>4. Need for trans-border work (harmonization of existing plans)</li> <li>5. Few civic and state organizations working on malaria</li> <li>6. Limited organized community participation in the interventions</li> </ol>

**Health systems strengthening; strategic planning, monitoring, and evaluation;  
operational research, and country-level capacity-building**

STRENGTHS	WEAKNESSES
<ol style="list-style-type: none"> <li>1. Reorganization of the national and territorial malaria program</li> <li>2. Health care model</li> <li>3. Collective interventions plan that needs updated criteria and reorganization for better program operation</li> <li>4. Human resources, equipment, and supplies</li> <li>5. The Office of Indigenous Health Matters created in 2011 (in Panama)</li> <li>6. Manual of standards and procedures for malaria</li> <li>7. National Strategic Plan for Malaria 2014-2017</li> <li>8. Concept Paper on Malaria 2015-2017</li> <li>9. Resources of a sufficiently technical level for implementing operational research on malaria</li> </ol>	<ol style="list-style-type: none"> <li>1. Need to generate scientific evidence on the outcomes of the prevention and control measures implemented</li> <li>2. Lack of evidence about the effectiveness of the vector control measures (IRS, LLITN, and anti-larval measures)</li> <li>3. Lack of studies on mobility and transmission (epidemiology of malaria in mobile populations)</li> <li>4. Research on vectors</li> <li>5. Maintenance of supplies and equipment (microscopes) essential for diagnosis</li> <li>6. Lack of monitoring of WHO pre-elimination criteria</li> <li>7. Failure to adapt strategies to indigenous populations and other ethnic communities</li> <li>8. Failure of health professionals and community health workers to raise awareness and apply national standards</li> <li>9. Insufficient human resources (in some cases concentrated in urban areas) and no development of new human resources</li> <li>10. Few entomology technicians</li> <li>11. Lack of epidemiologists in the municipalities where vulnerable populations are located</li> <li>12. Lack of supervision in the areas inhabited by vulnerable populations (usually in remote areas, areas of conflict, or border areas)</li> <li>13. Poor quality of the actions carried out by the Vector-borne Disease (VBD) technical personnel</li> <li>14. Reorientation of the health system from malaria control to malaria elimination</li> <li>15. Insufficient improvements in the levels of care (local, municipal, departmental, and central) with respect to malaria</li> <li>16. Procurement of supplies, materials, and equipment to promote the malaria elimination process</li> <li>17. Insufficient personnel to refocus the issue on elimination</li> <li>18. Scant operational research on the subject of malaria</li> <li>19. Failure to implement the recommendations made with regard to research conducted by the public system</li> </ol>
OPPORTUNITIES	THREATS
<ol style="list-style-type: none"> <li>1. International cooperation</li> <li>2. WHO manuals available to confirm the pre-elimination of malaria transmission</li> </ol>	<ol style="list-style-type: none"> <li>1. The national university does not have a public health program, and the limited research and education carried out in the country has been through the Uniformed Services of the Health Sciences University and a small local private research center—the Belize Vector and Ecology Center</li> <li>2. Failure to include the medical units as informants in the malaria program</li> <li>3. Sustaining the process of elimination with national sources</li> </ol>

**Other lines of action proposed by the countries**

OPPORTUNITIES	THREATS
<ol style="list-style-type: none"> <li>1. Reorganization in the three core areas: medical care, public health, and health risk</li> <li>2. Access to health services for indigenous and migrant populations</li> <li>3. Access to health services in areas of conflict</li> </ol>	<ol style="list-style-type: none"> <li>1. Little adherence to national standards</li> <li>2. Inconsistency of the country’s certification criteria with the WHO pre-elimination criteria</li> <li>3. Lag in epidemiological malaria surveillance</li> <li>4. Persons living with someone who has a confirmed case in the “Healthy Communities” strategy</li> </ol>

# **Chapter 4**

## **Master Plan for Road Safety in Mesoamerican Cities**

## 4.1 BACKGROUND

### Road safety around the world

Worldwide, about 1.24 million people die each year on the roads, and between 20 and 50 million are injured in traffic crashes. Young people ages 15-24 are one of the most affected populations (World Health Organization, WHO 2013). Furthermore, 50% of the fatalities involve vulnerable users: pedestrians, cyclists, and motorcyclists. WHO predicts (WHO 2013) that road traffic-related deaths reported in 2010 will jump from the eighth to the fifth leading cause of death by 2030.

### Road safety in developing countries: the case of Mesoamerica

Mortality disproportionately affects developing countries. As noted by WHO (2013), developing countries account for only 48% of the world's vehicles, but 91% of the world's traffic-related deaths. According to PAHO's "*Report on the Road Safety in the Region of the Americas*," road traffic injuries resulted in approximately 150,000 deaths in 2010, with an average mortality rate of 16.1 per 100,000 population.

According to the latest WHO road safety report (2013), the deaths due to vehicle accidents in Central American countries, per 100,000, were: Belize (16.4), Colombia (15.6), Costa Rica (12.7), Dominican Republic (41.7), El Salvador (21.9), Guatemala (6.7), Honduras (18.8), Mexico (14.7), Nicaragua (18.8), and Panama (14.1)<sup>8</sup>. Mesoamerica's economic development has resulted in the increased levels of motorization—in other words, people in these countries are transitioning from non-motorized modes of transportation (walking, cycling) to motorized ones, such as cars and motorcycles. The breakdown of the registered vehicle fleet varies among subregions. In Mesoamerica, excluding Colombia and Dominican Republic, four-wheeled vehicles constitute 66.1% of the vehicle fleet, heavy vehicles 25.7%, and two- and three-wheeled motor vehicles 6.5%. However, this distribution is not uniform across countries; for example, in Dominican Republic, motorcycles represent 49.5% of vehicles (PAHO, 2013).

Men account for 79% of the road traffic deaths in Mesoamerica. In this subregion, the highest proportion of deaths occur among pedestrians (31%), followed by

occupants of cars (26%), and motorcyclists or passengers of two- and three-wheeled vehicles (6%). However, these percentages also vary from country to country; for example, in Colombia, 39% of road deaths involve motorcycles (PAHO, 2013). The data highlight the need for continued efforts and intervention in this area. Otherwise, as already established in other documents drawn up by the Mesoamerican Integration and Development Project (2012), vehicle-related mortality in the Americas could reach an average of 200,000 fatalities per year.

### Global, regional, and subregional intervention strategies

#### Processes of the global road safety plan

The elevated number of road deaths and injuries, at least since 2003, has led to global interventions to address the problem. The WHO "*World Health Report*" in 2003 warned of three world epidemics: cardiovascular diseases, smoking-related diseases, and road traffic deaths and injuries. The latter was, in fact, recognized as the hidden epidemic (WHO, 2003).

Following the "*World report on road traffic injury prevention*" (WHO, 2004), a more concerted strategy was deployed and several measures were put forward, backed by scientific evidence. Afterwards, the Global Plan for the Decade of Action for Road Safety 2011-2020 was promoted, establishing a program of action that is divided into five pillars: 1) road safety management; 2) safer roads and mobility; 3) safer vehicles; 4) safer road users, and 5) post-crash response.<sup>9</sup>

#### Regional and subregional interventions

Several regions around the world have developed processes that seek to adapt the Global Plan for the Decade of Action for Road Safety to their respective circumstances. These include: Europe (European Commission, 2010), Africa (*United Nations Economic Commission for Africa and African Union*, 2011), Road Safety Action Plan (PAHO, 2011), and Mesoamerica (Mesoamerica Project, 2012). There are also other processes in Central America that stress the need for long-term road safety programs (ECLAC, 2009; Regional Transportation Technical Commission, 2014).

<sup>8</sup> To calculate subregional figures, a methodology considering the relative weight of each country would be needed. However, since this document only aspires to highlight the heterogeneity across the subregion, it was decided to present only national-level data.

<sup>9</sup> The official document of the "Global Plan for the Decade of Action for Road Safety 2011-2020" uses the word "accident" to refer to the fifth pillar and has opted to include it verbatim herein. However, it was decided not to use that term throughout this plan as it is not suitable for understanding the phenomenon.



## 4.2 PLAN

### 4.2.1 Positioning

In the context of both of the global and regional plans, Figure 4.1 shows the positioning of the Master Plan for the Strengthening of Road Safety in Mesoamerican Cities. It highlights its construction through a participatory process and indicates the elements that differentiate it from the other regional plans.

This Master Plan is based on three instruments (Global Plan for the Decade of Action for Road Safety, 2011-2020; the PAHO Plan of Action on Road Safety; and the Central American Road Safety Program, 2012). Also taken into consideration was the work done in Bogota, Colombia, at the seminar titled “Toward a Mesoamerican Master Plan for the Strengthening of Road Safety in Cities.” More than 40 representatives from local and national governments from 10 Mesoamerican countries and international agencies participated (PAHO, 2015). At the meeting, it was agreed to accentuate that cities should play these important roles:

- Develop more closely focused road safety intervention areas.
- Lead efforts with attention to the five objectives (leadership in road safety, legislation on risk factors and protectors, information systems, sustainable mobility, and pre-hospital care) and the five pillars.
- Suggest measures and activities for each objective.

The plan requires permanent support from national and local governments and their respective resources—e.g., national legislation or working agreements with local governments. Inter-institutional coordination is also important in the development of the plan. If the different ministries—health, infrastructure, justice, and education—coordinate with police and national road safety agencies, the goals can be achieved. The plan should also encourage public and private participation, and input from civil society. Finally, it is hoped that this plan will lead each country to establish a national road safety policy or strengthen its existing one.

### 4.2.2 Technical and political rationale

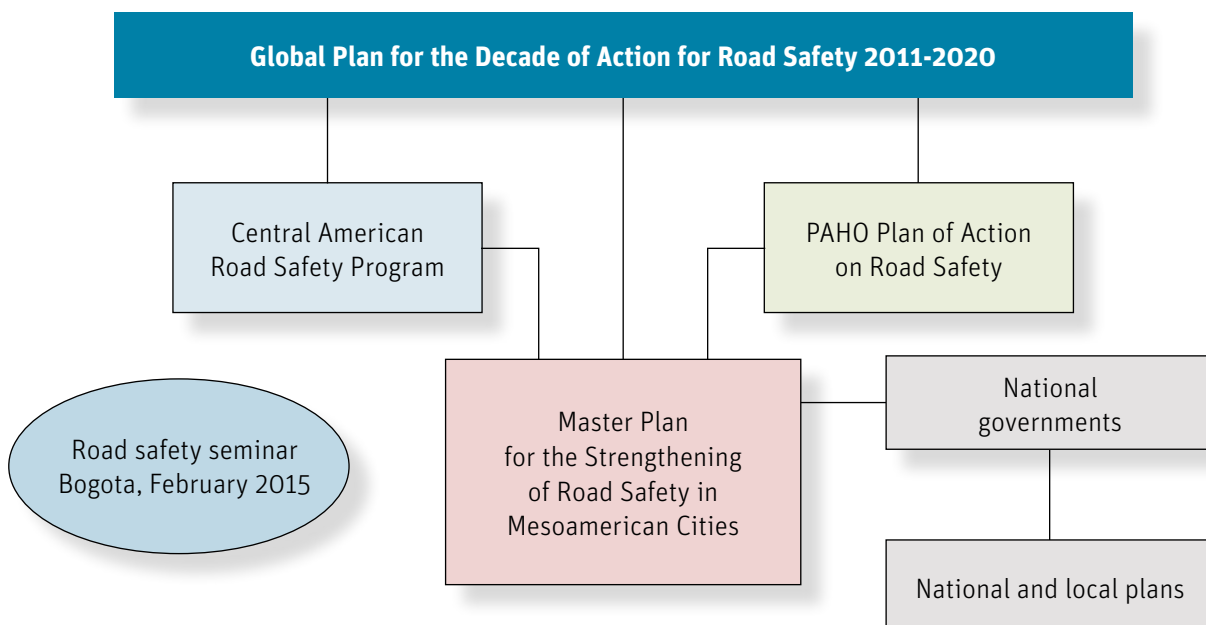
The Master Plan highlights that successful road safety models are based on national efforts that are replicated at the city level: even if they involve differentiated processes, they can be coordinated. General guidelines are formulated nationally, while in the city these interventions are adapted to the local reality and available resources.

### 4.2.3 Defining the five objectives of the Master Plan and how they intersect with the five pillars of the decade

#### Defining objectives

- **Objective 1.** City leadership in road safety. Support road safety activities with special emphasis on city plans prepared in consultation with an advisory committee, responsible authority, or lead agency, and

**Figure 4.1 Positioning of the Master Plan for the Strengthening of Road Safety in Mesoamerican Cities**



giving consideration to multisectoral coordination.

- **Objective 2.** Legislation on risk and protector factors in cities. Propose frameworks for inspections from regulatory authorities to decrease risk factors (speeding, use of alcohol, drugs and other psychoactive substances, and distractions), reduce injuries from road crashes, and to increase use of protective equipment such as helmets, seat belts, and child safety seats.
- **Objective 3.** Information systems in cities. Improve the coverage and quality of data on victims of road traffic injuries and on the risk factors and protectors.
- **Objective 4.** Sustainable mobility in cities. Encourage safe infrastructure, with special attention to pedestrians, cyclists, and motorcyclists; advocate for a safe and sustainable public transportation system.
- **Objective 5.** Pre-hospital and emergency hospital care in cities. Develop and implement comprehensive pre-hospital and hospital services for victims.

#### **How objectives intersect with “decade pillars”**

The five objectives of the Master Plan intersect with the five pillars of the Global Plan for the Decade of Action for Road Safety 2011-2020, making it possible to identify specific areas of action, and consequently, focus more closely on local conditions. The following outcomes are expected:

1. Road safety management (pillar 1) will have strong leadership in the city (objective 1) to develop, implement, and evaluate road safety plans.
2. Safer road users (pillar 4) will respond to legislation on risk factors and protectors in cities (objective 2). This will enable cities to improve their prevention and control activities.
3. Safer roads and mobility (pillar 2), safer vehicles (pillar 3), and safer road users (pillar 4) are linked to the principles of sustainable mobility in cities (objective 4).
4. Post-crash response (pillar 5), better pre-hospital and hospital care (objective 5): the local health system should provide victims of road crashes and their families adequate and complete pre-hospital and hospital care, including emergency and rehabilitation services.
5. Coordination of the information system (objective 3) addresses each of the five pillars by suggesting intervention measures in the cities based on the data collected, stored, analyzed, and delivered. With this, cities can improve the entire chain of processes linked to the information systems.

#### **4.2.4 Goal of the Master Plan**

The Master Plan proposes to continue with each goal proposed in the international, regional, and subregional instruments mentioned above. It also has its own target: by the end of 2018, at least one city in each Mesoamerican country (each country may select the number of cities according to its internal planning) will have implemented a road safety plan that allows the cities to reduce the total number of traffic related fatalities and injuries by 10%, respectively. (Each country may select the number of cities to participate, according to its internal planning.) These plans should pay special attention to: legislative control of risk and safety factors; design and implementation of coordinated information systems; promotion of sustainable mobility projects; improving pre-hospital care; and strengthening of local leadership regarding road safety.

#### **4.2.5 National and international management to support implementation of the plan**

In order to guide Mesoamerican countries in their efforts to achieve the subregional goal, it is essential that international and national management encourage city governments to develop road safety plans that consider the intersection of the Decade pillars with the measures of the Master Plan.

The coordination of activities associated with international and national management will be jointly overseen by PAHO, ECLAC, and AMEXCID. At the national level, each of the ten countries will choose at least one city for its road safety plan. Also, each country will make the necessary arrangements so that the selected cities are involved in planning, designing, preparing, and executing the plan.

##### **4.2.5.1 International management**

International coordination should strive toward providing maximum support for the development of the Master Plan for the Strengthening of Road Safety in Mesoamerican Cities. To this end, the following activities and indicators have been suggested:

- **Activities:**

**Activity 1:** The 10 countries of the Region choose at least one city for a road safety plan. Selection criteria should include political viability (e.g., mayors’ written commitment to allocate resources to road safety), traffic-related fatalities and injury rates, and availability of resources.

**Activity 2:** Provide technical support for at least 10 cities in developing and planning their road safety plans.

**Activity 3:** Support resource management so that at least 10 cities implement and evaluate their road safety plans.

■ Indicators:

1. Percentage of cities selected to be supported in designing road safety plans.
2. Percentage of cities receiving technical support for the implementation and evaluation of road safety plans.
3. Percentage of cities receiving financial resources from international and national organizations to support the development of their plans.

#### 4.2.5.2 National management

##### Objective 1: City leadership in road safety

■ Activities:

**Activity 1:** Promote coordination between national road safety agencies and city governments.

**Activity 2:** Promote the creation of local road safety committees that will implement comprehensive programs.

**Activity 3:** Promote the development of comprehensive management strategies in city governments, aimed at reducing road traffic fatalities and injuries and ensuring that the plan measures are implemented.

**Activity 4:** Train leaders of at least 10 cities on how to develop comprehensive management strategies through sharing experiences between countries and municipalities and organizing training programs run by international organizations that specialize in road safety.

**Activity 5:** Promote workshops and international seminars among city governments to facilitate sharing leadership experiences relevant to developing local road safety plans.

**Activity 6:** Support visits to cities that have implemented successful road safety programs to facilitate sharing experiences and exchanging ideas.

■ Indicators:

1. Percentage of cities that have road safety committees.<sup>10</sup>
2. Number of representatives per city who receive training on developing comprehensive management strategies

with targets to reduce road traffic mortality and morbidity.

3. Value of the resources dedicated to the conduct of road safety projects during the first year, per city.
4. Number of city representatives who attend semiannual meetings of cities to share experiences involving local road safety plans.
5. Number of city representatives who visit other cities to learn about implementing, monitoring, and evaluating road safety plans.

##### Objective 2: Legislation on risk and protector factors in cities

■ Activities:

**Activity 1:** Support processes that encourage the drafting and implementation of legislation to reduce risk factors and promote protective factors in cities; design projects that control speeding, alcohol and drug use; that encourage motorcyclists and cyclists to wear helmets; that encourage drivers and passengers of all motorized vehicles to wear seat belts; that discourage drivers from using distracting devices (e.g. cellphones); and that encourage adults with children to use child restraint systems.

**Activity 2:** Support training for road traffic controllers in cities and for judicial staff involved in enforcing road safety regulations.

**Activity 3:** Support training for journalists on media coverage of road safety.

**Activity 4:** Help design road safety campaigns that complement the strict enforcement of laws governing risk factors and protective equipment.

■ Indicators:

1. Percentage of cities that have implemented legislation on each risk and protective factor (speed, alcohol and drug use, helmets, seat belts, distracting elements, and child restraint systems).
2. Percentage of cities that strictly enforce legislation regulating excessive speed, alcohol and/or drug use, use of helmets by motorcyclists and cyclists, use of seat belts by all users of motor vehicles with four or more wheels, and use of child restraint systems.
3. Percentage of individuals driving under the influence of alcohol and/or drugs.
4. Percentage of motorcyclists and cyclists who wear helmets.
5. Percentage of drivers and passengers who use seat belts.

<sup>10</sup> For each of the indicators that establish “percentage of cities” as an achievement, the percentage is calculated from the number of cities participating in the plan, and the number of cities in Mesoamerica.

6. Percentage of drivers (of both motorized and non-motorized vehicle) who use distracting devices while in transit.
7. Percentage of adults whose children wear child restraint systems.
8. Number of agents, per city, trained to enforce road safety legislation.
9. Number of judges, per city, trained to improve judicial processes associated with road safety.
10. Number of journalists, per city, trained on media coverage of road safety.
11. Percentage of municipalities that have conducted road safety campaigns.

### Objective 3: Information systems in cities

#### ■ Activities:

**Activity 1:** Improve the quality and analysis of the road safety data collected in the 10 cities by coordinating the data collection, storage, linkage, analysis, and delivery processes so that mortality and morbidity rates reflect the characteristics of those injured. This may be achieved by conducting training courses for city representatives responsible for information systems.

**Activity 2:** Promote standardization of definitions and exchange of information among the cities via workshops and a virtual network.

**Activity 3:** Encourage the creation of road safety observatories for cities, and strengthen existing ones.

#### ■ Indicators:

1. Number of representatives per city who receive technical assistance to improve the collection, storage, linkage, analysis, and public delivery of road safety data.
2. Percentage of deaths classified as “others” in the user category.
3. Percentage of cities with standardized definitions and percentage that share information about their information systems.
4. Percentage of cities that have information systems whose data collection, storage, linkage, analysis, and delivery processes are coordinated and that facilitate adequate data on mortality and morbidity rates.
5. Percentage of cities that receive technical assistance to set up their road safety observatories.
6. Percentage of cities with operational road safety observatories.

### Objective 4: Sustainable mobility in cities

#### ■ Activities:

**Activity 1:** Promote the development of infrastructure that favors the safe movement of all road users in cities, especially pedestrians, cyclists, and motorcyclists. This infrastructure should also serve the more vulnerable sectors of the population, such as older adults or those with reduced mobility.

**Activity 2:** Support policy improvements for extensive public transportation by integrating criteria such as safety, equity, and accessibility, thereby promoting human rights.

**Activity 3:** Share successful experiences in sustainable mobility among the cities.

#### ■ Indicators:

1. Percentage of cities that implement urban policies for people traveling on foot and/or by bicycle; for the protection of motorcyclists; and for preventive maintenance of vehicles, taking into account both safety and environmental aspects.
2. Percentage of cities that incorporate road safety elements into road design and that take steps to reduce speed limits in areas used by pedestrians and/or cyclists.
3. Percentage of cities which introduce urban policies that promote extensive public transportation which is safe and healthy, and that promotes human rights by integrating safety, equity, multi-modality and accessibility.

### Objective 5: Pre-hospital and hospital care in cities

#### ■ Activities:

**Activity 1:** Strengthen and integrate pre-hospital and hospital healthcare services into Integrated Health Service Networks (HSN), including hospital-based and rehabilitation services.

**Activity 2:** Develop training courses for community agents and other actors who provide first aid, basic resuscitation, and other elementary interventions to reduce “inappropriate post-trauma care.”

**Activity 3:** Support improving the communication system, including a single, recognized emergency number.

#### ■ Indicators:

1. Percentage of cities with pre-hospital and hospital healthcare systems integrated into the health sector.
2. Number of community agents and other actors trained

in first aid, basic resuscitation, and other elementary interventions to reduce “inappropriate post-trauma care.”

3. Percentage of cities that have a single emergency number.

### 4.3 MONITORING AND EVALUATION

This plan will be monitored and evaluated in line with the results-based management frameworks of PAHO/WHO and AMEXCID, respectively, and use its own monitoring and performance evaluation processes. A baseline will be prepared at the start of the project and semiannual

progress reports will be drawn up thereafter, with the technical support of an external evaluator independent of local governments. During the last year of the plan, any incomplete monitoring information will be consolidated in a final evaluation to determine the strengths and weaknesses in the plan’s general execution, the factors leading to the successes and failures, and future actions to be undertaken.

### 4.4 BUDGET

The budget outlines how this Master Plan is to be financed for 2016-2018. Sums are in US dollars.

**Table 4.1 Budget by objective and year (in USD), 2016-2018**

Objective	Activity	2016	2017	2018	Total
City leadership in road safety	Promote coordination between national road safety agencies and city governments.	X	X		100,000
	Promote the creation of local road safety committees to implement comprehensive safety programs.	X	X		50,000
	Promote the development of comprehensive management strategies in city governments to ensure this plan is implemented.	X	X		50,000
	Train leaders in 10 cities how to develop comprehensive management strategies.	X			100,000
	Promote workshops and international seminars among city governments to facilitate sharing experiences in leadership in developing local road safety plans.		X	X	50,000
	Support visits to cities that have implemented successful road safety programs to facilitate sharing experiences.		X	X	100,000
Legislation on risk factors and protectors in cities	Support processes that improve drafting and implementing legislation that curb risk factors and promote protective factors in cities by designing projects that control speeding, alcohol, and drug use and promote use of helmets by motorcyclists and cyclists; use of seat belts by all motorized transport users; and use of child restraint systems.	X			50,000
	Support training for road traffic controllers in cities and for judicial staff involved in enforcing road safety regulations.		X	X	100,000
	Support training for journalists on media coverage of road safety.		X	X	70,000
	Help design road safety campaigns that complement the control of risk factors and protectors by the competent agencies.		X	X	70,000

**Table 4.1 Budget by objective and year (in USD), 2016-2018 (cont.)**

Objective	Activity	2016	2017	2018	Total
Information systems in cities	Improve the quality and analysis of the data collected on road safety in the 10 cities by coordinating data collection, storage, linkage, analysis, and delivery processes so that mortality and morbidity rates reflect the characteristics of those injured. This objective may be achieved by conducting training courses for city personnel responsible for information systems.	X	X		140,000
	Promote the standardization of definitions and exchange of information among the cities with a Mesoamerican workshop and a virtual working network.		X	X	50,000
	Promote the creation of road safety observatories for the cities, and strengthen existing ones.	X	X		100,000
Sustainable mobility in cities	Promote the development of infrastructure that favors the safe movement of all road users in cities, especially pedestrians, cyclists, and motorcyclists.	X	X		100,000
	Support policy improvements for extensive public transportation by integrating criteria such as safety, equity, and accessibility, thereby promoting human rights.		X		50,000
	Share successful experiences in sustainable mobility among the cities.		X		70,000
Pre-hospital care in cities	Strengthen and integrate pre-hospital and hospital health care services into the integrated health service networks, including hospital-based and rehabilitation services.	X	X	X	200,000
	Develop training courses for community agents and other actors who provide first aid, basic resuscitation, and other elementary interventions to reduce inappropriate post-trauma care.		X		100,000
	Support the strengthening of the communication system, including a single, recognized emergency number.		X	X	50,000
Evaluation	Evaluate the plan annually.	X	X	X	300,000
<b>TOTAL</b>					<b>1,900,000</b>

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