

Given the challenges related to the persistence of low coverage of the first and second doses of the vaccine against measles, rubella, and mumps (MMR1 and MMR2), the increase in measles cases globally, and the occurrence of imported cases in countries in the Region of the Americas, the Pan American Health Organization / World Health Organization (PAHO/WHO) urges Member States to continue with activities to increase and maintain adequate vaccination coverage against measles, rubella, and mumps and reiterates that vaccination, epidemiological surveillance, and preparation of rapid response to measles and rubella outbreaks constitute the three major strategies to annually monitor and reverify the interruption of endemic transmission of these viruses.

Summary of the situation

Globally, after years of declining measles vaccination coverage, measles cases in 2022 increased by 18% and deaths increased by 43% worldwide (as compared to 2021). According to a new report by the World Health Organization (WHO) and the United States Centers for Disease Control and Prevention (CDC), the estimated number of measles cases is 9 million and the number of deaths stands at 136,000 (most of them children) (1).

According to the provisional monthly measles and rubella surveillance data, published by WHO until January 2024², in 2022, 369,195 suspected cases of measles were reported in 166 Member States of the 6 WHO Regions, of which 171,156 (46%) were classified as measles (includes laboratory-confirmed cases, clinical, or epidemiological criteria). In 2023, 534,672 suspected measles cases were reported in 169 Member States, of which 280,933 (53%) were classified as measles (2). This represents a 64% increase in confirmed cases in 2023 as compared to 2022.

On 8 February and 20 October 2023, the Pan American Health Organization / World Health Organization (PAHO/WHO) warned about the decrease in coverage of the first and second doses of the measles, rubella, and mumps vaccine (MMR1 and MMR2) and the occurrence of measles cases in countries in the Region of the Americas (3,4).

Immunization coverage in the Region of the Americas (5)

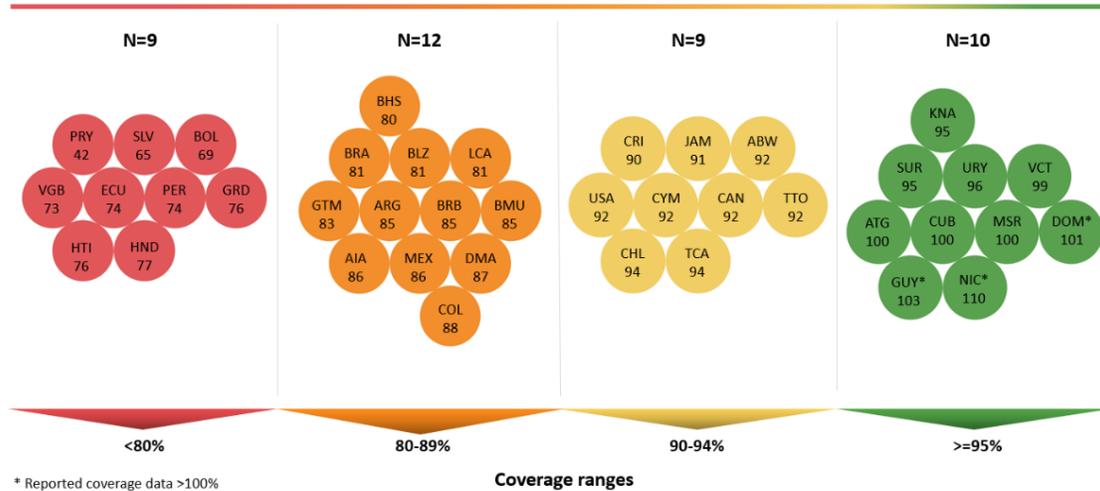
An analysis of the range of coverage for the MMR1 and MMR2 vaccines for 2022 in the countries of the Americas Region is presented below. Regarding the application of the first MMR1 dose, 25% (10/40) of the countries in the Region report a very high level of coverage (\geq to 95%), 22.5% (9/40) a high level of coverage (90-94%), 30% (12/40) a medium level (80-89%), and 22.5% (9/40) a low level of coverage (< 80%) (**Figure 1**).

¹ This corrigendum to the epidemiological alert originally published on 29 January 2024, includes a correction to align the country acronyms in Figure 1 and Figure 2 with the names indicated in the footnote of page 2.

² Provisional data based on monthly data reported to WHO (Geneva) up to January 2024.

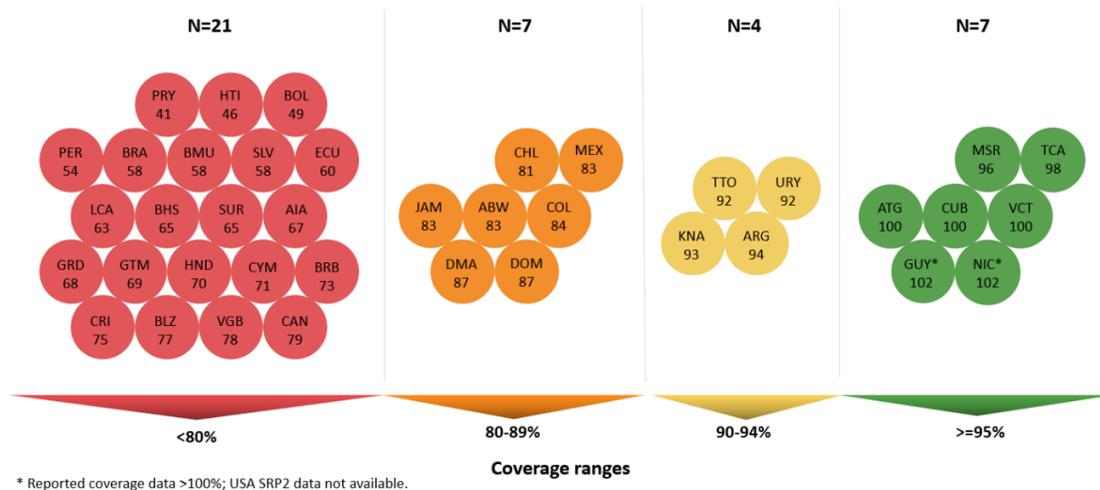
In relation to the application of the second MMR2 dose, only 17.5% of countries (7/40) report a very high level of coverage, while 53% of countries (21/40) report a low level of coverage (**Figure 2**). The overall average for the Region of the Americas is 85% coverage for MMR1 and 70% for MMR2.

Figure 1. Distribution of countries by range of coverage for the *first dose* of the MMR vaccine (MMR1), Region of the Americas, year 2022³.



Source: PAHO/WHO-UNICEF country report on the joint electronic reporting form on Immunization against MMR-measles-rubella-mumps, 2022. Available from: https://ais.paho.org/imm/IM_JRF_COVERAGE.asp

Figure 2. Distribution of countries by range of coverage for the *second dose* of the MMR vaccine (MMR2), Region of the Americas, year 2022.



Source: PAHO/WHO-UNICEF country report on the joint electronic reporting form on Immunization against MMR-measles-rubella-mumps, 2022. Available from: https://ais.paho.org/imm/IM_JRF_COVERAGE.asp

³ ARG: Argentina; ATG: Antigua and Barbuda; ABW: Aruba; AIA: Anguilla; BHS: Bahamas; BOL: Bolivia; BLZ: Belize; BRA: Brazil; BRB: Barbados; BMU: Bermuda; CAN: Canada; CHL: Chile; COL: Colombia; CRI: Costa Rica; CUB: Cuba; CYM: Cayman Islands; DMA: Dominica; DOM: Dominican Republic; ECU: Ecuador; GTM: Guatemala; GRD: Grenada; GUY: Guyana; HTI: Haiti; HND: Honduras; JAM: Jamaica; KNA: Saint Kitts and Nevis; LCA: Saint Lucia; MEX: Mexico; MSR: Montserrat; NIC: Nicaragua; PRY: Paraguay; PER: Peru; SLV: El Salvador; SUR: Suriname; TCA: Turks and Caicos Islands; TTO: Trinidad and Tobago; URY: Uruguay; USA: United States of America; VGB: British Virgin Islands; VCT: Saint Vincent and the Grenadines.

Epidemiological situation

In 2023, between epidemiological week (EW) 1 and EW 52, in the Region of the Americas, **14,884 suspected cases and 53 confirmed cases** of measles were reported (6). An update on the epidemiological situation of measles in countries that have reported confirmed cases in 2023 and up until 27 January 2024 is presented below.

In **Argentina**, on 19 January 2024, the National Ministry of Health confirmed a case of measles resident in the city of Salta. The patient is a 19-month-old boy who presented with fever, cough and conjunctivitis on 2 January, later progressing to a rash on 4 January. Twenty-four hours later, he consulted a private clinic and was admitted for pneumonia; pneumococcus was isolated from a respiratory sample. A serum sample was taken on 9 January and a positive IgM for measles was reported on 16 January by a private laboratory. This serum sample, together with the samples for viral detection, was referred to the National Reference Laboratory (ANLIS-Malbrán per its acronym in Spanish), confirming the infection by serology and detection of measles virus by RT-PCR in urine and nasopharyngeal aspirate on 19 January. The D8 genotype was detected, which is currently circulating in countries such as Germany, Austria, and the United Kingdom. The case has no history of vaccination with MMR and did not travel outside of the province. The child has a favorable clinical evolution. To date, no source of infection has been identified and no secondary cases have been detected (7,8).

In **Brazil**, on 25 January 2024, the Ministry of Health of Rio Grande do Sul reported through a press release an imported case of measles. The case corresponds to a 3-year-old boy from Pakistan, who entered the country on 26 December (in São Paulo) and arrived in Rio Grande do Sul on 27 December. On 2 January 2024, the case was brought to a clinic due to symptoms of abdominal pain and fever; he also developed a rash on 4 January. Serological tests at the Central Public Health Laboratory of Rio Grande do Sul (LACEN per its acronym in Portuguese) and molecular biology testing at the Fiocruz Reference Laboratory in Rio de Janeiro confirmed measles. Contacts are being monitored and no secondary suspected cases have been identified to date (9).

In **Canada**, from EW 1 to EW 52 of 2023, 12 cases of measles were laboratory-confirmed, of which 11 were classified as imported and 1 case of unknown origin (6). Genotypes B3 and D8 were identified in 7 and 5 of the confirmed cases, respectively. According to the Public Health Agency of Canada, as of 24 January 2024, no cases of measles have been reported in Canada in 2024 (10).

On 19 January 2024, the International Health Regulations (IHR) National Focal Point (NFP) of **Costa Rica** notified PAHO/WHO of the confirmation of a case of measles in San Josecito de San Rafael de Heredia. The case corresponds to a 53-year-old Costa Rican woman, residing in the canton of San Rafael, province of Heredia, with no recent history of international travel. The case was reported to the national surveillance system as dengue on 3 August 2023. As part of the active laboratory search, the serum sample from the case was processed and found to be IgM-positive and IgG-indeterminate for measles. A second serum sample was obtained on 16 November 2023 and processed in the laboratory with IgM-negative and IgG-positive for measles (936 mIU/mL). The samples were sent to the U.S. CDC, where preliminary serological results were confirmed. To date, no new associated cases have been detected.

Coverage of the 1st dose of MMR nationwide for 2023 was 92.16% and coverage of the 2nd dose of MMR was 84.25% (11, 12).

In **Chile**, between EW 1 and 52 in 2023, 95 suspected cases were reported, and 1 imported case of measles was laboratory-confirmed (6). On 12 August 2023, the NFP of Chile reported a probable case of measles corresponding to a 42-year-old man residing in the Metropolitan Region, with symptom onset on 7 August, and the appearance of a skin rash on 8 August; the case reported travel history to countries in the WHO European Region (Armenia and Georgia) between 16 and 26 July, returning to Chile on 26 July via Qatar and Brazil. The Institute of Public Health (IPH) of Chile identified the D8 genotype of measles virus in samples from the confirmed case. Subsequently, the case was confirmed by the Regional Ministerial Secretariat (SEREMI per its acronym in Spanish) through an official statement (13).

In the **United States of America**, the CDC reported through its website that from 1 January to 31 December 2023, 58 cases of measles were identified in 20 jurisdictions. Additionally, between 1 December 2023 and 25 January 2024, the U.S. CDC was notified of 26 confirmed cases of measles in the United States (17 cases in December 2023 and 9 cases in January 2024). The cases include seven direct importations of measles by international travelers; countries of travel included India, Indonesia, Kazakhstan, Pakistan, and Saudi Arabia. Two outbreaks with more than five cases each were reported. Twenty (77%) cases were among children and adolescents, and 25 (96%) were unvaccinated or had an unknown vaccination status. The B3 genotype of the measles virus was identified in 10 of the confirmed cases while the D8 genotype was identified in 12 of these cases. Up-to-date information on measles cases can be found on the U.S. CDC website (14).

The **Peru** IHR NFP reported a confirmed case of measles on 27 January 2024. The patient is a 21-year-old man with no history of measles vaccination. He traveled to Italy from 23 December 2023 to 7 January 2024 with two family members, visiting several cities and taking a cruise. Symptom onset began on 2 January including a runny nose, fever, and rashes. Upon his return to Lima on 11 January he sought medical attention and on 12 January a serological sample was obtained and tested in a private laboratory, with an IgM (+) result for measles on 18 January 2024. Two asymptomatic contacts were identified: his mother and sister. On 27 January 2024, the National Reference Laboratory issued two positive serology results for IgM measles in samples collected on 12 and 26 of January. The case was confirmed, and actions were initiated to identify contacts and block vaccination. The annual vaccination coverage in the country for the second dose of MMR2 between 2019 and 2022 was less than 95%, resulting in an accumulation of 888,455 children under 5 years of age who are susceptible to measles disease, reaching a risk index (RI) of 1.65 (15).

Guidance for Member States

PAHO/WHO recommends remaining alert to the potential appearance of suspected and/or confirmed cases of measles or rubella, which can be imported from other regions of the world and the occurrence of new outbreaks of varying magnitude in countries of the Region of the Americas. The following risk factors must be taken into account: 1) gaps in the performance of international indicators for integrated measles/rubella surveillance (6); 2) low vaccination coverage of the first and second doses of the measles, mumps, rubella vaccine (MMR1 and MMR2) in many countries and territories in the region; 3) active circulation of the virus in countries of other regions of the world; 4) the migratory flow of vulnerable populations within

the WHO Region of the Americas and from other WHO Regions; and 5) the occurrence of mass gathering events in the Region, where people from various parts of the continent and other continents congregate.

PAHO/WHO urges Member States to follow the recommendations of the Technical Advisory Group (TAG) on Vaccine-Preventable Diseases, available from: <https://www.paho.org/en/technical-advisory-group-vaccine-preventable-diseases> and follow the guidelines of the Regional Framework for follow-up and re-verification of the Elimination of Measles, Rubella, and Congenital Rubella Syndrome in the Region of the Americas, available from: <https://iris.paho.org/handle/10665.2/55074>

Among the guidelines and recommendations for countries with measles outbreaks, the following applies:

Vaccination

- Implement vaccination intensification activities to close immunity gaps in high-risk municipalities as soon as possible, mainly in those municipalities that are corridors of migrant population within each country.
- Vaccinate at-risk populations residing in areas where the measles virus is circulating who do not have proof of vaccination or immunity against measles and rubella.
- In health facilities where vaccination activities are carried out, it is essential that health professionals be alert for signs and symptoms of respiratory diseases and offer patients with flu-like symptoms a surgical mask and refer them for medical evaluation according to the local protocols for patients with suspected COVID-19.
- Maintain other infection prevention and control measures and respiratory hygiene practices in vaccination services.
- Although there are currently no known medical contraindications to vaccinating a person who has had contact with a COVID-19 case, it is recommended that vaccination be deferred until quarantine has been completed (14 days after last exposure).
- Maintain a stock of measles-rubella (MR) and/or measles, mumps, rubella (MMR) vaccine, and syringes/supplies for prevention and control actions in the event of imported cases.

Epidemiological surveillance

- Enhance epidemiological surveillance in high-risk areas and with epidemiological silence by implementing complementary surveillance measures in the field (for example, active searches).
- Strengthen epidemiological surveillance in border areas to quickly detect and respond to highly suspected measles cases.
- Map internal and external migration routes in each country, to strengthen epidemiological surveillance and strategic alliances with social actors involved in the health of migrants.

- Obtain serum samples, nasopharyngeal swabs, and urine samples (16) to perform serological tests for laboratory diagnosis and real-time RT-PCR molecular tests for confirmation of viral RNA and genomic sequencing to document the genotype associated with the infection.
- In an outbreak situation and if it is not possible to confirm the suspected cases by laboratory, use the confirmed case classifications by clinical criteria (presence of fever, maculopapular rash with at least one of the following symptoms and signs: cough, coryza, and conjunctivitis) and epidemiological link (direct contact with a laboratory-confirmed case), so as not to delay the implementation of response actions.
- Continue routine surveillance for other vaccine-preventable diseases (VPDs). Maintain supplies for the proper collection and transport of samples. If the laboratory does not have laboratory diagnostic capacity for the specific event, the samples must be sent to the reference laboratory to carry out the analyses that allow for the confirmation or discarding of the event, at the appropriate time and in accordance with what is defined in surveillance program. Countries must ensure the proper storage, preservation, and transport of samples in accordance with international recommendations for the transport of infectious substances (17).

Rapid Response

- Provide a rapid response to imported measles cases to prevent the reestablishment of endemic transmission through the activation of rapid response teams trained for this purpose and by implementing national rapid response protocols. Once the rapid response team is activated, coordination must be ensured between the national, subnational, and local levels, with continuous and fluid communication channels between all levels.
- In an outbreak situation, adequate intra-hospital case management must be established to avoid nosocomial transmission, with an adequate referral flow of patients to isolation rooms (at any level of care) avoiding contact with other patients in waiting rooms, and/or hospitalization rooms for patients hospitalized for other causes.
- Members of rapid response teams or health personnel linked to the response to outbreaks of measles and rubella or vaccine-preventable diseases must be adequately trained. To this end, PAHO has developed two virtual courses on the response of measles outbreaks, to transfer updated knowledge on this topic (18,19).

International travelers

A series of guidance that health authorities can provide to international travelers is presented below. In addition, included is a series of considerations in relation to health personnel, individuals, and institutions that are in contact with travelers before and after the trip.

1. Travelers

Prior to departure

PAHO/WHO recommends to all Member States that all travelers over the age of six months⁴ who are unable to show proof of vaccination or immunity, **to be fully vaccinated against measles and rubella**, preferably with the MMR vaccine, **at least two weeks before traveling to areas with documented measles virus circulation**. PAHO/WHO's recommendations regarding advice for travelers are available in the Epidemiological Alert published by PAHO/WHO on 27 October 2017 (20).

- Infants who receive the MMR vaccine before their first birthday must be revaccinated according to their country's vaccination schedule. Infants under the age of six months should not be vaccinated.
- Travelers who are not immunized are at higher risk of contracting either disease when in close contact with travelers from countries where the viruses still circulate.
- Exceptions to this recommendation include persons with medical contraindications to the measles and rubella vaccine.
- Persons considered immune to measles and rubella, are those who can present:
 - Laboratory confirmation of rubella and measles immunity (a positive serological test for the measles and rubella-specific IgG antibodies).
 - Written documentation of having received two doses of measles and rubella vaccine.

It is recommended that health authorities inform travelers prior to their departure of measles signs and symptoms, including:

- Fever,
- Rash,
- Cough, coryza (runny nose), or conjunctivitis (red eyes),
- Joint pain,
- Lymphadenopathy (swollen glands)

During the trip

- Travelers should be recommended that if they suspect to have measles or rubella, they should:
 - Seek care immediately from a health care professional.
 - Avoid close contact with other people for seven days following onset of rash.
 - Remain at the site of their current residence (e.g., hotel or home, etc.) except to seek professional health care, or as advised by a health professional.
 - Avoid travel and visit to public places.

⁴ The dose of MMR or MR vaccine administered in children 6 to 11 months of age does not replace the first dose of the recommended schedule at 12 months of age.

Upon returning

- If travelers suspect they have measles or rubella, they should seek immediately professional health care.
- If travelers develop any of the above-mentioned symptoms, they should inform their physician of their travel history.

2. Clinicians and health care providers

PAHO/WHO recommends to:

- Promote the practice of requesting proof of immunity/vaccination to measles and rubella in the health care sector (medical, administrative and security personnel)
- Since international travelers may seek medical attention at private health care facilities, sensitize private sector health workers on the need for immediate notification of any measles or rubella cases in order to ensure a timely response by national public health authorities.
- Continue to remind health care workers to always ask patients for their travel history.

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

- Advise personnel in the tourism and transportation sectors (i.e., hotels, airport, taxis, and other) to be fully immunized against measles and rubella and make the necessary regulatory and operational arrangements to promote vaccination.
- Conduct public awareness campaigns on the symptoms of measles and rubella, so that all travelers can recognize the symptoms and seek immediate medical care if need be. Information should be distributed at airports, ports, bus stations, travel agencies, airlines, etc.

4. Contact tracing of confirmed measles cases

- Conduct contact tracing activities according to national guidelines for contacts identified and present in the **national territory**, in accordance with the country's guidelines.
- Consider the **international implications** that **contact tracing** may present and consider the following scenarios and operational aspects while conducting these activities:
 - a. A case is identified by national authorities in a third party and national authorities are requested to locate contacts whose residence is most likely within their country. National authorities are urged to use all available coordination mechanisms to locate these persons. The information available for this action could be limited and efforts should be rational and based on existing resources. Health services should be alerted of the possible or actual presence of contacts in order to detect suspected cases.
 - b. A case is identified locally, and depending on the timing of the natural history of the diseases at detection:

- Current case: national authorities should obtain information about the possible location of contacts abroad and inform the relevant national authorities accordingly.
 - Retrospectively identified case: According to the travel history of the case, national authorities should inform relevant national authorities as this occurrence might constitute the first signal of measles virus circulation, or of an outbreak, in the other country or countries concerned.
- c. Conduct active institutional and community searches to quickly identify cases among those contacts that have not been identified during the outbreak investigation, following the route of the case(s).

Operational remarks

- If no international conveyances are involved (e.g., aircrafts, cruise ships, trains) as a possible setting for exposure to a case(s), national authorities should contact their counterpart(s) of other countries through the IHR NFP network or other bilateral or multilateral programmatic mechanisms, with copy to the WHO IHR Contact Point for the Americas (ihr@paho.org). The assistance of the WHO IHR Contact Point for the Americas can be requested to facilitate international contact tracing related communications.
- If international conveyances are involved (e.g., aircrafts, cruise ships, trains) as a possible setting for exposure to a case(s), national port authorities or whoever may be acting for the latter should activate existing mechanisms to obtain relevant information from carriers (e.g., airlines) to locate travelers, or establish such mechanisms if absent. For subsequent communication between national authorities see the preceding paragraph.

Channels to disseminate these recommendations

PAHO/WHO recommends that national authorities consider disseminating these recommendations outlined in this document through:

- Public awareness campaigns to promote and enhance travelers' health seeking behavior on the benefits of vaccination for measles, signs and symptoms of measles, and to promote and enhance travelers' health seeking behavior prior to travel and upon return. In addition to travel medicine services or clinics, airports, ports, bus and train stations, airlines operating in the country, should be utilized.
- Travel agencies and other tourism related agencies, and diplomatic corps, must also know and disseminate the necessary recommendations so that travelers can take necessary actions prior to travel.
- Reiteration of the content of existing national surveillance guidelines to clinicians and health care providers and timely dissemination of any newly developed procedure in relation to travelers as/if applicable.

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