SUMMARY
BEST PRACTICES

from the Chagas Disease Control in
Guatemala, El Salvador, Honduras and Nicaragua

2000 - 2014

April 2014

JICA

This document is a summary of the original report “Buenas Prácticas en el Control de la Enfermedad de Chagas en Guatemala, El Salvador, Honduras y Nicaragua 2000-2014” produced by the governments of these four countries and Japan, with assistance of Japan International Cooperation Agency (JICA) in Tegucigalpa, Honduras, in April 2014.

CENTRAL AMERICA

I. INTRODUCTION

What are best practices?

Best practices are defined as a set of coherent actions that have generated favorable changes in sustainability, scalability and/or impact in a given setting. The definitions used for these terms are included below.

Sustainability

- The practice is functional for more than 5 years.
- The actors' mindset evolves from a state of "inertia" to one of "intrinsic motivation".

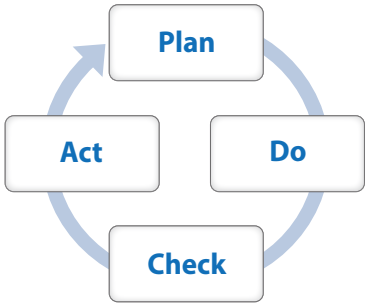
Scalability

- The practices are replicable in similar contexts to obtain resembling results.
- Although situational differences exist, the practice offers a foundational platform and indispensable factors.

Impact

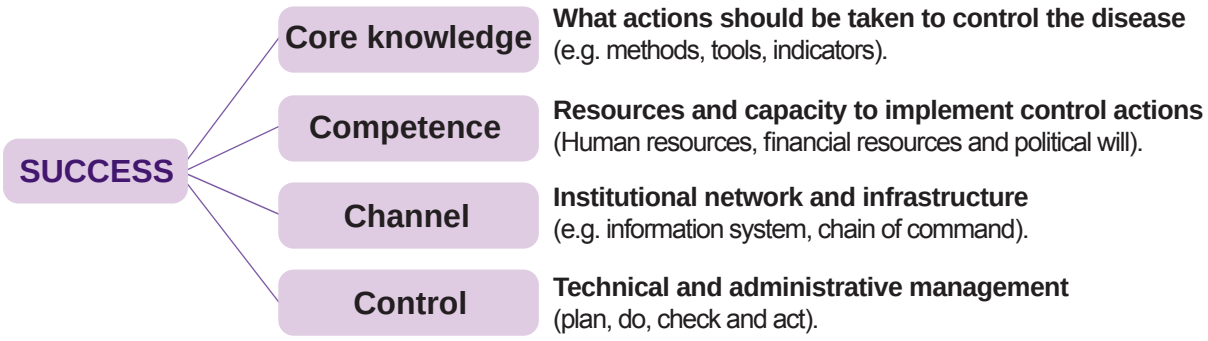
- In addition to the expected results, other benefits are observed as effects of the implementation of the practice.

Best practices usually have a characteristic in common, that is, the cycle of **"Plan – Do – Check – Act"**. This cycle is continually repeated from the beginning of the activity until the desired objective is achieved.



This process of continual improvement was employed when developing creative strategies, useful tools, systematic guidelines, etc., all of which helped to overcome these challenges.

In effect, the implementation of best practices strengthened at least one of the 4 fundamental elements of institutional capacity, that is **"Core knowledge, Competence, Channel and Control"**, that were needed to achieve success in the disease control efforts undertaken by the public health sector.



What is Chagas disease?

Signs and symptoms

Chagas disease, caused by infections with the parasite *Trypanosoma cruzi*, is characterized by two phases: acute and chronic.

Trypanosma cruzi

The acute phase occurs in the first 6 to 8 weeks after contact with the parasite. This phase is more likely to be asymptomatic than symptomatic. However, the clinical manifestations that may occur include fever, loss of appetite and general malaise. *T. cruzi* may enter on a cutaneous or mucosal surface and in this phase the characteristic inflammation called a Chagoma can be observed.

Palpebral edema known as Romana's sign is another well characterized clinical manifestation in endemic areas.

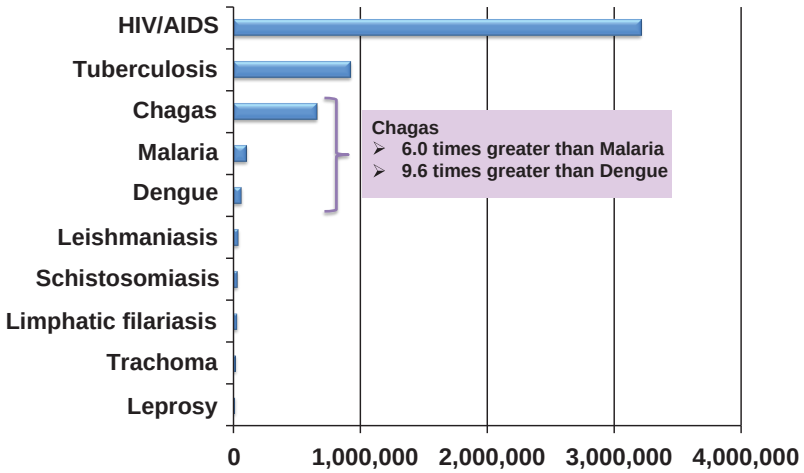
Romana's sign

The chronic phase may also be asymptomatic or symptomatic. It is estimated that between 30 and 40% of infected patients who do not receive specific treatment will suffer from cardiac, digestive or neurological damage 10 to 20 years after the initial infection. The remaining infected individuals will likely remain asymptomatic for life.

Impact on society

The burden of Chagas diseases in Latin America is high, due to the morbidity and mortality that the disease imposes on the economically active population.

The most affected population is found in rural areas. Precarious housing and living conditions are important risk factors. Chagas disease can easily be left neglected in the midst of poverty.



• Hookworm, akariasis and Trichuriasis were excluded from the chart for the broadly ranged values of 130,500 - 1,923,000, 124,800 - 1,092,000 y 265,600 - 1.062,000 respectively.

Figure 1. *Estimated burden of infectious disease in Latin America by Disability-Adjusted Life Year (DALY).*
Source: Hotes et al. 2008

Epidemiology

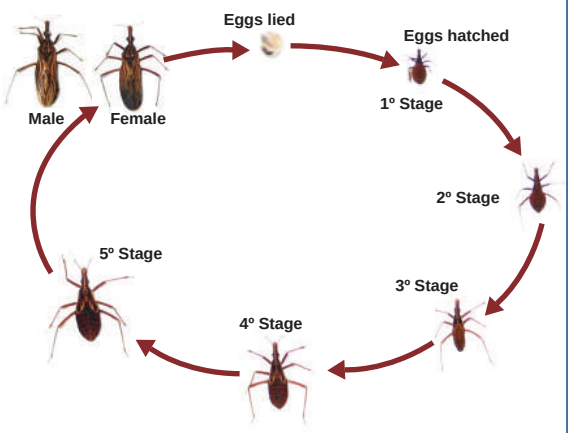
Chagas disease, discovered by the Brazilian doctor Carlos Chagas in 1909, is endemic only on the American continent. The disease affects more than 7.5 million people, among which 98% reside in the Americas. In Central America, approximately 0.8 million or 2% of the population is infected (PAHO 2006).

Carlos Chagas, 1879-1934

Transmission routes

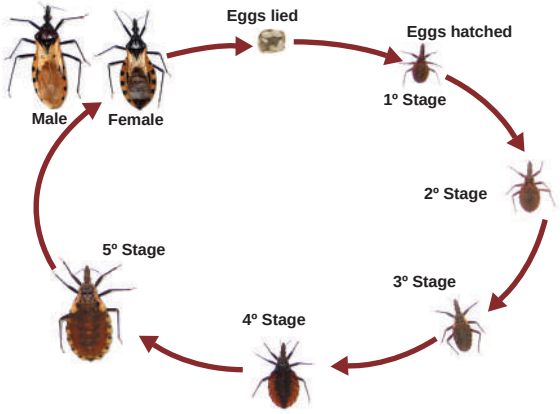
The most common form of transmission is through hematophagous insects of the Triatominae subfamily, a route that accounts for more than 80% of cases (other forms include blood transfusion, congenital and oral transmission, and laboratory accidents). In Central America, *Rhodnius prolixus* and *Triatoma dimidiata* have been the principal vectors of infection. *R. prolixus* is the more efficient transmitter of the disease, being strictly domestic, but more susceptible to insecticides. Thus, the vector has been considered eliminable. *T. dimidiata* is found in domestic, peri-domestic and sylvatic environments, and thus a reasonable aim is to reduce or eliminate this vector only in domestic areas.

Rhodnius prolixus



- The life cycle reaches approximately 6 months.
- *R. prolixus* are usually found in houses with thatched roofs made of straw, grass, palm fronds, sugar cane leaf etc. However, the vector can also adapt to houses roofed with tile, zinc, asbestos and others.

Triatoma dimidiata



- The life cycle lasts from 1 to 2 years.
- *T. dimidiata* enter the cracks of the mud walls called adobe and bajareque. Soil floor and animals inside the houses are also important risk factors for the vector infestation.

Control of the disease

Prevention and control measures should be directed towards elimination or reduction of triatomines, by increasing awareness among individuals, applying physical interventions (cleaning, improving and rebuilding of houses) and chemical control (residual insecticide spraying of houses). Community participation during these processes strengthens effectiveness, efficiency and sustainability of the disease control activities.

JICA Projects

Background

1975–1985: Onchocercosis (river blindness) Research and Control Project in Guatemala
1987–1990: Small scale malaria project in Guatemala
1991–1998: Tropical disease research project in Guatemala
2000–2014: Chagas vector control projects in Guatemala, El Salvador, Honduras and Nicaragua

- With IPCA* objectives: Interruption of transmission through the elimination of *R. prolixus* and the reduction of *T. dimidiata*.

* Intergovernmental Commission for the Central American Initiative for Interruption of the Vector and Transfusion Transmission of Chagas Disease

Chagas vector control strategy

Attack phase:

- Entomological and serological baseline survey, followed by massive insecticide spraying

Surveillance phase:

- Implementation of the community-based surveillance system for notification of vectors and institutional response

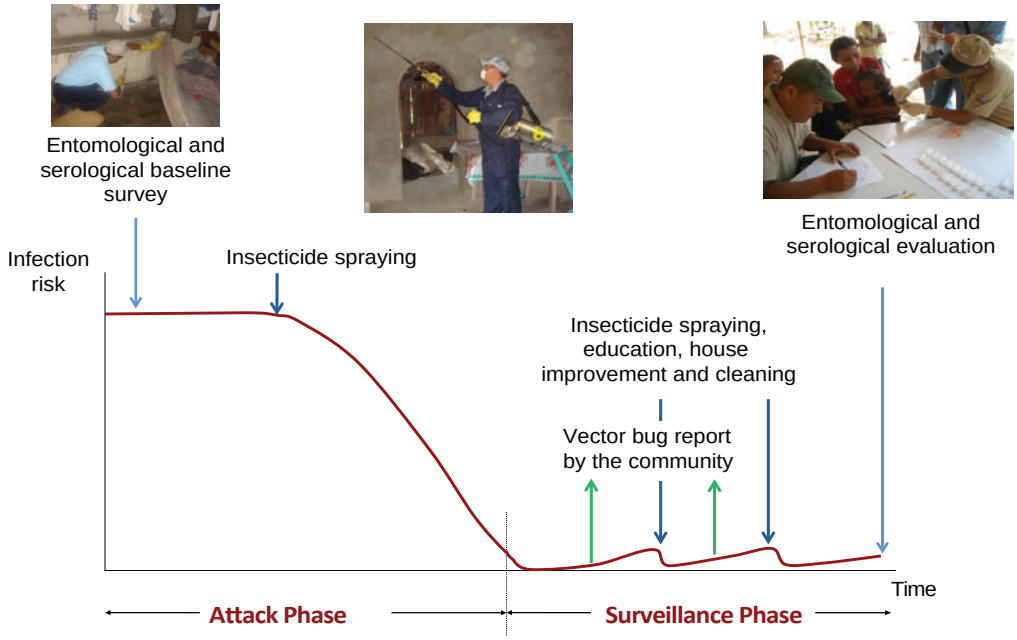


Figure 3. *Chagas disease vector control strategy*

Differences between vector control methods

	R. prolixus	*T. dimidiata*
Objective	Eliminate	Reduce
Main intervention	Insecticide spray	Insecticide spray, house improvement and cleaning
Geographic Area	Focalized	Extensive
Duration	Defined	Permanent

Expansion of the JICA cooperation

- In 2000, a pilot project began in the 4 most endemic departments in Guatemala and a model of cooperation was established for development of capacity in Chagas disease vector control.
- JICA cooperation continued to expand until it reached a total of 30 departments in Central America: Guatemala (10), El Salvador (7), Honduras (8) and Nicaragua (5) in 2009.
- The cooperation consisted of two elements. One is allocation of the Japanese adviser at the central level and volunteer assistants at departmental level of the Ministry of Health. Another is the donation of equipment and supplies such as vehicles, insecticides, spraying equipment, serologic diagnostic kits, educational materials and training expenses.

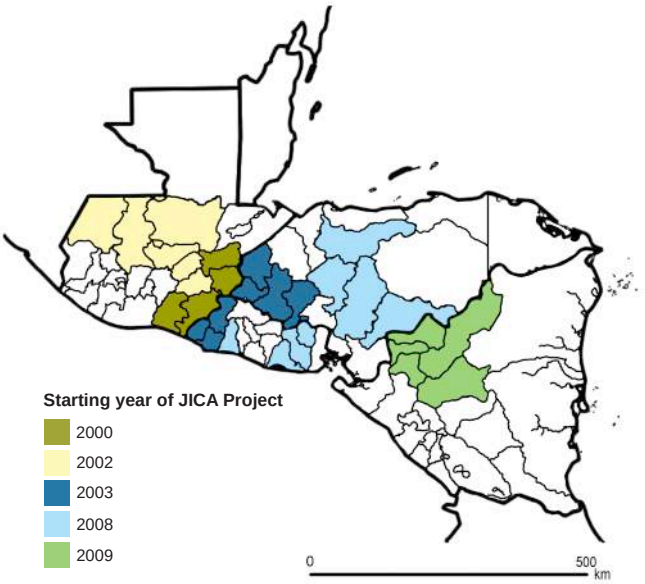
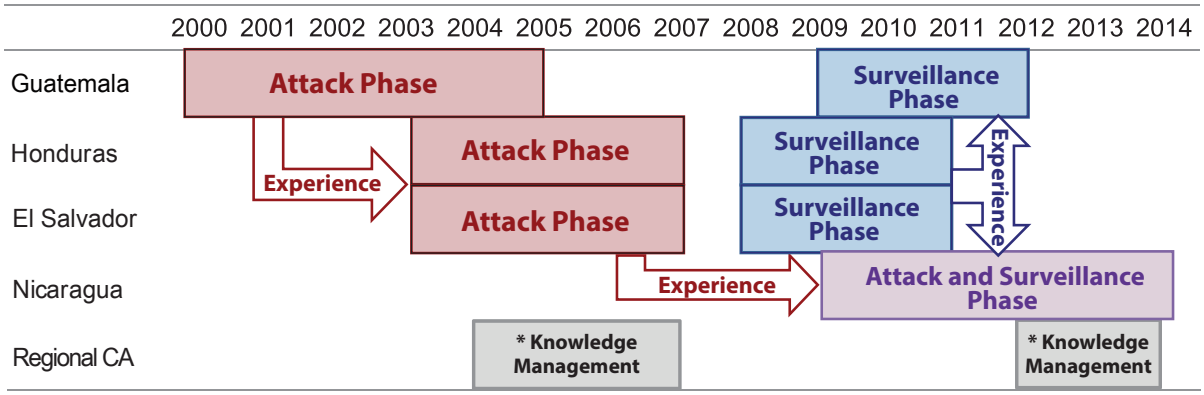


Figure 4. *The 30 departments covered by JICA for Chagas disease control in Guatemala, El Salvador, Honduras and Nicaragua, from 2000 to 2014.*



* Dispatch of a Japanese advisor to facilitate the exchange of experiences between countries.

Figure 5. *Chronogram for implementation of JICA cooperation on Chagas disease control in Central America from 2000 to 2014*

- During 2000-2013, JICA sent more than 80 advisors (16 long-term, 64 short-term) and more than 85 assistant volunteers (73 with a two year stay, the rest with a scheme of less than 10 months periods) from Japan.

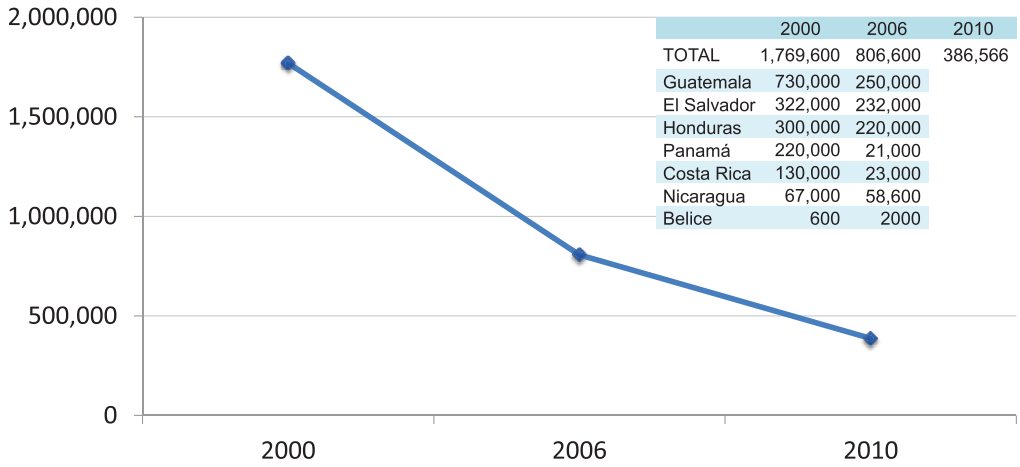
Epidemiology of Chagas disease

Estimates of the affected, 2000-2010

Between 2000 and 2010 a notable reduction was observed in the prevalence and incidence of Chagas disease in Central America.

Prevalence (total number of infected persons in the population)

The total number of people infected with Chagas disease in Central America was reduced by 78%, which implies that approximately 1.4 million individuals became free from the disease.

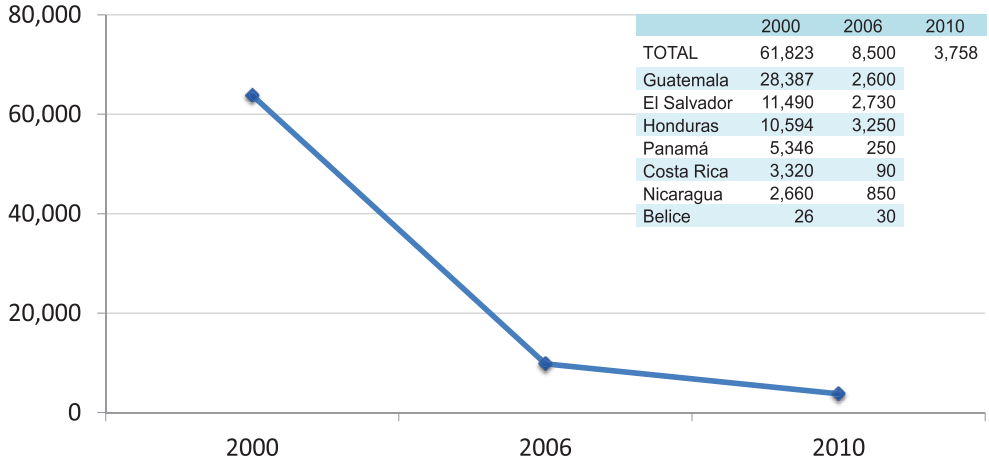


	2000	2006	2010
TOTAL	1,769,600	806,600	386,566
Guatemala	730,000	250,000	
El Salvador	322,000	232,000	
Honduras	300,000	220,000	
Panamá	220,000	21,000	
Costa Rica	130,000	23,000	
Nicaragua	67,000	58,600	
Belice	600	2000	

Figure 6. *Figure 6. Estimated number of population infected with Chagas disease in Central America in 2000, 2006 and 2010*
Source: WHO/CDS/WHOPES/GCDPP/2000.1, OPS/HDM/CD/425-06, Personal communication PAHO 2010

Incidence (number of new cases per year)

The number of people newly infected with Chagas disease was reduced by 94% as a result of the vector control interventions.



	2000	2006	2010
TOTAL	61,823	8,500	3,758
Guatemala	28,387	2,600	
El Salvador	11,490	2,730	
Honduras	10,594	3,250	
Panamá	5,346	250	
Costa Rica	3,320	90	
Nicaragua	2,660	850	
Belice	26	30	

Figure 7. *Estimated new infection cases of Chagas disease in Central America in 2000, 2006 and 2010*
Source: WHO/CDS/WHOPES/GCDPP/2000.1, OPS/HDM/CD/425-06, Personal communication PAHO 2010

International certifications

For achieving the IPCA goal to interrupt the transmission of Chagas disease by *R. prolixus* and eliminate this vector, Guatemala, El Salvador, Honduras and Nicaragua received IPCA-PAHO international certification between 2008 and 2011.

Certificación	Guatemala	El Salvador	Honduras	Nicaragua
Interruption of transmission of Chagas disease by *R. prolixus*	2008	-	2011	2011
Elimination of *R. prolixus*	-	2010	-	-

Guatemala

Awarding of the certification to the Coordinator of the Subprogram of Chagas Disease of Guatemala by the IPCA secretariat in Costa Rica, November 2008.

El Salvador

The Minister of Health of El Salvador received the first certification of elimination of R. prolixus in Central America in San Salvador, June 2010.

Honduras

National and departmental technical staff of the Secretary of Health in Honduras, with the awarded certificate at the XIII IPCA meeting in Tegucigalpa, August 2011.

Nicaragua

The Coordinator of the National Neglected Disease Program of the Ministry of Health in Nicaragua received the certification from the PAHO Headquarters Deputy Director and PAHO Director of Honduras in Tegucigalpa, August 2011.

1 Projecting a vision in a National Strategic Plan

HONDURAS
2003-2007
2008-2013

NATIONAL
level
relevance

Situations	Causes	Strategies
• National Program conducted activities on demand without a vision or plan	• Lack of concrete long term strategy	• Created a strategic plan for the National Program

Previous Situation

The National Program of Chagas Disease conducted activities on demand, without a plan for directing the Secretary of Health and to orient other accompanying institutions.

Strategies

The National Program prepared its Strategic Plan with participation of key actors, including technicians and politicians within the Secretary of Health and cooperating agencies.

Results

The Strategic Plan facilitated systematic and strategic programming and implementation of activities, and better integrated projects by cooperating agencies

Workshop to prepare the National Strategic Plan, at PAHO Honduras Office, June 2003.

Keys to success

- Supportive international public policies
- National Program leadership
- Actors with different specialties but the same purpose
- Vision shared through discussions
- Formation of a steering committee
- Political commitment key in the launch
- Application and evaluation of the Strategic Plan

Executors

National Program of Chagas Disease with assistance from the National Chagas Laboratory, PAHO, CIDA, CARE, JICA, World Vision and other cooperating agencies

2 Strategic design of a national plan and normative documents

NICARAGUA 2012-2013 | NATIONAL level relevance

Situations	Causes	Strategies
• The health service staff worked without shared plans and standardized methods	• The Ministry of Health did not have valid strategic or normative documents	• Prepared and implemented a long term national plan, standards and manuals

Previous Situation

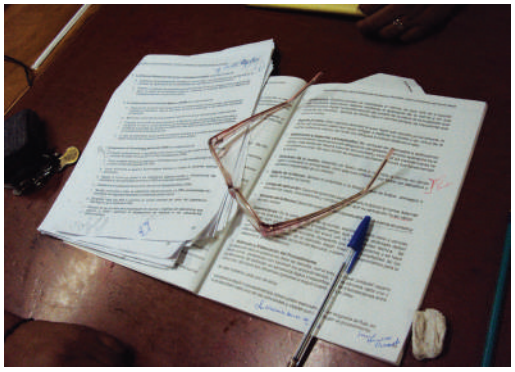
Activities for control of Chagas disease were conducted on-demand without a vision or systematic program. The health service staff had little idea of their functions, assignments and responsibilities.

Strategies

The National Program prepared the National Chagas Operating Plan, Technical Standards and Procedures Manual for Chagas disease in a coherent and strategic manner.

Results

A vision was shared between the health service and the national government. The Standards and the Manual presented clear regulations, procedures, flowcharts and indicators that were legally supported.



Review of the Technical Standards in Managua, May 2013.

Keys to success

- Follow protocol for document preparation
- Involve the Ministry's legal commission in the review
- National Program initiative
- Horizontal coordination within the Ministry of Health
- Review experiences and existing knowledge
- Link the vision to normative and operational guidelines
- Emphasis on operability

Executors

General Directorate of Public Health Surveillance, National Chagas Devision, MINSA-JICA Chagas Project.

3 Creating a diploma course on vector-borne diseases

EL SALVADOR 2004- | NATIONAL level relevance

Situations	Causes	Strategies
• Limited commitment and progress in Chagas-related operational activities when the Project began	• Lack of knowledge and interest among the staff of the Ministry of Health	• Organized a dedicated course with experts and trained the staff

Previous Situation
It was difficult to advance the vector control activities of Chagas disease due to limited involvement of the staff at various levels of the Ministry of Health, resulting from their scarce technical knowledge and lack of interest.

Strategies
The Regional and National Units organized a diploma course on vector-borne diseases in coordination with the local university. The course focused on medical entomology, and was open to staff with different disciplines and levels within the Ministry of Health.

Results
The trained staff created operational teams, implemented Chagas-related vector control activities and expanded the geographic coverage of intervention.

Practice with the microscope in the first diploma course in Santa Ana, March 2004.

Keys to success

- Platform for organizing diploma courses
- Ministry's interest in human resource development
- Employees' interest in professional development
- Self-motivated investment in high quality classes
- Positive reputation of the course
- Economic and physical access to the course
- Academic service and support from the university
- Financial support from cooperating agencies

Executors

National Unit of Vector Borne Diseases and the Western Regional Health Office of the Ministry of Health, Autonomous University of Santa Ana in El Salvador and JICA.

4 Integrating technicians from different disciplines for vector control operation

EL SALVADOR 2002- | NATIONAL level relevance

Situations	Causes	Strategies
• Some operational staff did not execute and/or record their activities • Inconsistent data recording	• Operational activities were not regulated • Data formats were not standardized	• Established minimum standards for daily data entry for different disciplines

Previous Situation

Progress in Chagas vector control activities was limited due to lack of operational human resources in the Vector Control Unit. Although other operational disciplines participated in Chagas-related activities on ocasion, the data were not systematized.

Strategies

The National Units coordinated and incorporated required operational activities in daily data entry for the different disciplines, trained the staff, and linked the data through an online information system.

Results

They found an increase in the recording of Chagas disease control activities, and the interventional geographic coverage. The data sharing between different disciplines facilitated operational planning.

Regular check of the spraying equipment by Vector Control Technician (left) and Environmental Sanitation Inspector (right) at the Guaymango Health Unit, Ahuachapán, November 2010.

Keys to success

- Availability of operational human resources
- Data entry machines for the online information system
- Integration of data in the information system
- Better estimation of workload allowing for effective approach
- Access to the information system for decision-makers
- Annual review of the daily data entry formants
- Revision of operational personnel profiles
- Most required activities assigned per jurisdiction
- Continuous training for the operational personnel

Executors

National Unit of Vector Borne Diseases in coordination with National Community Health and Environmental Sanitation Units

5 Applying Geographic Information Systems (GIS)

GUATEMALA 2001- | NATIONAL level relevance

Situations	Causes	Strategies
• Data tables offered limited visual projection of the risk and advances of the intervention	• Limited use of maps in information analysis	• Implemented geographic information system by training the health personnel

Previous Situation

All the data related to the risk and progress in Chagas disease control were presented with tables and occasionally with graphs. The spacial interpretation of the data presents depended on individual geographic knowledge.

Strategies

The National Program on Vector Borne Diseases in collaboration with JICA introduced a GIS software and trained the staff. Various maps were prepared with existing data and utilized in presentations.

Results

The prepared maps enabled visual integration and association of the data, risk projection and overall advances. The maps had greater impacts on government authorities and cooperating agencies.

Sample of GIS map: Distribution of villages infested with R. prolixus in Guatemala in 2000.

Keys to success

- Computer equipment
- Personnel with basic computer skills
- Availability of geographic data
- User-friendly GIS software
- Continuous support for software usage
- Learning to utilize the tool and its effects

Executors

National Program of Vector Borne Diseases in collaboration with JICA

6 Establishing Collaboration between the Ministries of Health and Education

Western Region 2004-2007, EL SALVADOR 2010- | NATIONAL level relevance

Situations	Causes	Strategies
• Little awareness of Chagas among the population • Limited participation by schools	• Lack of knowledge, commitment and educational materials for schools	• Established an agreement between the Ministries of Health and Education • Worked jointly on curriculum

Previous Situation

To increase awareness of Chagas disease among the population, the Ministry of Health had some support from schools, but it was sporadic and dependent on the teacher's will.

Strategies

The Ministry of Health formalized the collaboration of the Ministry of Education at regional level and subsequently at national level, as an official agreement, integrating teaching classes and surveillance of Chagas disease as part of health education.

Results

Teachers and students showed greater participation in the surveillance and celebration of National Chagas Day throughout the country.
The agreement facilitated coordination between health and education staff of the two Ministries at local level.

The Minister of Education (left) and the Minister of Health (center) signing the agreement for the prevention of Chagas disease, in the presence of the PAHO representative (right), San Salvador, March, 2010.

Keys to success

- Decentralized education and health systems
- Active key persons in the Ministries
- Favorable social relationship between highest authorities
- Involvement of third parties in lobbying
- Analysis of existing coordination at local level
- Building inter-institutional collaboration from the field
- Useful educational materials for teachers

Executors

The process initiated by the Western Regional Health Office and extended throughout the country by the National Unit of Vector Borne Diseases and the Ministry of Education, with support of JICA.

7 Strengthening diagnosis of acute cases

EL SALVADOR 2005-2013 | NATIONAL level relevance

Situations	Causes	Strategies
• Inconsistency was found in the methods, data and diagnostic systems of Chagas acute cases	• Limited knowledge and awareness among the health services staff	• Identified weaknesses • Prepared educational material • Trained the staff

Previous Situation

Although Chagas disease cases were reported as a mandatory issue, inconsistencies were observed in the diagnostic methods and in the medical and laboratory records.

Strategies

After identifying the weaknesses, the National team with an expert prepared a physiopathology diagram as a guide, updated the diagnostic methods and mechanisms, and trained the medical, nursing, operational and laboratory staff throughout the country.

Results

Health service personnel became trained on the standardized diagnostic methods. The recording and case referral systems were established.

National network of laboratories equipped with apparatus and trained staff for the detection of Chagas acute cases, Health Unit of San Rafael, Santa Ana, September 2012.

Keys to success

- Good access to the health services for the population
- Local laboratories with equipment and specialists
- Simple and economic diagnostic methods
- External assessment and intellectual inputs
- Training with an effective tool
- Cross-sectorial surveillance network

Executors

National Unit of Vector Borne Diseases and National Referral Laboratory in coordination with the Network of Clinical Laboratories, Epidemiology and Health Promotion Units

8 Developing a sustainable and scalable surveillance method through knowledge management

HONDURAS 2008-2011 | NATIONAL level relevance

Situations	Causes	Strategies
• Chagas surveillance was limited in its geographic coverage and not established as a system	• Lack of systematized and agreed surveillance knowledge, and expansion plans	• Accumulated experiences • Created a model and a guide for replication • Trained the staff

Previous Situation

Chagas surveillance activities were carried out in limited geographic areas, without planning or technical guidelines that would constitute its sustainability.

Strategies

The National Program accumulated experiences in pilot sites, constructed an efficient surveillance model between operational and normative staff, and scaled up this effort training the health service personnel using a practical guide.

Results

A sustainable and scalable method was established for the community-based surveillance system and was documented in a practical guide. Surveillance coverage was expanded as planned.

Educational chat in the rural community of Vega Grande, Ocotepeque, given by the Environmental Health Technician, 2008.

Keys to success

- Agreed concept for surveillance
- Efficient model, practical guide and feasible plan
- Trial and error approach
- Accompaniment at pilot sites
- Open discussions with effective facilitation

Executors

National Program of Chagas Disease in coordination with the Departmental Health Office, pilot Health Units and municipal governments.

9 Strengthening the National Program leadership with Inter-institutional Committee

GUATEMALA 2000- | NATIONAL level relevance

Situations	Causes	Strategies
• The National Program had limited leadership • Institutions worked for their own interests	• Lack of communication and coordination between programs and other institutions	• Created opportunities to coordinate between actors from key entities

Previous Situation

In Guatemala, leadership for Chagas disease was not consolidated by the Ministry of Health but by the universities.
There was incoordination and unnecessary competition.

Strategies

An inter-institutional Chagas committee was formed by the Ministry of Health through policy advocacy, and improved communications with other institutions.

Results

Leadership became cultivated at the Ministry of Health. The committee established a mechanism for quality control and technical and intellectual collaboration, as well as harmonization.

Committee members: National Program of Vector Borne Diseases Chagas Subprogram, Blood Banks, National Laboratory, USAC, UVG, PAHO and JICA, October 2011.

Keys to success

- Existence of supporting regional policies
- External agencies for creation of the committee
- Goals shared among members
- Technical sense, not political partisanship
- Members assume roles
- Efforts united for international meetings
- Incentives for all members
- No financing, but with legitimacy and credibility

Executors

National Program of Vector Borne Diseases with other programs of the Ministry of Health, Universities and cooperating agencies.

10 Harmonizing institutions' efforts using Technical Roundtable

HONDURAS 2004- | NATIONAL level relevance

Situations	Causes	Strategies
• The National Program did not know about Chagas-related work by other organisms	• Limited communication between the National Program and organisms working on Chagas issue	• Created opportunities to facilitate communication and mutual monitoring

Previous Situation

Lack of coordination between the National Program of Chagas Disease, other programs and cooperating agencies resulted in deficiency in coverage and quality of the activities.

Strategies

The National Program formed a Technical Roundtable with the other programs and institutions, held periodical meetings, and exchanged their advances and experiences.

Results

Chagas-related activities of the Secretary of Health and other institutions were conducted in harmonization, with mutual monitoring and without dualities.

Meeting of the Chagas Disease Technical Roundtable at the CIDA office, August, 2011.

Keys to success

- Shared long-term goals
- National Program leadership
- Mutual process monitoring
- Exchange of valuable information
- Resources optimized by collective activities
- Low cost for holding regular meetings
- Rotation of meeting locations

Executors

National Program of Chagas Disease, National Laboratory of Chagas Disease, PAHO, JICA, with the participation of other programs and cooperating agencies.

11 Systematizing interventions through biannual evaluation

GUATEMALA 2000- | NATIONAL level relevance

Situations	Causes	Strategies
• Chagas-related operational activities were conducted and monitored in a sporadic manner	• Lack of systematic evaluation of the activities	• Organized biannual evaluation on progress of the activities between the national and departmental level

Previous Situation

Chagas vector control activities were conducted without planning or systematic evaluation. Consequently, the Ministry of Health hardly had analyzable information or sharable experiences.

Strategies

The National Program organized evaluation meetings between the national and departmental level personnel, with Inter-institutional Committee members to analyze and discuss the operational activities.

Results

Implementation and evaluation of activities were systematized. This facilitated information analysis and the discussion of experiences from different departments.

Presentation by the departmental coordinator of Vector Control Unit during an evaluation held at the Ministry of Health in Guatemala City, March 2001.

Keys to success

- National Program initiative and incentives
- Financing for organizing the evaluations
- Standardized presentation formats
- Adequate setting of personnel, time and space
- Healthy competition between departments
- Opportunities for collective capacity development

Executors

National Program of Vector Borne Diseases with participation of the Health Areas.

12 Reinforcing decentralization by biannual evaluation

HONDURAS 2004- | NATIONAL level relevance

Situations	Causes	Strategies
• Sporadic activities were conducted based on the National Program's initiative	• Lack of local initiative, operational capacity, and national evaluation system	• Organized biannual evaluations between the National Program and the departmental teams

Previous Situation

The National Program of Chagas Disease recorded and managed data based on their direct interventions and subsequently shared annual reports with the Departmental Health Offices.

Strategies

The National Program organized periodical evaluations with the Departmental Health Offices and gave them opportunites to present corresponding reports and plans, with participation of other organisms.

Results

Coordination improved between the departmental and national level with more fluid and systematized information. The departmental teams developed technical and administrative management capacity for Chagas disease control.

XII Biannual evaluation of the National Program of Chagas Disease in Comayagua, Honduras, February 2011.

Keys to success

- National Program leadership
- Financing
- Standardized presentation formats
- Strengthening analytical skills
- Arrangement of personnel, time and environment
- Healthy competition between departments
- Atmosphere that surpasses discipline and status
- Sense of learning and capacity development

Executors

National Program of Chagas Disease with participation of Departmental Health Offices, other ministerial partners and cooperating agencies.

13 Establishing evidence of elimination of *Rhodnius prolixus*

EL SALVADOR 2003-2010 | NATIONAL level relevance

Situations	Causes	Strategies
• There was lack of evidence about the absence of *R. prolixus*, the vector aimed for elimination	• Historical data had not been organized and analyzed • Risk areas were yet to be determined and surveyed	• Identified and investigated villages with a history or a possibility of presence of the vector

Previous Situation

Although the control of *R. prolixus*, eliminable vector, had been conducted between 1950s and 1970s leaving the last report of the vector in 1976, there was no evidence that showed its elimination.

Strategies

Based on a review of historic documents, the National Unit identified villages with a history of the presence of the vector and those potentially at risk. After the entomological surveys, the results were consolidated and presented to the IPCA international evaluation commission.

Results

The evaluation commission certified that El Salvador was free of the vector *R. prolixus.* The relevant information was documented and published as a historical record.

IPCA-PAHO International Evaluation Commission for certification of the elimination of R. prolixus visiting a community in Acajutla, Sonsonate, November 2009.

Keys to success

- Mechanism and incentive for international certification
- Historic documents published and archived
- Information on border areas
- Long term planning and investment for certification
- Strengthening vector identification skills
- Academic collaboration in documentation

Executors

National Unit of Vector Borne Diseases of the Ministry of Health, in coordination with the investigator from University of El Salvador and the departmental Vector Control Units.

14 Serological and entomological exploration - New efficient method

HONDURAS 2004- | DEPARTMENTAL level relevance

Situations	Causes	Strategies
• Difficulties found in establishing a Chagas baseline in extensive geographic areas	• Ministry's insufficient resources to conduct entomological and serological surveys	• Innovated and implemented a new efficient method to determine risk levels

Previous Situation

Honduras had no serological or entomological baseline for Chagas disease. With limited number of operational personnel, it was difficult to implement the conventional survey methods based on domiciliary visits.

Strategies

The National Program of Chagas Disease opted for the methodology of serological and entomological exploration with local health service personnel, utilizing primary schools as strategic points.

Results

The obtained results constituted the baseline and facilitated determination of risk areas, especially those with a high disease transmission rate by the possible presence of *R. prolixus.*

Taking a blood simple for serological exploration at a primary school in San Francisco de Opalaca, Intibucá, June 2004.

Keys to success

- Limited resources
- Creative ideas
- Availability of tools
- Cost-benefit
- Participatory trials at pilot sites
- Coordination with schools
- Regulate or discard
- Knowing the limitations of the method

Executors

National Program of Chagas Disease in coordination with the National Laboratory of Chagas Disease, Departmental Health Offices and Health Units.

15 Establishing community participation in insecticide spraying and entomological survey

HONDURAS 1991-2003 | DEPARTMENTAL level relevance

Situations	Causes	Strategies
• Low geographic coverage of insecticide spraying and entomological survey	• Lack of operational personnel of the Secretary of Health	• Trained the community personnel on insecticide spraying and on subsequent bug search

Previous Situation

Insecticide spraying and entomological surveys for Chagas diesase control hardly made progress. The principal reason was lack of operational personnel to conduct the activities.

Strategies

The Honduran Secretary of Health implemented an intervention, where the trained community personnel sprayed insecticide and searched the bugs appearing inmdiately after the spraying.

Results

Geographic coverage augmented in both insecticide spraying and entomological surveys. Consequently, a significant reduction was observed in the distribution of *Rhodnius prolixus*.

Insecticide spray by a trained community member during a trial at San Francisco de Opalaca, Intibucá, June 2004.

Keys to success

- Provision of equipment, materials and supplies
- Financing for sprayers
- Simple and delegable spraying techniques
- Quality control for spraying
- Incentives for local authorities
- Sensitizing and involving the community
- Developing a model at pilot site
- Strategic selection of community sprayers

Executors

National Program of Chagas Disease with assistance from the National Laboratory of Chagas Disease, PAHO, JICA, CIDA, World Vision, Cooperative for Assistance and Relief Everywhere (CARE) and other cooperating agencies.

16 Campaign: "Search for the kissing bug and win a prize!"

Jalapa, GUATEMALA 2007 | DEPARTMENTAL level relevance

Situations	Causes	Strategies
• Reduced community reports of kissing bugs • Possible epidemiological silence	• Low infestation of kissing bugs • Limited wareness or interest among inhabitants	• Organized a kissing bug search campaign with schools

Previous Situation

Kissing bug infestation was reduced by the massive insecticide spraying during the attack phase. The number of community reports of kissing bugs maintained low in previously endemic villages.

Strategies

The Jalapa Departmental Health Office organized a campaign for kissing bug search at the municipal level, involving schools as focal points for the diffusion of information and reception of the reported insects.

Results

The campaign increased the number of community bug reports, including *R. prolixus, T. dimidiata* and other species.

Promotion of the campaign with school teachers by the Director of Health Center of San Pedro Pinula, Jalapa, July 2007.

Keys to success

- Possible epidemiological silence
- Contribution from local companies
- Intensifying and controlling the campaign activities
- Schedule and slogan
- Involvement of various key actors
- Coordination between Health and Education
- Prizes by group
- Timely response to the bug reports

Executors

Vector Control Unit and Directorate of the Health Area of Jalapa, in coordination with the Health Center of San Pedro Pinula, schools, private companies and NGOs.

17 Integrating deworming into the serological survey

HONDURAS 2005- | DEPARTMENTAL level relevance

Situations	Causes	Strategies
• Malnourished children not appropriate for Chagas treatment • Lack of deworming	• The deworming program was not established by the Honduran government	• Distributed deworming tablets during serological surveys

Previous Situation

Children found positive for Chagas disease were not appropriate for receiving the etiological treatment, because of their poor nutritional condition. Honduras had no established institution for distributing intestinal dewormers for children.

Strategies

The National Program of Chagas Disease and Departmental Health Office distributed dewormers to improve the nutritional condition of children participating in the serological surveys for Chgas disease.

Results

Deworming increased tolerance to the etiological treatment among the children with Chagas disease, and also improved the nutritional condition of the population.

Distribution of deworming medications to children during the serological survey in San Marcos de la Sierra, Intibucá, August 2011.

Keys to success

- Cost-effectiveness of deworming medications
- No additional cost for the government
- Community acceptance
- Interested donors
- No established deworming system
- Preparedness for a new modality
- Collaboration by local schools
- Action based on analysis
- Sufficient supplies of deworming tablets

Executors

National Program of Chagas Disease in coordination with Departmental Health Offices.

18 Reorganizing the Vector Control Unit at the departmental level

Santa Rosa, GUATEMALA 2000- | DEPARTMENTAL level relevance

Situations	Causes	Strategies
• Limited efficiency and coordination in vector control operations	• Vertical structure with monovalent personnel by disease	• Trained operational personnel in various issues and relocated them to Health Centers

Previous Situation

There was limited coordination and communication in operational activity management by the Vector Control Unit of Santa Rosa, where the technicians were assigned to one of the specific-disease control teams and were concentrated at the departmental office.

Strategies

The executive group trained the Vector Control personnel in all vector-related issues found in the department, reassigned their responsibilities and redistributed them to the municipal Health Centers. The system was constantly reviewed.

Results

The Vector Control Unit expanded the geographic coverage of operations for different diseases, and improved coordination within the Unit, as well as between the Unit and the Health Centers.

Operational personnel of the National Malaria Eradication Service, original organism of vector control. Guatemala City, 1980.

Keys to success

- Civil Service Law
- Support from the Health Area Directorate
- Waiting for politically favorable moments
- Executive group with leadership
- Simultaneous changes of profiles
- Continuous empowerment of operational personnel
- Constant review of the system

Executors

Vector Control Unit in coordination with the Health Area Directorate of the Department of Santa Rosa.

19 Improving housing and environment with ECOHEALTH approach

Jutiapa
GUATEMALA
2006-2013

OPERATIONAL level relevance

Situations	Causes	Strategies
• Continued house re-infestation of *T. dimidiata,* despite multiple insecticide spraying	• Structure of houses, especially walls and floors, encouraging vector re-infestation	• Improved walls and floors with local materials and reduce the risk factors

Previous Situation

Despite multiple cycles of insecticide spraying, re-infestation of *T. dimidiata* was frequently observed in some areas, because of cracked mud walls, dirt floors and animals sleeping inside the house.

Strategies

Unversity of San Carlos developed the ECOHEALTH method, which focused on wall plastering using mixture of mud and sand, and on floor firming with volcanic ash and lime, making use of locally available materials.

Results

The percentage of houses infested with kissing bugs maitained below 5% for 8 years without use of insecticide. In the long run, the house improvement reduced the amount of kissing bugs feeding on humans.

LENAP members helping to improve the floor of a house in La Brea, Quesada, Jutiapa, 2009.

Keys to success

- Research proposals and financing
- Developing practical methods for the community
- Continuous review of study design
- Constant communication with the Ministry of Health
- Replicable method with multidisciplinary support
- Cost-benefit method
- Involving key local actors

Executors

Laboratory of Applied Entomology and Parasitology of University of San Carlos (LENAP/ USAC) in coordination with Vector Control Unit of Health Area of Jutiapa, local council and community leaders.

20 Improving living conditions through community organization

Jutiapa
GUATEMALA
2011-

OPERATIONAL level relevance

Situations	Causes	Strategies
• Vector re-infestation persisted even after spraying, education and house improvement	• Kissing bug sources found inside the untidy houses, resulting from poor cleaning practices	• Raised awareness and help the inhabitants to clean up their houses through community organization

Previous Situation

The percentage of houses with kissing bugs persisted between 15% and 20%, despite multiple insecticide spraying, educational actitivities and housing improvement, due to poor cleaning practices.

Strategies

The Vector Control team of Jutiapa organized and sensitized the inhabitants to clean the houses through the community leaders. The team divided the community into sectors and placed a leader in each sector to accompany and monitor the process.

Results

Conditions improved in the majority of houses. The percentage of houses infestated by kissing bugs reduced to less than 5% in the community.

Untidy house in a rural area in Jutiapa.

Keys to success

- Constructing and testing hypotheses in the field
- Committed community leaders
- Delegating responsibilities to community leaders
- Identifying and involving social groups
- Optimizing influence of existing leaders
- Dividing and scaling down to manageable areas
- Accompanying and monitoring the community

Executors

Community oriented and supported by the Vector Control personnel in Jutiapa.

21 Preventing vector infestation using a Livelihood Improvement approach

Madriz, NICARAGUA 2012- | OPERATIONAL level relevance

Situations	Causes	Strategies
• Houses continued to be re-infested by kissing bugs, because of the inhabitants' living conditions	• Inhabitants had no knowledge of how to prevent the kissing bug infestation	• Organized a work group in the community • Implemented the Livelihood Improvement approach

Previous Situation

T. dimidiata was constantly found even after three cycles of insecticide spraying, because the inhabitants' lifestyle, such as allowing animals inside the house, incremented the infestation risks.

Strategies

Local health staff organized a work group and provided a series of workshops on the Livelihood Improvement method in a community, where the the inhabitants decided actions to take.
The staff facilitated and monitored the process.

Results

There were small, gradual changes observed in the lifestyle of the inhabitants, contributing to risk reduction of the kissing bug infestation.

A house with conditions presenting risks of kissing bug infestation in the village of Las Cruces, Totogalpa, Madriz

Keys to success

- Facilitator from local health service
- Formation of a trusted and active group
- Taking advantage of existing leadership in the community
- Support from the local municipal council
- Identifying necessary and feasible actions by the community
- Gradual implementation
- Continuous orientation and communication
- Exchanging experiences between communities

Executors

The 15 families in the community of Las Cruces, Cayantú Sector, municipality of Totogalpa, Department of Madriz. Physician of the local health sector as facilitator of the process.

22 Integrating the Entomological Surveillance System into Primary Health Care

NICARAGUA 2011- | OPERATIONAL level relevance

Situations	Causes	Strategies
• Primary health care system did not include actions of kissing bug surveillance in their routine work	• Unstructured surveillance mechanism • Health personnel lacked the surveillance knowledge	• Defined the adequate role • Tested a model in pilot sites • Trained and monitor the local health personnel

Previous Situation

Although the Primary Health Care (PHC) team who regularly visited communities to provide medical services, were assigned to kissing bug surveillance, the corresponding actions did not happen due to lack of established mechanisms and knowledge among the personnel.

Strategies

Based on the anlaysis of the role of the PHC team, their responsibility in the entomological surveillance system was defined in an operating guide, and implemented through training and monitoring of the health personnel at pilot sites.

Results

The PHC team became in charge of recording kissing bugs reported by the communities and visiting the infested houses as a response to the report. Thses actions increased the number of reports and the coverage of response.

Training of the local health personal in the Municipality of Ciudad Darío, Department of Matagalpa. April, 2013.

Keys to success

- Organized communities
- PHC community visit team (ESAFC) system functioning
- Preparedness of the departmental and municipal personnel
- National Program leadership
- Understanding the Primary Health Care Service
- Defining the responsibilities through trials
- Establishing an information system
- Replication guide
- Constant monitoring and supervision

Executors

National Division of Chagas Disease, SILAIS (Integrated Local Health Care System) and municipalities.

23 Sustaining the surveillance system

GUATEMALA
EL SALVADOR
HONDURAS
2008-2012

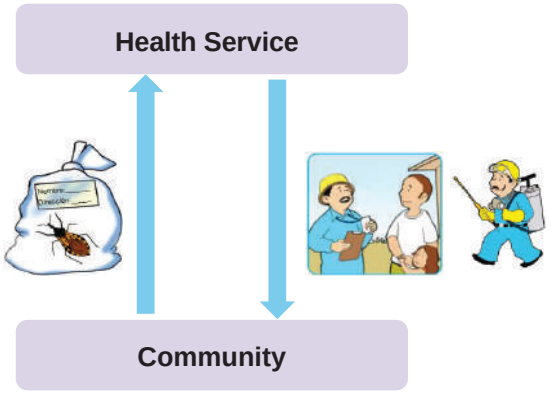
OPERATIONAL level relevance

Maintenance is the key for sustaining the system

This section of the document presents experiences of how the challenges were overcome to sustain the kissing bug surveillance system with community participation, focusing on some of the most frequently reported situations in Guatemala, El Salvador and Honduras during 5 years from 2008 to 2012.

Summary of challenges faced and actions taken to sustain the surveillance system

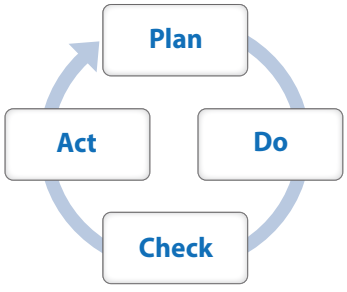
Situation with a LACK of:	Key actions
1. Financial resources	Avoid costs and propose ideas
2. Human resources	Simplify and distribute tasks
3. Transportation / fuel	Assign the local personnel
4. Spraying equipment / insecticide	Repair equipment and seek alternatives
5. Community bug reports	Organize campaigns
6. Consistency in recorded data	Utilize a drop box and a record book
7. Response to the community bug reports	Monitor the response coverage
8. Coordination between operational technicians and physicians / nurses	Officialize and increase communication
9. Quality control of surveillance performance	Evaluate regularly using a checklist
10. Coordination between health facilities and local schools	Establish a formal agreement



Basic concept of the surveillance system that consists of community bug reports and Ministry's response to the report.

Keys to success

- Developing an integral model (Plan)
- Working jointly with local actors (Do)
- Constant evaluation (Check)
- Continuous modification and training (Act)



¡Chinche Vista, Chinche Capturada!
Guatemala

¡No Chinche, No Chagas!
El Salvador

¡Sin Chinches, No Hay Chagas!
Honduras

¡Busca Chinches, Salva Vidas!
Nicaragua

¡No a la Enfermedad de Chagas!
Regional

SUMMARY

BEST PRACTICES
from the Chagas Disease Control in
Guatemala, El Salvador, Honduras and Nicaragua
2000 - 2014