Webinar

Measles reemergence: update on clinical, surveillance and vaccination

Tuesday,
19 March 2024

10:00 - 12:00
(Washington D.C.)

Zoom
ID 813 1246 6930

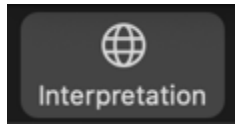
PAHO

Pan American Health Organization

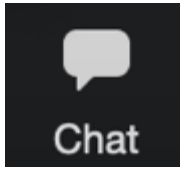
World Health Organization
Americas

Housekeeping rules

- This session has simultaneous interpretation, please use the **GLOBE** icon to select your language of preference



- Please use the **CHAT** icon to communicate any technical / audio issue



- Please use the QA icon to submit your questions only

Presentations and recording of the webinar will be available **tomorrow** at the below link:

https://www.paho.org/en/events/webinar-measles-reemergence-update-clinical-surveillance-and-vaccination

Webinario

Reemergencia del sarampión: actualización en la clínica, la vigilancia y la vacunación

Martes,
19 de marzo de 2024

10:00 - 12:00
Hora de Washington D.C.

Vía Zoom
ID 813 1246 6930

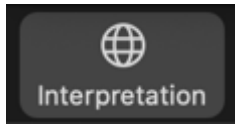
OPS

Organización Panamericana de la Salud

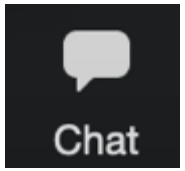
Organización Mundial de la Salud
Américas

Avisos importantes

- Esta sesión tiene interpretación simultánea, use el ícono del **GLOBO** para seleccionar su idioma de preferencia



- Utilice el ícono **CHAT** para comunicar cualquier problema técnico o de audio



- Las preguntas deben enviarse únicamente mediante el ícono del **QA**

Las presentaciones y grabación del webinario estarán disponibles mañana en el siguiente enlace: https://www.paho.org/es/eventos/webinario-reemergencia-sarampion-actualizacion-clinica-vigilancia-vacunacion

Webinar:
Measles reemergence: update on clinical, surveillance, and vaccination.
14th March 2024

The Return of Measles to the Americas

Global and regional epidemiological update

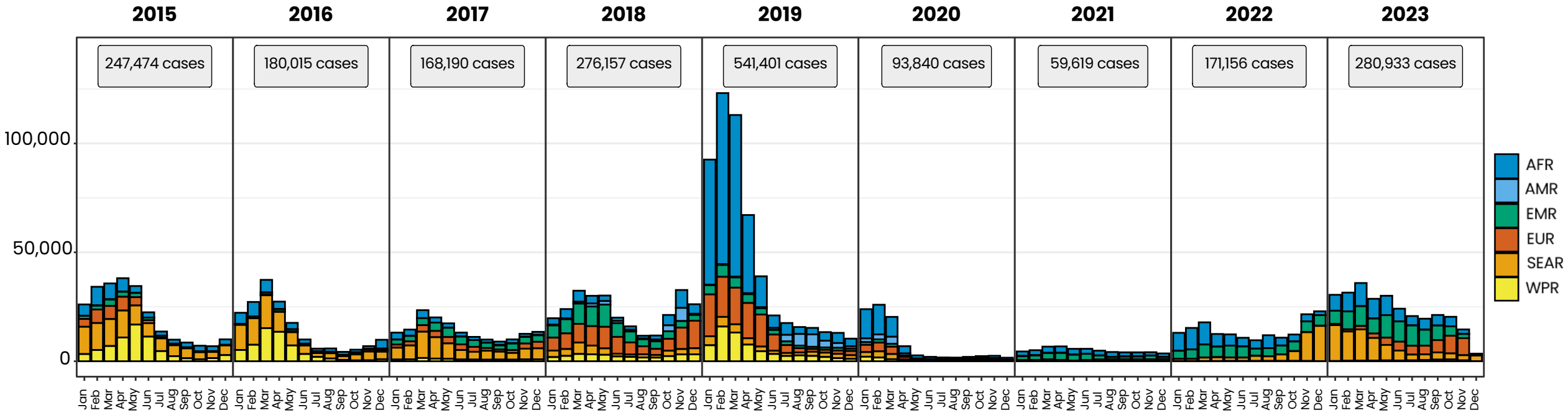
Gloria Rey-Benito
Desiree Pastor
Regional Advisors, CIM
PAHO/WHO

Outline

1. Why measles matters?
2. How can we know the risk in each country?
3. What do we need to do now?

Measles cases are increasing everywhere

*Cases reported to WHO increased by **79%** in 2023 versus 2022.*
And 2024 may be worse than 2023.



Data reported as of February 2024

World Health Organization

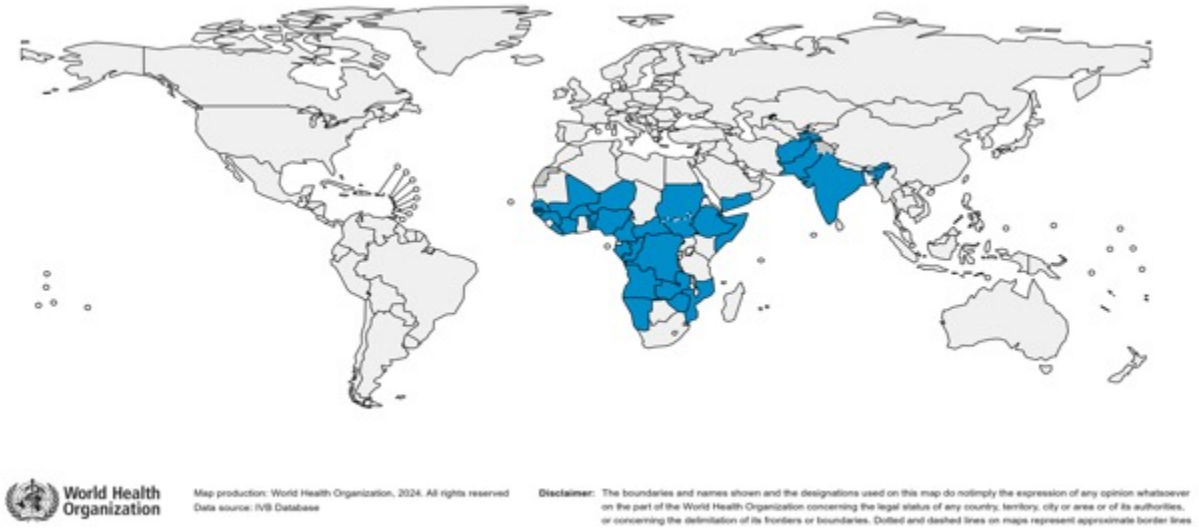
Notes: Based on data received 2024-01 - Data Source: IVB Database - This is surveillance data, hence for the last month(s), the data may be incomplete.

Large* or disruptive measles outbreaks increased in 31% in 2023

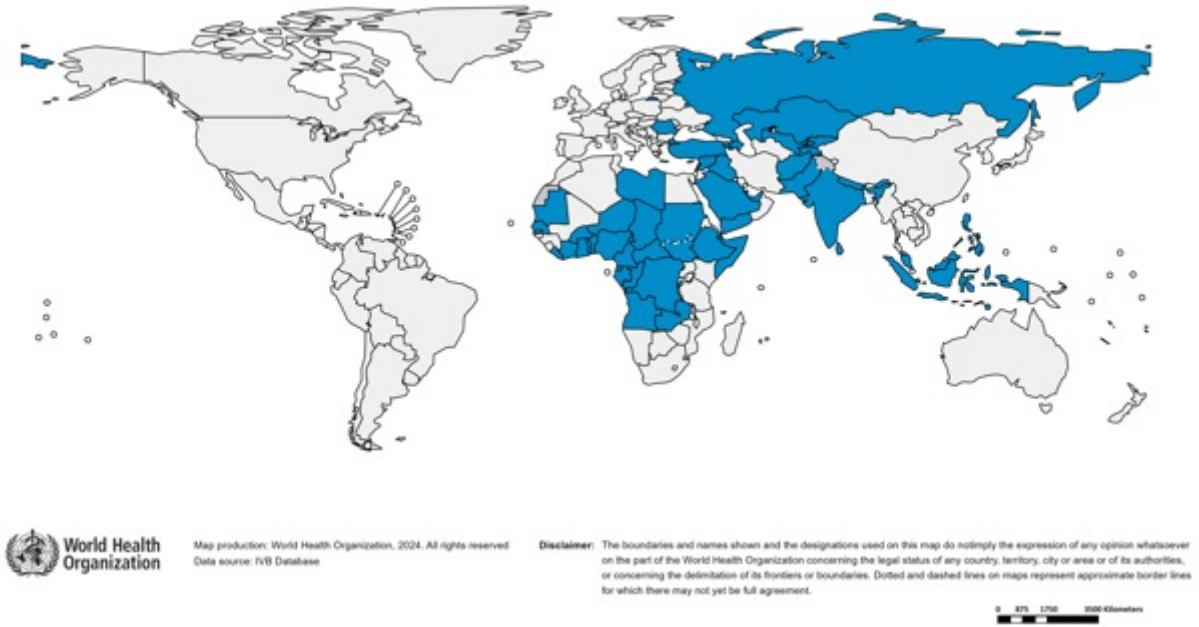
Number of countries reporting large outbreaks increased from **32 in 2022 to 51 in 2023.**

Increase observed in **European** (9) and **Eastern Mediterranean** (13) regions.

2022



2023



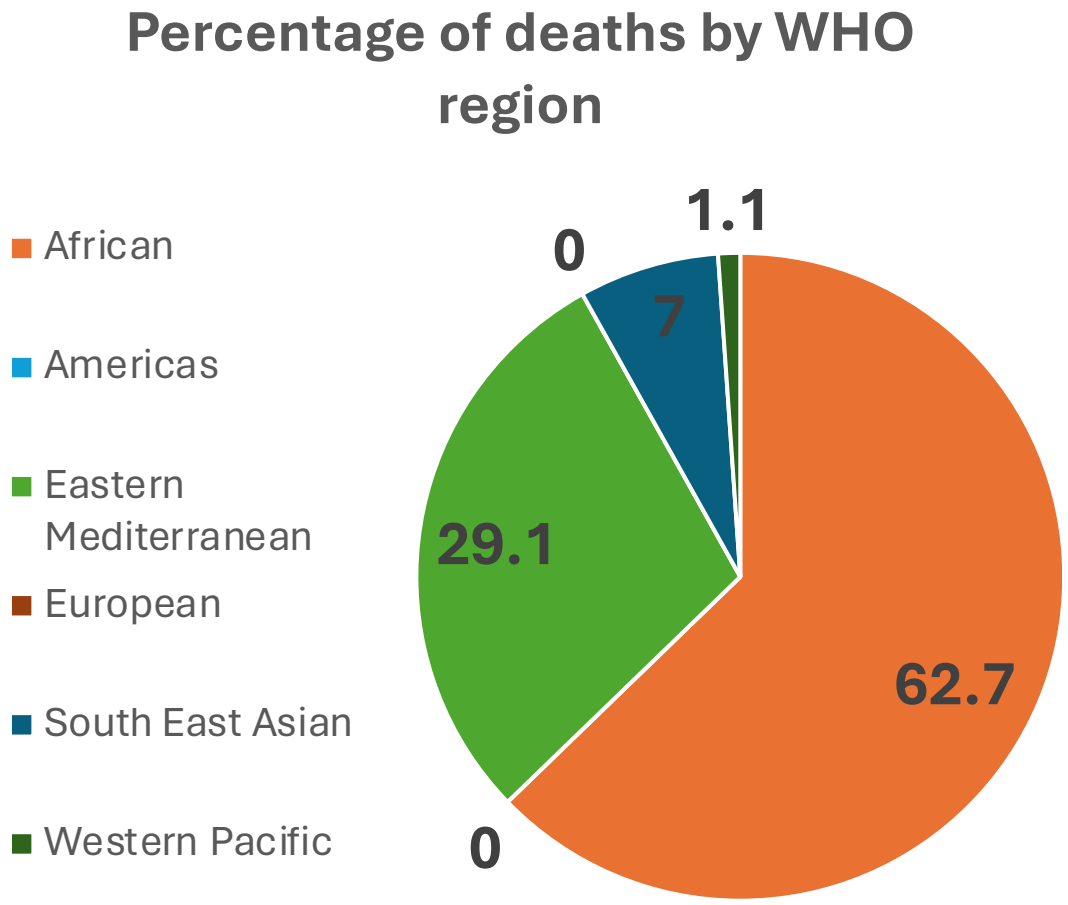
**Definition at global level: >=20 cases per million per 12 months*

World Health Organization

Even though a vaccine is available, deaths from measles continue to occur

Measles deaths don't happen equally everywhere

- ✓Estimated **136,216 measles deaths in 2022,** mostly in children resulting in a **43%** increase compared with 2021.
- ✓**92%** deaths occurred in **24%** of the world's population.
- ✓**Deaths in 2023 are likely to have increased further** because more measles cases were reported.



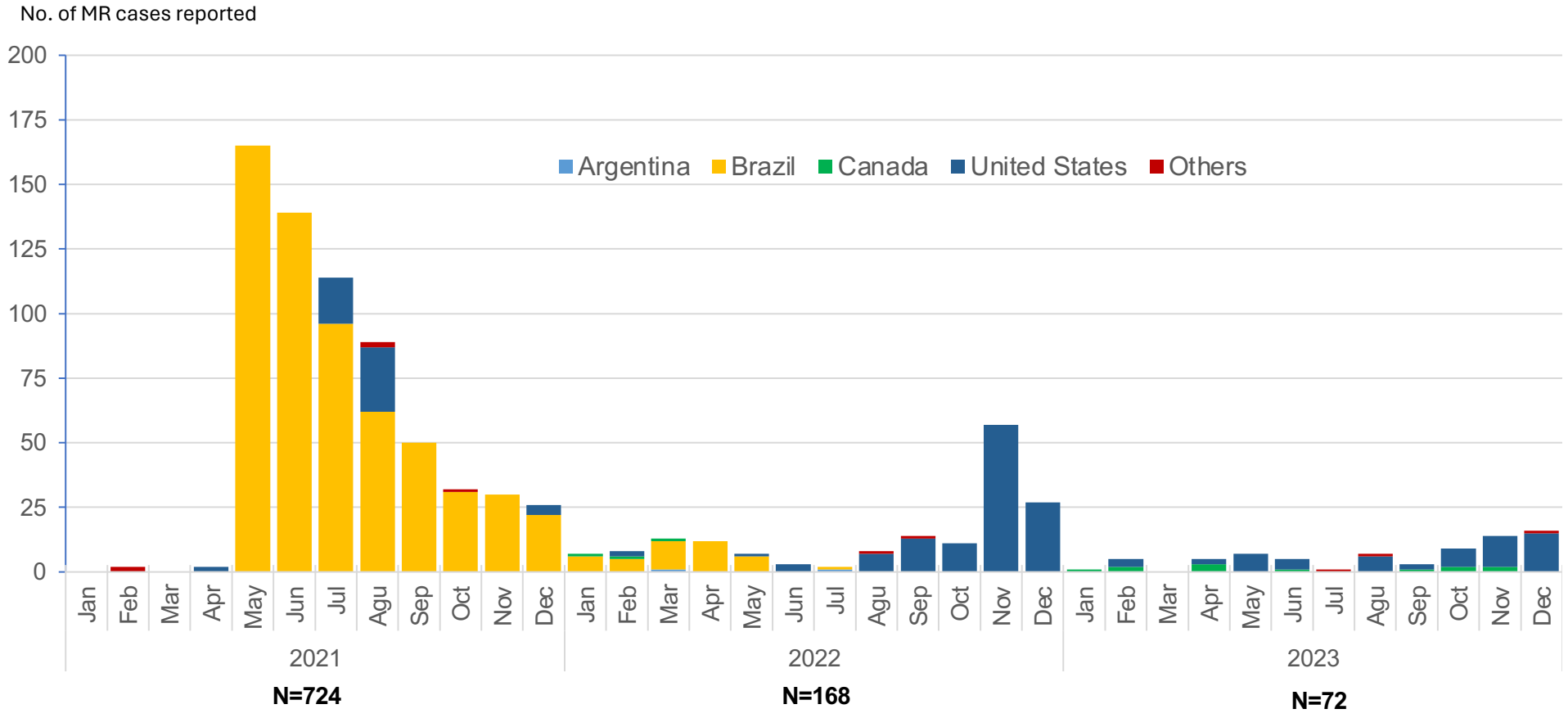
World Health Organization

Outline

2. How can we know the risk in each country?

Measles cases drastically rise in the Americas in 2024

Total cases reported as of epi-week 11 of 2024 exceeded the final measles count of 2023 by 28%



2024	
Countries	**No of cases**
Argentina	3
Bolivia	1
Brazil	1
Canada	26
Mexico	1
Peru	2
United States	58

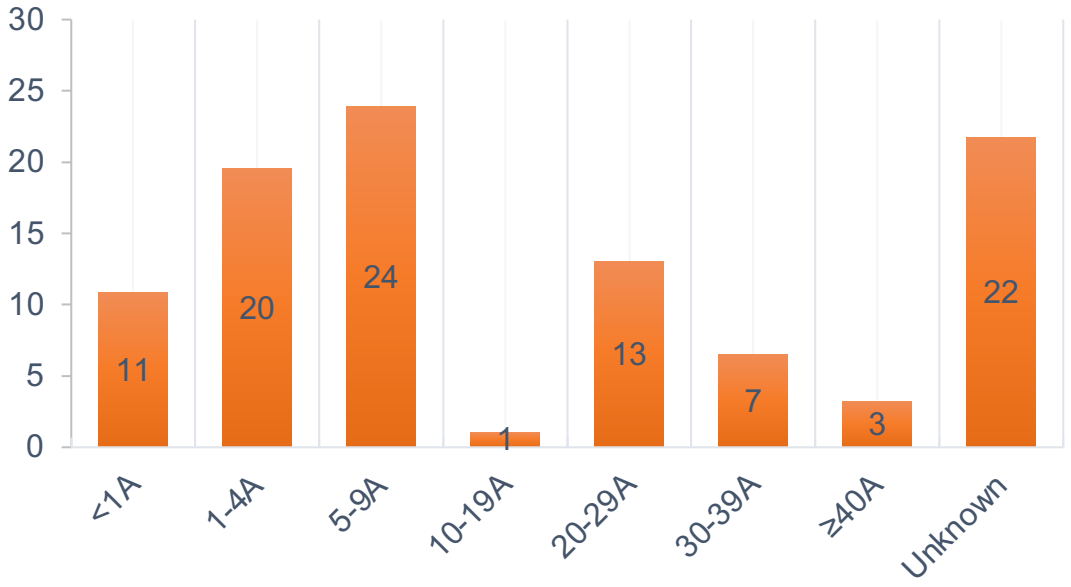
Total: 92

Source: Surveillance weekly reports storage at the Immunization Data Warehouse of the Pan American Health Organization.| *Data as of epidemiological week 11 (ending 16 March 2024). Others includes Chile (n=1), Costa Rica (n=1), French Guyana (n=5) and Paraguay (n=1).

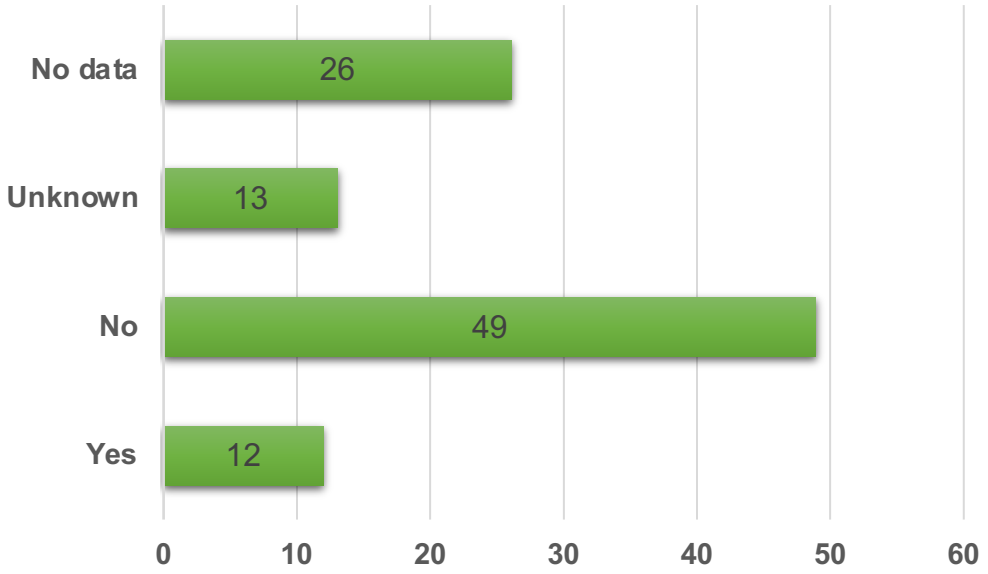
PAHO

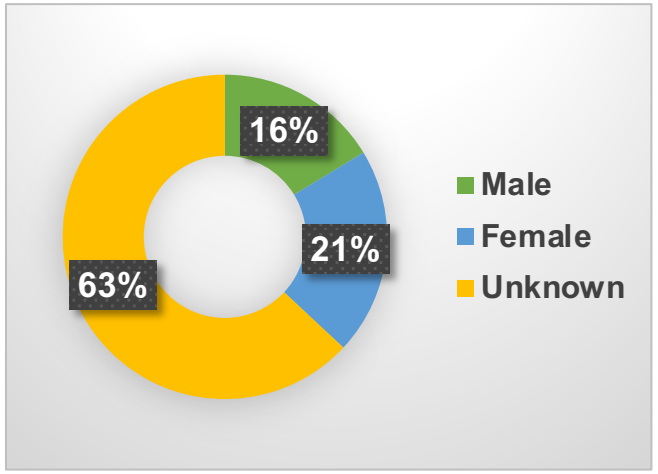
Characteristics of measles outbreaks in the Americas, 2024* (N=75)**

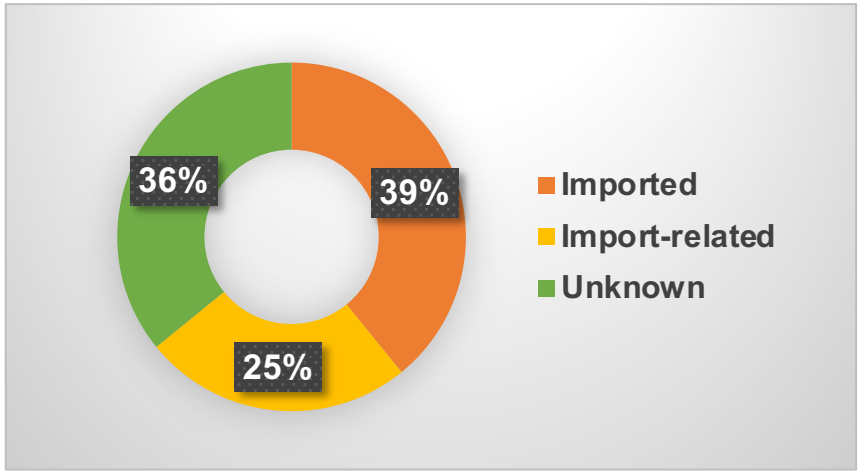
Age group (%)



Vaccination status (%)







Source: ISIS and country reports.
*Data as of epidemiological week 11.
**Case by case data available for 75 cases.

Not all countries have improved the sensitivity of their epidemiological surveillance systems post COVID-19

63% of countries/territories have achieved the annual reporting rate in 2023 in comparison of 2019

Central America, Mexico, Cuba, Haiti, and Dominican Republic

CtryCode	2019	2020	2021	2022	2023
CUB	34.27	13.94	6.47	14.22	21.20
SLV	8.57	2.94	5.59	9.00	9.30
DOM	1.79	0.42	0.30	1.26	2.50
HTI	1.84	1.25	1.42	1.64	2.24
NIC	10.48	1.90	2.04	2.12	2.19
CRI	2.04	2.04	0.39	1.24	1.96
HND	3.95	1.19	0.52	1.40	1.86
PAN	1.58	0.70	0.60	0.77	1.81
MEX	4.00	1.94	1.11	1.99	1.70
GTM	2.10	0.41	0.51	0.92	1.27

Andean Region, Southern Cone, and Brazil

CtryCode	2019	2020	2021	2022	2023
PRY	22.26	8.02	8.70	9.73	22.46
VEN	7.21	3.29	4.80	7.23	7.34
COL	8.78	1.45	2.01	2.21	3.25
ECU	3.54	1.29	1.34	2.29	3.07
BOL	1.45	1.18	1.06	2.07	1.76
CHL	4.27	0.26	0.24	1.53	1.12
BRA	32.08	8.29	1.30	1.77	1.02
ARG	3.72	0.76	0.32	2.00	0.71
PER	1.71	0.23	0.22	0.37	0.52
URY	2.05	0.32	0.00	0.12	0.18

Non-Latin Caribbean

CtryCode	2019	2020	2021	2022	2023
BRB	4.53	4.18	1.42	2.49	18.79
AIA	0.00	0.00	0.00	0.00	6.28
GRD	1.79	4.44	0.00	0.80	4.75
KNA	1.87	0.00	0.00	0.00	4.19
TCA	0.00	0.00	0.00	0.00	2.17
BHS	1.54	0.00	0.00	0.24	0.73
JAM	8.31	0.98	0.28	0.85	0.53
BLZ	8.97	0.50	0.25	1.48	0.49
SUR	1.03	0.00	0.00	0.00	0.16
GUY	5.49	0.89	0.00	2.84	0.12
ABW	0.00	0.00	0.00	0.00	0.00
ATG	2.06	0.00	0.00	0.00	0.00
CUW	0.61	0.00	0.00	0.00	0.00
CYM	1.65	0.00	0.00	0.00	0.00
DMA	1.35	0.00	0.00	0.00	0.00
LCA	2.19	0.00	0.00	0.00	0.00
MSR	18.72	0.00	0.00	0.00	0.00
SXM	0.00	0.00	0.00	0.00	0.00
TTO	0.72	0.00	0.00	0.00	0.00
VCT	0.00	0.00	0.00	0.00	0.00
VGB	0.00	0.00	0.00	0.00	0.00
BMU	0.00	0.00	0.00	0.00	0.00

Regional

	2019	2020	2021	2022	2023
Total**	14.13	3.93	1.44	2.32	2.35

** Canada and USA not included

- ≥2.00 x 100.000 population
- 1.00-1.99 x 100.000 population
- <1.0 x 100.000 population

Source: Country reports through ISIS and Excel reports to CIM/PAHO. | *Data as of 1 March 2024.

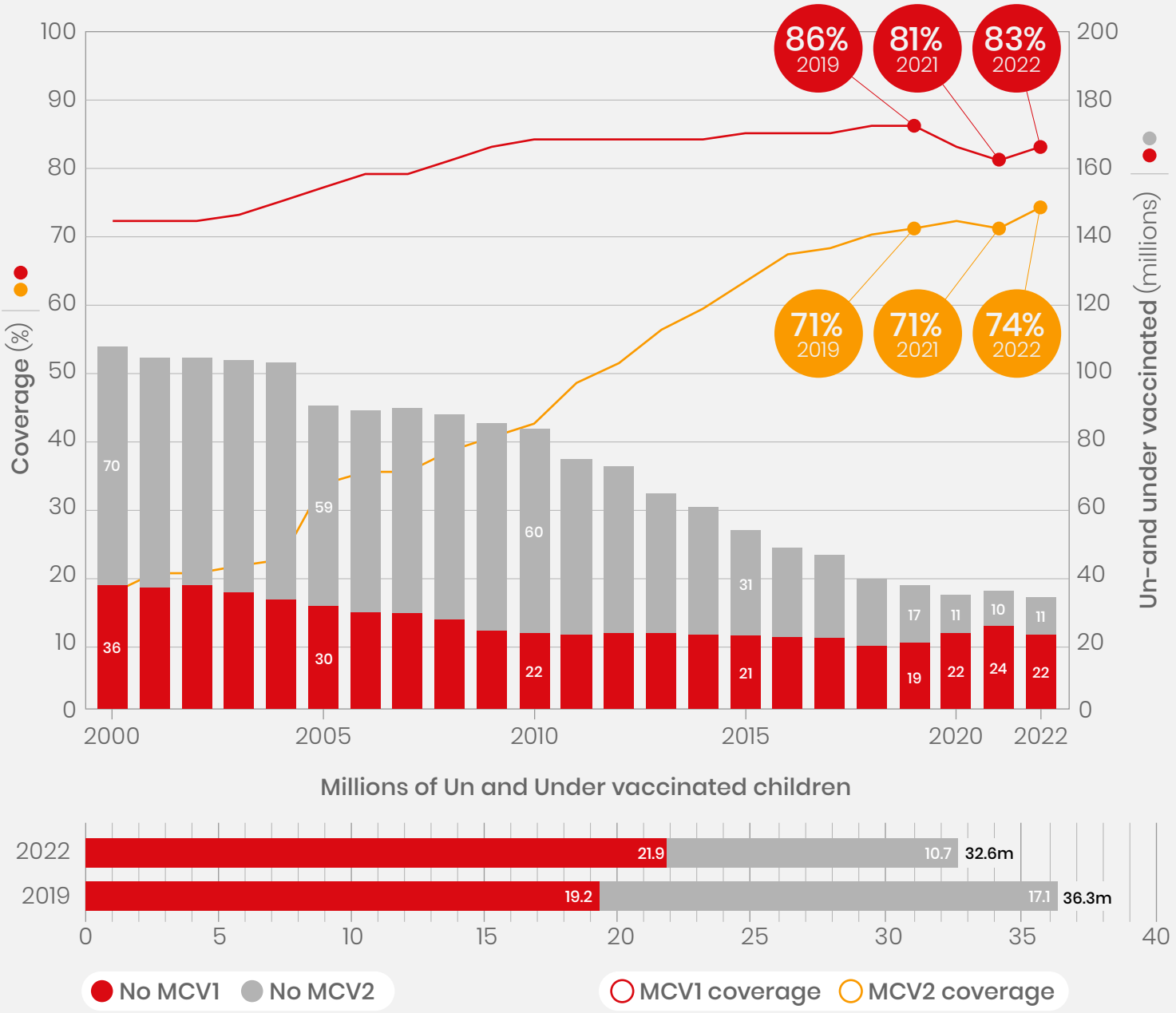
PAHO

Pandemic hits: Measles vaccine coverage not recovered by 2022

Measles first dose (MCV1) coverage 3% below the pre-pandemic peak of 86%

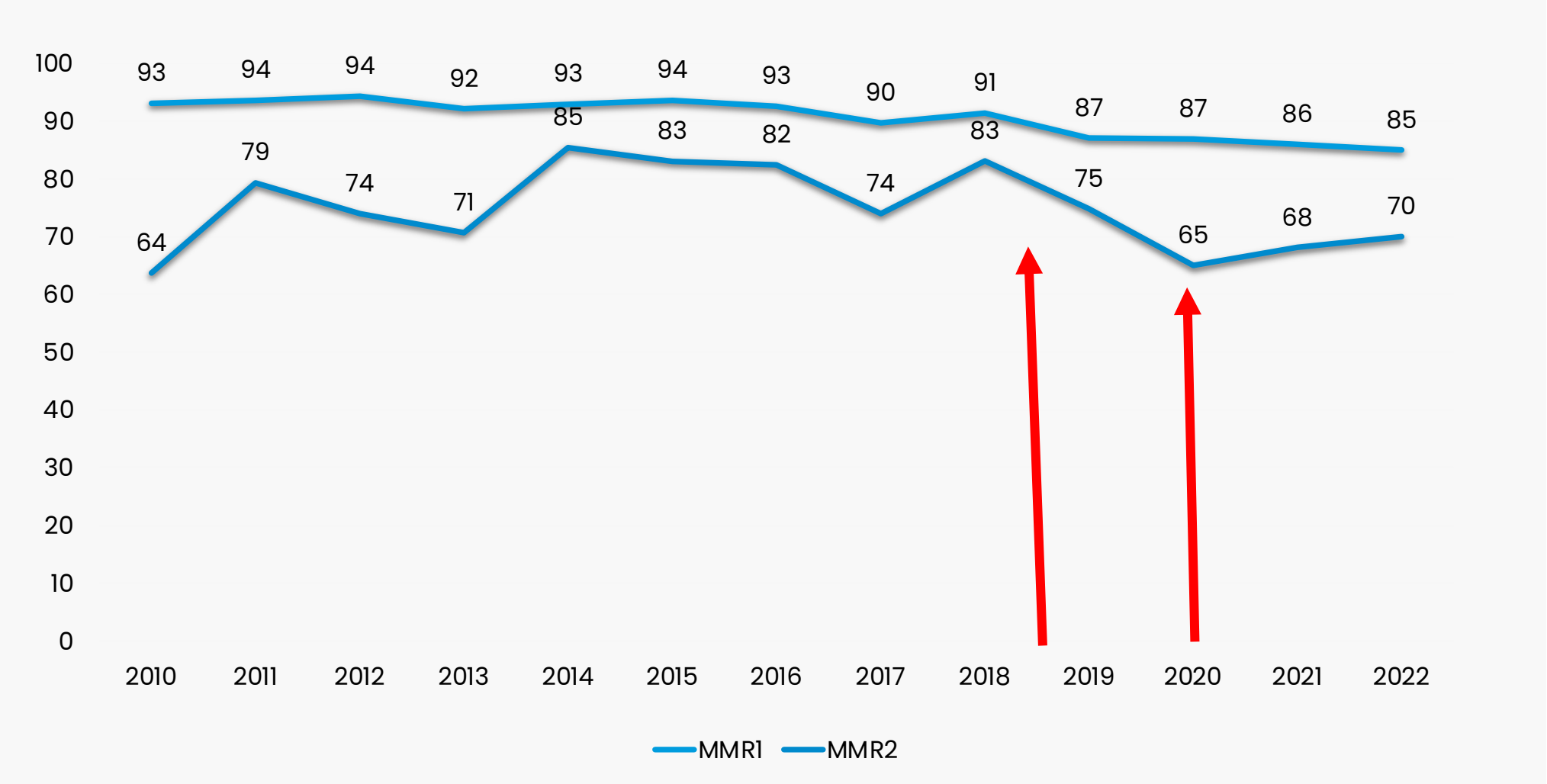
86% too low to prevent the epidemics of 2019

World Health Organization unicef



The COVID-19 pandemic further accentuated the pre-pandemic trend in the decline of MMR1 and MMR2 coverage. Still a decrease with a first dose?

Many countries have not reached pre-pandemic measles coverage levels, and many are getting worse



Source: Country reports using the joint WHO/UNICEF electronic form (eJRF).

PAHO

Outline

3. What do we need to do now?

PAHO's Microplanning (MP) Methodology Applied to Vaccination Campaigns and Routine Immunization Program (RI). Region of the Americas, 2021-2023

COUNTRIES	START YEAR	MICROPLANNING METHODOLOGY APPLIED FOR FOLLOW UP VACCINATION CAMPAIGNS 2021-2023	MICROPLANNING METHODOLOGY APPLIED FOR ROUTINE IMMUNIZATION PROGRAM 2022-2023	MICROPLANNING METHODOLOGY FOR FOLLOW UP CAMPAIGNS 2024 OR RIP
COLOMBIA	2021			
MEXICO	2021			
ARGENTINA	2022			
BRASIL	2022			
BOLIVIA	2022			
EL SALVADOR	2022			
HONDURAS	2022			
NICARAGUA	2022			
R.DOMINICANA	2022			
PARAGUAY	2022			
VENEZUELA	2022			
ECUADOR	2023			
PANAMA	2024			
COSTA RICA	2024			
GUATEMALA	2024			

Pan American Health Organization
World Health Organization
PAHO

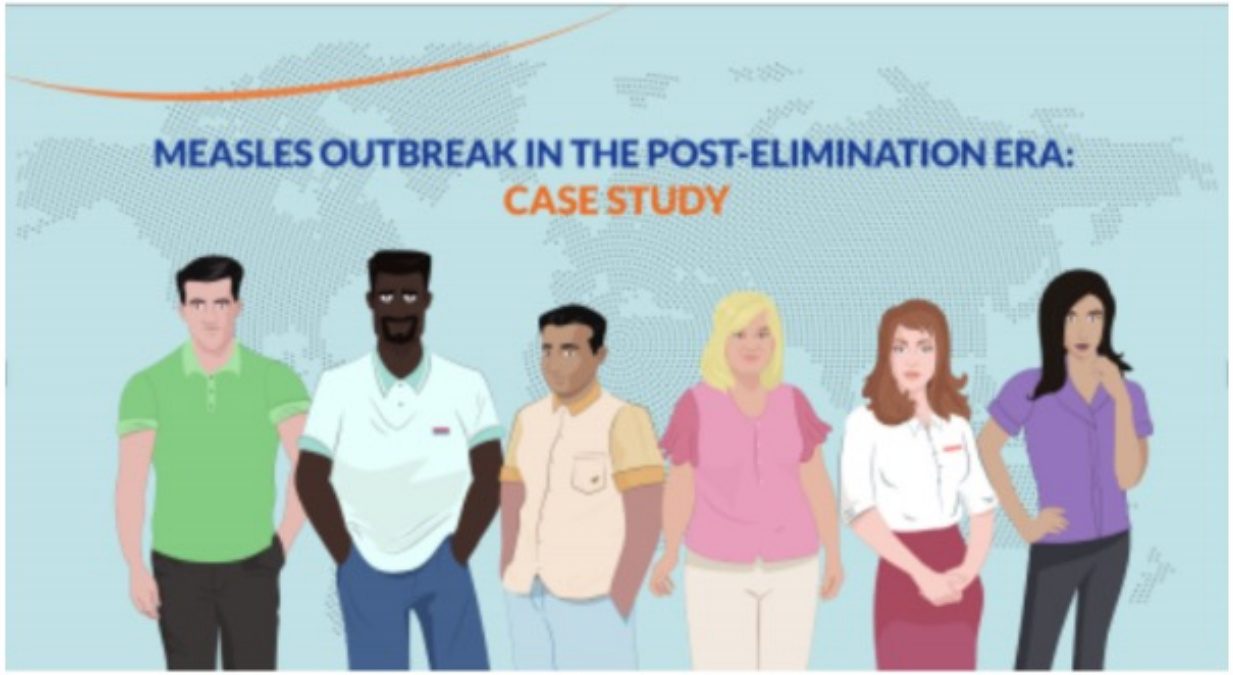
Enhancing surveillance & response

E-learning training on measles outbreak response

Rapid response to measles outbreak in the Americas

https://campus.paho.org/es/curso/brote-de-sarampion-en-la-era-post-eliminacion-estudio-de-caso-2022

Measles outbreak in the post elimination era: Case study



https://www.campusvirtualsp.org/es/curso/brote-de-sarampion-en-la-era-post-eliminacion-estudio-de-caso-2022

Available at: https://www.campusvirtualsp.org/

Pan American Health Organization
World Health Organization
PAHO

The essential actions to implement now

RESPONSE	SURVEILLANCE			VACCINATION	
Reactivate	**Enhance**	**Map**	**Obtain**	**Implement**	**Maintain**
the rapid response teams, **which should be adequately trained**, and implement coordinated national rapid response protocols. Prevent nosocomial transmission by having an adequate referral flow of patients to isolation rooms.	epidemiological surveillance in high-risk areas (e.g., border municipalities) and with epidemiological silence by implementing complementary field activities (e.g., active searches).	internal and external migration routes in each country. Conduct risk assessment analysis to prioritize high-risk municipalities	serum samples, nasopharyngeal swabs, and urine samples for laboratory diagnosis and genomic sequencing.	vaccination activities in high-risk municipalities as soon as possible, using an **adequate microplanning** in the routine program.	Maintain a stock of MR/MMR vaccines, syringes and supplies for prevention and control actions in the event of imported cases.

Epidemiological Alert - Measles in the Region of the Americas - 29 January 2024: https://www.paho.org/en/documents/epidemiological-alert-measles-region-americas-29-january-2024

ACKNOWLEDGMENTS

- Health workers of the region
- Regina Duron, CIM
- Carilu Pacis, CIM
- Pamela Bravo, CIM

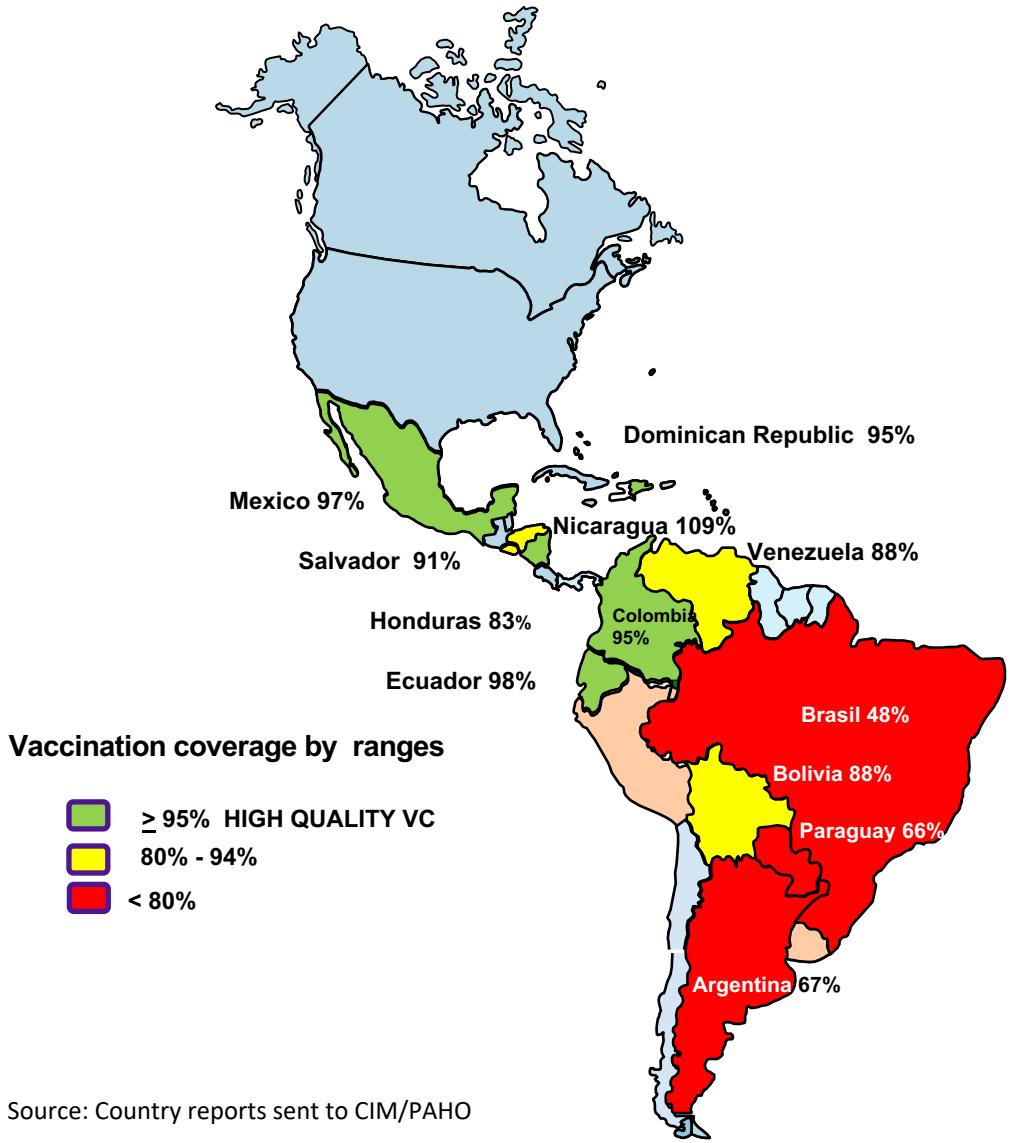
www.paho.org/immunization

Pan American Health Organization
World Health Organization
Americas
PAHO

Backup slides

Countries managed to implement follow-up vaccination campaigns amidst the COVID-19 Pandemic

More than 36 million children aged 1 to 12 years were vaccinated between 2021-2023



COUNTRY	POPULATION	GOAL	VACCINATED POPULATION	% COVERAGE
FOLLOW UP VACCINATION 2021				
MEXICO	1-4 Y 1-9 Y	8,613,162 3,009,232	8,268,636 MR 2,934,149 MMR	**96** **97**
COLOMBIA	1-10 Y	7,588,401	7,133,097	**95**
BOLIVIA	1-6 Y	1,181,729	1,049,830	**88**
PARAGUAY	1-6 Y	845,865	559,840	**66**
FOLLOW UP VACCINATION CAMPAIGNS 2022				
ARGENTINA	13 M a <5 Y	2, 315,692	1,531,840	**67**
BRAZIL	12 M a <5 Y	12,927,057	6,204,098	**48**
EL SALVADOR	1-6 Y	544,089	495,121	**91**
HONDURAS	1-6 Y	1,195,147	955,122	**83**
NICARAGUA	1-5 Y	788,190	859127	**109**
REPUBLICA DOMINICA	1-5 Y	954,554	906,836	**95**
VENEZUELA	1-6 Y	2,692,674	2,046,432	**88**
FOLLOW UP VACCINATION CAMPAGINS 2023				
ECUADOR	1-12 Y	3,189,901	3,119,884	**98**

In 2021, four countries vaccinated 19.9 million children aged 1 to 10 years.
In 2022, seven countries vaccinated more than 12.9 million children aged 1 to 6yo
In 2023, Ecuador has vaccinated a total of 3,2 million children aged 1 to 12 years.

Source: Country reports sent to CIM/PAHO

PAHO

OTHER RECOMMENDATIONS for vaccination against measles and rubella

1. Travelers: prior departure, during the trip, and upon returning.

2. Clinicians and health care providers

3. Persons and institutions in contact with travelers, before and/or after trip

4. Contact tracing of confirmed measles cases

Epidemiological Alert - Measles in the Region of the Americas - 29 January 2024: https://www.paho.org/en/documents/epidemiological-alert-measles-region-americas-29-january-2024

PAHO

Clinical aspects of measles and rubella and main differences with other febrile and rash diseases

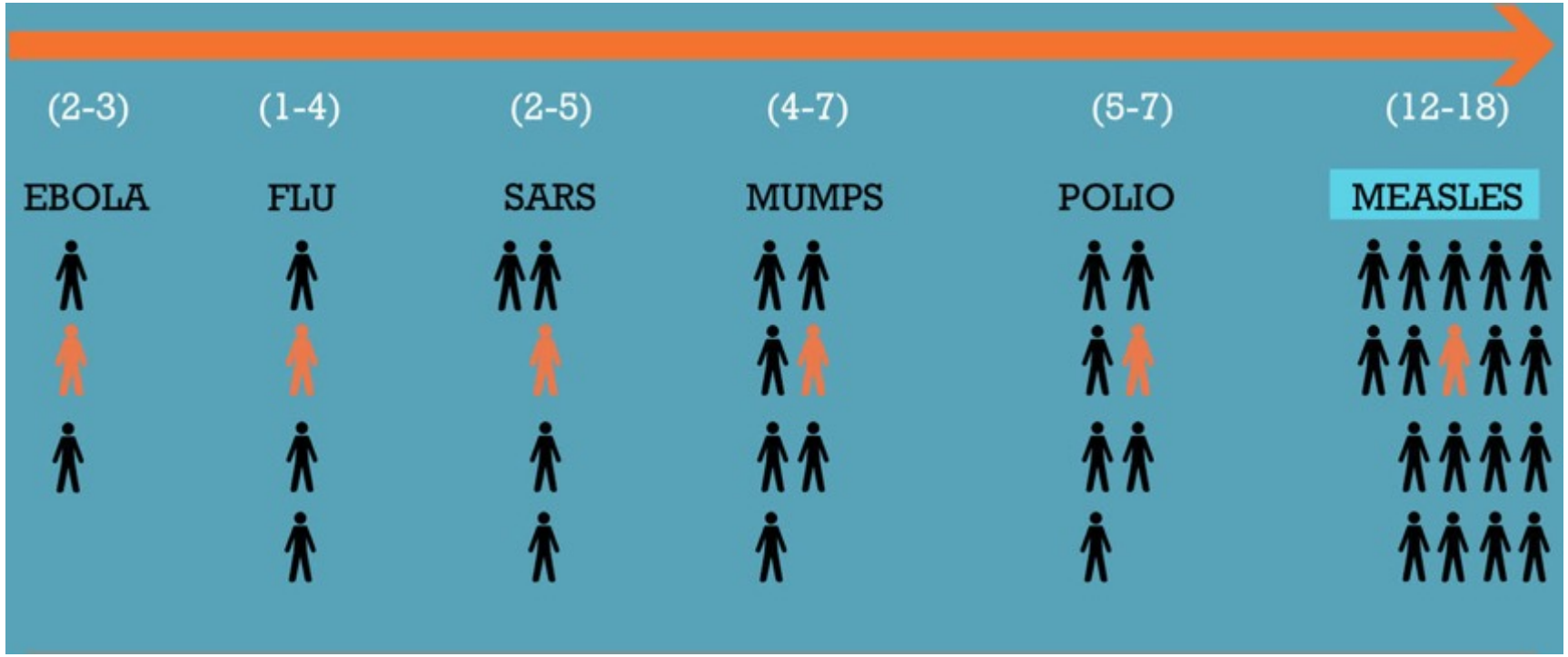
Tracy Evans- Gilbert MD, MPH
CTropmed®

Outline

- The clinical course of measles
- Measles complications
- Differential diagnosis
- Treatment

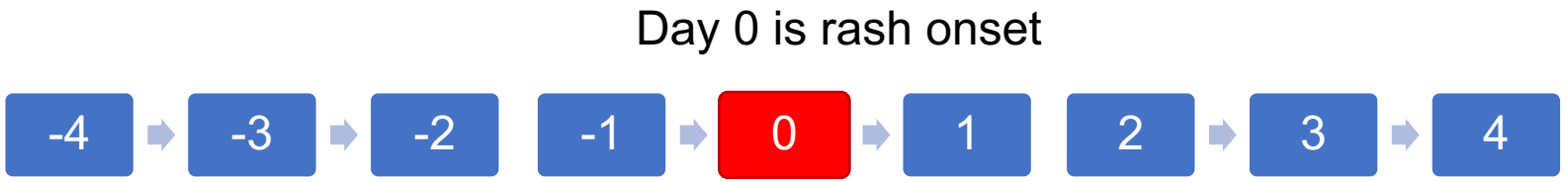
Measles Virus is highly contagious

- Reproduction rate of measles surpasses other infectious diseases such as Hepatitis C , Ebola ,HIV,SARs and parotitis



CDC/WHO

Period of infectivity and isolation precautions

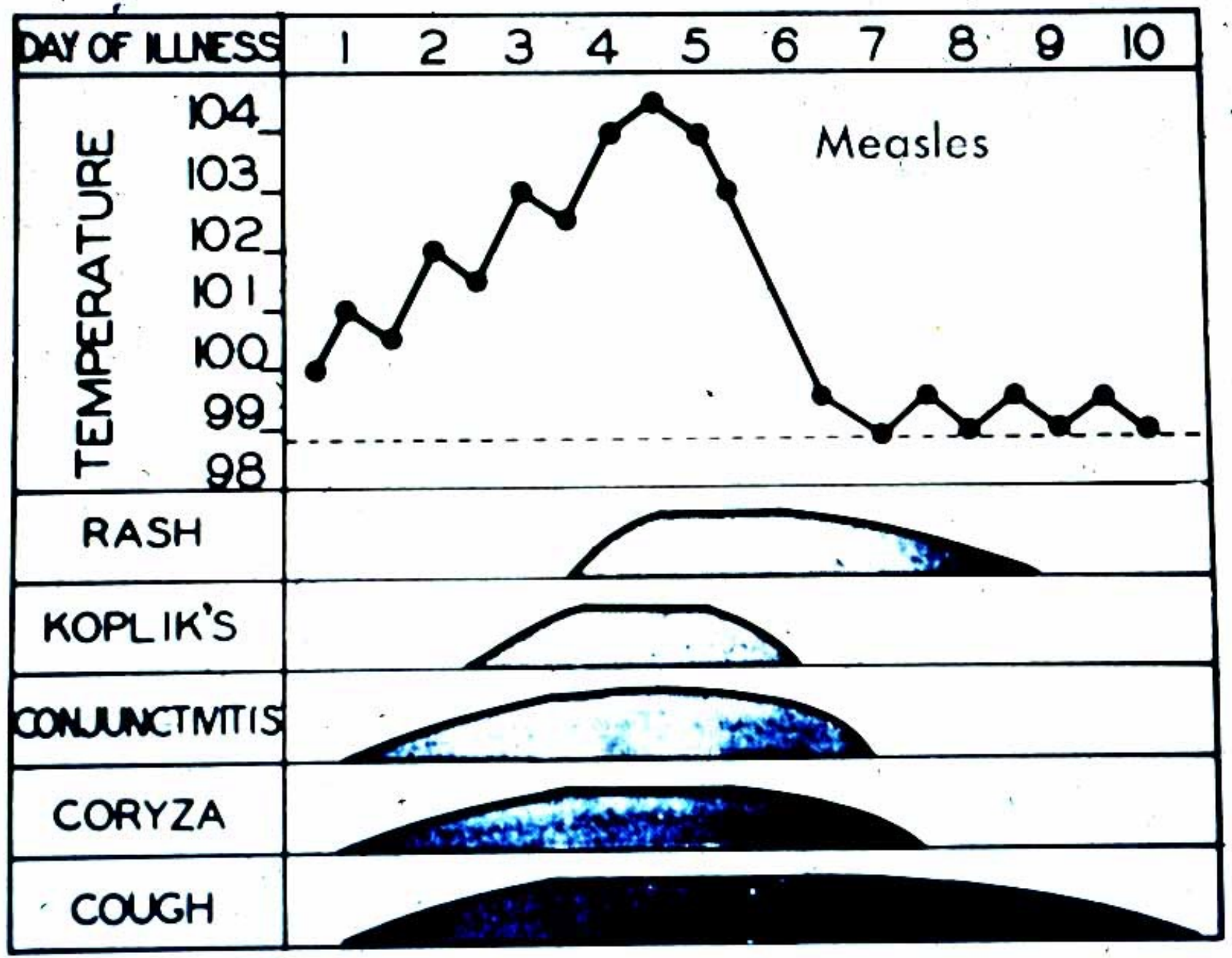


Infected Host

Airborne transmission precautions are indicated for 4 days after the onset of rash in the healthy host.

Exposed Contact

Exposed susceptible patients should be placed on airborne precautions from day 5 after first exposure until 21 days after last exposure.


DAY OF ILLNESS
1 2 3 4 5 6 7 8 9 10
TEMPERATURE
104
103
102
101
100
99
98
Measles
RASH
KOPLIK'S
CONJUNCTIVITIS
CORYZA
COUGH

Prodrome

- Cough
- Coryza
- Conjunctivitis
- Fever
- Malaise
- Lasts 4-7 days

Photo Credit Centers for Disease Control and Prevention

Koplick Spots

Premolar

- Tiny red spots with bluish-white centers inside the mouth on the lining of the cheek
- Appear **2-3 days before rash** and fade 1-2 days later.

Credit Col Marty Weisse MD West Virginia University Medicine Children's Hospital

- On first day of rash solitary lesions on face appears, 2-4 days after the prodrome.

Credit Col Marty Weisse MD West Virginia University Medicine Children's Hospital

Begins at the hairline, then involves the face and upper neck

Photo credit visualdx

Day 2-3

- Facial rash becomes confluent
- Lesions appear on the trunk

Photo Credit Col Marty Weisse MD West Virginia University Medicine Children's Hospital

Measles case in a 7-year-old child, detected in Latin America

- Spreads and head-to-toe
- Proceeds downward and outward to hands and feet

Morbilliform rash

- Confluent erythema with lakes of normal skin
- Blanches on pressure
- By day 3, the whole body is involved
- Rash lasts 5 to 6 days
- Severe areas peel off in scales

Credit Col Marty Weisse MD West Virginia University Medicine Children's Hospital

Desquamation period

- Fades in order of appearance

Imported measles case in an adult female

Photo credit: Dr. Orlando Castillo, Colombia

Measles case in a teenager from Latin America

Complications

Risk groups

- Children < 5 years old
- Adults > 20 years old
- Pregnant women
- Malnutrition, immunodeficiencies

Death

- 1 to 3 per 1,000 cases reported will die from respiratory or neurologic disease.
- Outcomes are worse among the elderly, infants 6-11 months, malnourished or immunocompromised

Complications

Respiratory

- Pneumonia occurs in 1-6 %
- Pneumonia cases 60% of measles deaths
- Due to direct invasion or secondary bacterial infection (Staphylococcus aures and Strep pneumoniae.
- Otitis media, sinusitis, croup

Neurologic

Acute measles encephalitis

- More common in adults than in children
- 1 in 1,000 to 2,000 patients
- Characterized by fever during the convalescent phase, headache, seizures, and altered consciousness.

Subacute Sclerosing Panencephalitis

- Past history of measles at a young age <2
- 1 in 100,000
- About 7-10 years after illness
- Personality change, myoclonic seizures, motor disturbance, coma and death

Complications

Diarrhea and stomatitis

- Accounts for sickness and death in developing countries

Subclinical hepatitis

- 30% of adult measles cases

Less common

- Thrombocytopenia, pericarditis, myocarditis, appendicitis, ileocolitis, hypocalcemia

Immunity

- Measles weakens the immune system, making children vulnerable to secondary infections

Severe measles among a malnourished female from Yanomami tribe in the Amazon

Source: https://www.survivalinternational.org/news/11967

Malnourished child

- Desquamation may be deeper and lead to depigmentation, skin breakdown, and infection.
- Severe fulminant measles present with hemorrhagic skin lesions, DIC... Death.

Pregnant women

- Measles can result in the baby being born prematurely with a low birth weight.

Credit Center for Disease Control

- Keratomalacia in a malnourished child with measles.
- Acute measles precipitates vitamin A deficiency leading to more severe ocular injury.
- Vitamin A supplementation given to children with measles is associated with better outcomes.

Credit Col Marty Weisse MD West Virginia University Medicine Children's Hospital

Modified measles

- Occurs in patients with passive immunity
- Recent immunoglobulin
- Infants with passive maternal transfer
- History of vaccination

Clinical Infectious Diseases

MAJOR ARTICLE

IDSA hivma

Clinical Characteristics of Measles in Previously Vaccinated and Unvaccinated Patients in California

James D. Cherry[1] and Matt Zahn[2]

[1]David Geffen School of Medicine, University of California, Los Angeles, and [2]Orange County Health Care Agency, Santa Ana, California

The Journal of Infectious Diseases

MAJOR ARTICLE

IDSA hivma

Measles Outbreak Among Previously Immunized Healthcare Workers, the Netherlands, 2014

Susan J. M. Hahné,[1] Laura M. Nic Lochlainn,[1,4] Nathalie D. van Burgel,[2] Jeroen Kerkhof,[1] Jussi Sane,[1,4] Kioe Bing Yap,[3] and Rob S. van Binnendijk[1]

[1]Center for Infectious Disease Control, National Institute for Public Health and the Environment, Bilthoven, [2]Haga Hospital, and [3]Municipal Health Service Haaglanden, the Hague, The Netherlands; and [4]European Programme for Intervention Epidemiology Training, European Centre for Disease Prevention and Control, Stockholm, Sweden

Clinical Presentation:

- Mild prodrome
- Cough and fever, may have no conjunctivitis
- Sparse, discrete rash of short duration
- Transmission of measles in secondary vaccine failure is rare
- Cases still required the same amount of public health effort in tracing contacts as in cases who were unvaccinated

- Measles case among a 40-year-old known vaccinated , 3rd day of rash. Detected in Latin America

Imported measles case among a 57-year-old from Europe. The case contracted the wild virus in childhood.

Photo credit: Dr. Orlando Castillo, Colombia

Notification of measles

Prompt notification of measles, and rubella ensures public health action can be taken promptly.

Notification should be based on clinical suspicion and should not await laboratory confirmation

Surveillance should use the case definition of fever and rash

Clinical diagnosis is not sufficient to confirm infection, so laboratory confirmation is vital

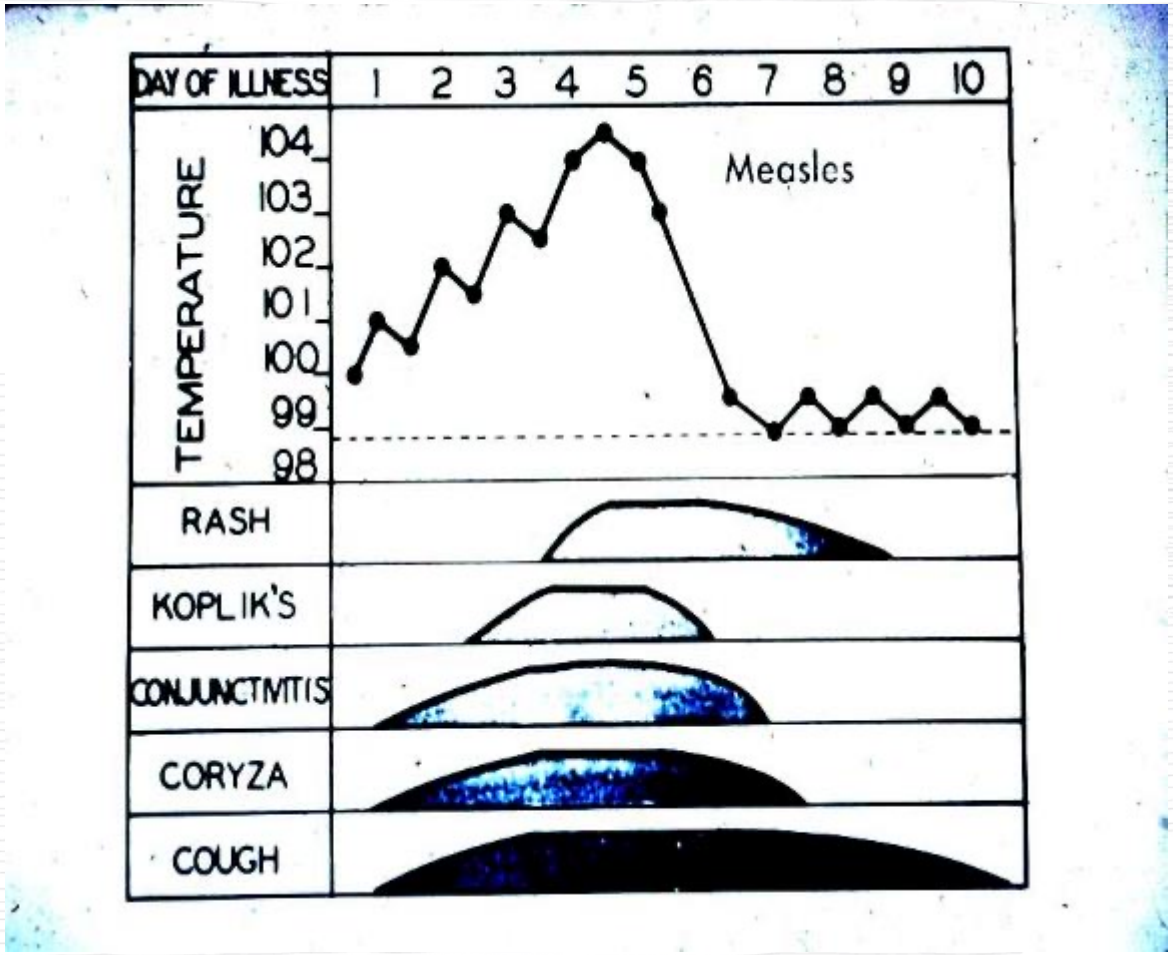
Type of sample	Minimum time to obtain	Maximum time to obtain	Obtaining the sample	Objective
Sample 1 Serology Blood (serum)	At the 1st contact of the suspect case	Up to 30 days from the onset of the rash	5- 8mL of blood, in sterile tube, without anticoagulant, centrifuge and separate serum	Detection of IgM antibodies
Sample 2 Nasopharyngeal / Pharyngeal	1st day of the rash onset	Up to 7 days from the onset of the rash	In medium viral transport (MVT)	Isolation of the virus and identification of the genotype
Sample 3 Urine	1st day of the rash onset	Up to 7 days from the onset of the rash	In sterile bottle, well labeled. Keep cold chain (2-8ºC). Complete notification form	Isolation of the virus and identification of the genotype

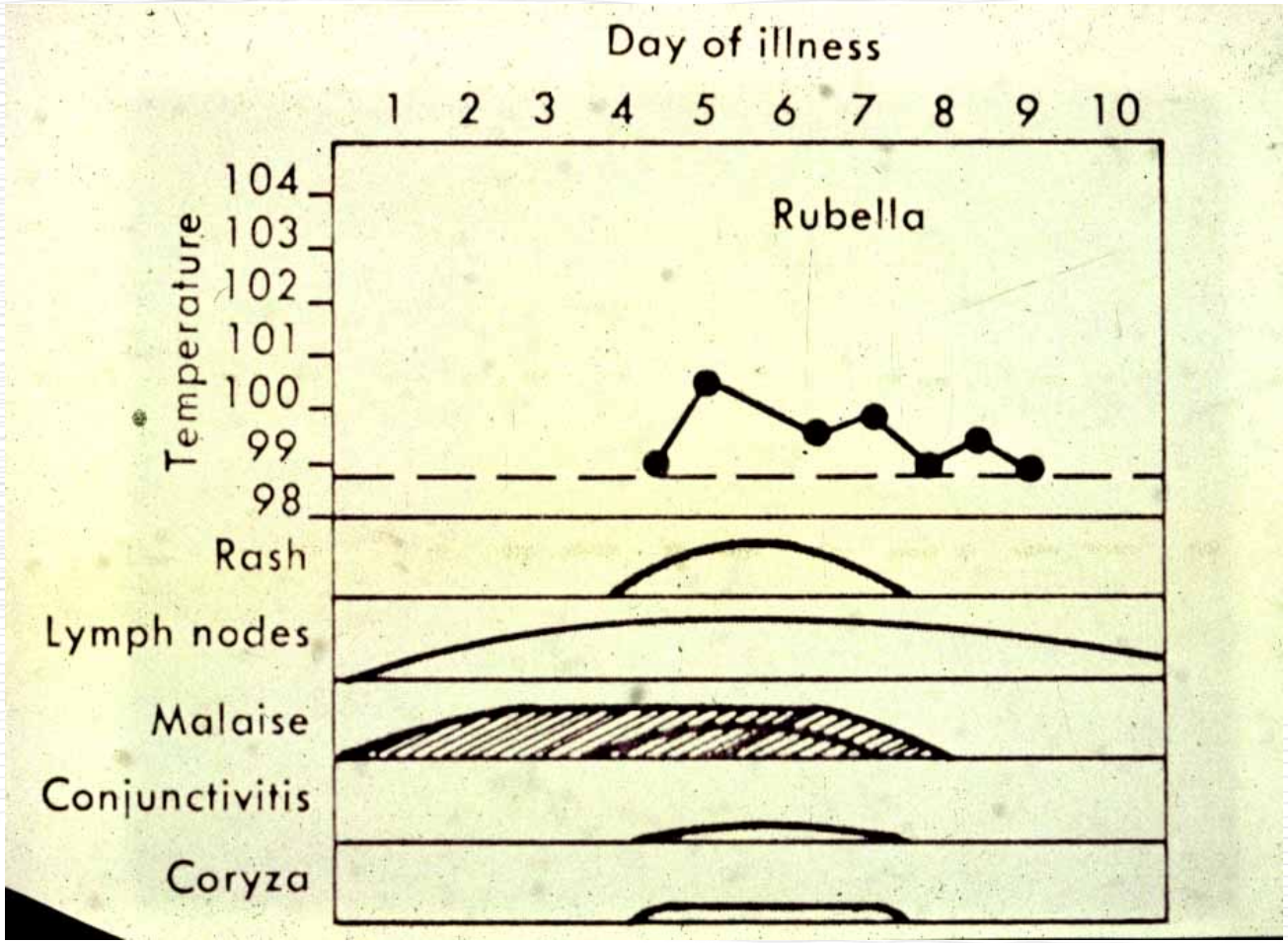
Comparison of clinical and epidemiological characteristics of **measles** and its differential diagnoses

Disease	Measles	Rubella [a]	Roseola (exhantema subitum)	Erythema infectiosum	Dengue	Chikunguna	Zika
Etiology	Paramyxoviridae, genus Morbillivirus	Togaviridae, genus Rubivirus	Betaherpesviridae, genus Roseolovirus (human herpes virus 6)	Parvoviridae, genus Erythrovirus (human parvovirus B19)	Flaviviridae, genus Flavivirus	Togaviridae, genus Alphavirus	Flaviviridae, genus Flavivirus
Incubation period (days)	7-21	12-23	5-15	4-20	3-14	4-7	2-7
Fever	Yes	Yes	Yes	Yes	Yes	Yes	May appear
Characteristics	High fever	Low grade fever or afebrile	Abrupt and high fever	Low grade fever or afebrile	Mild, occasionally biphasic	High fever	Low grade fever or afebrile
Rash	Si	Yes	Yes	Yes	Frequent	Frequent	Yes
Characteristics	Maculopapular	Maculopapular	Maculopapular	Macular/ Maculopapular	Maculopapular	Maculopapular	Maculopapular
Distribution	Cephalocaudal	Cephalocaudal	Thorax and abdomen	Cephalocaudal	Centrifugal	Cephalocaudal, intensely pruritic	Cephalocaudal, intensely pruritic
Cough	Frequent	No	No	No	No	No	No
Coryza	Frequent	May appear	Yes	Yes	No	No	No
Conjunctivitis	Frequent	May appear	No	No	May appear	May appear [b]	Yes
Arthralgia	No	Frequent	No	May appear (adults)	Frequent	Yes	Frequent
Lymphadenopathy	No	Frequent	May appear	May appear	No	May appear Postauricular	May appear Postauricular

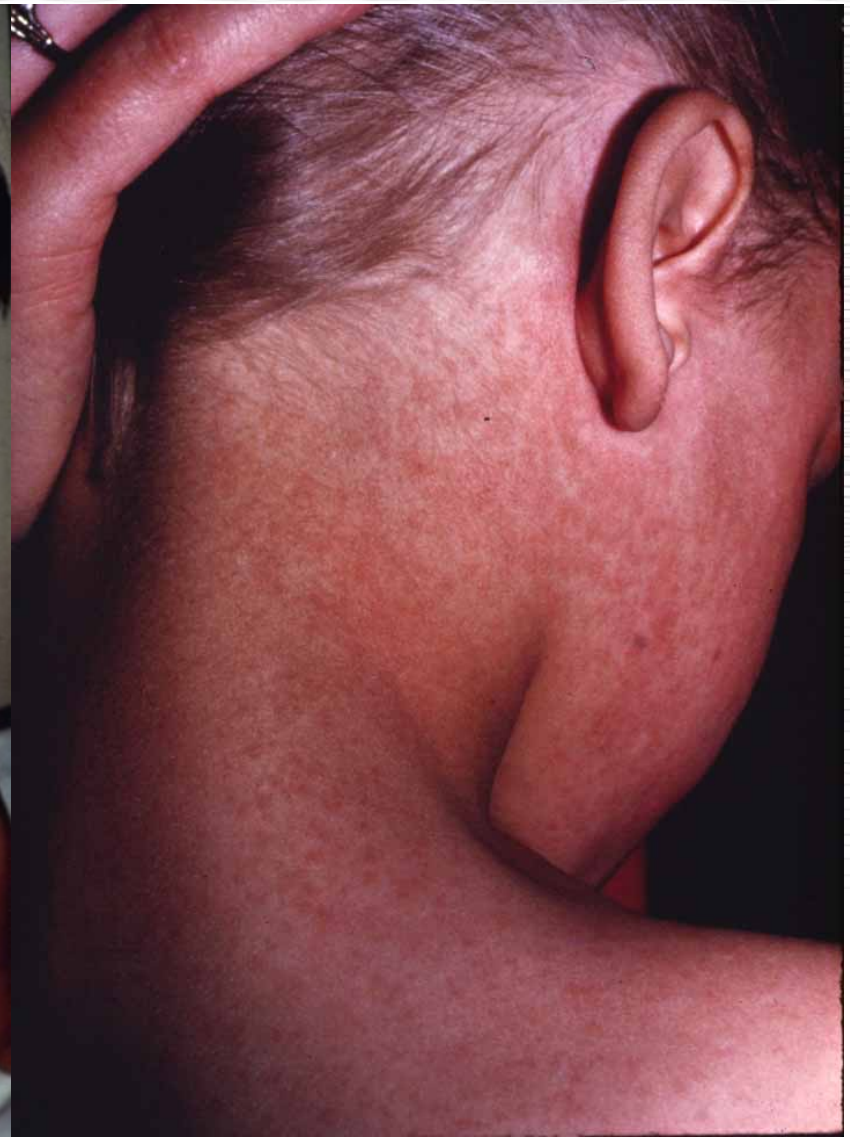
Source: https://www.campusvirtualsp.org/es/curso/brote-de-sarampion-en-la-era-post-eliminacion-estudio-de-caso-2022

Measles vs. Rubella





Rubella



- Posterior cervical adenopathy
- Rash is splotchy on first day, will become pinpoint as it moves down the body

Credit Col Marty Weisse MD WVU Medicine Children's Hospital

Erythema Infectiosum or fifth's disease

- Caused by Parvovirus B19
- Characterized by fever, rhinorrhoea, headache and rash **(slapped cheek)**

Dengue vs measles

- “Islands of white” in a sea of red

- Confluent erythema with lakes of normal skin

Zika virus vs measles

Zika

- Slight fever with cephalocaudal, itchy rash

Measles

- Intense and continuous fever, cephalocaudal , morbilliform rash preceding prodrome

Photo Credit Col Marty Weisse MD West Virginia University Medicine Children's Hospital

Treatment

- Supportive- Nutrition, fluids, prodromal symptoms
- Vitamin A- once daily. Two doses
- IVIG- within 6 days of exposure to immunocompromised, <6 months; nonimmune pregnant women
- Measles vaccine given within 72 hours of measles exposure to all vaccine-eligible unvaccinated or single-dose vaccinated individuals

Vitamin A

Administration of Vitamin A - reduces severity / lethality

- Give vitamin A (unless previously treated)

  < 6 months: 50,000 IU po

  6-11months: 100,000 IU po

  ≥12 months: 200,000 IU po

  - Once daily for 2 days
  - Children with clinical signs of vitamin A deficiency receive an age-specific dose in 2 weeks.

Source: http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/measles-rubeola

Take away messages

- Measles is highly contagious.
- Complications occur in 30% of infected person.
- Outcomes are worse among infants 6-11 months, malnourished; immunocompromised.
- **Dengue fever does not present respiratory symptoms, which are common in measles.**
- Consider secondary vaccine failure among symptomatic vaccinated persons with mild symptoms.
- Ensure prompt notification on clinical suspicion.
- Find and vaccinate every susceptible person, ensure fever rash surveillance and high-quality outbreak response

Thank you!

Webinar:
Measles reemergence: update on clinical, surveillance, and vaccination.
14th March 2024

Epidemiological surveillance field actions to improve system sensitivity

Gloria Rey-Benito
CIM | PAHO/WHO

Outline

1. Essentials of routine surveillance for measles
2. Risk assessment for measles
3. Active case finding

The Measles Virus

Taxonomy

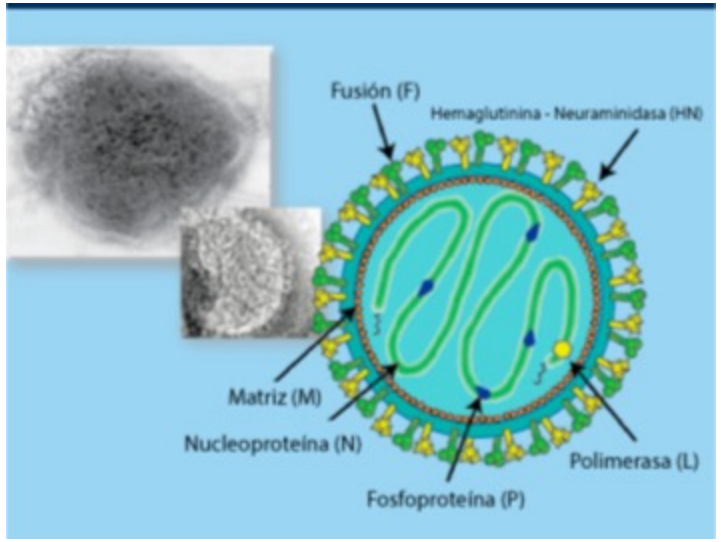


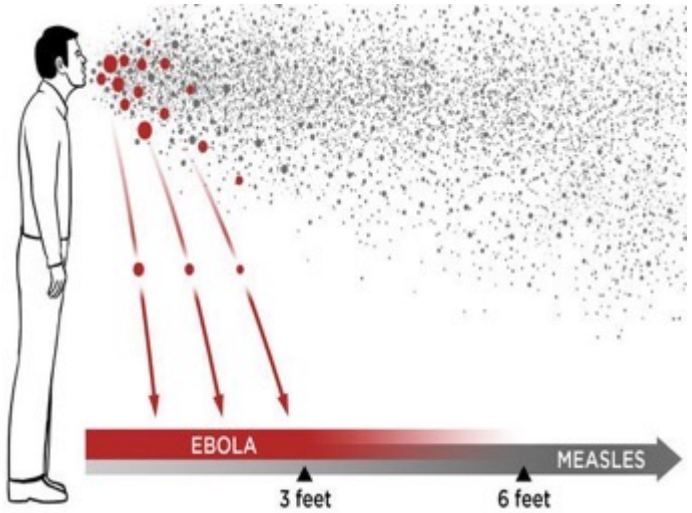
Imagen: https://www.tododiagnostico.com/enfermedades-infecciosas/vigilancia-epidemiologica-del-sarampion/

Genus: *Morbillivirus*

Family: *Paramyxoviridae*

RNA- single stranded virus, enveloped

Survival



The virus remains active in the air for up to 2 hours in a radius of 2-4 meters.

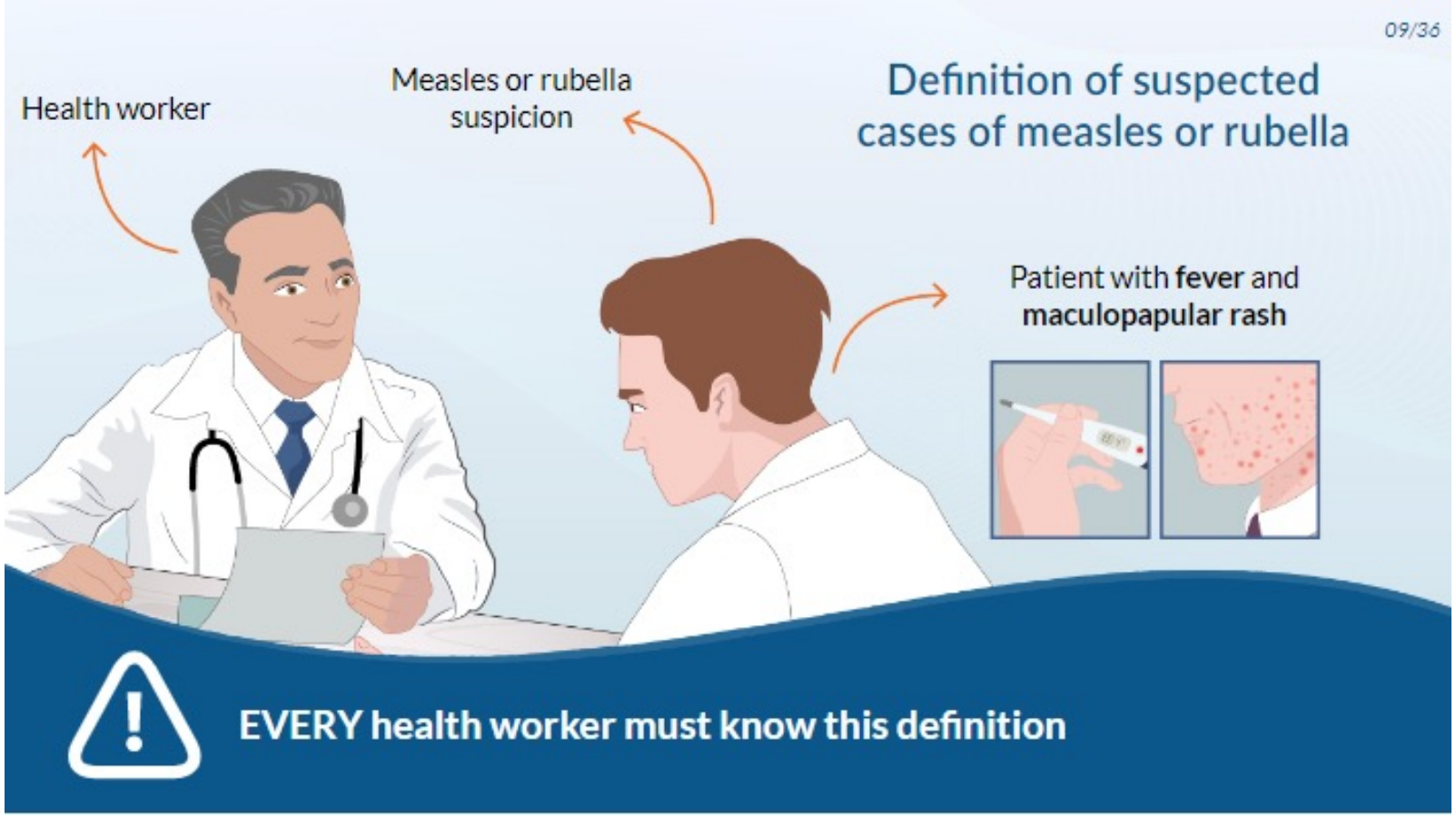
Transmissibility

Person-to-person transmission by respiratory droplets, when the infected person coughs or sneezes; or direct contact with infected secretions

Only one serotype with 24 genotypes: the measles containing vaccine is effective against all 24 genotypes.

PAHO

Suspected* case definition for measles and rubella



Presence of arboviral (dengue) outbreaks or other febrile and rash illnesses

Travel history

Contact with people that have traveled to countries with measles circulation

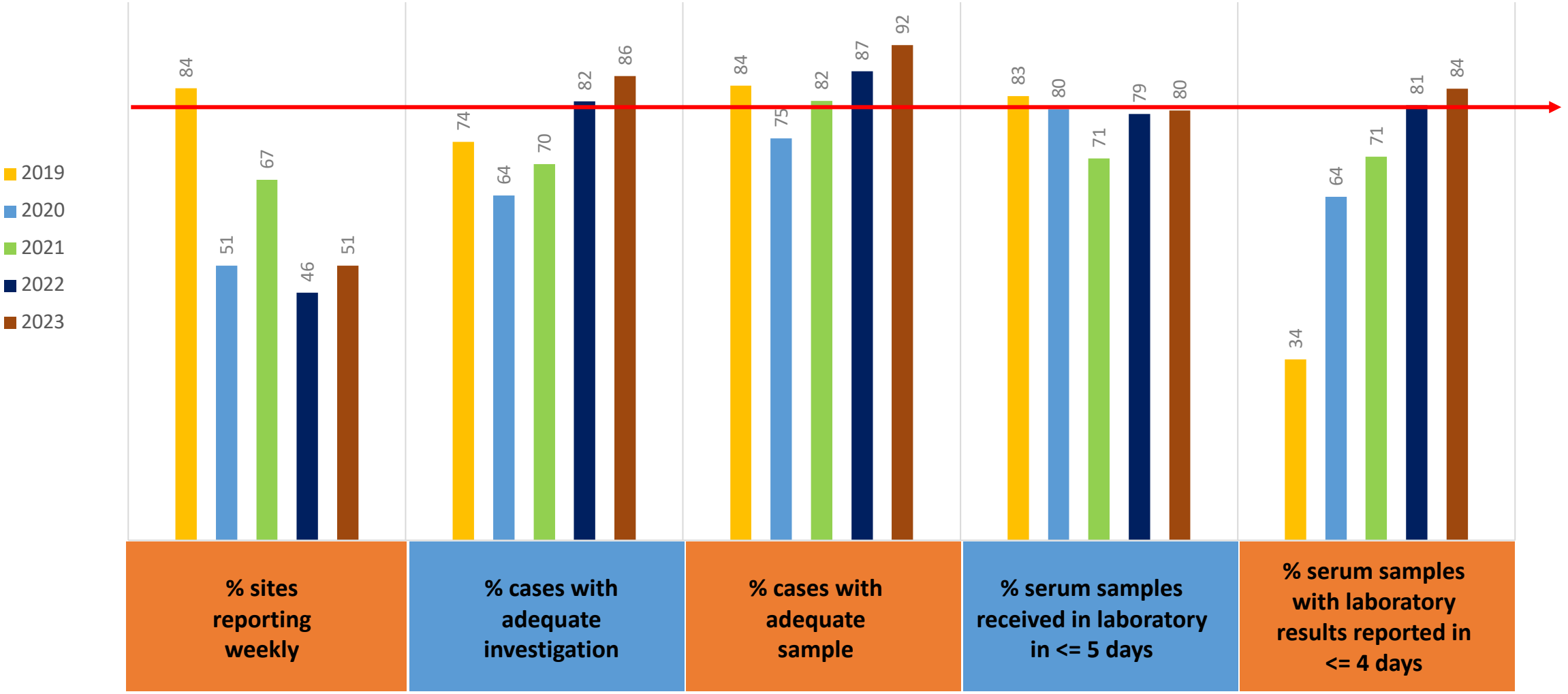
*Countries temporarily modifying their measles and rubella case definitions, such as during arbovirus outbreaks, should document their use (TAG recommendation, 2019).

Performance indicators for measles and rubella (MR) surveillance

Sensitivity of the system	Detection of **at least 2** suspected MR cases per 100,000 population
Adequate case investigation	≥80% of suspected cases adequately investigated during the first **48 hours** post notification and with completeness of **8 out of 11** core variables
Adequate serum sample collection	≥80% of cases with serum sample collection **within 30** days after onset of rash
Timely arrival of samples	≥80%of serum samples receiving at the laboratory in **<= 5 days** after collection
Timely laboratory results	≥80% of serum samples with laboratory results reported in **<= 4 days** following reception at testing laboratory

PAHO

Regional Performance of Measles-Rubella Surveillance Indicators Latin America and the Caribbean Countries, 2019-2023*

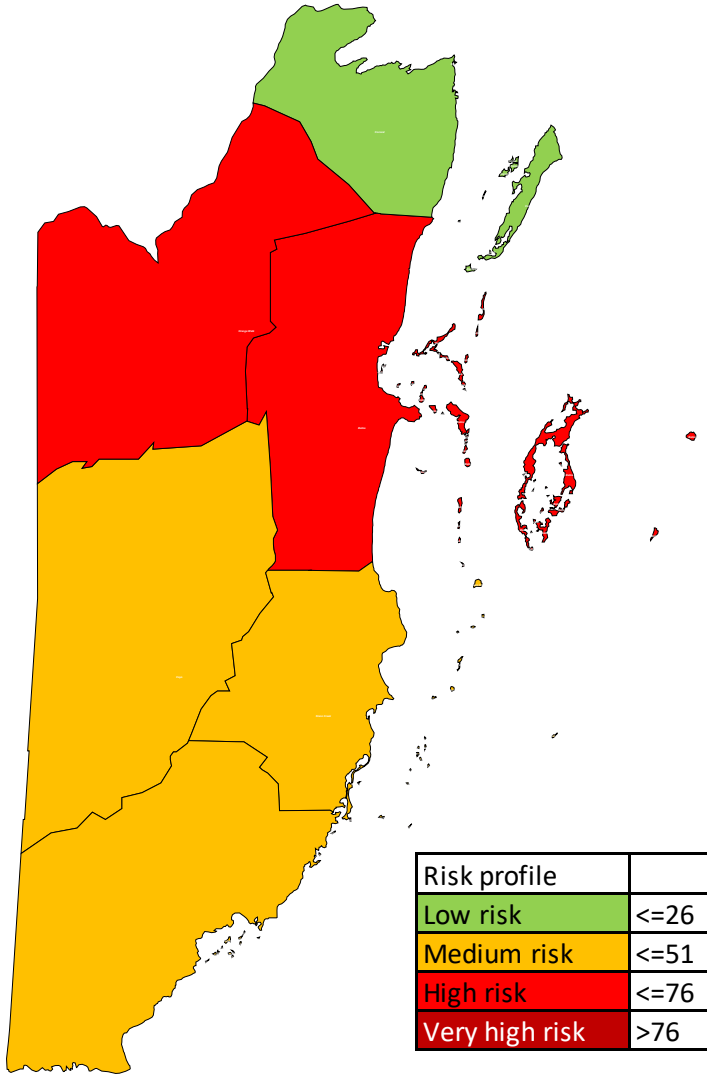


Source: ISIS, MESS and country reports | * Data as of epidemiological week 10 (ending 8 March 2024).

2. Risk Assessment for measles and rubella

The PAHO Risk Assessment Tool for Measles and Rubella

- Identify at-risk municipalities for MR, to **prioritize** the implementation of corrective measures in immunization and surveillance areas.
- Risk was assessed as the sum of indicator scores of 5 categories: population immunity, quality of surveillance, threat assessment and rapid response.
- Countries should conduct the risk assessment on annual basis, to develop a tailored plan aim to close the detected gaps in the prioritized municipalities.
- Ongoing monitoring and **field supervision** is strongly encouraged, to ensure the quality of the interventions.



Risk profile	
Low risk	<=26
Medium risk	<=51
High risk	<=76
Very high risk	>76

Outline

3. Active case finding

What is active search?

- The active search for cases of acute flaccid paralysis (AFP), measles and rubella (MR) is a surveillance strategy carried out in health services, laboratories, and communities.

- In this type of surveillance, the health team goes to the source of information to conduct an intentional **retrospective** search for cases that meet the definition of probable AFP and suspected MR cases, which were or were not notified to the routine surveillance system.

- This type of surveillance does not replace routine passive surveillance because it does not guarantee timely notification of cases.

The active search can be implemented by a multidisciplinary team at the national and subnational levels comprised by medical, epidemiological and nursing personnel.

PAHO

Types of active search

Institutional

Systematic review of medical records in public and private health services, corresponding to a given period.

Community

Search for cases in the community through interviews with parents or guardians, community leaders, and other social actors.

Laboratory

Search for biomarker of acute infection in serum specimens obtained for surveillance of dengue or other arboviral diseases. This type of search is performed for measles and rubella.

PAHO

How do I identify suspected MR cases?

During **institutional active search**, medical records should be selected with:

1. Description of signs and symptoms according to the **case definition** for the surveillance of these diseases.
2. **Differential clinical diagnoses** of the targeted disease (ICD-10 o ICD-11).

During **community active search**, cases are identified through interviews with the support of photographs, infographics, among others.

How are municipalities selected?

1. Prioritized areas according to the risk analysis for polio, measles, and rubella.

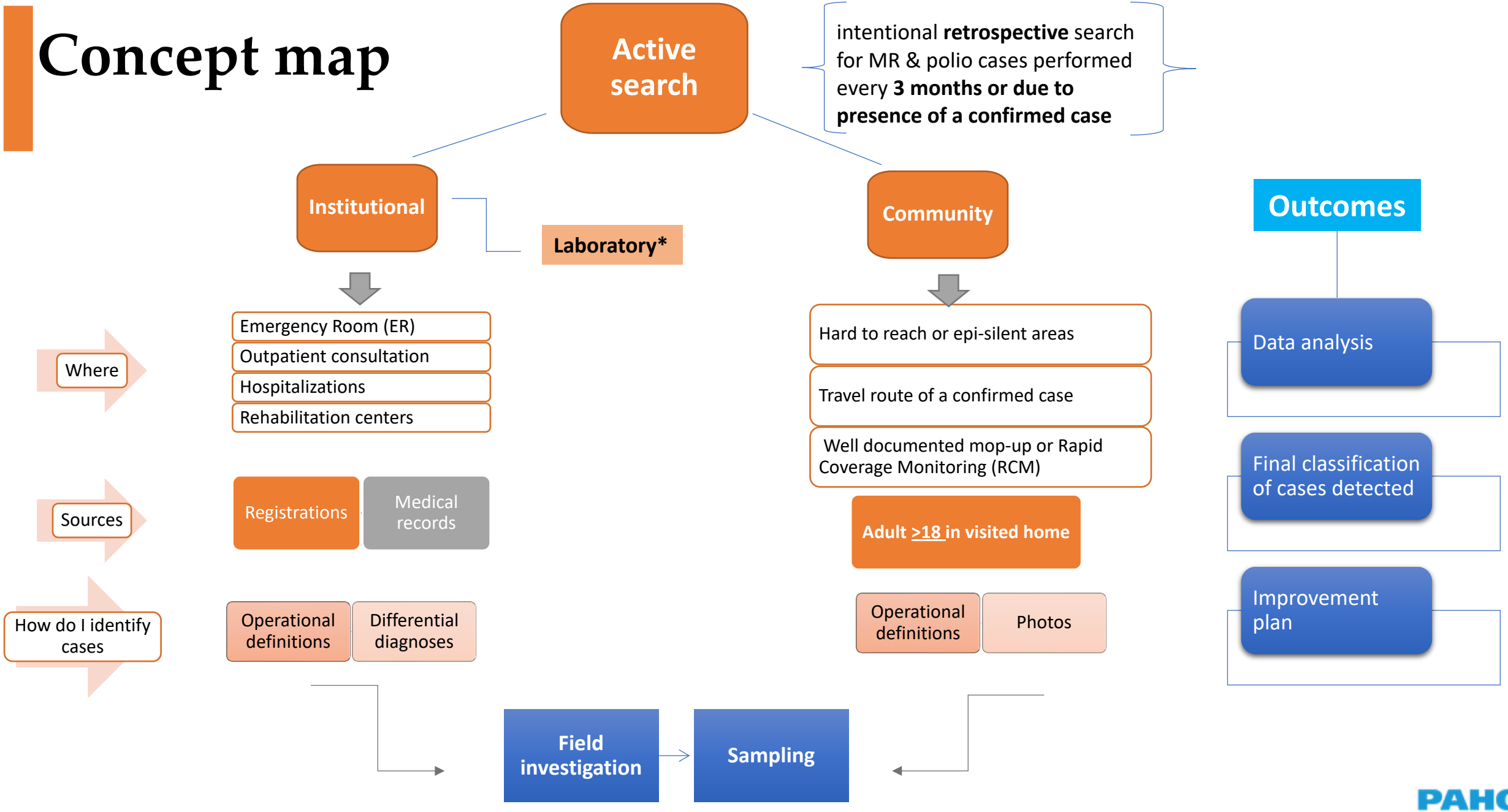
2. If the risk analysis could not be carried out, in municipalities with epidemiological silence or non-compliance with the MR and/or AFP notification rate

3. Places and localities where the confirmed case(s) was mobilized and displaced during the period of transmissibility of VPD.

For the **final selection of municipalities**, countries should consider the presence of one or more risk factors (e.g., high influx of tourists) **PLUS** logistical aspects: distance, transport, safety conditions, etc.

PAHO

Concept map



*For more information visit https://iris.paho.org/bitstream/handle/10665.2/34932/9789275119976_eng.pdf?sequence=13&isAllowed=y

Scenarios to conduct the laboratory active case search

In silent areas/municipalities

1. case presented fever and rash;
2. serum of a probable case of dengue or another arboviral disease;
3. serum was negative for dengue or another arboviral disease;
4. serum was obtained 30 days before IgM testing for MR

At the onset of an outbreak

1. case presented fever and rash;
2. serum of a probable case of dengue or another arboviral disease;
3. serum was negative for dengue or another arboviral disease;
4. **serum was obtained 30 days prior to onset of rash of index case**
5. **Samples were obtained in the same municipality where index case was confirmed.**

When closing an outbreak

1. case presented fever and rash;
2. serum was negative for dengue or another arboviral disease;
3. serum of a probable case of dengue or another arboviral disease**, from areas where MR cases were confirmed**
4. **serum was obtained within 12 weeks following the last confirmed MR case**

The sera selected for MR IgM testing, for any of the above-mentioned scenarios, should meet **ALL** the following criteria:

*Source https://www.paho.org/en/documents/guidance-testing-measles-and-rubella-laboratory-network-region-americas-2018

PAHO

Take away messages

01

Every **MR suspected case** must be notified and investigated, with collection of blood, respiratory, and urine samples for diagnosis.

02

Surveillance **monitoring** should be done continuously, thereby actions to improve surveillance indicators can be timely implemented.

03

In silent settings or with a low notification rates, **high-quality** active case search should be implemented every **3 months**.

04

Institutional active search should be done using the ICD-10 or ICD-11*. Laboratory active search should be done periodically during **dengue epidemics**.

*If the diagnosis is not found, the search should be made based on typical signs and symptoms of the disease.

PAHO
Pan American Health Organization
World Health Organization

Acknowledgements:

- Pamela Bravo

www.paho.org/immunization

Differential diagnoses of MR

Operational definition: Patient suspected by a health care worker of having measles or rubella, or presenting with fever and maculopapular rash.

Differential diagnoses	ICD-10	ICD-11
Measles	B05	1F03
Rubella	B06	1F02
Scarlet fever	A38	1B50
Dengue	A90	1D20
Mononucleosis	B27	1D81
Roseola or sudden exanthema (sixth disease)	B082	1F01
Erythema infectiosum (fifth disease)	B083	1F04
Enteroviral vesicular stomatitis with exanthema	B084	DA01
Specified viral infections, characterized by lesions of the skin and mucous membranes	B088	
Unspecified viral infection, characterized by lesions on the skin and mucous membranes.	B090	EA3Z: Human herpes virus infections affecting the skin or mucous membranes
Rashes and other skin eruptions	R21X	1F0Z: Viral infections characterized by cutaneous and mucosal lesions.
Sudden exanthema	B082	1F01
Unspecified dermatitis	L309	
Chickenpox	B01	1E90

PAHO

Example of a photo of a measles case*.

*Case detected during the 2000 outbreak.
Credit: Dr. José Moya, PAHO-Haiti.

Organización Panamericana de la Salud
Organización Mundial de la Salud
Américas

Actions in vaccination to increase the levels of population immunity

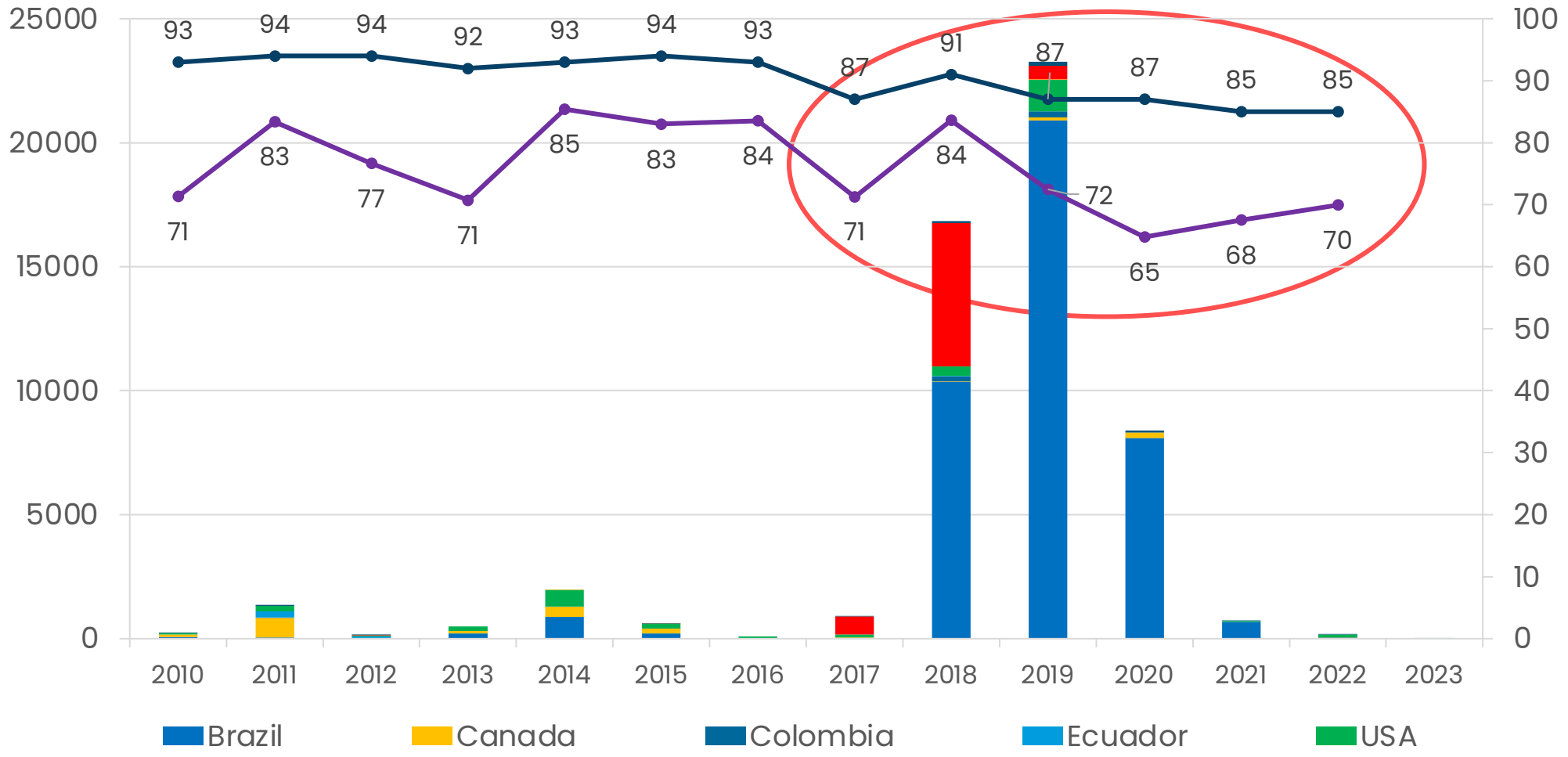
Desiree Pastor | Regina Durón

Pan American Health Organization
World Health Organization
Americas
PAHO

Outline

1. **Why timely vaccination is so important?**
2. **How many countries are at high risk to spread measles virus?**
3. **What do we need to do now?**

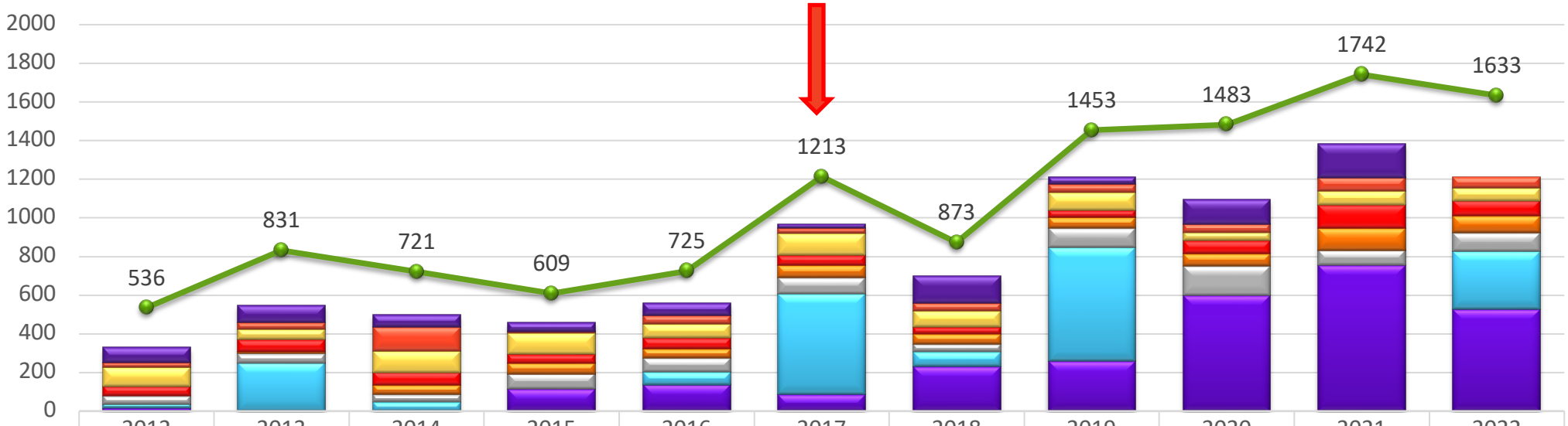
The measles virus will find every child unvaccinated as it did in the major outbreaks between 2017 and 2020!



Source: Country reports using the joint WHO/UNICEF electronic form.

PAHO

Number of children 1-year-old (x 1,000) that did not receive MMR first dose on time at one year of age. Latin American and Caribbean countries*, 2012-2022



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Venezuela	75	88	61	46	64	22	141	39	128	171	
Guatemala	26	34	124	10	43	25	41	40	42	71	57
Haiti	97	55	110	109	73	111	81	92	44	72	65
Colombia	49	61	68	45	55	51	35	38	67	121	81
Ecuador	0	12	49	55	48	65	56	55	64	114	86
Argentina	43	46	37	80	73	84	39	100	150	76	95
Mexico	23	251	48	0	66	523	75	588	0	0	300
Brazil	14	0	0	114	137	86	232	260	601	756	528
Regional	536	831	721	609	725	1213	873	1453	1483	1742	1633

Source: Country report on the WHO/UNICEF Joint Immunization Reporting Form (eJRF). *Haiti administers the first dose of MMR vaccine at 9 months of age.

Pan American Health Organization
World Health Organization
Americas
PAHO

The earlier we vaccinate children with two doses, the better protected they will be. The Americas, 2023

15

5 Countries

- Months
  - **Bahamas (15 M)**
  - **Brazil (15 M)**
  - **EL Salvador (15 M –18 M)**
  - **Haiti (12-23 M)**
  - **Uruguay (15 M)**

18 -35

25 Countries

- Months
  - **Antigua and Barbuda, Barbados, Belize, Bolivia, Canada, Colombia, Dominica, Dominican Republic, Ecuador, Grenada, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Vincent, Suriname , Trinidad and Tobago, Venezuela.**

≥ 36

5 Countries

- Months
  - **Argentina (Y5)**
  - **Costa Rica (Y4)**
  - **Chile (36 M)**
  - **Cuba (Y6)**
  - **United States (Y4)**

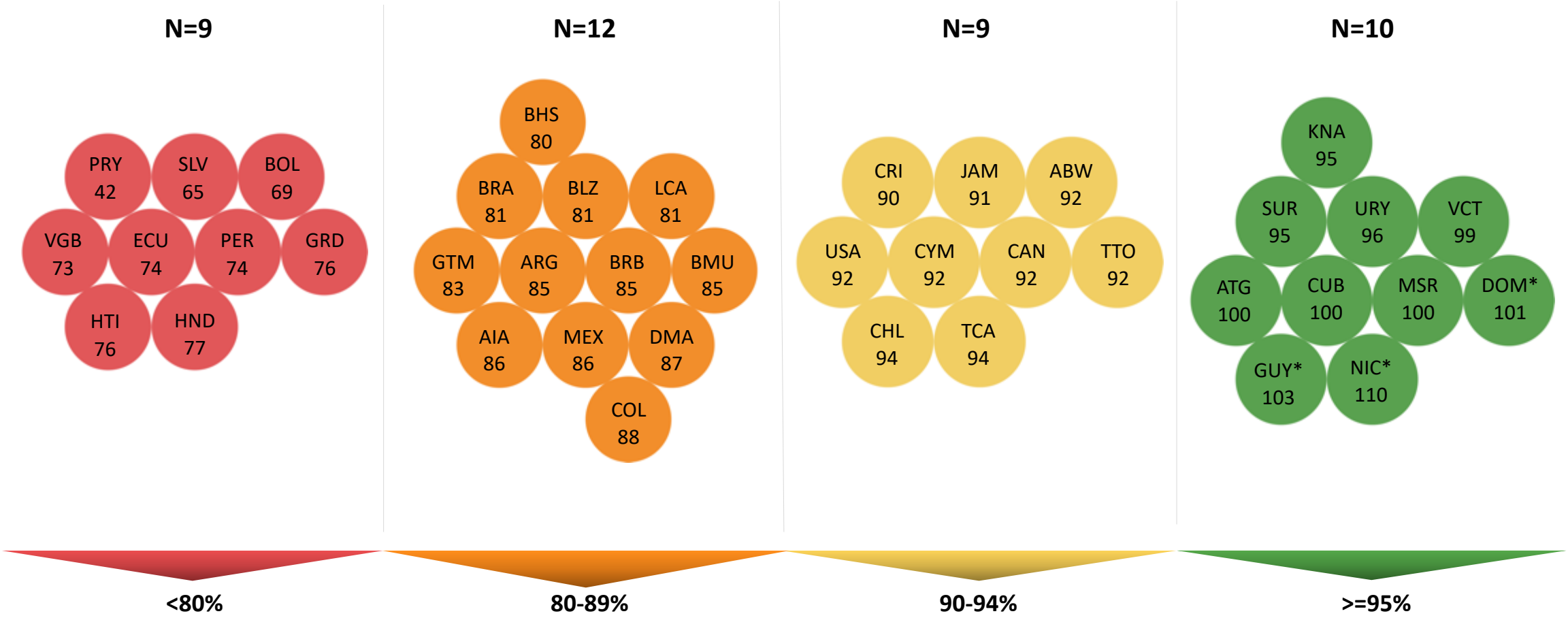
Source: Country reports through the PAHO-WHO/UNICEF Joint Reporting Forms (JRF)

Outline

How many countries are at high risk to spread measles virus?

One of the most important challenges is not having high vaccination coverage

MMR1 vaccination coverage, Region of the Americas, 2022

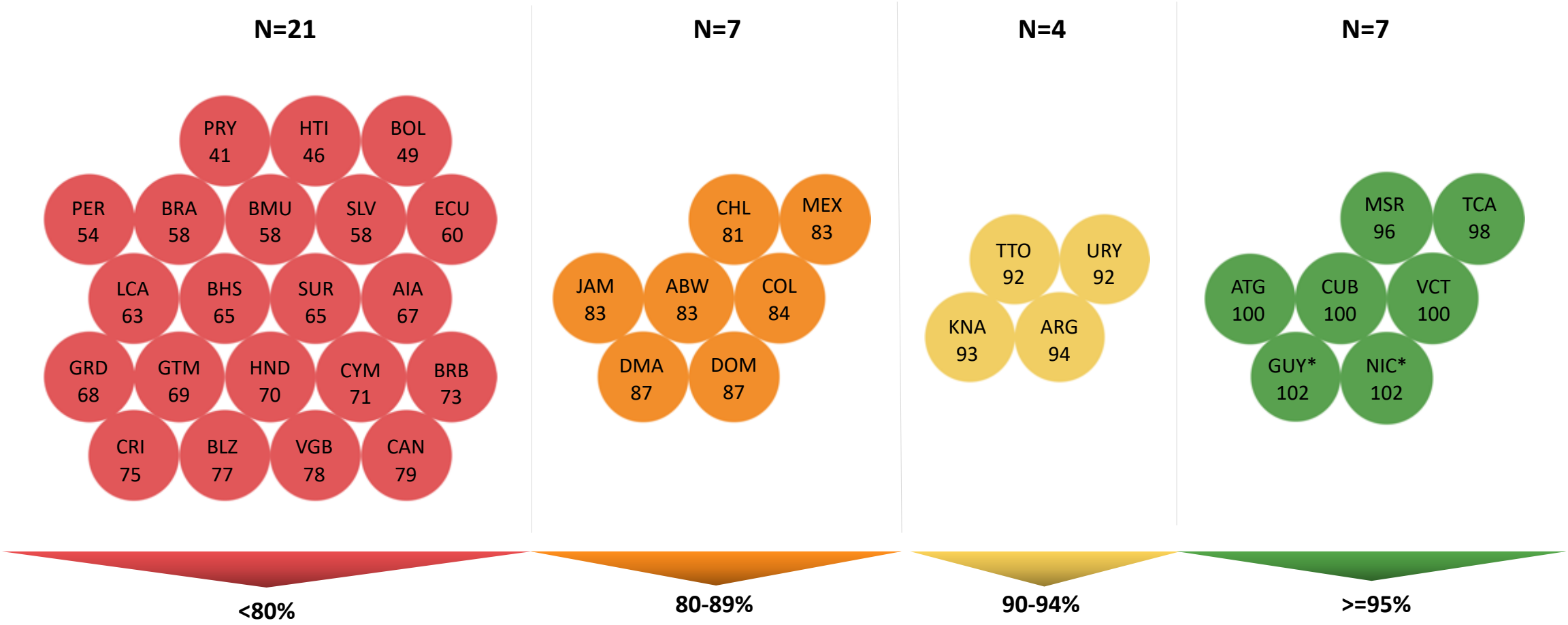


Source: WHO/UNICEF Joint Immunization Reporting (eJRF) e-Reporting Form, 2023.

MMR1- measles-rubella-mumps first dose

* Countries reporting coverage data >100%

And the situation is worst with MMR2 vaccine!
Region of the Americas, 2022

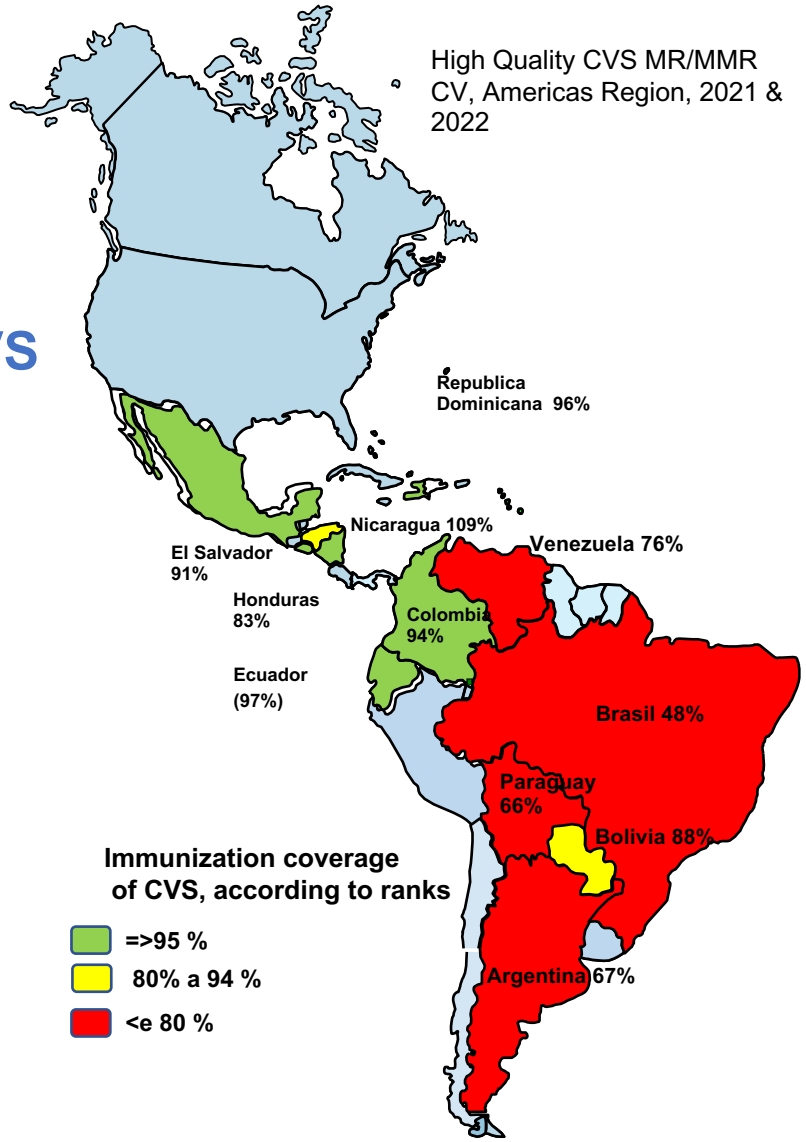


Source: WHO/UNICEF Joint Immunization Reporting (eJRF) e-Reporting Form, 2023.
MMR2- measles-rubella-mumps second dose
* Countries reporting coverage data >100%; USA not reported MMR2 data.

Results of Follow-Up Vaccination Campaigns against Measles Rubella: Population Immunity Gained in 20 Years!

- In the period 2003-2022, 27 countries conducted 62 CVS vaccinating 95,509,979 between 1 - 10yo

- **In 2021 and 2023, 11 countries vaccinated 36 million children, aged 1 - 10yo, with MR/MMR.**



Outline

What do we need to do now?

The minimum planning to ensure success in a high-quality campaign is 4-6 months!!!!!!

Months before CVS or high-quality intensification

PLANNING

Situational analysis
Lessons learned
Political decision
Technical Decision
Management Plan
Financial resources

- Background
- Objectives
- Age Groups
- Strategies
- Periods
- Phases
- Budget
- Organization
- Inventory

- Lineamentos Technicians (Components)
- Operating Manual
- Vaccinator's Guide
- Safe Vaccination Plan
- Communication plan

ORGANIZATION

Formation of National, Sub-national and Local Committees

TRAINING

National, Sub national and Local level

MICRO PLANNING

Terrain Reconnaissance & Adjustments

EXECUTION

- Vaccination Strategies & Tactics
- Intramuros – permanent fixed vaccination posts
- Extramural – fixed and mobile community posts, vaccination in schools, strategic sites and house-to-house
- Sweep
- MRV

EVALUATION WITH QUALITY CRITERIA

Final report – according to model structured according to OPS format

National, Sub national and Local level

Application and use of Micro Planning

¿For what?

Goals and targets according to the target population defined by the country

¿What to do?

Important activities according to the key components of the strategic orientation plan

¿How are we going to do it?

Intramural and extramural vaccination strategies and tactics

¿Where are we going to do it?

alities using vaccination tactics according to the characteristics of the population

¿Who's going to do it?

Responsible technicians, second level of activity

¿With what?

Type of resources, financial, human and material

¿When are we going to do it?

Time Required, Second Steps, Stages, Steps, and Products

¿What will be the results?

Evolution, according to the target population, objectives and scope of the indicators

Stage 1

Analysis of the local situation with geographical, socioeconomic and demographic characteristics, as well as those related to the health service, target population, installed capacity of human resources, materials, equipment and logistics for decision-making.

STEP 1
Data organization

It generates data that needs to be entered into the official information systems, organization, debugging, verifying inconsistencies and duplication.

Los datos estructurados permiten actualización y modificación, a nivel local, por barrio, distrito

Prioritization of socially determinant actions, analysis of susceptibilities

STEP 2
Information analysis

Identification of pockets of susceptible population,

Prioritization of localities according to risk and target population,

Compliance with indicators
Identification of strengths, weaknesses, opportunities, and threats and
Fulfillment of daily, weekly and monthly goals,

STEP 3
Mapping, sectorization and georeferencing

Delimitation and sectorization of neighborhoods and localities,

Availability and elaboration of maps and sketches by locality with population information, including:

geographical, demographic, socio-economic,
inhabited and uninhabited dwellings, and
Target Population by Age.

In this step, all actions are aimed at identifying the unvaccinated population, both in the routine program and in the quality CVS to define and execute vaccination actions such as vaccine screening, intensification or contingency plans implemented in the UBS, localities and municipalities that do not achieve homogeneous coverage ≥95% to capture the target population and achieve coverage according to the established goal.

Pan American Health Organization
World Health Organization
PAHO

Stage 2

The programming includes the definition of vaccination strategies and tactics at the intramural and extramural levels. The calculation of needs and the implementation and operationalization are known, as well as the components of training, monitoring and social mobilization and safe vaccination.

STEP 4
Defining Vaccination Tactics

Identification of vaccination tactics according to the intra- or extramural strategy;

Determination of the percentage of the population for each strategy and tactic to be used.

Modification in the micro-planning process at the local level,

Established geographic areas of responsibility for each team and day of high-quality CVS.

STEP 5
Requirements Calculation

Calculation of needs according to target population by simple age,

Type of vaccine in CVS syringes, supplies and cold chain.

Performance of the vaccination resource according to:
vaccination strategy and tactics adopted,
6-hour workday

Organization of vaccination teams.

STEP 6
Operationalization

Formulate weekly and daily work plan
High-quality CVS action plan.

Schedule of activities, assigning managers, resources and logistics determination of dates, places and educational institutions, vaccination tactics,

Target Population, Transport and Contact

Pan American Health Organization
World Health Organization
Americas
PAHO

Stage 3

The follow-up guides all the steps to measure progress in achieving the vaccination goals and epidemiological surveillance, compliance with the indicators of efficacy, homogeneity, timeliness and efficiency of the QALY, identification of the vaccinated and unvaccinated population, which will allow decision-making and timely implementation in real time.

STEP 7
Rapid Vaccination Monitoring

Identify the vaccination status of the target population, in an area, sector or neighborhood of the municipality,

Search for vaccinated and unvaccinated in the field, in a short period of time, that allows the identification of the unvaccinated population.

Results allow decision-making on the definition or redefinition of additional vaccination strategies,

Improves vaccination coverage, homogeneity, and consequently reduces the susceptible population.

STEP 8
Analysis of pockets of susceptible

Identification of the unvaccinated population, both in the routine program and in the high-quality CVS,

Intensification of contingency plans in the US, localities and municipalities that do not achieve homogeneous coverage ≥95%,

Capturing the unvaccinated target population and increasing the target

Stage 4

The evaluation process is carried out in three stages: Before: to verify the preparation phase of QALYs During: verifying compliance with the action plan, and the performance of vaccinators After: evaluating compliance with objectives and targets, indicators and identification of susceptible foci

STEP 9
Supervision

Oversight: a process of planning and evaluation of QALYs across all components,

Use of techniques and instruments to monitor efficiency, homogeneity, timeliness and efficienc.

Development of the validation of the performance of evacuation teams

STEP 10
Evaluation and quality control

Analysis of the proposed indicators, for their incorporation into the final report,

Identification of strengths, weaknesses, opportunities and threats,

Implementation of recommendations, lessons learned and good practices.

Compliance with indicators of effectiveness, homogeneity, timeliness, and efficiency, evaluating the activities carried out before, during, and after.

Thanks!!

- Health workers of the region
- Regina Duron, CIM
- Carilu Pacis, CIM
- Claudia Ortiz, CIM

www.paho.org/immunization

Pan American Health Organization
World Health Organization
Americas
PAHO

OTHER RECOMMENDATIONS for vaccination against measles and rubella

1. Travelers: prior departure, during the trip, and upon returning.

2. Clinicians and health care providers

3. Persons and institutions in contact with travelers, before and/or after trip

4. Contact tracing of confirmed measles cases

Epidemiological Alert - Measles in the Region of the Americas - 29 January 2024: https://www.paho.org/en/documents/epidemiological-alert-measles-region-americas-29-january-2024

PAHO

OTHER RECOMMENDATIONS for vaccination against measles and rubella

5. Identify the route of displacement of the case in the period of transmissibility for guiding vaccination activities

6. Implement *Rapid Vaccination Monitoring (MRV) in the area of residence where the case lives*

7. Conduct selective mop up *(if MRV was performed) or indiscriminate mop up (if MRV was not performed).*

8. Diseminate a national and international epidemiological alert (IHR) once a case is confirmed to prepare a strong vaccination interventions

Epidemiological Alert - Measles in the Region of the Americas - 29 January 2024: https://www.paho.org/en/documents/epidemiological-alert-measles-region-americas-29-january-2024

PAHO

OTHER RECOMMENDATIONS for vaccination against measles and rubella

9. Implement vaccination intensification to close immunity gaps in high-risk municipalities and immigrant transit populations

Epidemiological Alert - Measles in the Region of the Americas - 29 January 2024: https://www.paho.org/en/documents/epidemiological-alert-measles-region-americas-29-january-2024

PAHO
Pan American Health Organization
World Health Organization