Malaria elimination in the Americas.

Challenges to the malaria elimination strategy

Dr. Roberto Montoya
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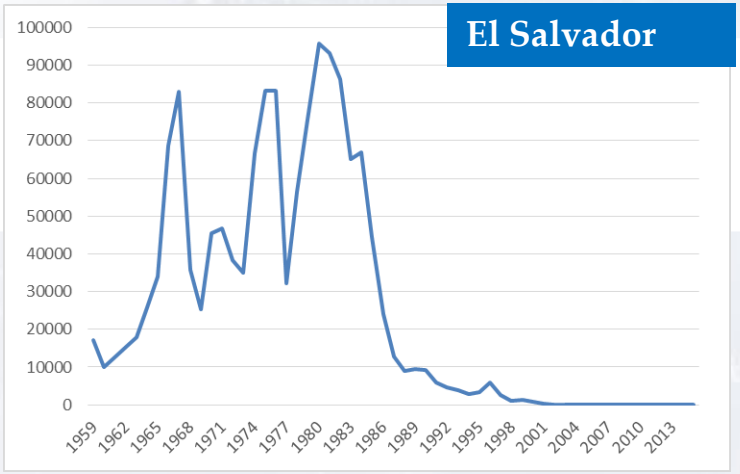
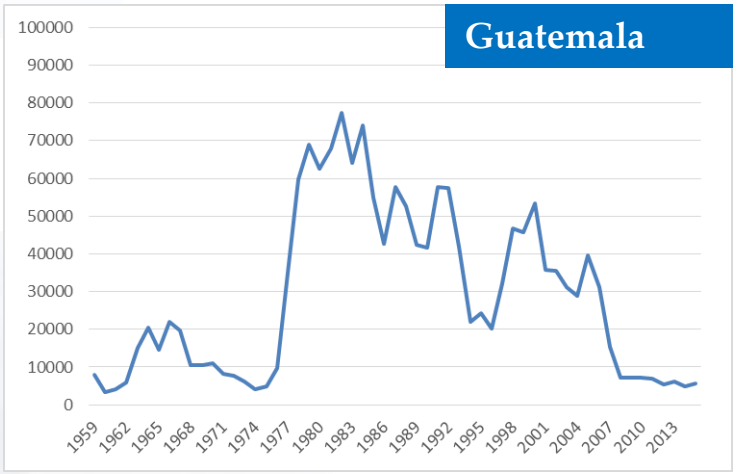
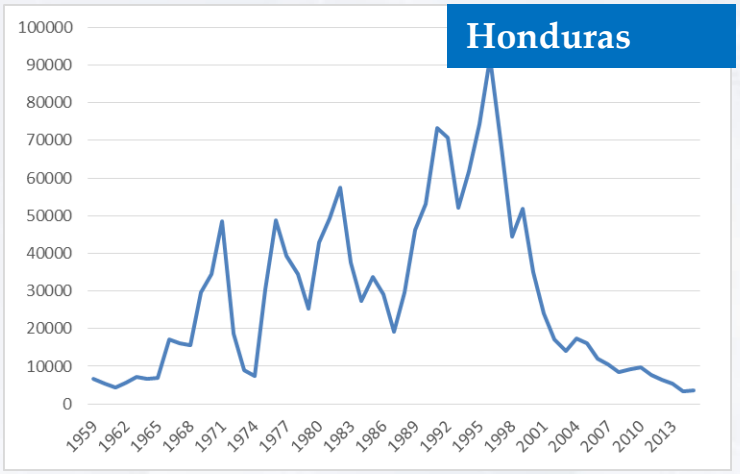
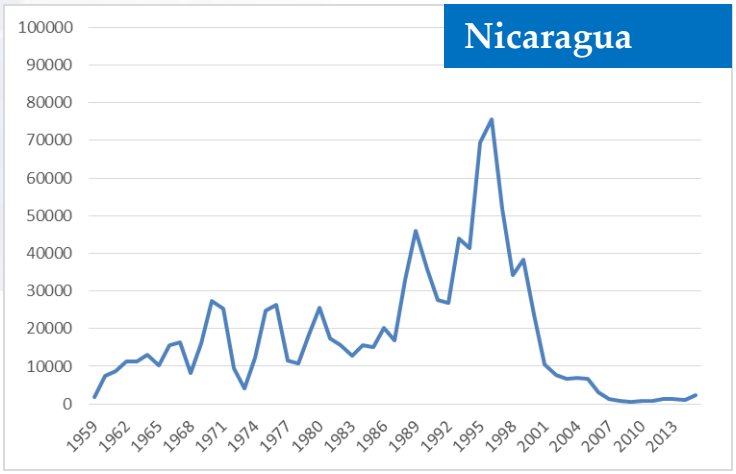
Oficina Regional para las Américas

Number of malaria cases 1959 – 2015.
El Salvador, Guatemala, Honduras and Nicaragua









Cotton boom

DDT resistance

Civil wars

Programs changes

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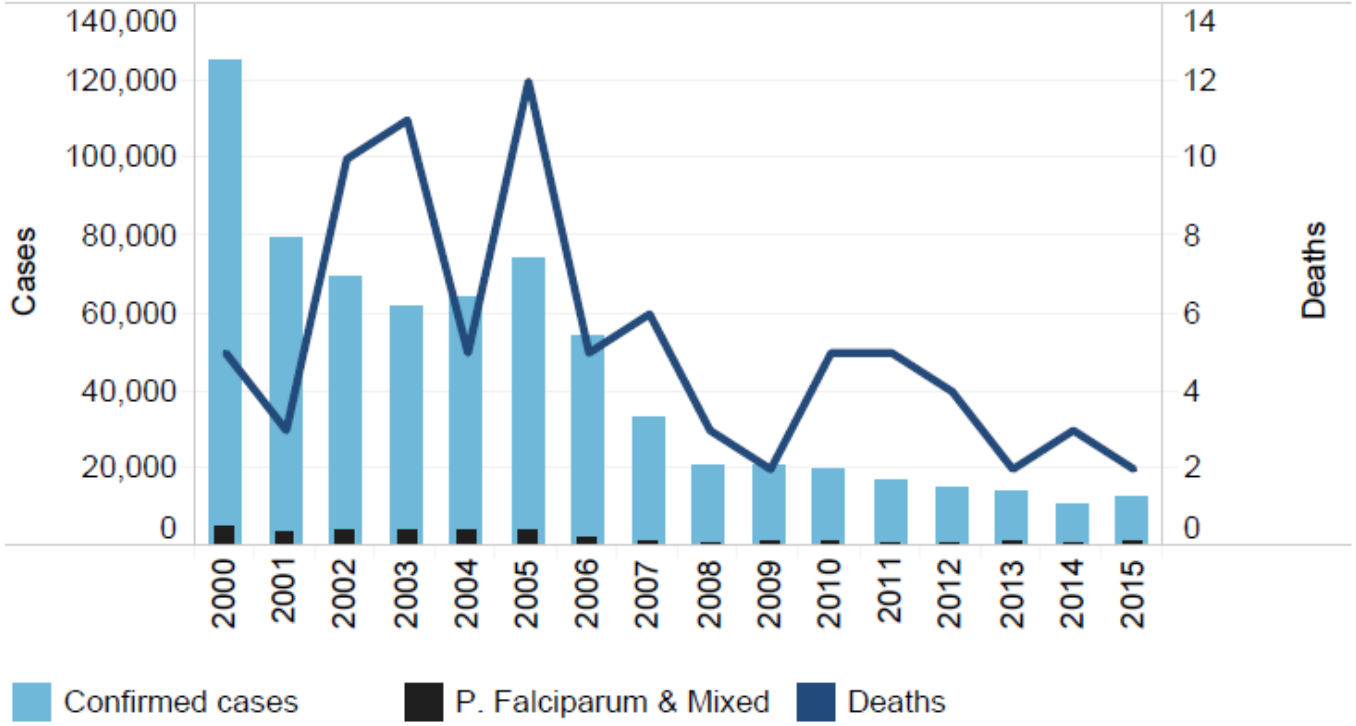
Number of cases and deaths due to malaria in the Mesoamerican Sub-region, 2000-2015



Malaria cases 2015 and 1982

Subregion	1982	2015
Amazon	352,632	420,426
Central America	240,972	12,001
Hispaniola	70,008	18,244
Mexico	49,993	551
Southern Cone	633	9
Total	**714,238**	**451,231**

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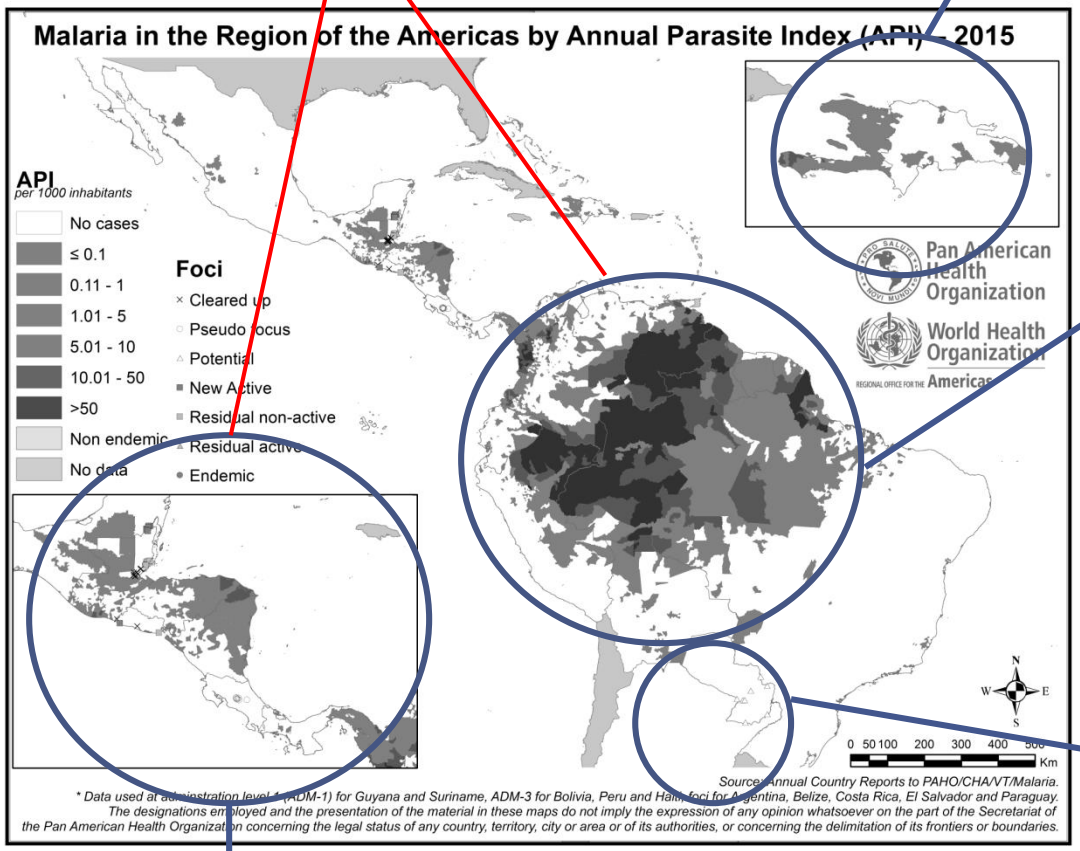
Malaria en los países cerca de eliminación en la Región de las Américas, 2013-2016

País	Año	Casos Confirmados	Casos Investigados	Importados	Autóctonos P. falciparu..	Importados P. falciparu..	Importados P. vivax	Focos Activos
Argentina	2014	4	4	4	0	0	4	0
	2015	1	1	1	0	0	1	0
	2016	1	1	1	0	0	1	...
Belice	2014	19	19	0	0	0	0	8
	2015	13	13	4	0	0	4	11
	2016	5	5	1	0	0	1	2
Costa Rica	2014	6	6	5	0	3	2	0
	2015	8	0	8	0	4	4	0
	2016	13	13	9	0	3	6	1
Ecuador	2014	241	...	...	...	...	...	...
	2015	686	686	68	184	43	25	20
	2016	926	1.191	56	403	27	29	23
El Salvador	2014	8	8	2	0	0	2	2
	2015	9	9	6	0	0	6	4
	2016	14	14	1	0	0	1	6
México	2014	666	666	10	0	8	2	56
	2015	551	551	34	0	6	27	50
	2016	596	596	45	0	14	31	43
Paraguay	2014	8	0	8	0	1	1	0
	2015	8	0	8	0	2	2	0
	2016	10	0	10	0	3	3	0
Suriname	2014	401	...	1	...	...	...	...
	2015	376	376	295	17	91	170	...
	2016	327	327	251	6	94	147	...

MEC 2020: 7 countries

Hispaniola : Possible as binational target. Critical gaps in access to diagnosis – treatment and vector control core interventions.



Amazon countries :

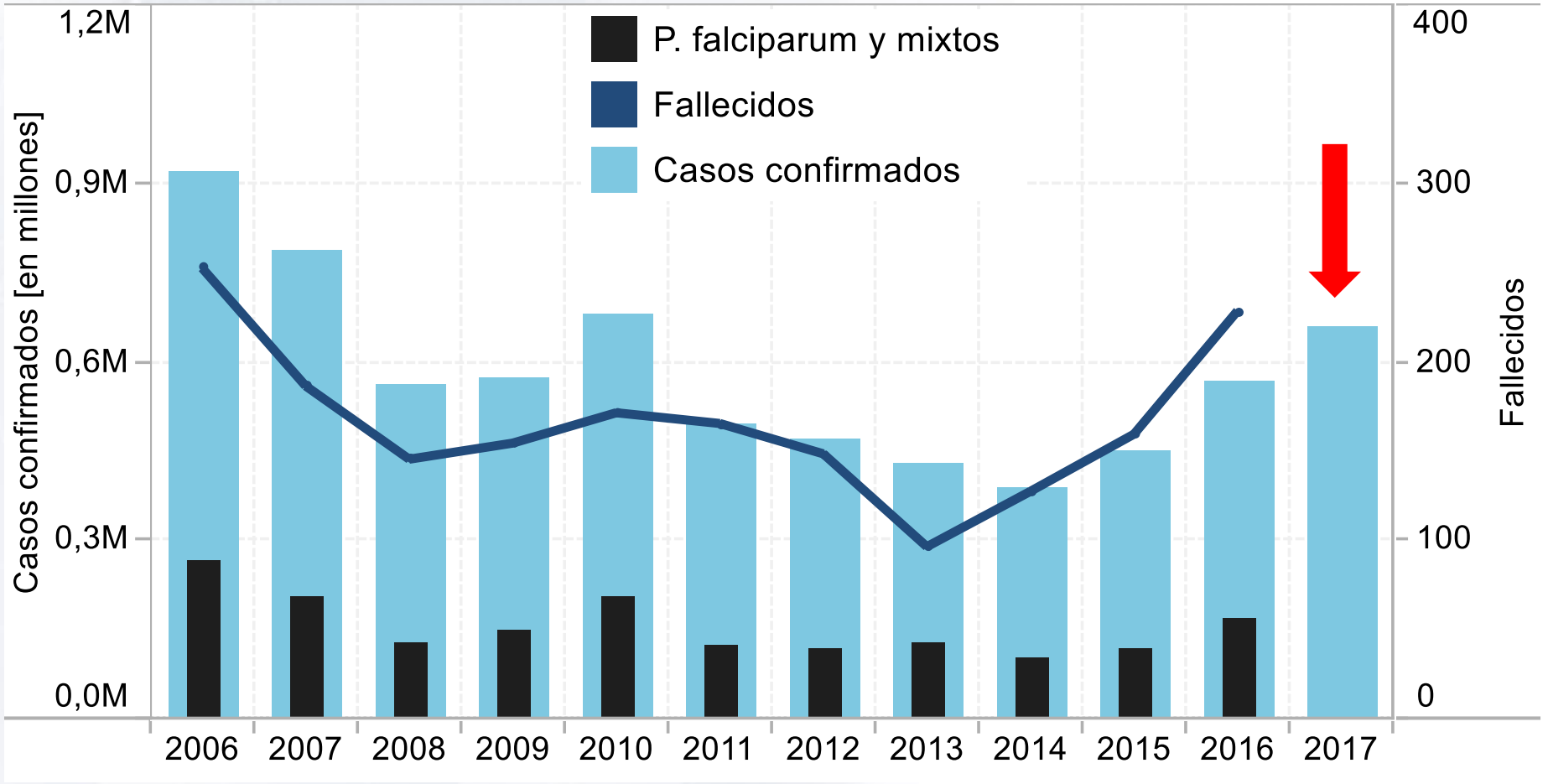
- Suriname: few cases.
- Ecuador epidemiological situation changing but still favorable. Common issue: contention of reintroduction from neighbors?
- Bolivia without ***P. falciparum***
- ***P. falciparum*** elimination as a intermediate target in Colombia, Brazil, Venezuela, Perú, Guyana

Southern cone :

zero indigenous cases in Argentina and Paraguay for more than 3 years. Both countries in certification processes

Mesoamerica : Possible as regional target. Three countries very close (Costa Rica, El Salvador, Belize). Two countries with favorable epidemiological situation (Mexico, Panama). Key local specific situations must be addressed (Guatemala, Honduras, Nicaragua)

Malaria morbidity Americas 2016



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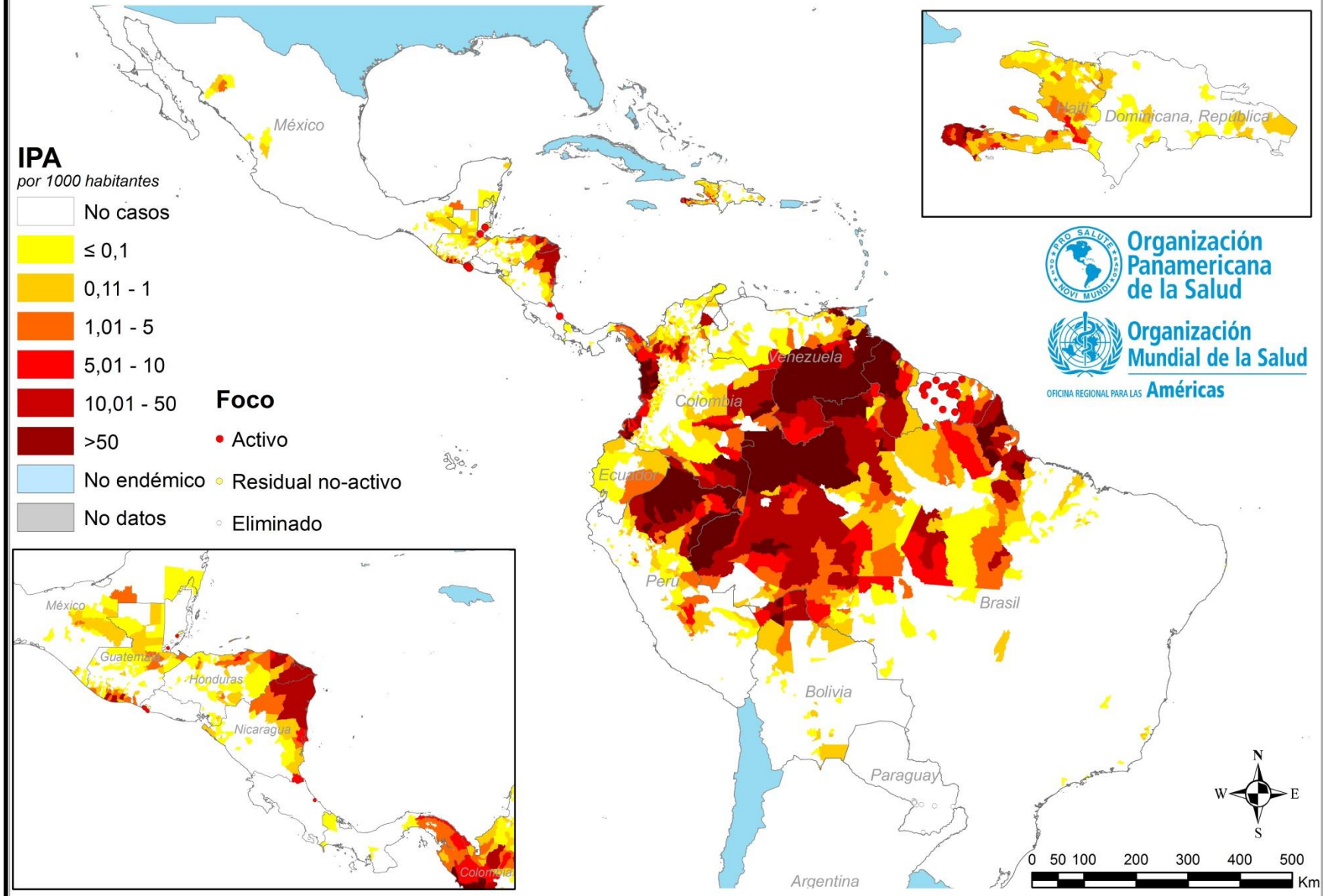
Malaria en la Región de las Américas por Incidencia Parasitaria Anual (IPA)– 2016



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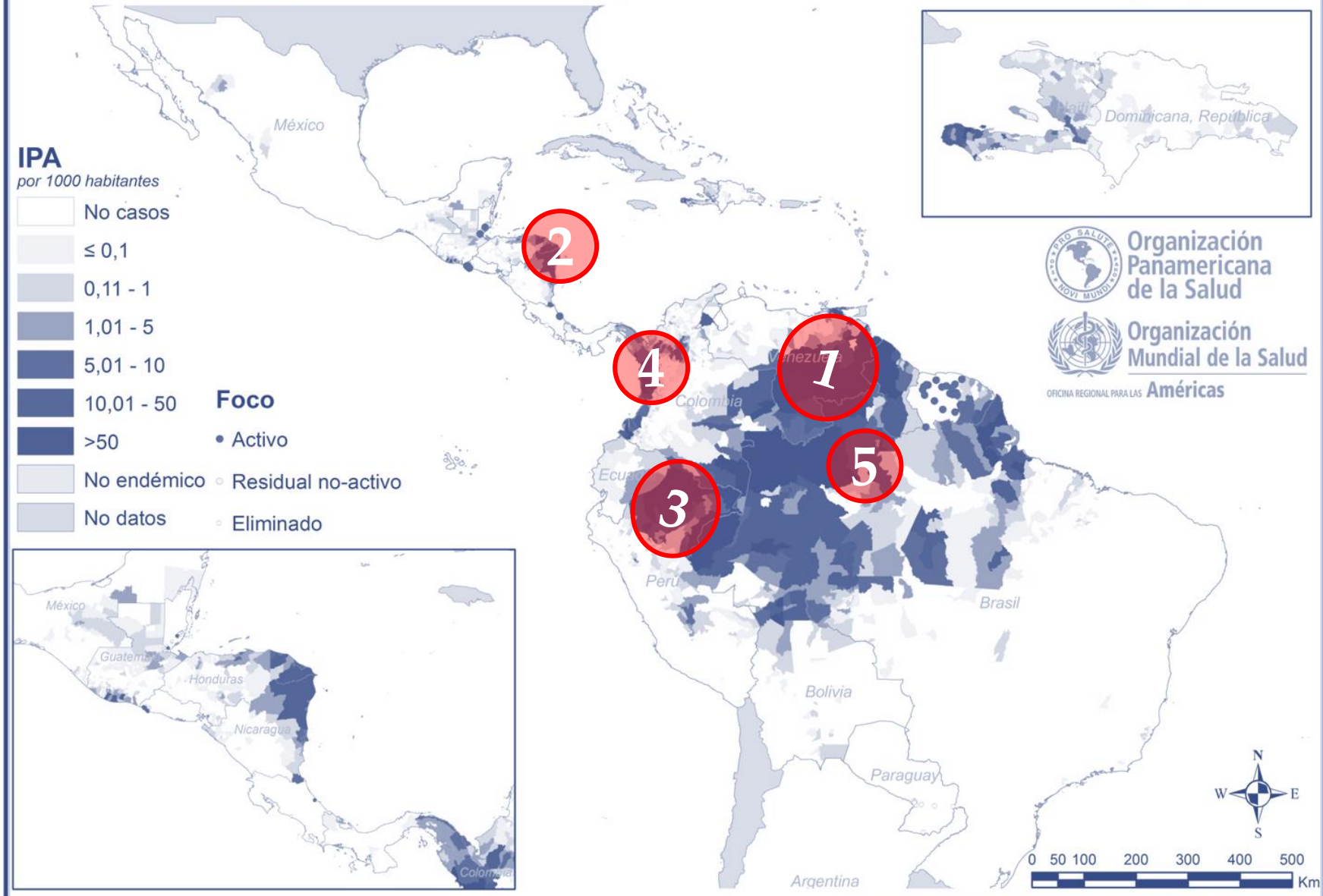
OFICINA REGIONAL PARA LAS Américas

Fuente: Informes anuales de los países a la OPS/CHA/VT/Malaria.

Datos a nivel administrativo 1 (ADM-1) para Guyana y Ecuador; ADM-3 para Bolivia, Haití y Perú; focos para Argentina, Belice, Costa Rica, El Salvador, Paraguay y Suriname.

Las denominaciones empleadas en estos mapas y la forma en que aparecen presentados los datos que contienen no implican, por parte de la Secretaría de la Organización Panamericana de la Salud, juicio alguno sobre la condición jurídica de países, territorios, ciudades o zonas, o de sus autoridades, ni respecto del trazado de sus fronteras o límites.

Malaria en la Región de las Américas por Incidencia Parasitaria Anual (IPA)– 2016



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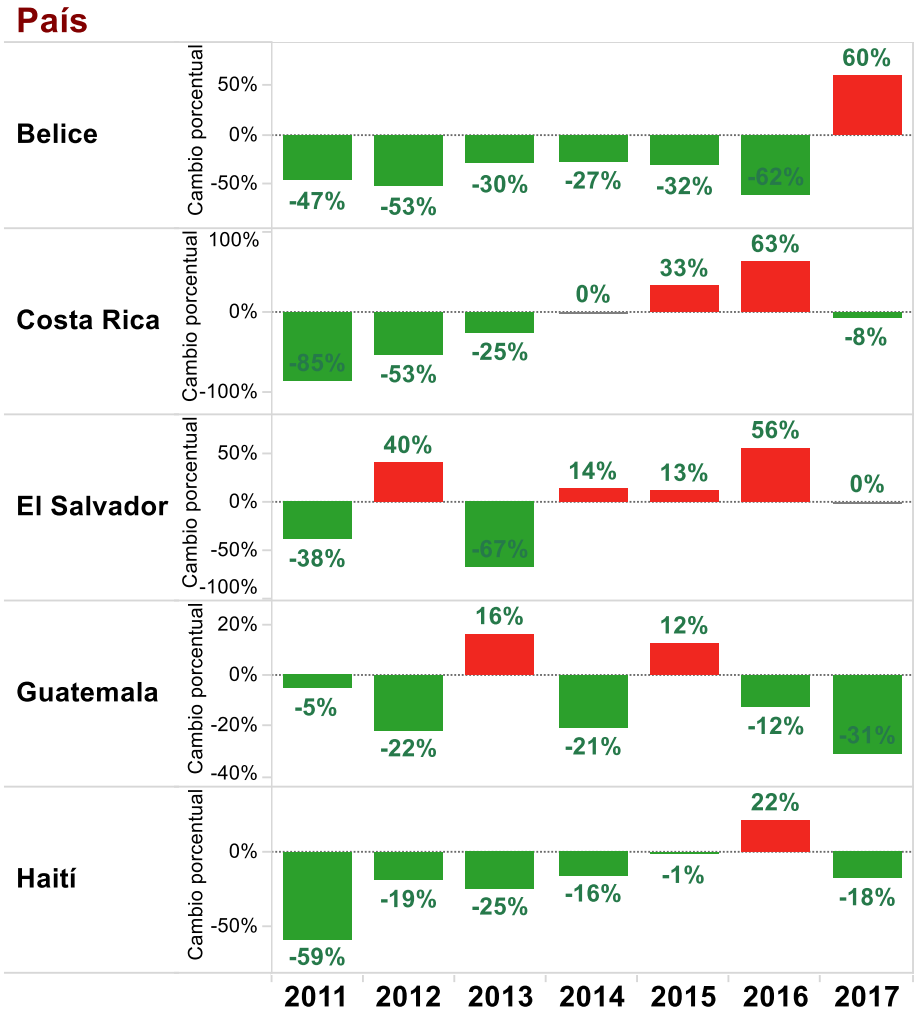
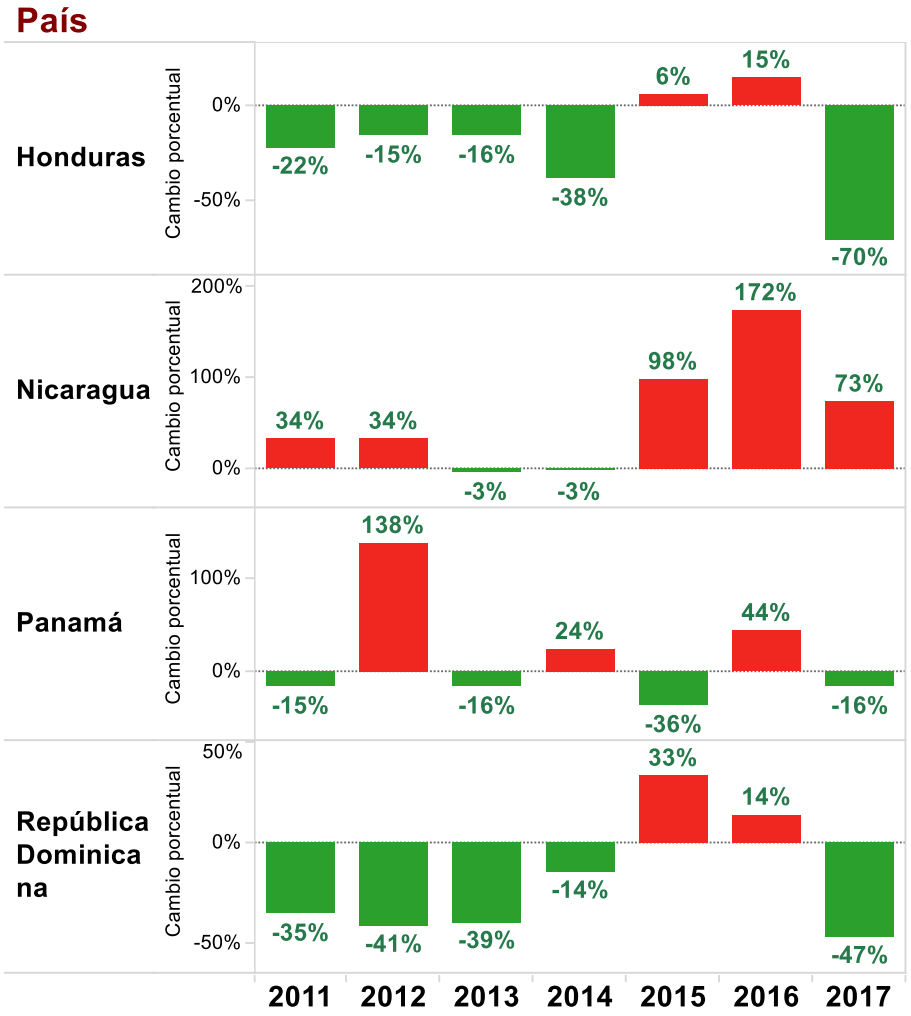
Cambio porcentual en morbilidad por malaria en comparación al año anterior 2010-2017: Mesoamérica





Datos preliminares para el año 2017

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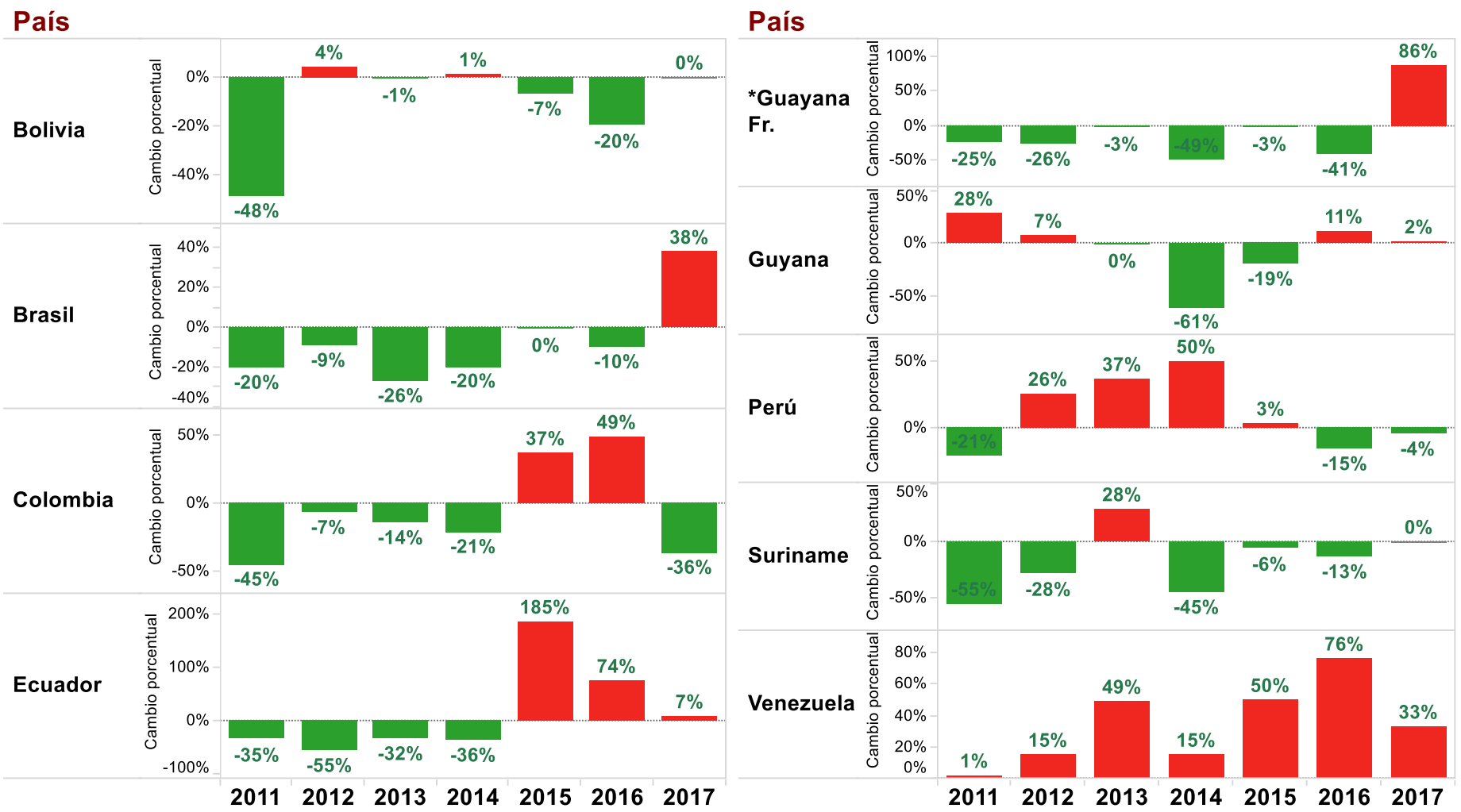
Cambio porcentual en morbilidad por malaria en comparación al año anterior 2010-2017: Sudamerica



Datos preliminares para el año 2017,
Proyección usada para Venezuela (2017)

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Alerta Epidemiológica
Aumento de casos de malaria

15 de febrero de 2017

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Actualización Epidemiológica
Aumento de malaria en las Américas

30 de enero de 2018

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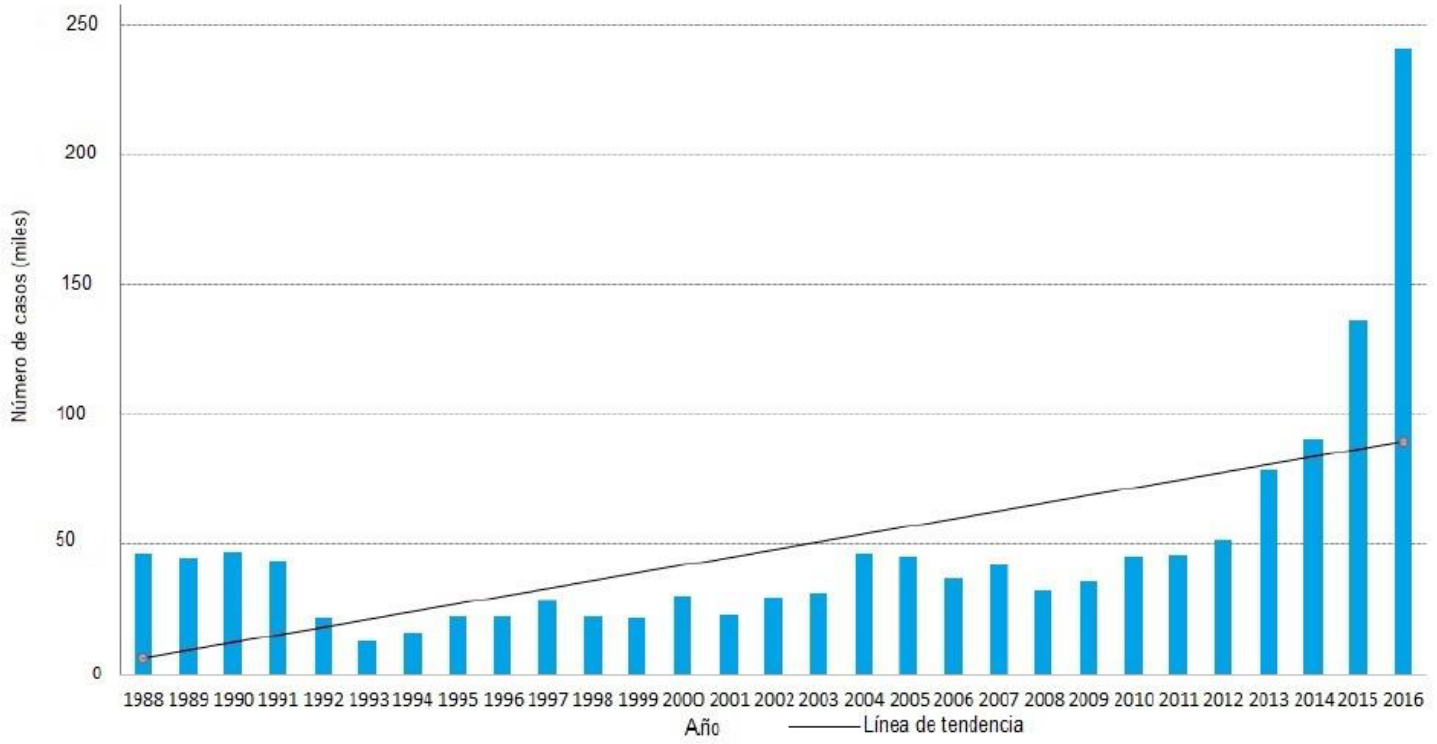
Malaria morbidity in Venezuela. 2000 – 2016.

Figura 2. Número de casos notificados de malaria. Venezuela, 1988-2016



Fuente: Compartido por el CNE para el RSI de Venezuela[4] y reproducido por OPS/OMS.

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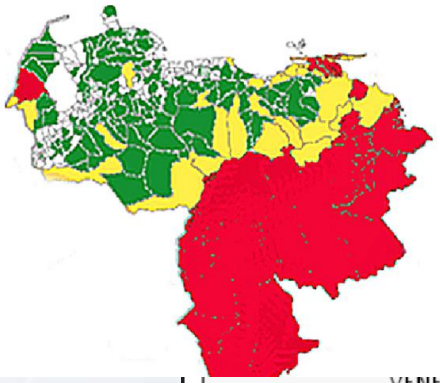
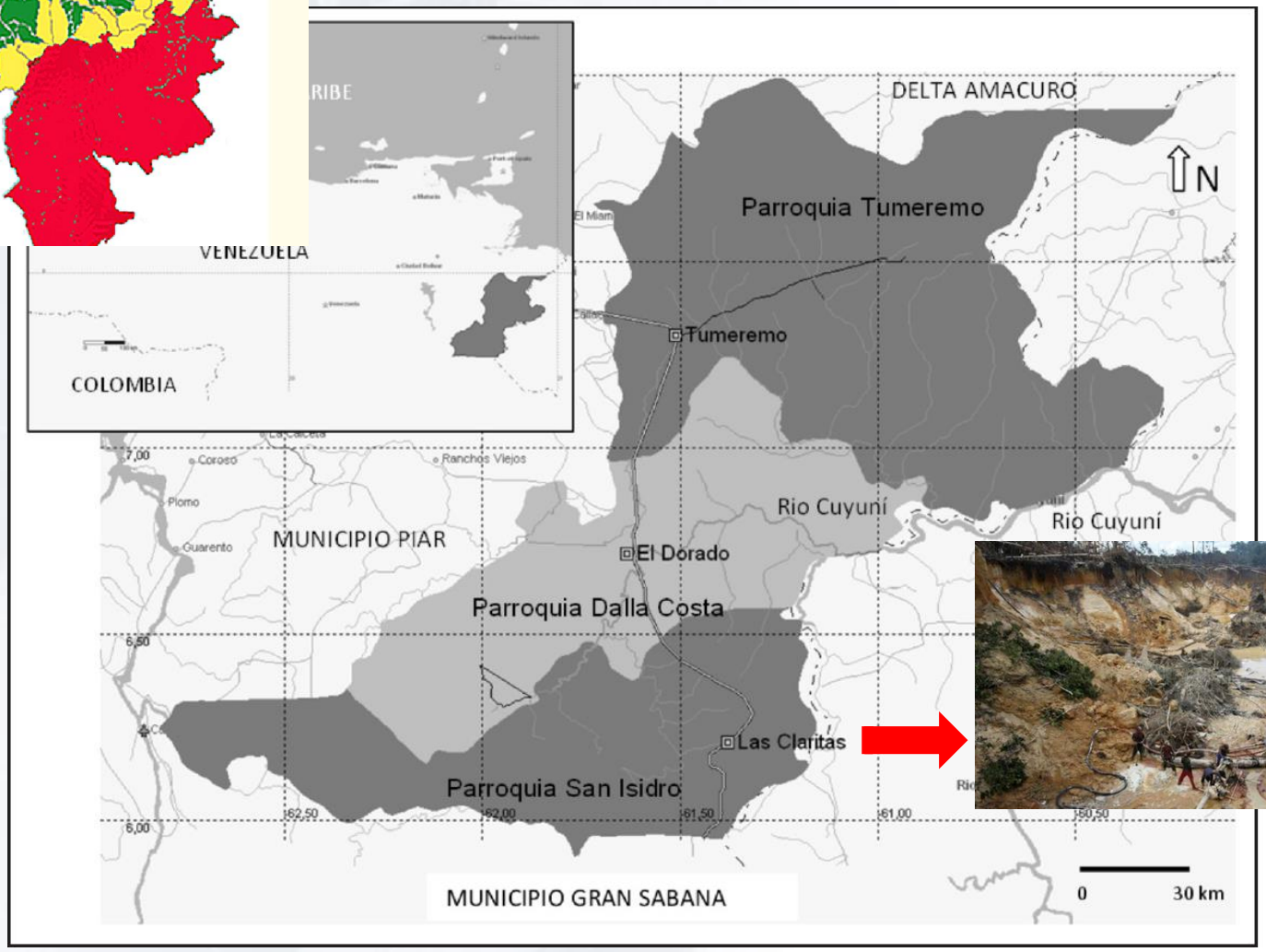
Malaria in Bolivar State, Venezuela





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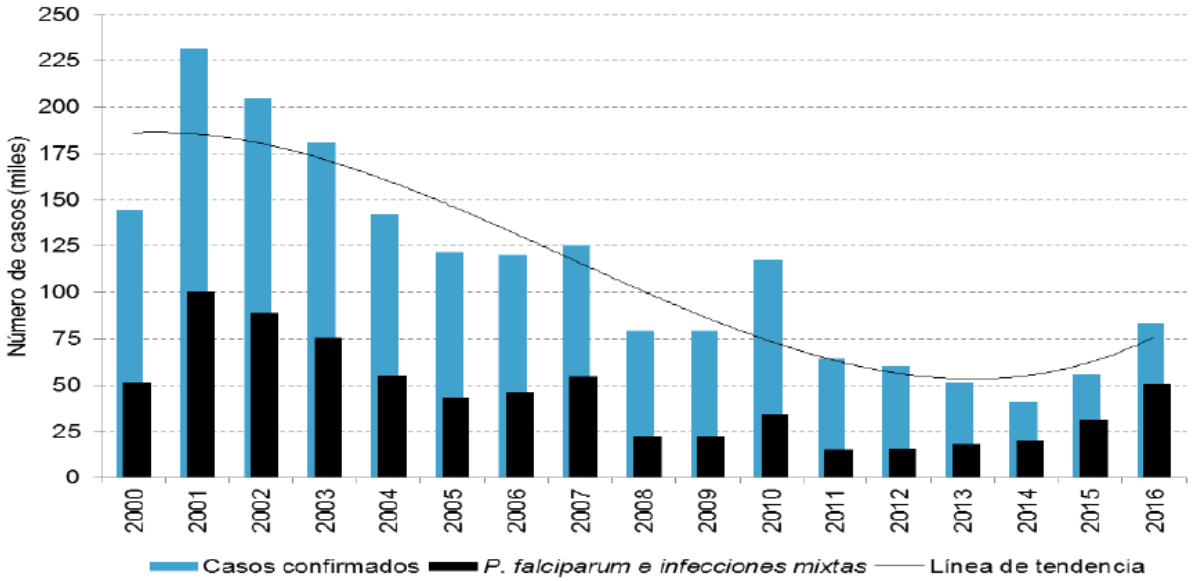
Malaria morbidity in Colombia. 2000 – 2016.

Figura 1. Casos de malaria en Colombia, 2000-2016.



Fuente: Datos 2000-2014 provienen de los informes anuales de los países a la OPS. Datos 2015 tomados del Informe Mundial de malaria, 2016 de la OMS. Datos 2016 tomados del Boletín Epidemiológico Semanal (BES) No. 52 del Instituto Nacional de Salud (INS)[1]

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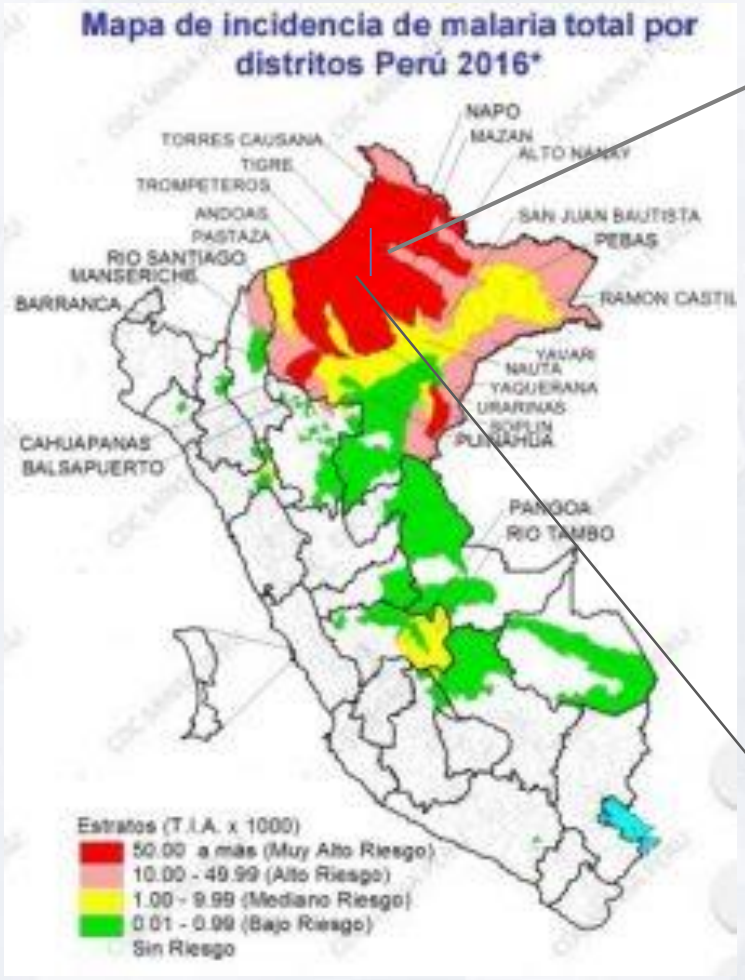
Number of malaria cases Brazil. 2016 - 2017

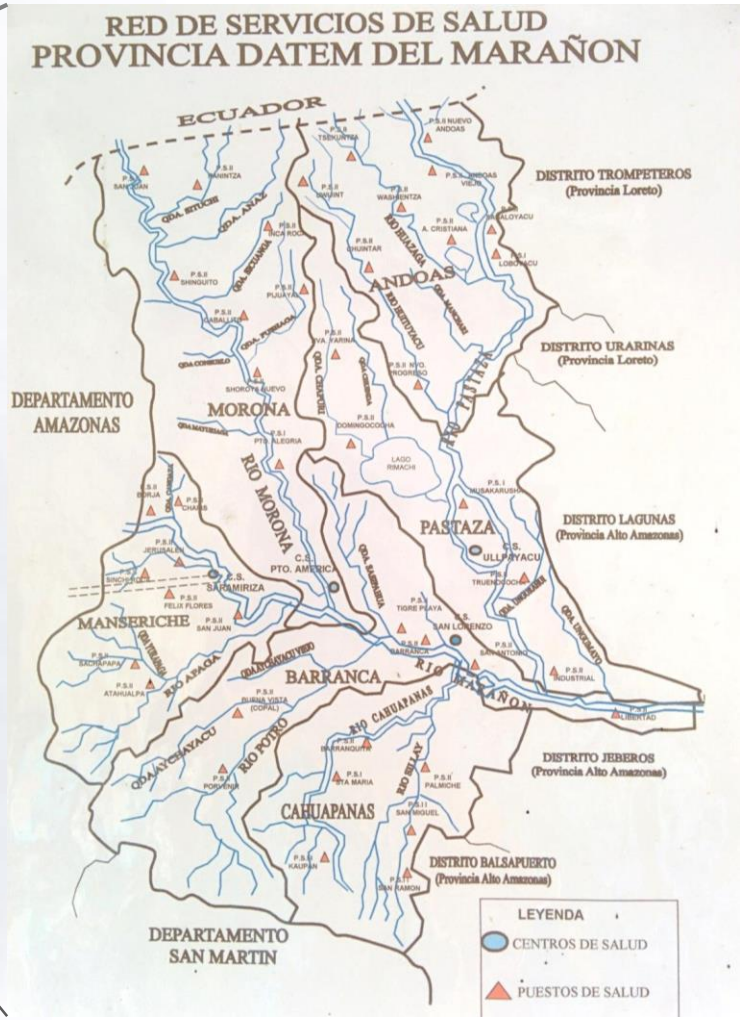
Tabla 1. Casos de malaria notificados en la región Amazónica de Brasil, por estado. Enero a noviembre 2016 y 2017

Estado de notificación	2016	2017	Diferencia porcentual
Acre	31.297	32.463	4%
Amazonas	45.611	74.423	63%
Amapá	11.348	13.931	23%
Maranhão	700	888	27%
Mato Grosso	495	476	-4%
Pará	13.235	33.122	150%
Rondônia	6.817	7.182	5%
Roraima	8.307	11.966	44%
Tocantins	22	71	223%
Total	**117.832**	**174.522**	**48%**

Fuente: Información proporcionada por el Centro Nacional de Enlace para el RSI de Brasil.

Malaria incidence. Peru, 2016





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Malaria elimination in the Americas.

Challenges to the malaria elimination strategy

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Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas

55th DIRECTING COUNCIL

68th SESSION OF THE REGIONAL COMMITTEE OF WHO FOR THE AMERICAS

Línea de Acción 1: Acceso universal a intervenciones de buena calidad para la prevención de la malaria, el **control integrado de los vectores y el diagnóstico y tratamiento** de la malaria

Línea de Acción 2: Fortalecimiento de la **vigilancia** de la malaria para avanzar hacia la toma de decisiones y respuesta basadas en datos científicos

Línea de Acción 5: Esfuerzos centralizados y métodos adaptados para facilitar la **eliminación de la malaria** y prevenir su reintroducción en áreas libres de malaria

Línea de Acción 3: Iniciativas estratégicas de promoción de la causa, **comunicación, y alianzas y colaboraciones**

Línea de Acción 4:**Fortalecimiento de los sistemas de salud**, la planificación estratégica, el seguimiento y la evaluación, las **investigaciones operativas** y

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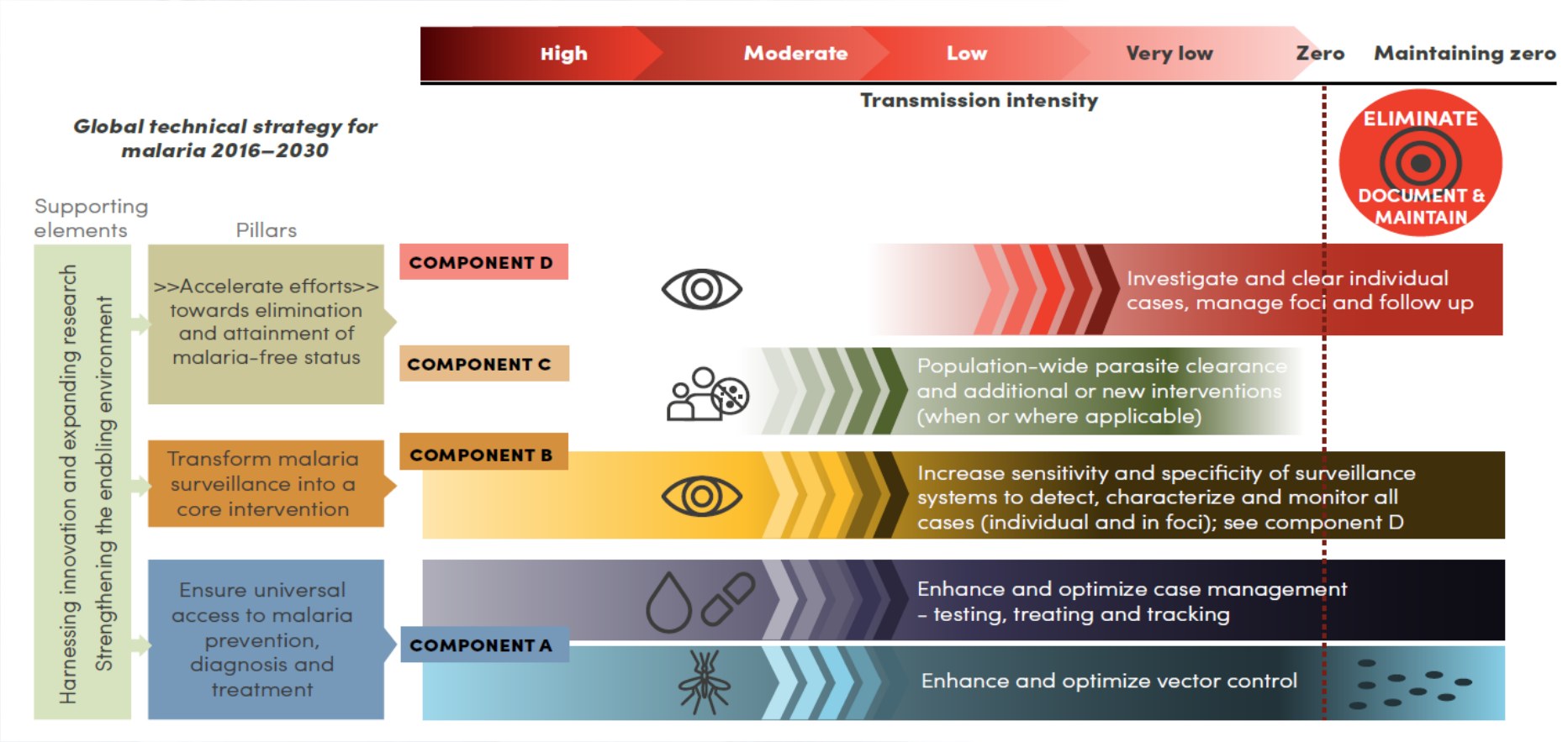
ESTRATEGIA TÉCNICA MUNDIAL CONTRA LA **MALARIA** 2016–2030

Global **Malaria** Programme

A framework for malaria elimination

The programme actions along **the continuum of malaria transmission**, from high to very low



Drivers of malaria risk in the Region

- Gold mining operations (large scale driver)
- Agricultural activities and investments (banana, sugar, oil palm)
- Intensification of other economical activities (fishing – jellyfish, sea cucumber, Brazil nuts)
- Migrations (labor)
- Land conflicts, illegal activities, and rural to urban migrations

Malaria in gold-mining areas in Colombia

Angélica Castellanos[1], Pablo Chaparro-Narváez[2], Cristhian David Morales-Plaza[3], Alberto Alzate[1], Julio Padilla[4], Myriam Arévalo[1,5], Sócrates Herrera[1,3]/+

[1]Malaria Vaccine and Drug Development Centre, Cali, Colombia [2]National Institute of Health of Colombia, Bogotá, Colombia
[3]Caucaseco Scientific Research Centre, Cali, Colombia [4]Ministry of Health and Social Protection, Bogotá, Colombia
[5]Universidad del Valle, Faculty of Health, Cali, Colombia

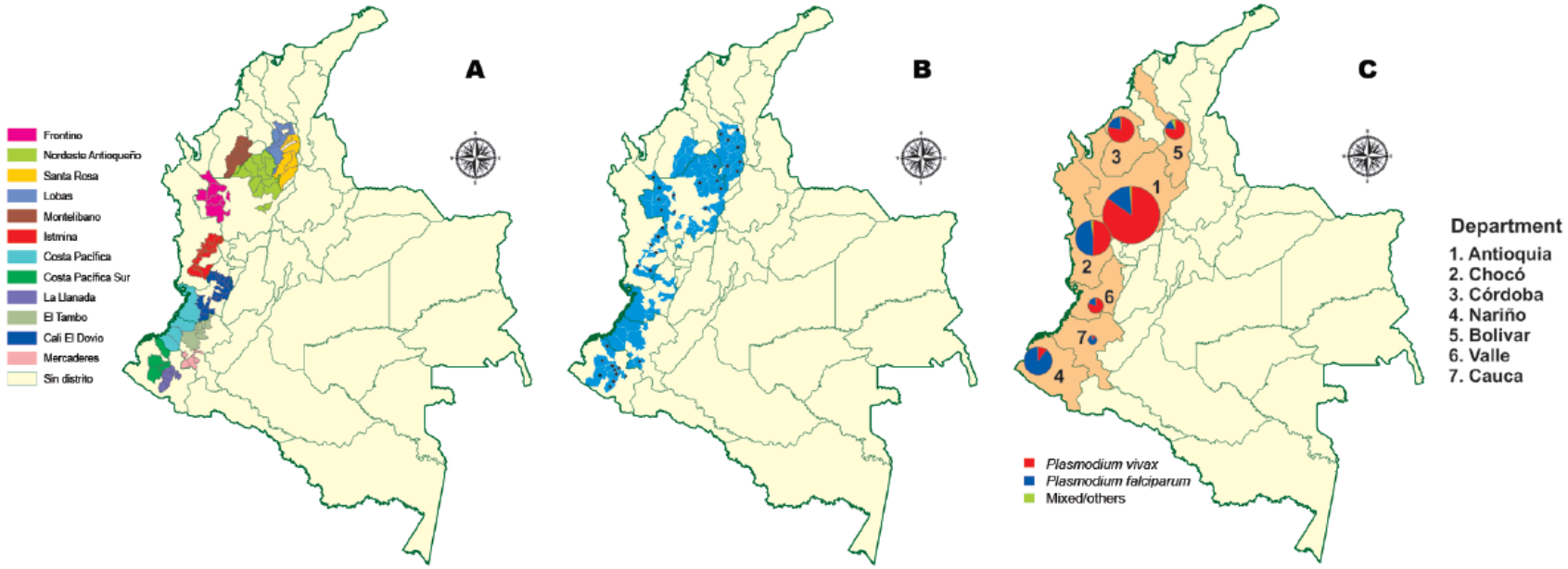


Fig. 1A: gold-mining distribution in malaria endemic areas in Colombia. Name and geographic gold-mining districts (GMD) distribution in Colombia. Source: modified from simco.gov.co/Simco/Portals/0/mapaDistritosMineroscolombia2008.pdf; B: gold-mining production units or municipalities (spot) by GMD. Source: modified from Cuales son los distritos mineros de Colombia? (simco.gov.co/simco/Politicasdelsector/MejoramientodelaProductividadyCompetitividad/Gesti%C3%B3ndelosDistritosMineros/tabid/86/Default.aspx); C: total morbidity of malaria distribution in Colombia by parasite species in 2010-2013.

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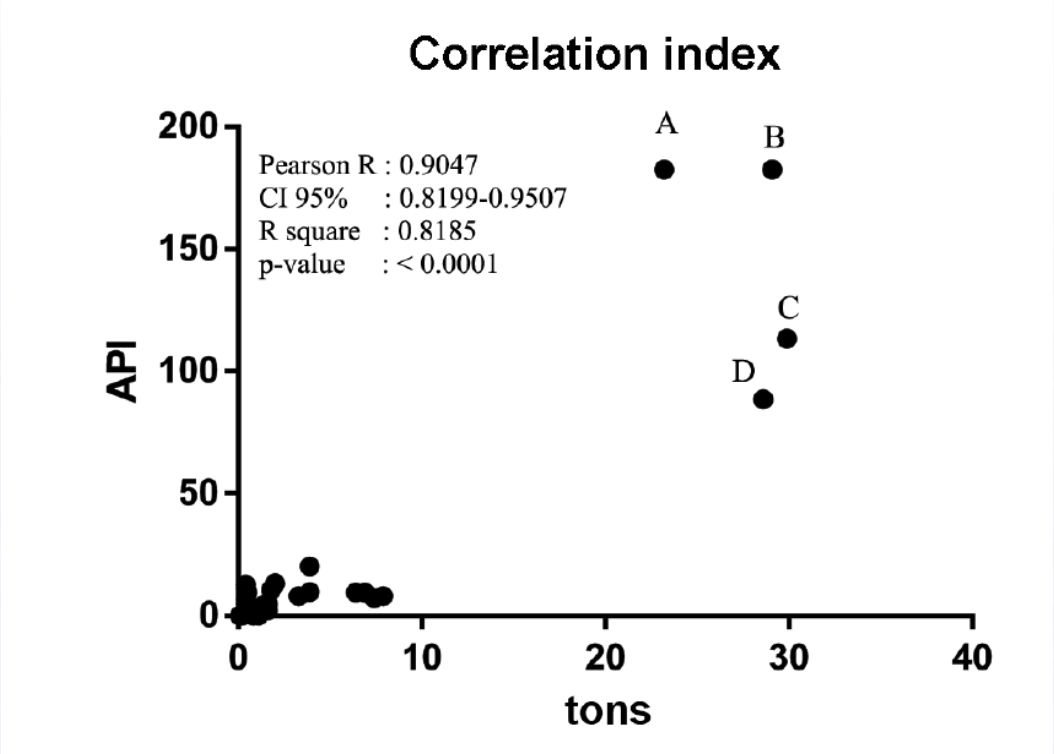
Correlation between annual parasite index (API) and gold-mining district (GMD) production



31.6% of malaria cases were from mining areas.

The annual parasite index (API) correlated with gold production (R2 0.82, $p < 0.0001$);

… for every 100 kg of gold produced, the API increased by 0.54 cases per 1,000 inhabitants

Mem Inst Oswaldo Cruz, Rio de Janeiro, Vol. *111*(1): 59-66, January 2016 59

Malaria in gold-mining areas in Colombia

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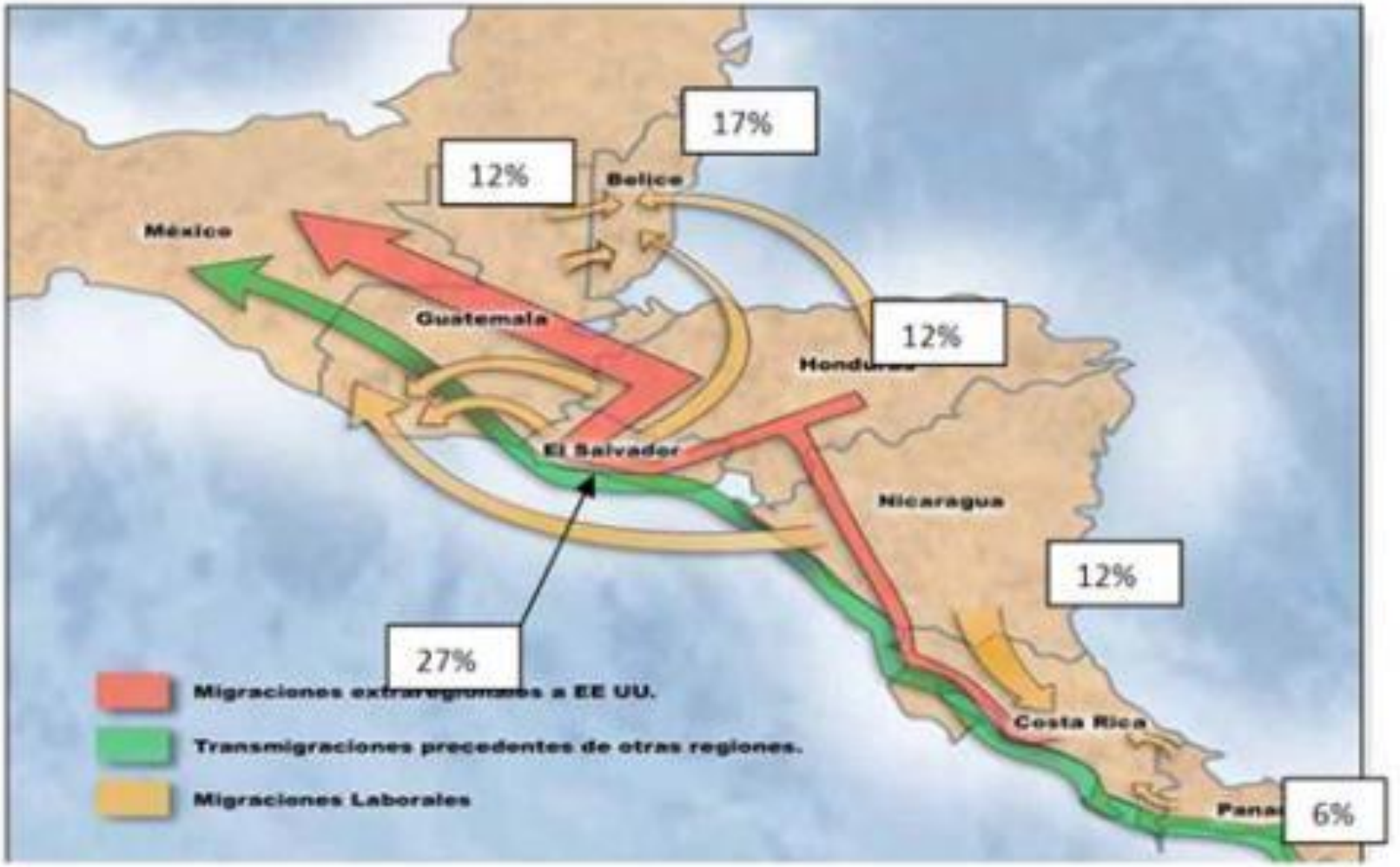
Américas

Gold mining and malaria

- Increases the size of dispersed settlements
- Increase breeding niches for the Anopheles mosquito
- Exposure of immunologically naive persons to infection
- Increase in malaria transmission
- Poor housing conditions
- Mobile population
- Poor access to health services
- Illegal conditions and connection with other illegal activities (more barriers to access services)
- Counterfeit medicines, black market, monotherapy, incomplete treatmets and self-medication
- Migration (risk for spread of malaria transmision and resistant parasites)

- Malaria .. the tip of the iceberg (social and public health problem)

MAPA DE LA MIGRACIÓN CENTROAMERICANA CON PORCENTAJES DE POBLACIÓN MIGRANTE



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Challenges for malaria elimination

- Eliminate *P. falciparum* before emergence of resistance to ACT
- Relapses
- Other challenges related with *P. vivax* (gametocites day 0)
- Exophagic vectors with exophilic resting behavior
- Undetected infections

- Socio - economic drivers
- Porous borders and intense intra / inter-country migration
- Hard to reach populations

- Changes in malaria and other vector borne diseases programs
- Gaps in primary health care models in rural areas

November 6

Malaria Day in the Americas

Closing Local Gaps Toward Malaria Elimination

dti-r

diagnosis • treatment • investigation – response

www.paho.org

Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas

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FIU Robert Stempel College of Public Health & Social Work
Global Health Consortium

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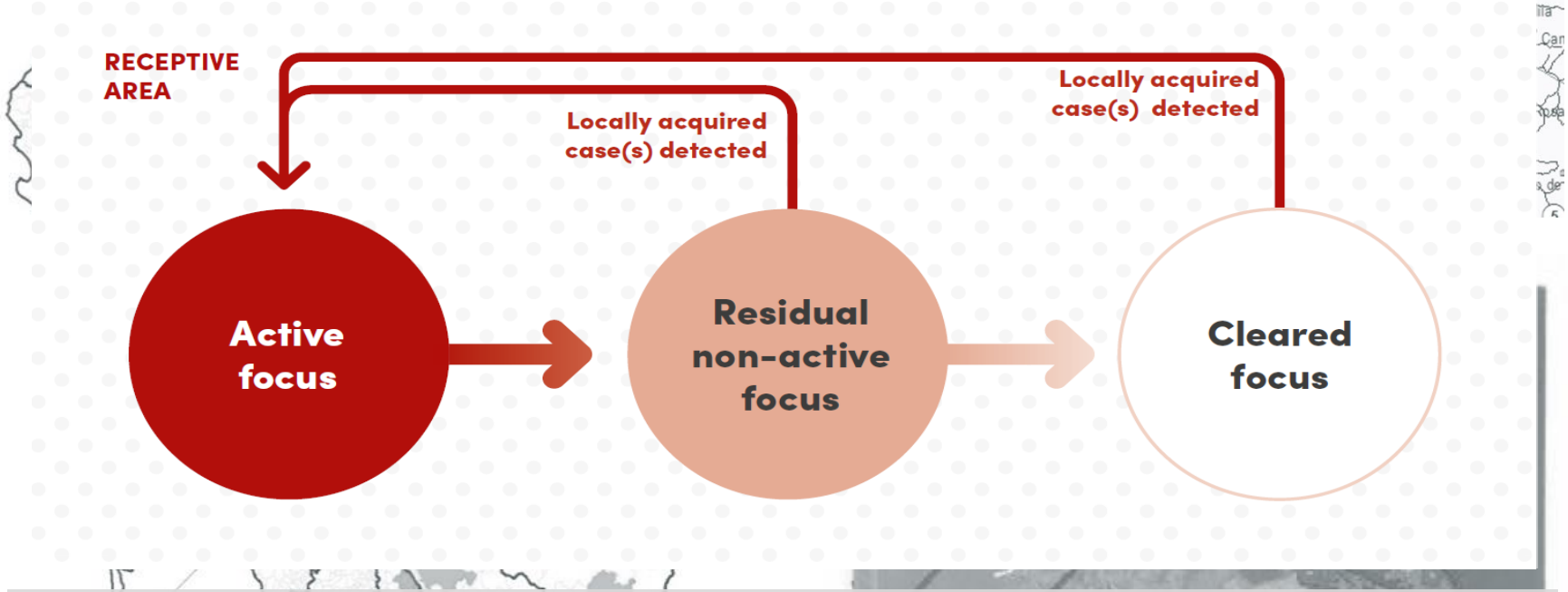
Milken Institute School of Public Health
THE GEORGE WASHINGTON UNIVERSITY

JOHNS HOPKINS
BLOOMBERG SCHOOL of PUBLIC HEALTH

JOHNS HOPKINS
Center for Communication Programs

How to eliminate malaria?...

… transforming all active foci into cleared foci



Malaria elimination at country level is the sum of the elimination of malaria in each one of the foci

The work must be done at local level (municipality, focus)

How to eliminate malaria?...

… eliminating the human reservoir of parasites

- By early **infection detection** and **radical treatment**
- **Infection detection** is a technical / operational bottle neck to eliminate the human reservoir
- **How much early? How much sensitive? How much massive?**

- There are still **important gaps** in **infection detection** (mainly symtomatic malaria) that can be addressed improving access to RDT and microscopy
- Access to **diagnosis** as the key operational bottle neck towards elimination of human reservoir
- But, access to **treatment** also remains as basic operational bottle neck

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Closing Local Gaps Toward Malaria Elimination: **two key ideas**

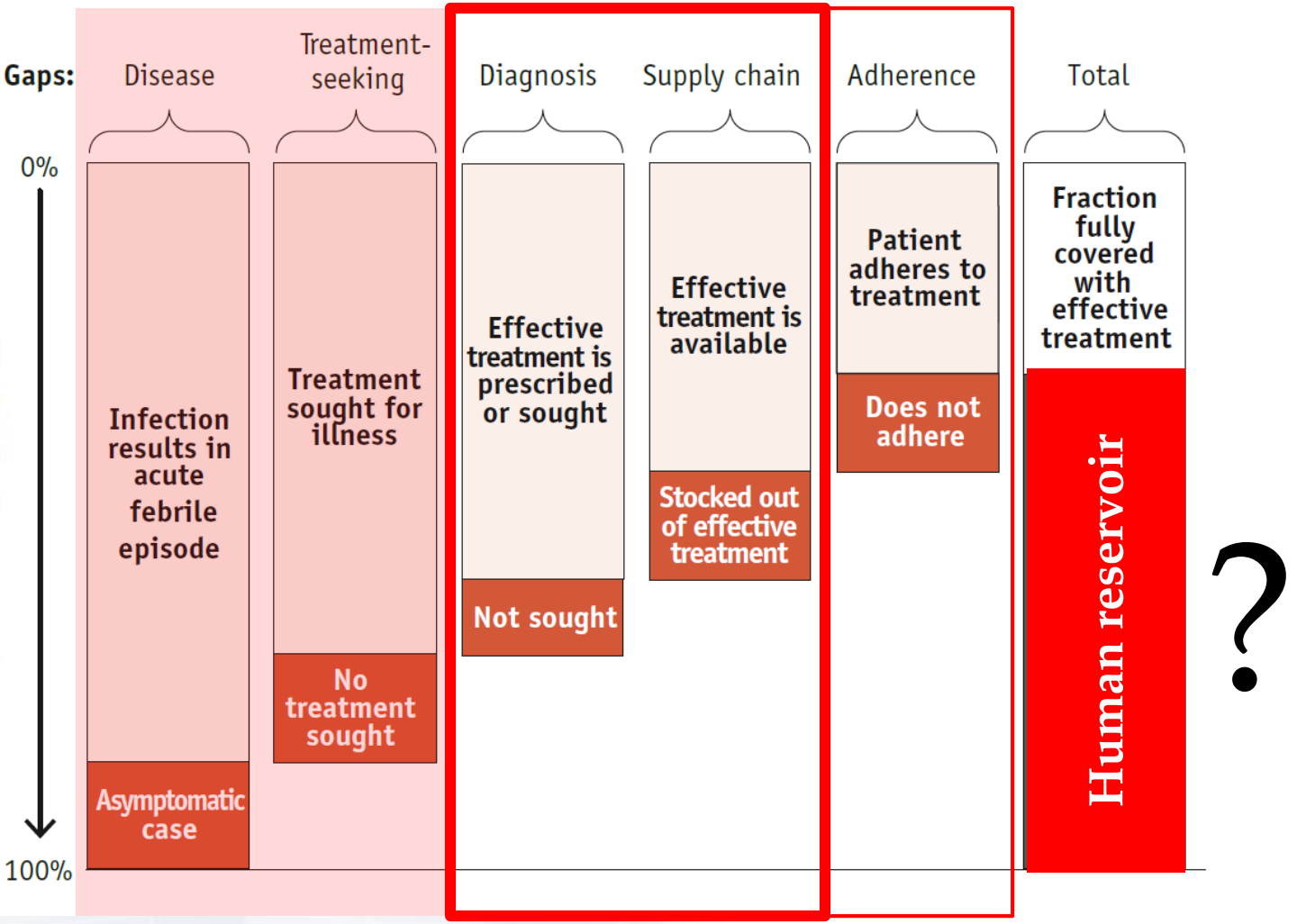
1. **Concentrate efforts in closing gaps in key interventions (dti-r)**

2. Promote joint efforts in key municipalities (foci): "high burden" and "eliminating"

Potential coverage gaps that determine the fraction of infections rapidly identified and treated.

FROM MALARIA CONTROL TO MALARIA ELIMINATION

A MANUAL FOR ELIMINATION SCENARIO PLANNING



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Access to prompt diagnosis is the main gap

- Countries with massive efforts in detection but without proper diagnosis (no prompt case investigation and response)
- Countries with short time for detection but critical delays in diagnosis (case investigation and response)
- Territories where RDT should be highly effective but with important gaps in implementation
- Areas with legal restrictions for diagnosis and treatment by community health workers
- Countries with barriers for accessing diagnosis even in urban areas
- Countries with community health workers being considered in the malaria strategy but without appropriate networking support and structure
- Countries where community health workers are not even considered in the new health model
- Countries where diagnosis is only available at the central level

d t i

DIAGNOSIS

Every suspected malaria case must be diagnosed using microscopy or RDT within the first 48h from onset of s[Gaps ?]w transmission settings: unrealistic? Always in the first 7 days from onset of symptoms.

TREATMENT

Every confirmed case must receive appropriate treatment based on the national p[Gaps ?]g the same day of the diagnosis.

INVESTIGATION

Every case or cluster of cases should trigger a basic action to promptly detect and trea[Gaps ?] related cases within 7 days.

7 days from the onset of symptoms

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- dti-r is a stepwise approach in which diagnosis, with the consequent treatment, **is the first step**,

- Investigation, surveillance and response are the natural extension of a proper network of diagnosis.

Without proper **diagnosis,** there is no proper treatment, no investigation, no knowledge of malaria distribution, no way to stratify the risk, no way to identified focus, no guidance for vector control, no response.

- Assuming that dti-r is the anchor of a successful program, attention should be focused on **coverage, access** and **quality** of the **services.**

Closing Local Gaps Toward Malaria Elimination: **two key ideas**

1. Concentrate efforts in closing gaps in key interventions (dti-r)

2. **Promote joint efforts in key municipalities (foci): "high burden" and "eliminating"**

15 municipalities in 2015 contributed more that 80% of the cases of the continent:

Municipality	Departament	Country				
Sifontes	Bolivar	Venezuela	46,610	52,509	71,934	34.4%
Cruzeiro do Sul	Acre	Brazil	20,043	17,210	14,979	41.6%
Atures	Amazonas	Venezuela	4,377	5,897	9,812	46.2%
Manaus	Amazonas	Brazil	7,295	7,443	9,748	50.9%
Gran Sabana	Bolivar	Venezuela	5,195	5,224	8,354	54.9%
San Juan Bautista	Loreto	Peru	7,414	10,616	8,006	58.7%
Andoas	Loreto	Peru	1,029	6,842	7,898	62.5%
Raul Leoni	Bolivar	Venezuela	2,844	5,130	7,777	66.2%
Quibdo	Choco	Colombia	4,232	5,008	7,120	69.6%
Cedeno	Bolivar	Venezuela	5,057	5,289	6,898	72.9%
Ipixuna	Amazonas	Brazil	5,455	2,983	6,731	76.1%
Eirunepe	Amazonas	Brazil	8,483	5,288	6,240	79.1%
Tado	Choco	Colombia	1,814	3,472	5,716	81.8%
Mancio Lima	Acre	Brazil	7,281	6,207	5,552	84.1%
Labrea	Amazonas	Brazil	4,651	7,412	5,161	86.3%

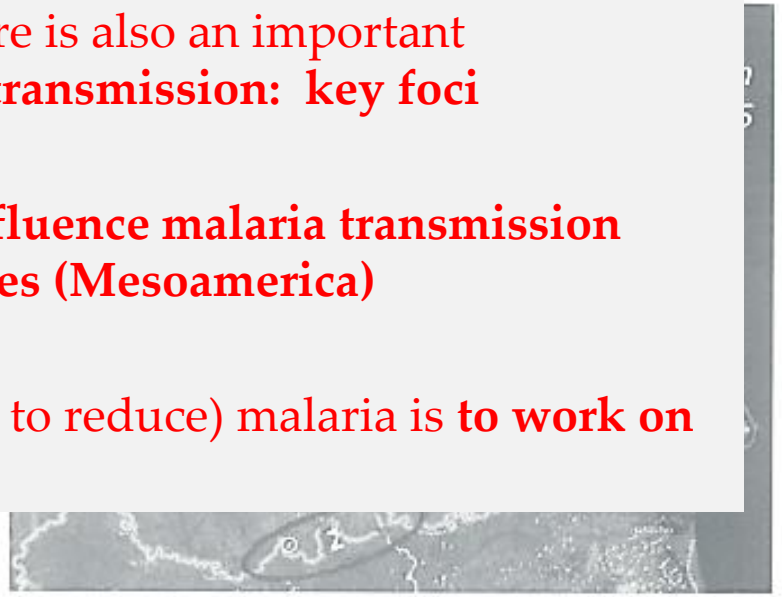
0 100,000 0 100,000 0 100000 0% 50% 100%

Cumulative % 2015

"..." indicates unavailable data.

**Sao Gabriel da Cachoeira*

- Malaria transmission in Americas is **geographically heterogeneous.**
- Malaria transmission is **concentrated in limited number of municipalities**
- **Within high burden municipalities** there is also an important **geographical heterogeneity in malaria transmission: key foci**
- Malaria transmission in key foci **may influence malaria transmission across the country… and across countries (Mesoamerica)**
- The most efficient way to eliminate (and to reduce) malaria is **to work on the "high burden" foci**



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How to address the focus - **Methodology**

Dynamics of malaria transmission- analysis / hypothesis

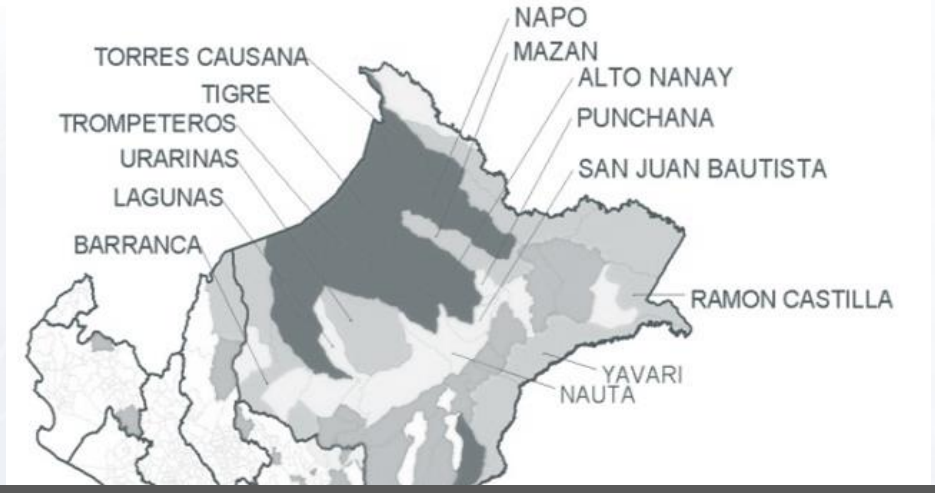
1

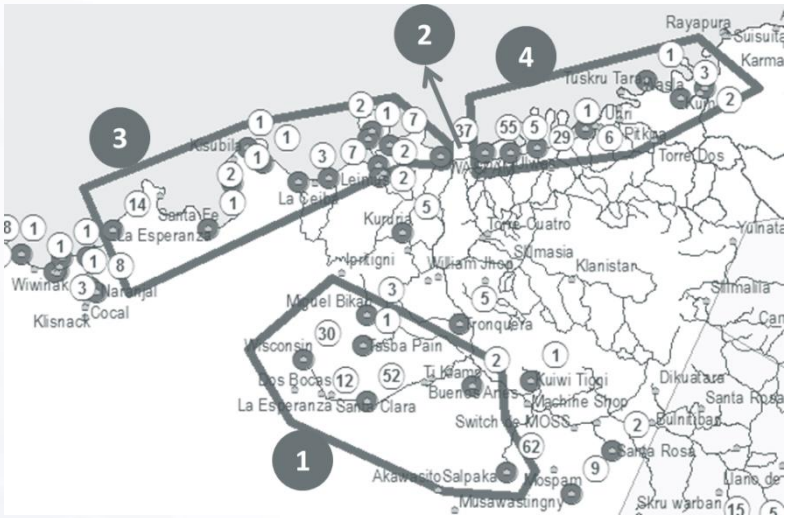
Identifying local drivers of the transmission,

Identifying barriers and gaps …

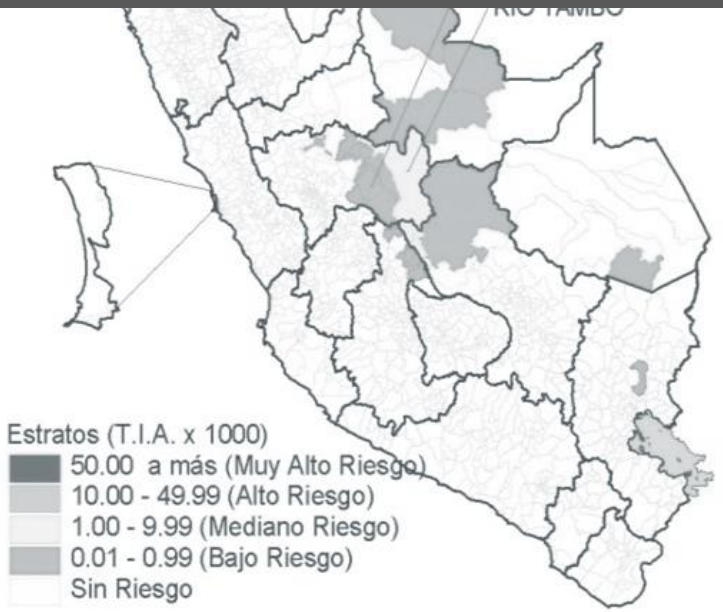
2

- **Diagnosis**
- **Treatment**
- **Investigation**
- **Response**





Call for action for national and local authorities and other actors to increase efforts in reducing burden and eliminating malaria in "high burden" municipalities



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Technical missions

Assessments of the malaria situation

Training in service

Networking

Expert consultations

Legal and normative barriers

Task forces (for key foci)

Scenario for academic training programs

Call for action for national and local authorities and other actors to increase efforts in reducing burden and eliminating malaria in "high burden" municipalities

Innovation (technological and operational)

Communities of practice

Pilot experiences – (the foci as pilot areas)

South – south cooperation

Communication

Advocacy with authorities

Local plans for malaria elimination

Operational research (foci level)

Public – private partnership

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Oficina Regional para las Américas

November 6

Malaria Day in the Americas

Malaria Day in the Americas

End malaria for good

Thank you

dti-r

diagnosis • treatment • investigation – response

Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas

USAID
FROM THE AMERICAN PEOPLE

FIU Robert Stempel College of Public Health & Social Work
Global Health Consortium

UNITED NATIONS FOUNDATION

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COMMUNICATIONS TOOLKIT

“Ready to beat malaria”

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