



**ASEAN  
BIOLOGICAL THREATS  
SURVEILLANCE CENTRE**

**MEASLES**  
In the ASEAN Region  
FOCUS REPORT

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### PUBLISHER

ASEAN BIOLOGICAL THREATS SURVEILLANCE CENTRE

### EDITORIAL ADDRESS

ASEAN BIOLOGICAL THREATS SURVEILLANCE CENTRE  
Health Policy Agency  
Ministry of Health of Indonesia,  
Building 6- Center of Global Health Strategy and  
Governance Policy, 2nd floor  
Percetakan Negara No. 29 Johar Baru, Jakarta  
Pusat, Indonesia 10560  
E-mail: [support@aseanbiosurveillance.org](mailto:support@aseanbiosurveillance.org)  
E-mail: [data@aseanbiosurveillance.org](mailto:data@aseanbiosurveillance.org)

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## Acronyms and Abbreviations

AEFI	:	Adverse Events Following Immunization	MR SIA	:	Measles And Rubella Supplementary Immunization Activity
AFR	:	Africa	MRCV2	:	Measles-rubella-containing Vaccines Second Dose
AMR	:	America	MV	:	Measles Virus
ASEAN	:	Association Of Southeast Asian Nations	MYNAPHS	:	Malaysia National Action Plan for Health Security
AVSSR	:	ASEAN Vaccine Security and Self-reliance	NIP	:	National Immunization Program
CDC	:	Centers For Disease Control and Prevention	NIS	:	National Immunization Strategy
DBS	:	Dried Blood Spots	OF	:	Oral Fluid
ECDC	:	European Centre for Disease Prevention and Control	ORI	:	Outbreak Response Immunisation
EIA	:	Enzyme Immunoassay	RT-PCR	:	Reverse Transcription Polymerase Chain Reaction
EMR	:	Eastern Mediterranean	SEAR	:	South-east Asia
EPI	:	Expanded Programme on Immunization	SEARO	:	South-east Asia Regional Office
EUR	:	Europe	SIA	:	Supplementary Immunisation Activities
IgM	:	Immunoglobulin M	SSPE	:	Subacute Sclerosing Panencephalitis
MCV1	:	Measles-containing Vaccine Dose 1	UNICEF	:	United Nations Children's Fund
MCV2	:	Measles-containing Vaccine Dose 2	WHO	:	World Health Organization
MMR	:	Measles, Mumps, And Rubella Vaccine	WPR	:	Western Pacific
MMR1	:	Measles, Mumps, and Rubella Vaccine Dose 1	WPRO	:	Western Pacific Regional Office

# MEASLES

## Introduction & Methods



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## Introduction

Measles is a highly infectious viral disease transmitted through respiratory droplets released when an infected individual breathes, coughs, or sneezes. The infection can cause severe complications and, in some cases, death, with children representing the most frequently affected population. Immunization remains the most effective intervention to prevent infection and interrupt transmission. Prior to the introduction of the measles vaccine in 1963 and the subsequent expansion of immunization programs, recurrent epidemics occurred every two to three years, resulting in an estimated 2.6 million deaths annually (WHO, 2025a).

Despite the availability of safe and effective vaccines, measles outbreaks persist globally, largely due to gaps in immunization coverage, population movement, and health system disruptions (WHO, 2025a). Within ASEAN, the epidemiological situation reflects both progress and ongoing challenges. Several

member states report sporadic clusters or localized outbreaks, often linked to communities with low vaccination uptake or delayed routine immunization. Regional surveillance data highlight the importance of sustained monitoring to detect early signals of transmission and guide rapid response.

In line with global commitments, ASEAN member states (AMS) have joined efforts to achieve elimination by 2026, as outlined in the Regional Vaccine Implementation Plan 2022–2026 (WHO, 2025a). This focus report provides a comprehensive overview of measles, including its transmission dynamics, clinical features, and current epidemiological trends, while examining the regional situation within ASEAN. It highlights the collective strategies employed to control the disease, underscoring the critical role of prevention and preparedness in reducing the burden of communicable diseases across vulnerable populations.

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## Methods

This report undertakes a comprehensive review of the literature to examine the global landscape of measles, with particular emphasis on the ASEAN region. Data were sourced from established databases such as PubMed, Embase, and Scopus, alongside official reports and publications from the World Health Organization (WHO) and AMS.

Information on disease incidence, diagnostic criteria, preventive measures, and policy strategies was also collated from relevant reports and news sources. Through this integrated approach, the report provides an in-depth analysis of current trends, patterns, and challenges in measles management within ASEAN.

# *Case Definition and Clinical Features*



## Case Definition

A case definition is a standardized set of criteria used to determine whether an individual should be classified as having a particular disease or health condition. In public health surveillance, establishing a clear and uniform case definition is essential to ensure that cases are identified, classified, and reported consistently across different locations, time periods, and investigators. Both the WHO and the Centers for Disease Control and Prevention (CDC) emphasize that standardized case definitions are critical for reliable disease monitoring, meaningful comparison of data, and effective outbreak investigation and response (CDC, 2012; WHO, 2018).

In measles surveillance, case definitions are applied extensively to support standardized reporting and systematic

case classification. These definitions enable early outbreak detection, facilitate aggregation and analysis of surveillance data, and allow comparison of epidemiological trends across geographic regions and over time. The WHO Measles Outbreak Guide (2022) specifies that suspected measles cases should be assessed using a combination of clinical, epidemiological, and laboratory criteria to determine final case classification (WHO, 2022). This structured approach supports accurate case identification, timely confirmation or exclusion of suspected cases, and coordinated public health action during both outbreaks and routine surveillance activities. The measles case definitions and final classification categories used for surveillance are presented in Table 1 (WHO, 2018).

**Table 1. Measles case definitions and final classification**

Case Definition	Description
<b>Case Finding</b>	
Suspected measles case	A person with fever and maculopapular (non-vesicular) rash, or a person in whom a health-care worker suspects measles.
<b>Final Classification</b>	
Laboratory-confirmed measles	A suspected case confirmed positive by laboratory testing in a proficient laboratory, with vaccine-associated illness ruled out.
Epidemiologically linked measles	A suspected case not laboratory-confirmed, but geographically and temporally linked to a laboratory-confirmed or epidemiologically linked measles case, with rash onset 7–23 days apart.
Clinically compatible measles	A suspected case with fever and maculopapular rash and at least one of cough, coryza, or conjunctivitis, with no adequate specimen and no epidemiological link to a confirmed measles case.
Discarded (non-measles) case	A suspected case excluded as measles when a) laboratory testing is negative, b) another infection is confirmed, c) epidemiological linkage is to a non-measles outbreak, or d) clinical criteria are not met.

The WHO defines a measles outbreak based on numerical and epidemiological criteria rather than relying solely on case counts. An outbreak is identified when

there are at least five confirmed cases of measles with dates of rash onset occurring 7–21 days apart that are epidemiologically linked.

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## Transmission

The measles virus is a single-stranded, enveloped, negative-sense RNA virus classified within the genus *Morbillivirus* of the family *Paramyxoviridae* (WHO, 2017a). In infected individuals, the virus is present in the mucus of the nasal passages and

throat and is primarily transmitted through direct contact with respiratory secretions generated by coughing and sneezing, as well as through inhalation of airborne particles.

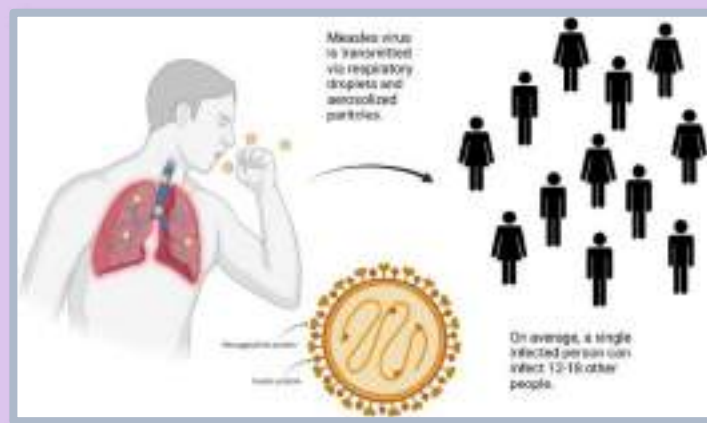


Figure 1. Transmission and Reproductive number (R0) of measles virus. Transmission is via the respiratory route, through respiratory droplets and aerosols

(Source: <https://www.sciencedirect.com/science/article/abs/pii/S0891552021000994?via%3Dihub>)

Measles is one of the most contagious diseases affecting humans and demonstrates pronounced seasonal patterns in endemic settings. In tropical regions, transmission tends to increase during the dry season, whereas in temperate regions incidence typically peaks in late winter and early spring (WHO, 2023a). These seasonal trends reflect variations in population contact patterns and environmental conditions that facilitate airborne spread.

The virus can remain viable and infectious in the air or on contaminated surfaces for up to two hours, which substantially enhances its transmission potential. Infection may occur through inhalation of contaminated air or via contact with infectious surfaces followed by touching the eyes, nose, or mouth (CDC, 2024). An infected individual can transmit the virus to approximately 90% of susceptible, unvaccinated close contacts and is considered contagious from four days prior to four days following the onset of

rash (WHO, 2025a). The presence of the measles virus RNA can be detected in both blood and urine for an extended period, with the RNA persisting for a duration of several months. In rare but well-documented cases, single individuals have been identified as the source of transmission to more than 200 secondary cases, highlighting the potential for measles “superspreading” events (Misin et al., 2020).

Figure 2 shows the schematic representation of the course of measles virus (MV) infection (Laksono, et al, 2020). The green bell-shaped curve in the upper

panel indicates changes in viral load over time. MV enters the host through the upper (a) or lower (b) respiratory tract by infecting CD150-expressing cells or by binding to DC-SIGN-positive dendritic cells and alveolar macrophages. These infected cells migrate to bronchus-associated lymphoid tissue (c) or draining lymph nodes (d), where the infection is amplified in susceptible lymphocytes. MV-infected CD150<sup>+</sup> lymphocytes, predominantly CD4<sup>+</sup> memory T cells, disseminate the virus systemically via the bloodstream (e) and lymphatic system (f).



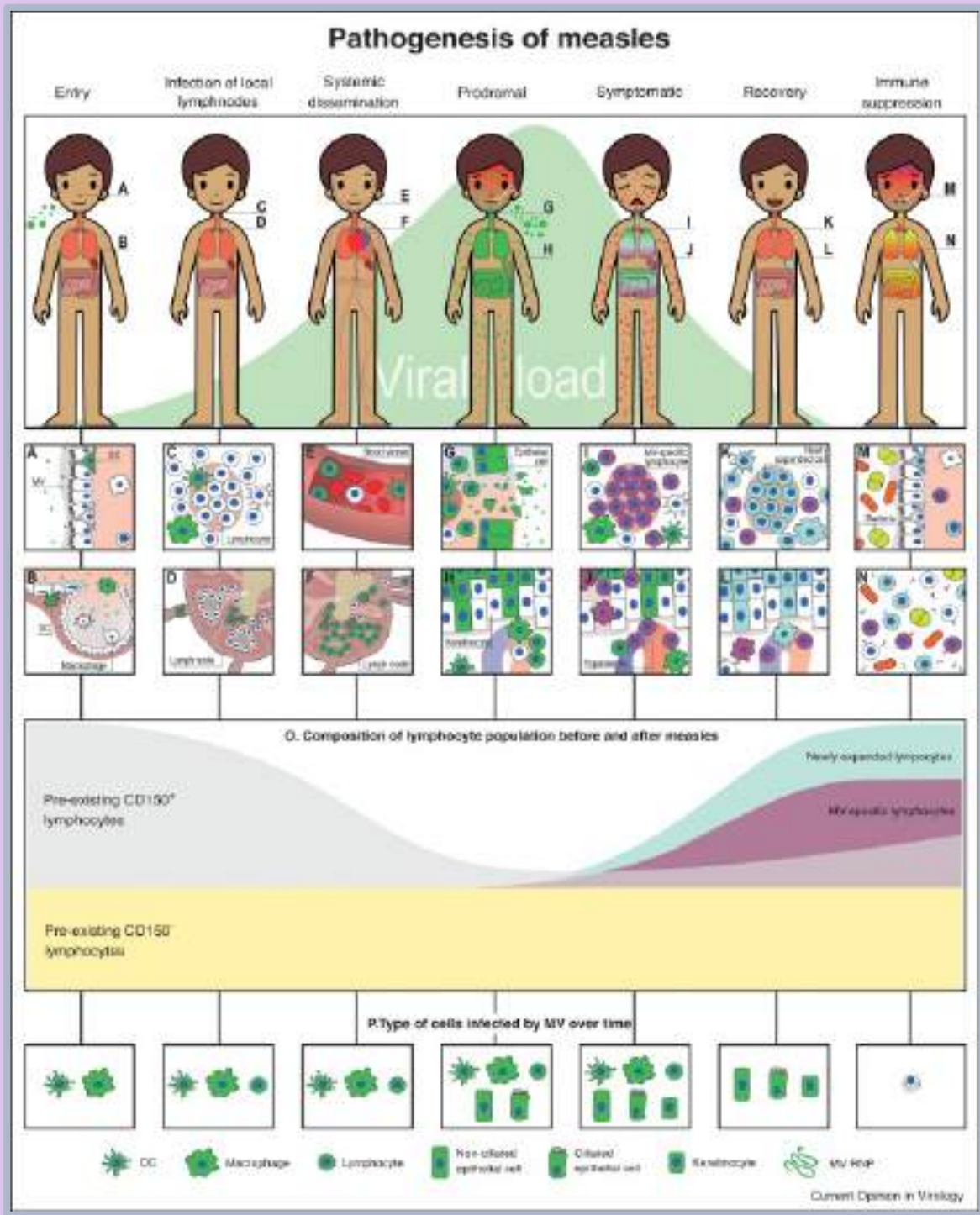


Figure 2. The Pathogenesis of Measles  
 (Source: <https://www.sciencedirect.com/topics/medicine-and-dentistry/measles-virus>)

Infection of respiratory epithelial cells enables release of infectious MV particles into the respiratory lumen, facilitating transmission (g). Concurrently, infection of dermal myeloid and lymphoid cells leads to viral spread among epidermal keratinocytes

in a nectin-4-dependent manner (h). Expansion of MV-specific lymphocytes initiates viral clearance (i). Skin capillary hyperaemia results in recruitment of MV-specific lymphocytes and activated macrophages to infected skin, and, together

with oedema, produces the characteristic erythematous, morbilliform rash (j).

During recovery, depletion of lymphocytes is partially masked by expansion of newly generated immune cells (k). The rash resolves and the epidermis is cleared of infection (l), conferring lifelong protection against clinical measles. However, loss of pre-existing lymphocytes and plasma cells (m) and the associated decline in pre-existing antibodies (n) result in increased susceptibility to other infections, particularly respiratory pathogens (o).

The schematic further illustrates lymphopenia and shifts in lymphocyte populations before and after measles

infection. Owing to its lymphotropic nature, MV preferentially infects and depletes CD150<sup>+</sup> pre-existing lymphocytes, though long-term loss is masked by rapid generation of MV-specific cells and homeostatic expansion of newly produced lymphocytes (p). Myeloid cells act as early targets and transports virus to lymphoid tissues; lymphocytes mediate systemic dissemination; respiratory epithelial cells are central to viral transmission; and dermal immune cells together with epidermal keratinocytes give rise to the rash. Although most infected cells are eliminated by MV-specific immune responses, some lymphocytes may retain MV RNA long after clinical recovery.

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## Complications

Measles-associated complications most commonly affect the respiratory and gastrointestinal systems and include pneumonia, croup, otitis media, oral ulcers, and diarrhea (WHO, 2022). Neurological complications, such as seizures and encephalitis, may also occur. While some complications arise directly from measles virus infection, many result from secondary bacterial infections, which characteristically peak 2 to 3 weeks after rash onset.

A rare but severe long-term complication of measles is subacute sclerosing panencephalitis (SSPE), a progressive, degenerative, and ultimately fatal neurological disorder resulting from persistent measles virus infection in the central nervous system (WHO, 2022). SSPE

occurs in approximately one per 5,000 measles cases, with symptom onset typically appearing an average of seven years after acute infection, although latency may range from one month to 27 years. In adults, measles may also be associated with hepatitis and adverse pregnancy outcomes. Pregnant individuals infected with measles face an increased risk of miscarriage, preterm birth, low birth weight, and maternal mortality.

Measles-related deaths remain disproportionately high in parts of Africa, the Middle East, and Asia, where socioeconomic and health system challenges persist. Limited access to healthcare, delayed care-seeking, inadequate service quality, and ineffective control programs further exacerbate mortality (WHO, 2024a).

## Risk Factors and Risk Groups

Individuals who lack protective immunity, either due to absence of vaccination or an inadequate immune response following immunization, remain susceptible to measles infection. Unvaccinated infants and young children are particularly vulnerable, as they are more likely to experience both infection and severe disease outcomes (WHO,2024a).

Epidemiological data reported by the European Centre for Disease Prevention and Control (ECDC) in 2023 indicate that measles cases occurred across all age groups (ECDC, 2025). Children aged 1–4 years represented the largest proportion

of cases, accounting for 11,655 cases (33.1%), followed by children aged 5–9 years with 5,634 cases (16.0%). Infants under one year of age accounted for 4,578 cases (13.0%). Older children aged 10–14 years comprised 11.6% of reported cases, while adolescents aged 15–19 years accounted for 8.8%. Adults aged 20–29 years represented 6.5% of cases, and individuals aged 30 years and older accounted for 10.9%. Overall, the data show that while measles affected all age groups, the highest burden was observed among young children, particularly those aged 1–4 years.

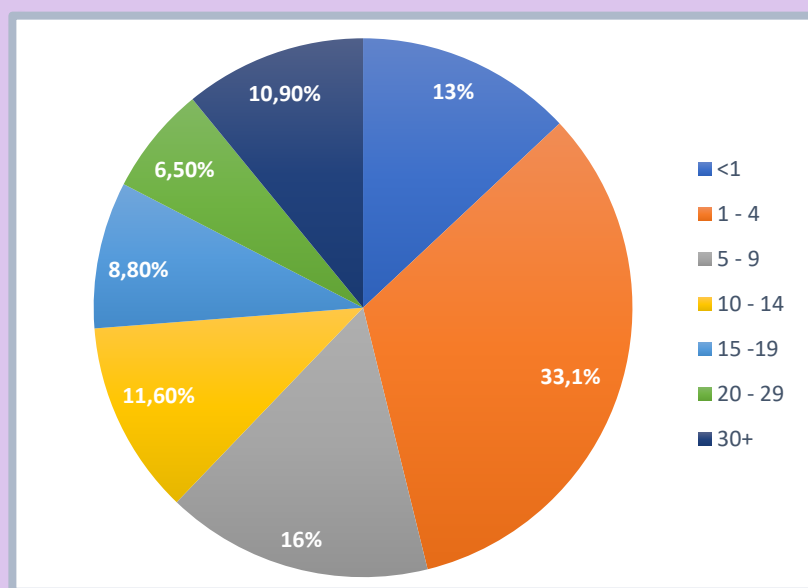


Figure 3. Distribution of Measles Cases by Age Group (Percentage), WHO European Region, 2024  
(Source: <https://www.ecdc.europa.eu/en/publications-data/measles-annual-epidemiological-report-2024>)

Additional determinants such as malnutrition, secondary infections, and prevailing epidemiological patterns contribute to elevated risk of death, placing considerable strain on available resources and hindering progress toward universal immunization coverage (Sbarra *et al.*, 2023). Nutritional status plays a critical role in measles severity, with vitamin A deficiency strongly associated with complications such as blindness, severe diarrhea, and pneumonia. Accordingly, WHO and CDC recommend vitamin A supplementation in children diagnosed with measles (Suchdev *et al.*, 2025; WHO, 2025a).

Pregnant women represent another particularly vulnerable population. Physiological and immunological adaptations during pregnancy shift the maternal immune response toward increased tolerance, which may heighten susceptibility to viral infections, including measles (Abu-Raya *et al.*, 2020). Infection during pregnancy is associated with severe outcomes, including maternal death, miscarriage, stillbirth, preterm birth, and low birth weight (Ogbuanu *et al.*, 2014; UNICEF, 2025).

Other vulnerable populations, such as migrants, nomadic groups, and individuals

affected by conflict or humanitarian crises, are disproportionately impacted by measles due to gaps in vaccination coverage and limited access to health services, underscoring the need for targeted and context-specific immunization strategies (WHO, 2020a). Healthcare workers are also at increased risk of infection, particularly in under-immunized settings, where nosocomial transmission may occur in the absence of adequate infection prevention and control measures (Fappani *et al.*, 2022).

Genetic factors and vaccine failure (both primary and secondary) also contribute to breakthrough infections and complicate elimination efforts (Fappani *et al.*, 2022). High-risk transmission settings, such as health-care facilities, mass gatherings, and contexts involving international travel, further facilitate measles spread (PAHO, 2025). Importantly, measles infection can induce long-term “immune amnesia,” resulting in the loss of pre-existing immune memory and increased susceptibility to other infectious diseases well beyond the acute phase of illness (Tchos, 2025).

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## Clinical Diagnostic

Measles should be suspected in patients presenting with febrile rash illness accompanied by characteristic clinical features, particularly among those with recent international travel or exposure to individuals with similar symptoms (CDC, 2026). Laboratory confirmation is essential for both sporadic cases and outbreak investigations, with diagnostic approaches including serological detection of measles-specific IgM antibodies and identification of measles RNA through reverse transcription polymerase chain reaction (RT-PCR) from respiratory specimens (WHO, 2018):

- 1. Whole Blood /Serum:** Whole blood or serum collected via venipuncture is primarily used for antibody detection, including measles-specific IgM and paired sera to assess IgG seroconversion or rising IgG titers. Recommended volumes are 4–7 mL for older children and adults, 1 mL for younger children, and 0.5 mL for infants. Samples should be obtained within 28 days after rash onset, with paired sera collected 10–20 days apart.
- 2. Dried Blood Spots (DBS):** Dried blood spots on filter paper can be utilized for antibody detection (IgM and IgG seroconversion) as well as viral RNA detection through RT-PCR. At least three fully filled circles are required to ensure adequate sample volume. Collection should occur within 28 days of rash onset.
- 3. Throat/ Nasal/ Nasopharyngeal Specimens:** Swabs or nasopharyngeal aspirates are suitable for viral isolation via cell culture and for RNA detection using RT-PCR. These specimens are ideally collected within 5 days of rash onset, though virus detection remains possible up to 14 days.
- 4. Oral Fluid (OF):** Oral fluid specimens can be used for measles-specific IgM antibody detection and viral RNA detection by RT-PCR. Samples are obtained using a sponge device rubbed along the gums for more than one minute, yielding approximately 0.5 mL of crevicular fluid. For viral detection, specimens should be collected within 5 days of rash onset but remain acceptable up to 14 days. For antibody detection, samples can be collected up to 28 days after rash onset.
- 5. Urine:** Urine specimens are also suitable for viral isolation and RNA detection by RT-PCR. A minimum of 10 mL is required, with first morning voids preferred as larger volumes increase detection probability. Optimal collection is within 5 days of rash onset, though detection remains possible up to 14 days.

IgM antibody detection by enzyme immunoassay (EIA) remains the gold standard for laboratory confirmation of measles, with results ideally reported within four days of specimen receipt

(WHO, 2018). In addition, diagnostically significant rises in IgG antibody titres or documented seroconversion provide reliable evidence of recent infection.

Molecular methods, including RT-PCR and virus isolation, offer definitive confirmation and are particularly valuable during outbreak investigations and for epidemiological assessment. Complementing these diagnostics, measles virus genotyping permits molecular characterization of circulating strains, supporting identification of transmission chains, differentiation between ongoing transmission and new

importations, and strengthening overall surveillance capacity.

WHO recommends that at least 80% of laboratory-confirmed outbreaks undergo genotyping, with results reported within two months of specimen receipt. In specific contexts, extended sequencing or whole-genome analysis may be undertaken to further elucidate transmission dynamics. Together, these serological and molecular approaches ensure robust case confirmation and provide critical support to global measles elimination efforts.



# *Epidemiology*

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**Measles** [

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## Global Situation

Measles continues to pose a significant public health challenge worldwide. In 2024, the WHO recorded over 359,000 reported cases globally, over twice the number documented in 2022 (WHO, 2026a). Despite this recent increase, the highest burden of the past decade occurred in 2019, when 541,401 cases were reported worldwide.

Figure 4 displays a multi-year overview of measles trends across six WHO regions through stacked bars representing monthly case counts. Each bar contains color-coded segments for Africa (AFR), the Americas (AMR), the Eastern Mediterranean (EMR), Europe (EUR), South-East Asia (SEAR), and the Western Pacific (WPR), allowing comparison of regional contributions over time. Annual totals displayed above each year range from 180,015 cases in 2016 to a high of

541,401 in 2019, followed by a decline to 59,619 in 2021 and a subsequent increase to 359,450 in 2024 (WHO, 2026a).

The chart covers January 2016 to December 2025 and reveals a pronounced global surge in 2019, when total monthly cases exceeded 120,000 in February, largely driven by sharp increases in the African region. After this peak, reported cases dropped significantly during 2020–2021, before gradually rising again between 2022 and 2024 as seasonal peaks began to reappear (WHO, 2026a). In 2025, case numbers remained elevated but appeared more stable than during the 2019 surge and slightly lower than those reported in 2024. Overall, the figure illustrates the uneven regional distribution of measles transmission and the shifting global patterns observed over the past decade.

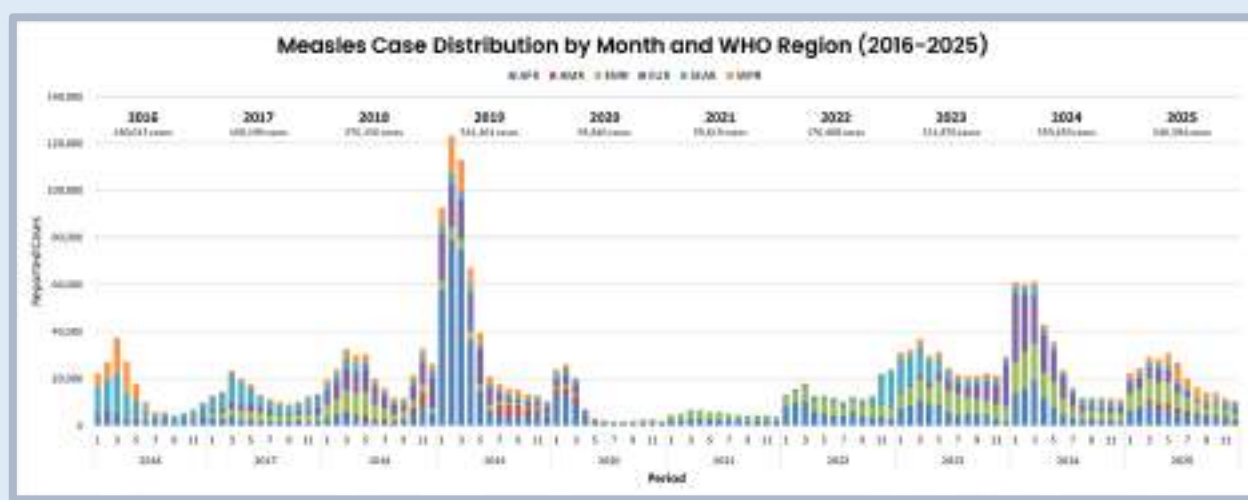


Figure 4. Number of reported cases of measles by country, 2023

(Source: WHO (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

Measles incidence varies widely across countries and regions, reflecting differences in vaccination coverage, surveillance capacity, population immunity, and outbreak response. While some countries maintain consistently low incidence through strong immunization programs, others continue to experience recurrent outbreaks or sustained transmission, leading to uneven global patterns of measles distribution.

The paired world maps in Figure 5 present a global comparison of measles incidence per 1,000,000 population over a ten-year period, using a color-coded scale ranging from dark green (0 cases) to red (1,000+ cases). In 2015 (A), many countries across the Americas, Europe, and parts of Asia appear in shades of green and yellow, indicating lower incidence rates, while several countries in Africa and parts of Asia

show orange and red zones signifying higher measles burdens (WHO, 2026a).

By contrast, the 2025 map (B) displays a notable intensification in colours across multiple regions: larger portions of Africa, the Middle East, and parts of Europe and Asia shift into orange and red categories, illustrating increased incidence (WHO, 2026a). Some countries that were previously light green or yellow in 2015 appear noticeably darker in 2025, suggesting rising case numbers. Despite these increases, a few countries maintain zero to low incidence, remaining green across both maps. Together, the two visuals highlight a clear global trend: measles incidence has expanded geographically and intensified in multiple regions, emphasizing widening immunity gaps and emerging hotspots over the decade.

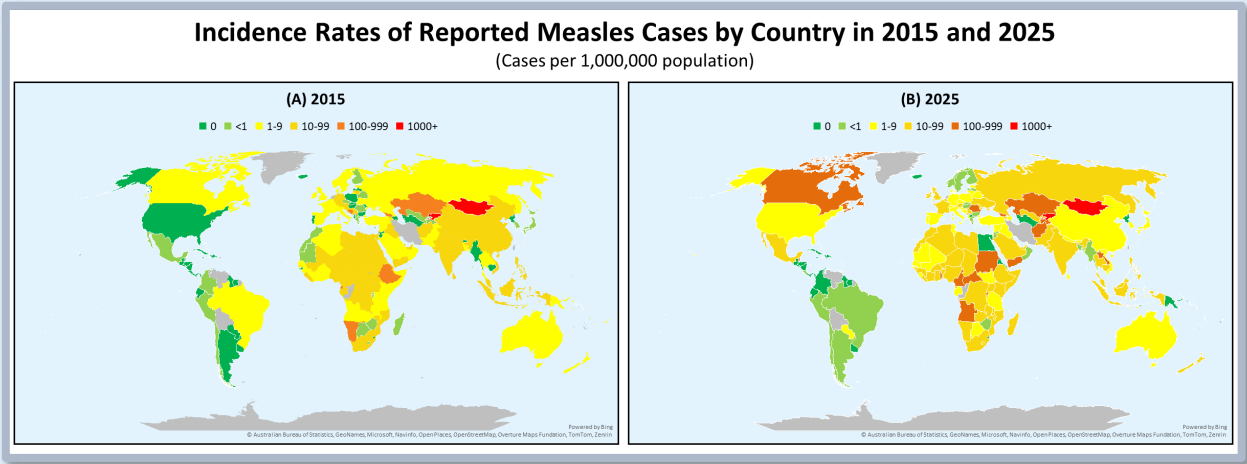


Figure 5. Incidence rates of reported measles cases by country, 2015 and 2025  
(Source: WHO (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

Effective measles and rubella control depends on timely surveillance. Detecting and confirming suspected cases through surveillance systems enables early identification of outbreaks, assessment of ongoing transmission to guide more targeted vaccination responses, and estimation of the underlying disease burden based on patterns observed in reported data (WHO, 2026b). Most Member States submit monthly reports to the WHO on suspected and confirmed measles and rubella cases detected through national surveillance systems.

However, a gap exists between reported cases and the true burden of infection in the community (WHO, 2026b). Reported data generally capture only a fraction of actual cases, as many individuals do not seek healthcare and some diagnosed infections are not reported. In addition, reporting typically involves a delay of about one to two months. As a result, the most recent monthly figures are often incomplete and likely underestimate the true number of cases, particularly for the latest reporting period.



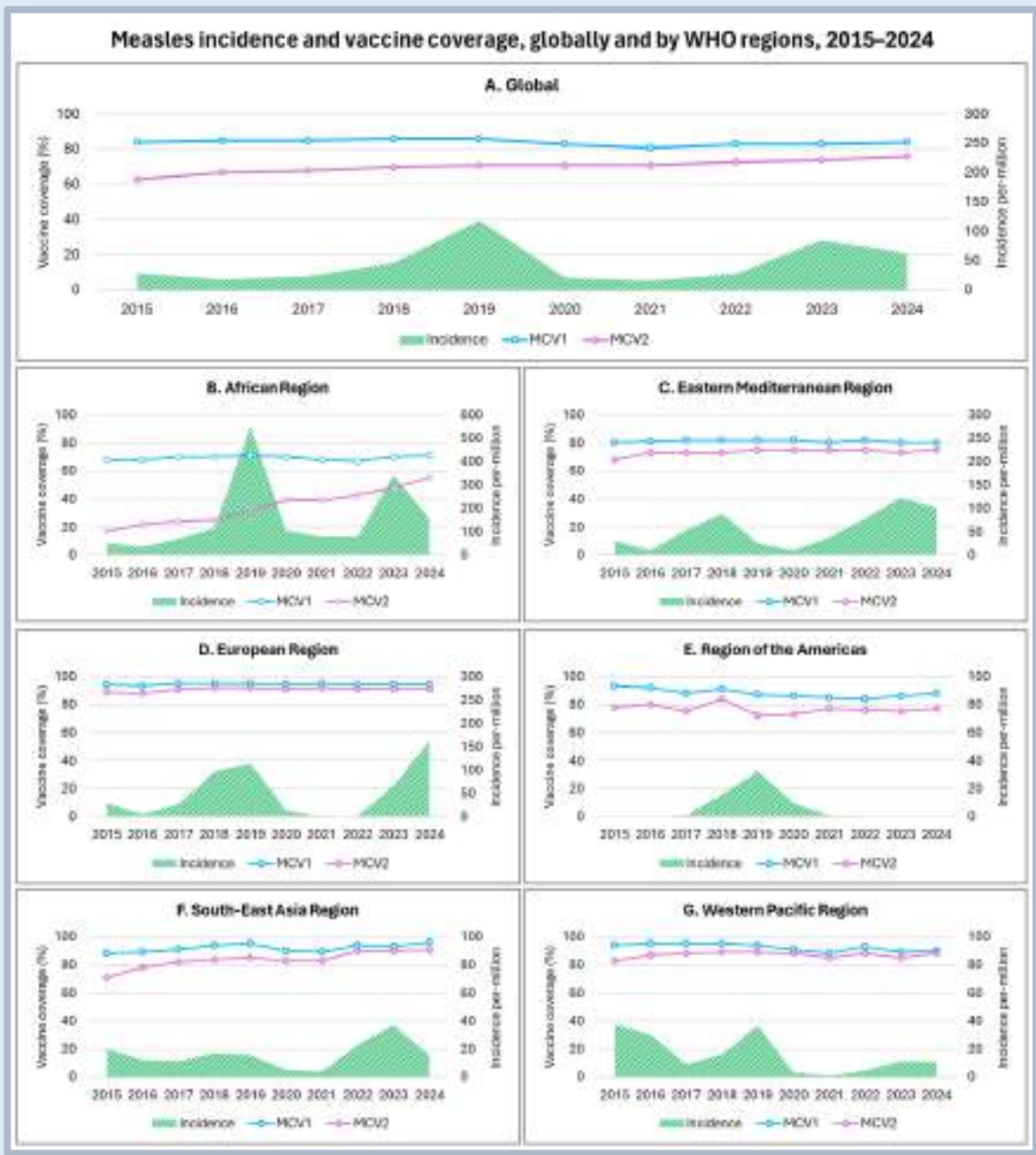


Figure 6. Measles incidence and vaccine coverage, globally and by WHO region, 2015–2024  
 (Source: WHO (<https://immunizationdata.who.int/global?topic=&location=>))

Figure 6 illustrates global and regional trends in measles incidence and measles-containing vaccine coverage from 2015 to 2024 (WHO, 2026a). Each panel presents measles incidence per million population alongside coverage of the first (MCV1) and second (MCV2) doses of measles-containing vaccine. Overall, the figure demonstrates relatively stable global

immunization coverage over the decade, with temporary declines during the COVID-19 pandemic period.

Globally, measles incidence and measles-containing vaccine coverage are shown for the period 2015–2024 (panel A). Coverage with the first dose of measles-containing vaccine (MCV1) remains

relatively stable over the period, ranging 81-86%. Coverage with the second dose (MCV2) increases steadily from 63% in 2015 to 76% by 2024. Over the same period, measles incidence fluctuates markedly, with a pronounced peak around 2019, a sharp decline during 2020–2021, and an increase again after 2022.

In the African Region (panel B), MCV1 coverage remains relatively stable throughout the period, generally between approximately 65% and 70%. Coverage with MCV2 increases progressively from very low levels in 2015 to above 50% by 2024. Measles incidence varies substantially over time, with a pronounced peak around 2019 and a further increase in 2023. Incidence levels in this region remain among the highest across all regions shown. In the Eastern Mediterranean Region, MCV1 coverage remains relatively stable, generally around 80% to 82% over the period (panel C). MCV2 coverage shows gradual improvement, reaching 75% by 2024. Measles incidence displays cyclical variation, with increases observed around 2017–2018 and again between 2022 and 2023, followed by a decrease in 2024.

In the European Region (panel D), coverage with both MCV1 and MCV2 remains consistently high, typically ranging between 93% and 95% throughout the period. Measles incidence increases during 2018–2019, declines sharply during 2020–2021 to very low levels, and then rises again in 2023 before declining the following year. In the Region of the Americas (panel E), MCV1

coverage remains relatively high over the period, generally between 84% and 93%, while MCV2 coverage ranges between 72% and 84%. Measles incidence peaks around 2019, declines to near zero since 2021, and remains low through 2024.

In the South-East Asia Region (panel F), MCV1 coverage increases over time, reaching 96% in 2024, while MCV2 coverage rises to 91% by the end of the period. Measles incidence declines after 2019, increases during 2022–2023, and then decreases again. In the Western Pacific Region (panel G), coverage with both MCV1 and MCV2 remains high and stable, with MCV1 generally around 88%–95% and MCV2 around 85%–89% throughout the period. Measles incidence remains relatively low overall, with an increase around 2019, a decline during 2020–2021, and smaller increases thereafter.

WHO data enable comparison of measles control efforts across regions. As shown in Figure 6, measles incidence varied substantially between regions from 2015 to 2024, despite relatively stable or gradually improving measles-containing vaccine coverage. While first-dose coverage remained largely stable globally and second-dose coverage increased steadily, measles incidence fluctuated over time, with peaks around 2019, declines during 2020–2021, and renewed increases in several regions after 2022. Collectively, these trends underscore the heterogeneous global epidemiology of measles and the need for continued monitoring of both vaccination coverage and disease incidence across region.

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## Burden of Measles in the ASEAN Region

Measles continues to impose a substantial public health burden globally, including across the ASEAN region, despite the long-standing availability of effective vaccination programmes (WHO, 2025a). The magnitude and timing of cases vary considerably between countries. Regional trends are therefore shaped by periodic surges in individual countries that can significantly influence the overall pattern of measles transmission within the ASEAN.

Figure 7 illustrates trends in reported measles cases alongside first- and second-dose measles-containing vaccine coverage (MCV1 and MCV2) across ASEAN Member States (AMS) from 2016 to 2025. Overall, measles incidence showed marked temporal fluctuations during the period. Reported cases increased steadily from approximately 6,000 in 2016 to a pronounced regional peak in 2019, when nearly 70,000 cases were recorded (WHO, 2026a). This surge was driven by large outbreaks across several countries, with the most intense increase occurring between late 2018 and early 2019. At the monthly level, cases peaked at around 18,000 in February 2019, largely due to a sharp rise in cases reported from the Philippines, with additional contributions from Myanmar, Thailand, and Viet Nam.

Following this peak, measles cases declined sharply in 2020 and reached their lowest levels in 2021 (WHO, 2026a). This

downturn likely reflects a combination of strengthened outbreak control measures, reduced transmission during the COVID-19 pandemic, and possible underreporting during this period. However, from 2022 onwards, measles incidence began to rise again, with a clear resurgence observed through 2023 to 2025. By 2025, reported cases exceeded 29,000, indicating renewed transmission and highlighting persistent susceptibility to measles outbreaks across the region.

Measles vaccine coverage (MCV1 and MCV2) remained relatively stable but consistently below optimal levels throughout the period. First-dose coverage (MCV1) stayed high, largely in the upper-80% to around 90% range but never reached the  $\geq 95\%$  level recommended for herd immunity (WHO, 2026a). Second-dose coverage (MCV2) was consistently lower, ranging roughly from the mid-60% to low-80% range. A notable feature of the trend is the dip in MCV2 coverage around 2020–2021, which coincides with the COVID-19 pandemic. During this period, routine immunization services across many countries were disrupted due to movement restrictions, health system reallocation toward pandemic response, reduced health-seeking behaviours and interruptions to outreach and school-based vaccination activities (Kaur, et al, 2023, Packham, et al, 2024). These

disruptions likely delayed or missed second-dose vaccinations, contributing to the sharper decline observed for MCV2 compared with MCV1. Although partial recovery in coverage is evident from 2022

onward as immunization services resumed, MCV2 did not fully rebound to pre-pandemic levels by 2025, leaving a substantial cohort of children insufficiently protected.

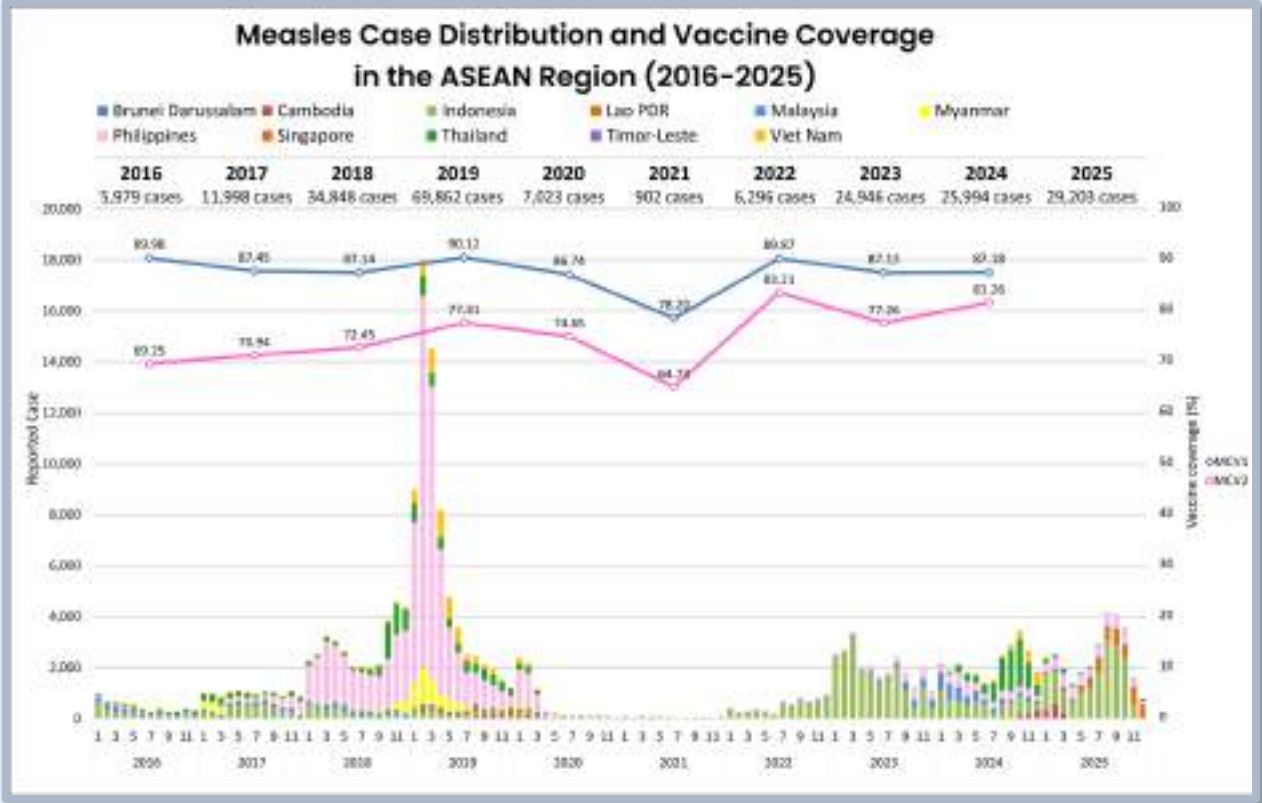


Figure 7. Measles case distribution and vaccine coverage in the ASEAN Region, 2016 to 2025 (Source: WHO (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

To understand regional patterns of measles incidence and immunization coverage more fully, it is important to look beyond aggregated figures and examine trends at the country level. Regional summaries highlight broad fluctuations and shared challenges, but they can overlook meaningful differences among ASEAN Member States (AMS). These include variation in the scale, timing, and persistence of measles transmission.

A country-level perspective offers clearer insight into how regional patterns emerge from distinct national experiences. Disaggregating confirmed measles cases by AMS makes it possible to identify countries that recorded sustained increases in measles incidence, those that maintained relatively low case numbers despite wider regional increases, and those that accounted for a larger share of reported cases during certain periods. This approach also helps clarify how

overlapping increases in transmission across multiple countries contributed to the regional rises and declines observed over the past decade.

The following section therefore reviews confirmed measles cases in each ASEAN Member State from 2016 to 2025, using data from WHO immunization and

surveillance systems (WHO, 2026a). By examining national-level patterns, the analysis seeks to more precisely describe the scale, timing, and continuity of measles transmission within individual countries, and to highlight the diverse epidemiological trajectories that together have shaped measles trends across the ASEAN region



## Brunei Darussalam

The bar chart in Figure 8 illustrates the trend of confirmed measles cases in Brunei Darussalam from 2016 to 2025, revealing an exceptionally low and sporadic occurrence of the disease.

Throughout the decade, confirmed cases never exceeded one per year, with single cases recorded only in 2016, 2018, 2019, and 2023.

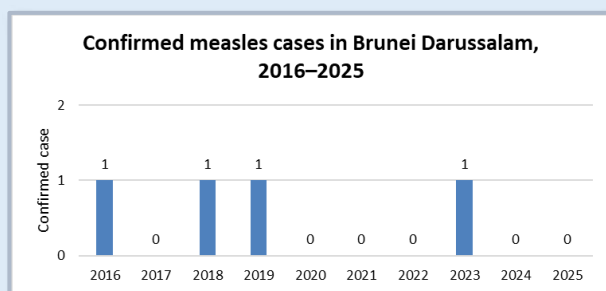


Figure 8. Trend of measles cases and incidence in Brunei Darussalam, 2016-2025  
(Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))





## Cambodia

Figure 9 illustrates the trend in confirmed measles cases in Cambodia from 2016 to 2025, revealing a highly volatile epidemiological pattern characterized by significant surges and periods of low transmission. After maintaining relatively low figures between 2016 and 2018, the country experienced a sharp increase in 2019 with 675 confirmed cases. This was

followed by a gradual decline over the next four years, with cases dropping back to near-negligible levels between 2021 and 2023. However, the most recent data indicates a substantial resurgence of the virus, with cases climbing sharply to 666 in 2024 and reaching a ten-year peak of 1,098 cases in 2025.

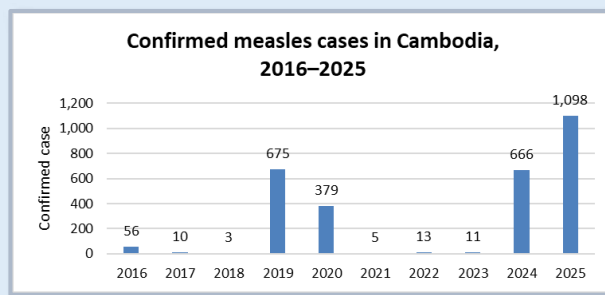


Figure 9. Trend of measles cases and incidence in Cambodia, 2016-2025

(Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))



## Indonesia

Figure 10 demonstrates the trend of confirmed measles cases in Indonesia from 2016 to 2025. Between 2016 and 2021, case numbers remained comparatively low and stable, fluctuating between a high of 685 in 2016 and a decade low of 114 in 2021. However, beginning in 2022, the country

experienced a sharp and rapid surge, with confirmed cases jumping to 4,009 and then more than doubling to 9,249 in 2023. Although there was a temporary decline to 2,759 cases in 2024, the figures spiked in 2025, reaching a ten-year peak of 17,204 confirmed cases.

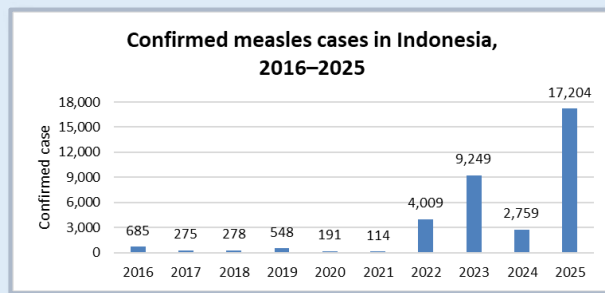


Figure 10. Trend of measles cases and incidence in Indonesia, 2016-2025

(Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))



## Lao People's Democratic Republic

Figure 11 illustrates the trend of confirmed measles cases in Lao PDR from 2016 to 2025. Between 2016 and 2018, the country maintained very low case numbers, ranging from 2 to 3 annually, before experiencing a notable outbreak in 2019 with 221 confirmed cases. This was

followed by a sharp decline in 2020 and a return to near-zero levels between 2021 and 2024, including a year with no confirmed cases in 2022. However, the most recent data shows a substantial resurgence in 2025, with cases climbing to a ten-year high of 349.

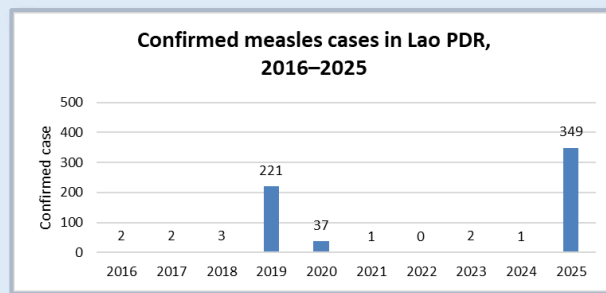


Figure 11. Trend of measles cases and incidence in Lao PDR, 2016-2025

(Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))



## Malaysia

Figure 12 illustrates the trend of confirmed measles cases in Malaysia from 2016 to 2025. During the initial period from 2016 to 2018, cases were relatively high and stable, ranging from 1,550 to 1,836, before entering a steady downward trend that reached a decade low of 121

cases in 2021. However, this period of improved control was followed by a sharp resurgence starting in 2023, with cases climbing rapidly to a ten-year peak of 3,313 in 2024 before decreasing to 620 cases in 2025.

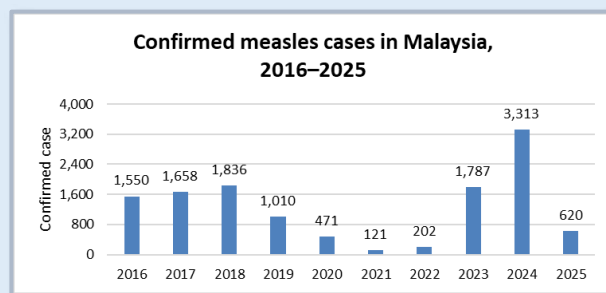


Figure 12. Trend of measles cases and incidence in Malaysia, 2016-2025

(Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))



## Myanmar

Figure 13 illustrates the trend of confirmed measles cases in Myanmar from 2016 to 2025. After reporting no cases in 2016, the country saw a significant presence of the virus with nearly 1,000 cases annually in 2017 and 2018, culminating in a major surge of 3,497 cases in 2019. However, this peak

was followed by a dramatic and rapid decline to 206 cases in 2020, with figures further plummeting to single or low double digits for the remainder of the decade. Between 2021 and 2025, Myanmar maintained exceptionally low transmission levels, ranging from a low of 4 to a high of 20 cases.

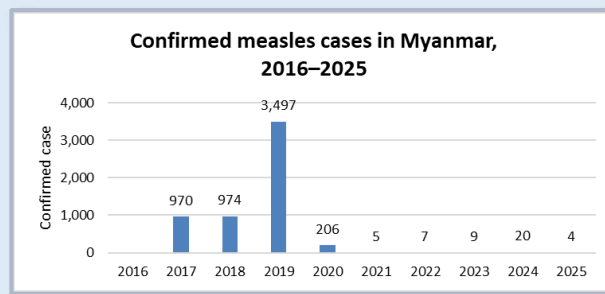


Figure 13. Trend of measles cases and incidence in Myanmar, 2016-2025

(Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))



## Philippines

Figure 14 illustrates the trend of confirmed measles cases in the Philippines from 2016 to 2025. Following relatively low numbers in 2016 and 2017, the country experienced a massive escalation that peaked in 2019 with 4,336 confirmed cases. This was followed by

a significant decline, reaching a decade low of just 12 cases in 2021. However, the data indicates a steady and concerning resurgence starting in 2022, with case numbers climbing annually to reach 1,415 in 2025.

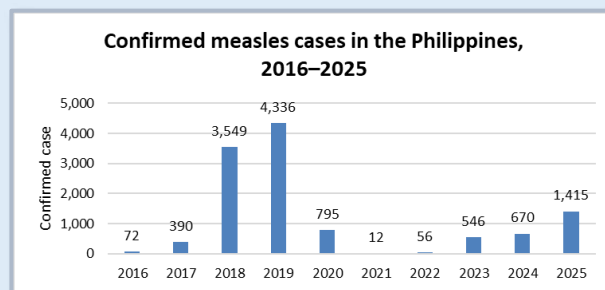


Figure 14. Trend of measles cases and incidence in the Philippines, 2016-2025

(Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))



## Singapore

Between 2016 and 2019, Malaysia saw variable incidence levels, peaking early in 2016 with 140 cases before dropping and then surging again to 101 cases in 2019 (Figure 15). Following this period, there was a dramatic and sustained decline in transmission, reaching a decade low of

zero cases in 2021 and maintaining single-digit figures in 2022 and 2023. While the most recent data indicates a gradual increase to 12 cases in 2024 and 26 cases in 2025, these numbers remain significantly lower than the levels observed in the late 2010s.

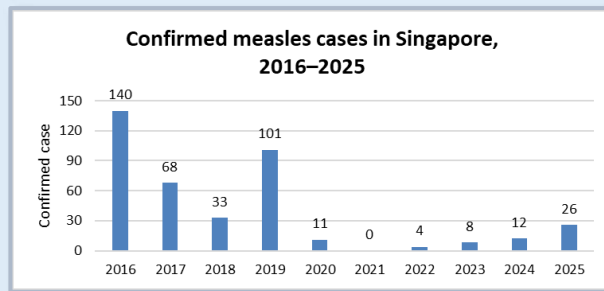


Figure 15. Trend of measles cases and incidence in Singapore, 2016-2025

(Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))



## Thailand

Figure 16 illustrates the trend of confirmed measles cases in Thailand from 2016 to 2025. During the first half of the period, case numbers climbed steadily from 720 in 2016 to a peak of 3,586 in 2019, before a sharp decline led to a three-year phase of highly effective suppression

between 2021 and 2023, where cases remained in the low double digits. However, a dramatic resurgence was observed in 2024, when confirmed cases spiked to a ten-year high of 4,318 before decreasing to 515 the following year.

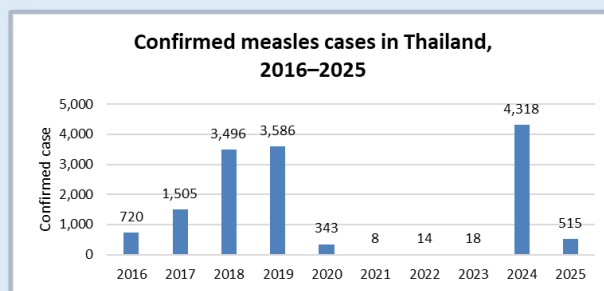


Figure 16. Trend of measles cases and incidence in Thailand, 2016-2025

(Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))



## Timor-Leste

Figure 17 illustrates the sporadic trend of confirmed measles in Timor-Leste from 2016 to 2025. While the country maintained low or zero cases for much of the decade, specifically in 2017, 2018, 2020, and 2025, a significant increase in

incidence occurred in 2019, peaking at 23 cases. Following a return to negligible levels, a modest rise reached 8 cases in 2023 before declining to 2 in 2024 and zero by 2025.

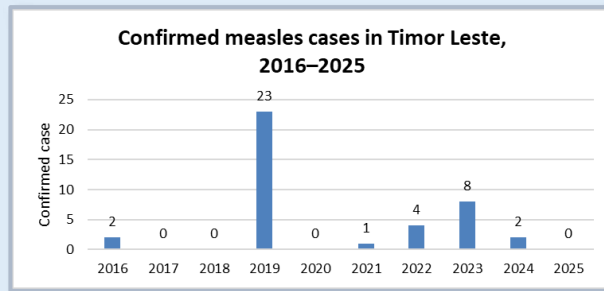


Figure 17. Trend of measles cases and incidence in Timor-Leste, 2016-2025  
(Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))



## Viet Nam

Figure 18 illustrates confirmed measles cases in Viet Nam from 2016 to 2025, a decade marked by two distinct transmission cycles separated by effective suppression. Following a gradual rise from 36 cases in 2016 to 367 in 2018, the country saw a major peak of 3,699 cases in

2019. A rapid decline followed, with cases reaching a decade low of 8 in 2023. However, a significant resurgence occurred in 2024 with 1,500 cases, before transmission decreased again to 144 in 2025.

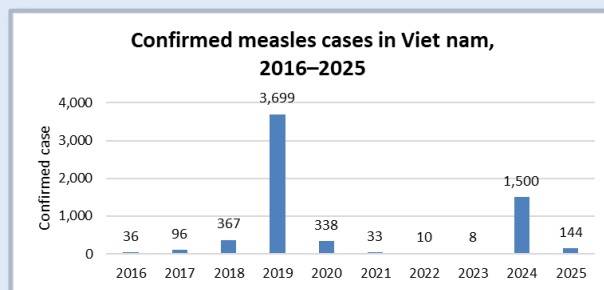


Figure 18. Trend of measles cases and incidence in Viet Nam, 2016-2025  
(Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

# Case Management and Prevention



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## Case Management

There is no specific antiviral treatment for measles; clinical management is therefore supportive and focused on symptom relief and prevention of complications, including secondary bacterial infections (CDC, 2026). Early identification and appropriate management of complications are critical. Most uncomplicated cases can be managed at home with adequate hydration, fever control, and nutritional support, although recovery of nutritional status may take four to eight weeks in children (WHO, 2017b).

Hospitalization is required only for severe disease or complications (WHO, 2017b). Given the high transmissibility of measles, strict infection prevention and control measures are essential in healthcare settings. Suspected or confirmed cases should be isolated until at least four days after rash onset, with airborne precautions implemented where feasible, including negative-pressure rooms (WHO, 2017b). In the absence of indications for inpatient care, home-based management with appropriate guidance and follow-up is preferred (WHO, 2017b).

### **Early Recognition and Triage of Patients with Suspected Measles**

Early recognition and appropriate triage of patients with clinically suspected measles are essential to ensure timely management and to reduce transmission (WHO, 2020b). Health-care providers

should assess whether patients meet the suspected measles case definition (Table 1), including evaluation of recent travel to measles-affected areas or contact with a suspected or confirmed case. Where measles is suspected, immediate infection prevention and control measures should be implemented, including provision of a mask, prompt isolation, and collection of appropriate specimens (e.g. serum, urine, or throat swab) for laboratory confirmation.

Triage should prioritize identification of warning signs indicative of severe disease or complications, such as seizures, altered consciousness, severe respiratory distress, inability to eat or drink, persistent vomiting, dehydration, corneal involvement, severe malnutrition, or evidence of serious secondary infection (WHO, 2020b). Patients presenting these signs require urgent referral or hospitalization. Individuals without warning signs may be managed as outpatients, with vitamin A supplementation and counseling to minimize exposure of non-immune individuals. Patients at higher risk of complications—including infants, pregnant women, undernourished individuals, adults aged over 20 years, and immunocompromised persons—should be considered for closer monitoring or admission, even in the absence of severe symptoms.

### Immediate administration of vitamin A

Vitamin A supplementation is a critical component of measles case management, as it reduces disease severity and mortality (WHO, 2017b). WHO recommends that all children diagnosed with measles receive vitamin A according to age-specific dosing:

- 50,000 IU for infants aged <6 months
- 100,000 IU for infants aged 6–11 months
- 200,000 IU for children aged ≥12 months

The first dose should be administered at the initial health-care contact, followed by a second dose the next day. Children with clinical signs of vitamin A deficiency (such as Bitot’s spots) should receive a third

dose 4–6 weeks later. For children managed at home, public health staff should ensure that vitamin A is provided as recommended.

### Symptomatic treatments for prevention of complications

Measles patients are at increased risk of complications, making supportive and preventive care essential. Attention should be given to the skin, oral cavity, and eyes to reduce the risk of secondary bacterial infections, as shown in Table 2 (WHO, 2020b). Adequate nutritional support throughout illness and recovery is also critical to prevent clinical deterioration.

**Table 2. Symptomatic treatments**

Symptoms	Treatment
Fever	Fever treated with paracetamol.
Nutrition	Monitor weight and food intake daily. Continue breastfeeding for infants. Provide frequent, age-appropriate, nutrient-dense meals. Refer to a dietitian if available. Identify and treat malnutrition promptly.
Mouth ulcers	Rinse mouth with clean, salted water four times daily. Avoid spicy foods. Use antibiotics if ulcers show signs of secondary bacterial infection.
Eye care	No treatment needed for mild conjunctivitis with clear discharge. If purulent discharge is present, treat as bacterial conjunctivitis. Apply antibiotic eye ointment (e.g. tetracycline) three times daily for 7 days. Clean eyes gently and consult an eye specialist if needed. Do not use steroid eye ointments.
Skin care	Keep skin clean and dry. Monitor for cellulitis or severe soft-tissue infection and treat promptly if detected.

### Early supportive care for sepsis/severe illness

Monitoring frequency is determined by clinical severity: patients at high risk or showing signs of sepsis require at least hourly assessments within an intensive care or high-dependency unit, while those with mild illness should be evaluated every eight hours (WHO, 2020b). For clinically stable patients, reassessment intervals may be set at three to four hours,

though any signs of deterioration necessitate immediate escalation. Comprehensive monitoring must include vital signs, mental status, urine output, and focused physical examinations, with all data documented to track trends. To ensure timely intervention, the use of early warning scoring systems is recommended to standardize the identification of clinical decline.

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## Prevention



Figure 19. Vaccine Injections (Source: CDC - Vaccine Administration: During Vaccination (<https://www.cdc.gov/vaccines/hcp/administration/during.html>))

Community-wide immunization remains the primary strategy for measles prevention (WHO, 2025a). All children should receive two doses of measles-containing vaccine, which is safe, effective, and affordable. In high-risk settings, the first dose is typically administered at 9 months of age, while in lower-risk settings it is given at 12–15 months, followed by a second dose at 15–

18 months. The vaccine may be provided as a monovalent measles vaccine or in combination with vaccines for mumps, rubella, or varicella.

Strong routine immunization systems, combined with supplementary immunization activities in areas with high transmission, are essential to reducing measles-related morbidity and mortality. In emergency contexts, including humanitarian crises and among displaced populations and refugees, rapid vaccination is critical to prevent outbreaks. Although combination vaccines may slightly increase procurement costs, they improve delivery efficiency and provide broader protection, particularly against rubella, which poses serious risks during pregnancy.

Despite global progress, immunity gaps remain. In 2024, approximately 84% of children worldwide received their first dose of measles-containing vaccine by their first birthday, while only 76% received the recommended two doses (WHO, 2025a). Two doses are essential to ensure full protection, as a single dose

does not confer immunity in all children. Consequently, an estimated 30 million infants remained under-protected against measles in 2024, according to WHO and UNICEF estimates, underscoring the ongoing need to strengthen immunization coverage and equity.



# *Control Measures Strategy*



In 2020, the WHO, in collaboration with global partners, developed the Measles and Rubella Strategic Framework (MRSF) 2021–2030 to guide immunization stakeholders at global, regional, and national levels in planning and implementing effective measles and rubella elimination efforts ([WHO, 2020c](#)). The framework is fully aligned with the Immunization Agenda 2030 (IA2030) and other key strategic documents, in support of regional elimination targets. Adopting the IA2030 structure, the MRSF outlines strategic priorities, objectives, and focus areas specific to measles and rubella elimination.

All six WHO regions have committed to achieving measles and rubella elimination, although regional targets and milestones differ. To achieve and sustain these commitments, the MRSF 2021–2030 identifies seven strategic priorities, aligned with IA2030, which serve as the organizing framework for coordinated action across countries and partners:

### **Strategic Priority 1: Primary Health Care and Universal Health Coverage**

Integrate all measles and rubella-related activities, including surveillance and case management, as core components of primary health care (PHC) systems to advance universal health coverage (UHC). This priority emphasizes strengthening measles and rubella surveillance within broader disease surveillance systems, while improving the collection, analysis, and use of monitoring and surveillance

data to support evidence-based decision-making.

### **Strategic Priority 2: Commitment and Demand**

Strengthen ownership, accountability, and responsibility for measles and rubella elimination objectives at all levels of the health system. This priority also focuses on enhancing community engagement to build trust, increase demand for vaccination, and improve uptake of measles- and rubella-containing vaccines.

### **Strategic Priority 3: Coverage and Equity**

Identify and close immunity gaps for measles and rubella by leveraging all relevant points of contact between individuals and the health system. Where such contact points are weak or absent, targeted approaches should be established or strengthened to effectively reach under-served and under-immunized populations.

### **Strategic Priority 4: Life Course and Integration**

Adopt a life-course approach to vaccination by ensuring timely administration of the second routine dose of measles-rubella-containing vaccines and implementing catch-up vaccination strategies. This priority also calls for integration of measles and rubella activities with other health and non-health interventions to maximize efficiency, reach, and programmatic impact.

### **Strategic Priority 5: Outbreaks and Emergencies**

Ensure comprehensive preparedness for measles and rubella outbreaks to enable rapid detection, timely response, and effective case management. The objective is to interrupt transmission quickly while minimizing morbidity and associated mortality, particularly in emergency and fragile settings.

### **Strategic Priority 6: Supply and Sustainability**

Secure a reliable and uninterrupted supply of high-quality measles-and rubella-containing vaccines, essential

immunization commodities, and laboratory reagents. This priority also emphasizes the need for sustainable domestic and external financing for immunization and surveillance activities to support long-term program resilience.

### **Strategic Priority 7: Research and Innovation**

Promote research and innovation to address barriers to achieving high population immunity against measles and rubella, while improving the generation, quality, and use of surveillance and programmatic data for continuous learning and performance improvement.

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## **Control Measures in ASEAN Member States**

The ASEAN region includes member states covered by two WHO regional offices: the South-East Asia Regional Office (SEARO) and the Western Pacific Regional Office (WPRO), both of which are committed to eliminating measles and rubella. SEARO has set ambitious targets to interrupt transmission of indigenous measles and rubella viruses by 2026, with regional verification of elimination targeted for 2029 (WHO SEARO, 2024). Countries that achieve elimination must sustain it by maintaining at least 95% coverage for the second dose of measles-rubella-containing vaccines (MRCV2) at the district level and ensuring high-quality surveillance, including a minimum discard rate of two suspected cases per 100,000 population.

SEARO's 2024–2028 strategic plan builds on earlier frameworks and aligns with the Immunization Agenda 2030 (WHO SEARO, 2024). It focuses on five core priorities: achieving high vaccination coverage through two-dose schedules; strengthening case-based surveillance systems; maintaining robust laboratory networks; ensuring rapid outbreak preparedness and response; and fostering an enabling environment through strong governance, monitoring, communication, and research.

In parallel, WPRO emphasizes sustaining elimination and addressing remaining transmission risks. Its approach includes preventing the re-emergence of endemic measles genotypes, interrupting ongoing transmission in affected countries, and

minimizing outbreak risks from imported cases (WHO WPRO, 2017). To support these goals, countries are required to maintain verification-standard surveillance systems backed by WHO-accredited laboratories. Key strategic areas include strengthening immunization systems, optimizing vaccine delivery across all age groups, enhancing epidemiological and laboratory surveillance, conducting regular programme reviews and risk assessments, ensuring rapid outbreak response, and reinforcing partnerships, advocacy, and verification processes.

### **ASEAN-Level Coordination and Cross-Border Health Mechanisms**

ASEAN complements these WHO-led strategies through regional coordination mechanisms that address cross-border health threats (ASEAN, 2025a). The ASEAN Border Management Cooperation Roadmap (2025) promotes integrated, risk-based approaches, including real-time information sharing, joint training for frontline personnel, and standardized

screening and data systems at points of entry. These measures are designed to improve early detection and coordinated responses to infectious disease threats, including measles.

Regional vaccine security is further supported by the ASEAN Vaccine Security and Self-Reliance (AVSSR) Strategic and Action Plan 2021–2025 (ASEAN, 2025b). This initiative focuses on strengthening vaccine access, production, and preparedness across member states. Foundational work, such as the ASEAN Vaccine Baseline Survey conducted by Thailand’s National Vaccine Institute, has identified gaps across the vaccine value chain—from research and development to delivery—informing targeted strategies to improve immunization systems. Together, these regional frameworks reinforce ASEAN’s collective capacity to prevent, detect, and respond to measles, supporting progress toward elimination while safeguarding against cross-border transmission risks.

## **Brunei Darussalam**

Brunei Darussalam operates a comprehensive Expanded Programme on Immunization (EPI) under the Infectious Disease Act, targeting ten vaccine-preventable diseases, including measles (WHO, 2020d). The National Childhood Immunization Programme, established in 1957, is regularly updated in line with

WHO recommendations and remains widely accepted. Vaccination services are provided free of charge through maternal and child health clinics, school health programmes, and government hospitals, with additional outreach to military personnel and remote populations via mobile and flying medical services.

A structured procurement and cold chain system ensures vaccine quality and consistent supply (WHO, 2020d). Laboratory capacity is supported by a WHO-accredited national measles and rubella laboratory, while surveillance systems based on active case finding have contributed to low and declining measles incidence. Continued efforts focus on strengthening detection among higher-risk groups, such as foreign students and migrant workers. Immunization coverage is monitored through facility-based reporting, with records maintained at maternal and child health clinics and compiled through the national health information system. Although a centralized registry is not yet established, coverage estimates are derived from annual birth cohorts.

As shown in Figure 20, Brunei Darussalam maintained consistently high measles vaccine coverage between 2015 and 2024, corresponding with a marked decline in incidence (WHO, 2026a). Incidence peaked at 9.5 cases per million in 2015 despite already high MCV1 (96%) and MCV2 (97%) coverage, then dropped to zero in most subsequent years as coverage increased and stabilized. From 2021 onward, MCV2 reached 99%, coinciding with sustained elimination of reported cases. Minor resurgences in 2018, 2019, and 2023 remained limited and short-lived. By 2024, with both MCV1 and MCV2 at 99%, incidence returned to zero, highlighting the impact of sustained high immunization coverage.

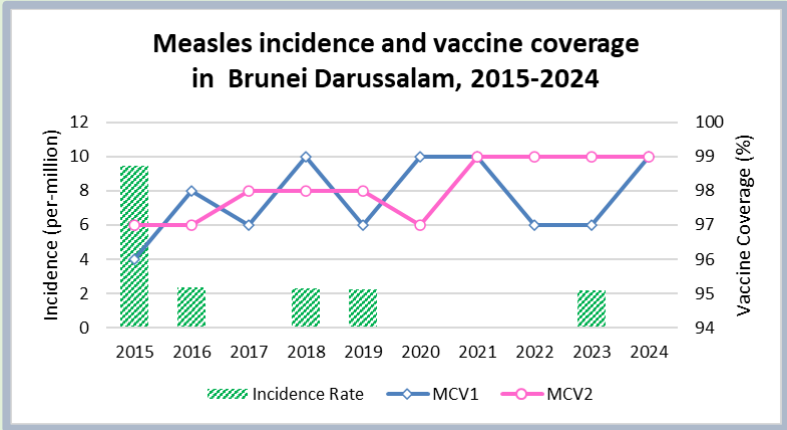


Figure 20. Trend of measles incidence and vaccine coverage in Brunei Darussalam, 2015-2024 (Source: WHO immunization data ([https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=\)e](https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=)e))

## Cambodia

Cambodia's National Immunization Program (NIP) is currently shaping its 2026–2030 strategy based on a thorough 2025 review of the 2021–2025 plan, ensuring that lessons learned and existing gaps are carefully addressed. The Cambodia National Immunization Strategy 2021–2025 and beyond up to 2030 was originally developed in alignment with global and regional guidance, including the WHO Regional Strategic Framework for Vaccine-Preventable Diseases and Immunization in the Western Pacific 2021–2030, the Immunization Agenda 2030, and the Gavi 5.0 strategy, while also supporting the National Health Strategic Plan 2022–2030. It provides a clear vision for the national immunization program, outlining key strategies, interventions, and a monitoring and evaluation framework, positioning immunization as a core component of primary health care (Ministry of Health Cambodia, 2022). Building on this foundation, the upcoming 2026–2030 strategy is closely aligned with Gavi 6.0 and the Immunization Agenda 2030, with an increased focus on sustainable, life-course immunization, strengthened identification of zero-dose populations, and broader health system strengthening. It also incorporates lessons from COVID-19 vaccination efforts, leveraging experiences beyond childhood immunization to advance a more comprehensive, long-term approach to

immunization across the life course in Cambodia.

The National Immunization Strategy (NIS) 2021–2025 strategies emphasize strengthening immunization systems to effectively prevent and control vaccine-preventable diseases such as measles, which remains a significant public health concern. Key priorities include improving governance and coordination within immunization programs, ensuring skilled human resources, and strengthening vaccine supply chains and cold chain systems to maintain vaccine quality. Expanding service delivery is critical to reaching unreached and under-immunized children, thereby reducing measles outbreaks and moving toward elimination targets. In addition, enhancing surveillance systems and outbreak response capacity is essential for early detection and rapid control of measles cases. The strategies also highlight the importance of reliable data monitoring, strong community engagement to increase vaccine acceptance, and sustainable financing to support immunization activities (Ministry of Health Cambodia, 2022). Looking toward 2030, a more integrated and resilient immunization program is needed to address challenges from past outbreaks, including measles, and to ensure high coverage across all populations, ultimately preventing future epidemics.

From 2015 to 2024, Cambodia experienced fluctuating measles vaccine coverage alongside periodic incidence spikes (Figure 21). MCV1 remained relatively stable (79–87%), while MCV2 varied more widely, rising from 59% in 2015 to 75% in 2019 (WHO, 2026a).

Despite this peak in MCV2, 2019 saw the highest incidence, exceeding 40 cases per million. Incidence declined between 2021 and 2023, even as MCV1 fell to 79% in 2023. However, cases resurged in 2024 to 37.8 per million.

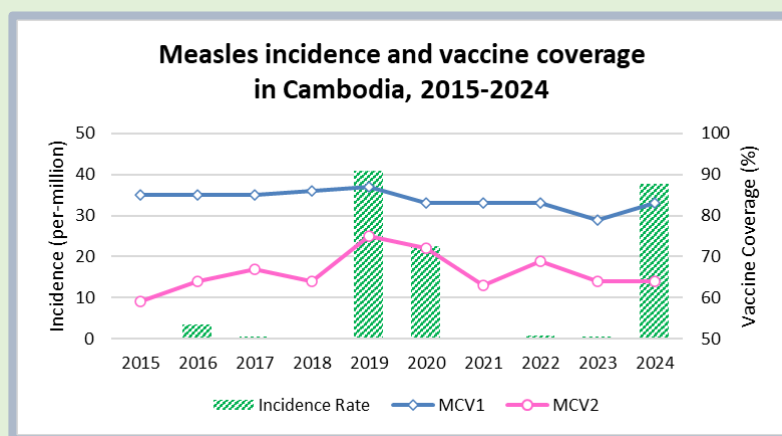


Figure 21. Trend of measles incidence and vaccine coverage in Cambodia, 2015-2024 (Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

## Indonesia

The 2025–2029 National Immunization Program sets ambitious targets aligned with the National Medium-Term Development Plan, the Health Sector Master Plan, and the global Immunization Agenda 2030, with a strong emphasis on the principle of “leaving no one behind,” particularly in preventing measles. As a priority health program, immunization aims to ensure that all individuals, especially children, receive complete vaccination, which is critical to achieving and sustaining herd immunity against highly contagious diseases like measles. The program contributes to broader national goals, including the vision of

“Golden Indonesia 2045,” by improving population health and productivity. Measles control is embedded within strategic indicators such as the percentage of districts and cities reaching herd immunity targets, supported by clearly defined program and activity performance indicators. Through a structured strategy, roadmap, and sustainable funding approach, the program seeks to strengthen measles immunization coverage, reduce outbreaks, and move closer to elimination by 2029 (Ministry of Health Indonesia, 2025).

There are two strategies developed to achieve the Immunization Program Goals, each has its interventions:

- Strategy 1: Increasing high, equitable, and high-quality immunization coverage, expanding new antigen coverage, and strengthening surveillance of vaccine preventable disease and Adverse Events Following Immunization (AEFI), consists of four interventions.
- Strategy 2: Strengthening management and governance of the Immunization Program at all levels, consists of two interventions.

The approach of these two strategies aligns with the seven strategic priorities of the 2030 IA and their adaptations at the regional level. Each intervention is outlined in operational plan activities and

serves as the basis for preparing funding requirements, divided into ten annual cost components (Ministry of Health Indonesia, 2025).

As shown in Figure 22, Indonesia’s measles trends reflect shifting vaccine coverage and delayed effects on incidence between 2015 and 2024. MCV1 remained around 80-92%, while MCV2 rose from 31% in 2015 to 71% in 2019, coinciding with declining incidence (WHO, 2026a). Coverage dropped sharply in 2020–2021, with MCV1 falling to 72%, preceding a major surge in 2023 to over 70 cases per million. In 2024, MCV2 reached 82% and incidence declined to 25 per million. The pattern indicates that even short-term declines in coverage can trigger substantial surge.

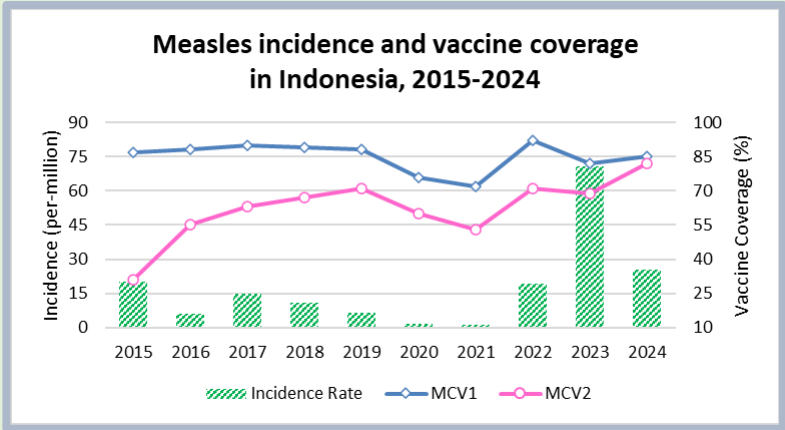


Figure 22. Trend of measles incidence and vaccine coverage in Indonesia, 2015-2024 (Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

## Lao People's Democratic Republic

The Government of the Lao People's Democratic Republic, in partnership with UNICEF and WHO, has reaffirmed its commitment to measles elimination through the adoption of the NIS 2025–2030 (Lao Government, 2026). Concurrently, a programme-wide consultation was launched to shape the next Country Programme for 2027–2031, ensuring that every child is reached with essential vaccines. To advance toward elimination, Lao PDR is expanding digital tracking systems to monitor newborns and their vaccination status in real-time. This digital transformation aims to achieve higher routine coverage, enable timely detection of potential outbreaks, and advance Lao PDR toward measles elimination while leaving no child unprotected.

To address disruptions caused by the COVID-19 pandemic, the Ministry of Health launched a large-scale Measles and Rubella Supplementary Immunization Activity (MR SIA) in May 2024 (WHO, 2024a). Supported by Gavi, the Australian Government, WHO, and UNICEF, the campaign successfully reached 95.2% coverage. A critical factor in this success was the multi-sectoral coordination led by the National Immunization Programme (NIP), which engaged local governance and mass organizations to mobilize communities. Beyond vaccination, the

campaign integrated Vitamin A supplementation to strengthen children's overall immune health.

In 2025, proactive measures resulted in the vaccination of nearly 36,000 children specifically in outbreak-prone regions (Lao Government, 2026). UNICEF continues to play a vital role by managing cold chain logistics and social mobilization, ensuring that vaccines are distributed safely and efficiently across the country's diverse geography. Collectively, these strategic investments in digital infrastructure, inter-agency collaboration, and targeted campaigns demonstrate Lao PDR's progress toward a resilient routine immunization system that protects every child.

Between 2015 and 2024, measles trends in Lao PDR show a clear link between declining vaccine coverage and increased transmission (Figure 23). MCV1 coverage was 78% in 2015 but reductions led to heightened vulnerability, culminating in a 2019 peak of nearly 180 cases per million as MCV1 and MCV2 fell (70% and 50%, respectively) (WHO, 2026a). Coverage dropped further in 2021, with MCV1 reaching 62%, before gradually recovering. By 2023, MCV1 and MCV2 converged at 69%, with incidence returning to near zero. This pattern underscores the importance of sustained immunization to prevent outbreaks.

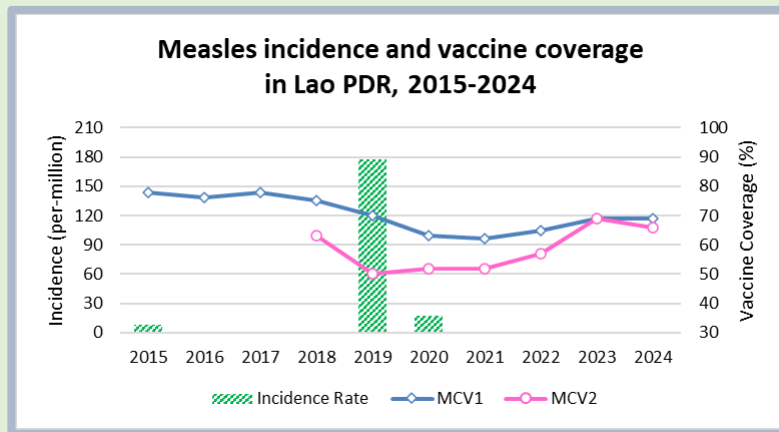


Figure 23. Trend of measles incidence and vaccine coverage in Lao PDR, 2015-2024 (Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

## Malaysia

Within the Malaysia National Action Plan for Health Security (MyNAPHS) 2025 - 2030, measles control is positioned as a critical component under the pillar of prevention and risk reduction, implemented through the national immunization program and disease elimination strategies (Ministry of Health Malaysia, 2026). The overarching objective is articulated in Goal 4.4: Advance Immunization Prevention, which targets the elimination of measles and rubella by 2030. To achieve this, Malaysia has adopted the National Strategic Framework for Measles and conducted short-term risk assessments to identify immunity gaps.

The national immunization schedule mandates MMR vaccination at 9 and 12 months of age for all children, with an additional measles dose at 6 months in Sabah (WHO, n.d). Where immunity gaps are detected, Supplementary Immunisation Activities (SIA) are deployed,

targeting children aged 6 months to under 5 years, supported by risk communication campaigns through Info Sihat and the MySejahtera application (Ministry of Health Malaysia, 2025).

Case-based surveillance with mandatory laboratory confirmation forms the backbone of detection and response, reinforced by national and subnational laboratories accredited by WHO in 2023–2024 (WHO, 2024b). This capacity ensures diagnostic quality, accurate case classification, and rapid outbreak response through Outbreak Response Immunisation (ORI).

Continuous monitoring via KKMNOW provides transparent data to evaluate immunization trends and outbreak patterns, while performance indicators include reductions in measles/rubella incidence and full implementation of the national strategic framework (Ministry of

Health Malaysia, n.d). Collectively, these measures underscore Malaysia's commitment to measles control, health system strengthening, and readiness to achieve regional elimination targets for measles and rubella by 2030.

Between 2015 and 2024, Malaysia experienced notable fluctuations in measles vaccine coverage and a corresponding rise in disease incidence

(Figure 24). MCV1 remained relatively high, while MCV2 declined from 99% in 2015 to 84% in 2020 (WHO, 2026a). Although incidence dropped to near zero in 2021–2022, this was followed by a sharp resurgence. By 2024, MCV1 stabilized at 96% but MCV2 fell to 93%, coinciding with a peak incidence of nearly 110 cases per million. The pattern suggests that declines in second-dose coverage can precede significant increases in transmission.

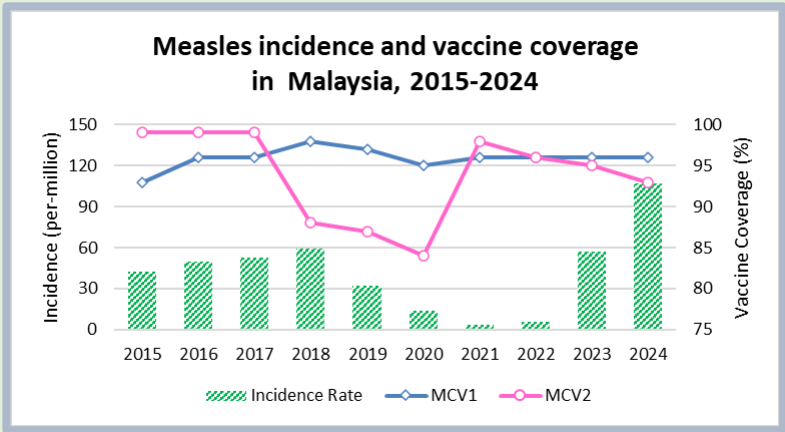


Figure 24. Trend of measles incidence and vaccine coverage in Malaysia, 2015-2024 (Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

# Myanmar

Myanmar's measles and rubella elimination efforts are aligned with global strategies and implemented through the national immunization programme (Ministry of Health Myanmar, 2022). Measles vaccination was introduced in 1987, with the second dose gradually expanded nationwide by 2012 (WHO, 2023b). Under the current schedule, children receive the first dose at nine months and the second between 15 and 18 months (Ministry of Health Myanmar,

2022). Catch-up immunization during routine health visits is therefore critical, and parents are encouraged to check vaccination records to ensure full coverage. Immunization efforts are integrated with broader child health services, including Vitamin A supplementation and other EPI Plus interventions such as iron supplementation, malaria prevention, and integrated management of childhood illnesses. These measures help reduce the

risk of severe measles outcomes while addressing underlying health vulnerabilities.

In March 2025, Myanmar conducted a nationwide measles vaccination campaign targeting 6.4 million children aged 9 months to 5 years (McNab, 2025). The campaign combined door-to-door community outreach with well-organized vaccination services, supported by trained health workers and volunteers. Careful planning, follow-up of missed children, and strong community participation contributed to high uptake and reinforced public confidence in immunization programmes.

Community engagement plays a central role in improving coverage and equity. The Ministry of Health works with local groups, teachers, and civil society organizations to reach underserved populations and overcome barriers such as limited access,

low awareness, and hesitancy (Ministry of Health Myanmar, 2022). Surveillance is a key component of the measles elimination effort, with case-based monitoring integrated into the broader communicable disease system and supported by outbreak investigation and response mechanisms at all administrative levels.

Between 2015 and 2024, Myanmar's measles trends show high initial vaccine coverage followed by a sharp decline and fluctuating transmission (Figure 25). MCV1 and MCV2 began at 84% and 78% with near-zero incidence, but a major surge occurred in 2019, reaching nearly 100 cases per million (WHO, 2026a). Despite coverage peaking at 91% in 2020, uptake collapsed in 2021 to 44% (MCV1) and 42% (MCV2). Coverage gradually recovered but remained below pre-2020 levels, reaching 71% and 68% by 2024.

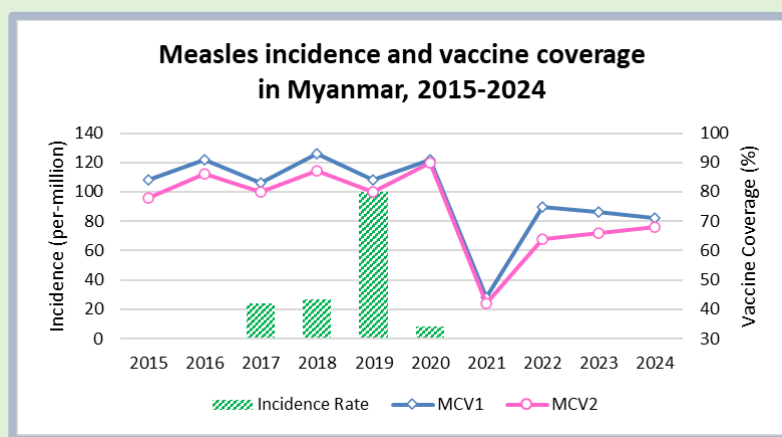


Figure 25. Trend of measles incidence and vaccine coverage in Myanmar, 2015-2024 (Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

# Philippines

The Philippines has implemented a series of large-scale immunization campaigns to accelerate measles elimination. Nationwide mass vaccination drives were conducted in 1998, 2004, 2007, and 2011 to boost population immunity and reduce transmission (Department of Health Republic of the Philippines, 2023). In 2009, the country introduced a two-dose measles-containing vaccine schedule, with the first dose administered at 9–11 months and the second dose at 12–15 months, strengthening routine immunization coverage. Laboratory-based surveillance was also enhanced to improve confirmation and monitoring of measles cases.

A major milestone was the 2011 supplemental immunization campaign, “Iligtas sa Tigdas ang Pinas” (“Save the Philippines from Measles”), which targeted 15.6 million children aged 9 months to 8 years with the measles-

rubella vaccine (Department of Health Republic of the Philippines, 2023). To ensure quality and coverage, a rapid coverage assessment was conducted, showing that 97.6% of eligible children in surveyed barangays were vaccinated. The government allocated approximately PhP 635.7 million to support this nationwide effort, underscoring its commitment to measles control and elimination.

Figure 26 shows that from 2015 to 2024, the Philippines showed marked volatility in measles transmission linked to shifting immunization levels. MCV1 remained around 80%, while MCV2 rose from 57% in 2015 to 67% in 2019, yet incidence surged to over 400 cases per million in 2019 (WHO, 2026a). Coverage declined sharply in 2021 to 64% (MCV1) and 55% (MCV2). Although uptake recovered by 2024 to 80% and 71%, incidence began rising again to 35 cases per million

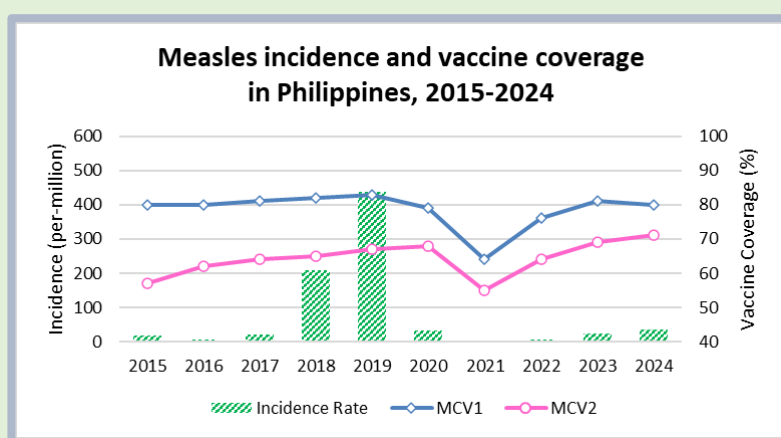


Figure 26. Trend of measles incidence and vaccine coverage in the Philippines, 2015-2024 (Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

## Singapore

Singapore has strengthened its public health measures to minimise the risk of measles transmission. These include rapid isolation of confirmed cases, thorough contact tracing, targeted vaccination, and quarantine of close contacts (Ministry of Health Singapore, 2026a). The measures, outlined in a national press release in early February 2026, have been widely disseminated through official communication channels. At the same time, healthcare providers are urged to remain vigilant and promptly report suspected cases to enable timely intervention, while public education efforts support early recognition and appropriate response to infection.

These response measures are reinforced by a strong prevention framework centred on high vaccination coverage—the most effective strategy against measles (Ministry of Health Singapore, 2019). Under the national immunisation schedule, children receive the first dose at 12 months and the second between 15 and 18 months, with vaccination compulsory for local children. Since 2019, this requirement has also been extended to foreign children applying for long-term passes to further strengthen population

immunity. The Health Promotion Board supports uptake through parental reminders and school-based catch-up programmes, while free vaccinations at polyclinics ensure equitable access. As a result, coverage remains high, reaching about 95% for the first dose at age two and 93% for the second dose by age seven.

Beyond childhood immunisation, adult vaccination provides an additional layer of protection. Under the National Adult Immunisation Schedule, adults without clear evidence of prior immunity are advised to complete two doses of the measles, mumps, and rubella (MMR) vaccine (Ministry of Health Singapore, 2026a). Those uncertain of their vaccination status are encouraged to consult healthcare providers to ensure adequate protection.

From 2015 to 2024, Singapore maintained high and stable measles vaccine coverage (Figure 27). MCV1 rose slightly from 95% to 97%, while MCV2 increased from 90% to 94% in 2020 before stabilizing around 92–93% (WHO, 2026a). Incidence peaked at 28 cases per million in 2016 and 2019, then declined sharply after 2020. From 2021 to 2024, incidence remained below 3 cases per million.

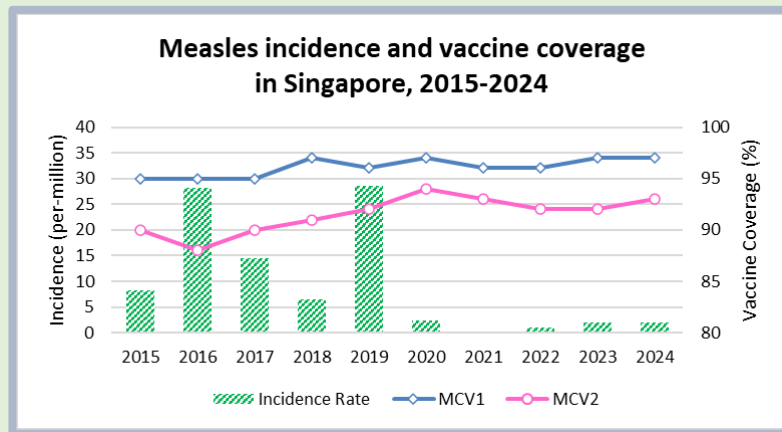


Figure 27. Trend of measles incidence and vaccine coverage in Singapore, 2015-2024 (Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

## Thailand

Thailand has maintained a strong commitment to measles and rubella elimination since 2010, guided by strategies to increase vaccination coverage, strengthen surveillance and laboratory capacity, and enhance outbreak response (WHO, 2025b). These efforts are overseen by the National Verification Committee in collaboration with the Ministry of Public Health and international partners.

In 2024, MMR vaccine coverage reached 87.6% for the first dose of the measles–mumps–rubella (MMR1) vaccine and 86.5% for the second dose (MMR2) (WHO, 2025b). Targeted campaigns have focused on high-risk groups, including prisoners and healthcare workers. However, vaccine hesitancy continues to limit uptake. In response, authorities have introduced measures such as provincial performance targets and linking vaccination with social support programmes.

In healthcare settings, infection prevention is critical due to the airborne transmission of measles and its infectious period from four days before to four days after rash onset. Facilities implement Standard and Airborne Precautions, including isolating suspected cases or establishing cohort wards during outbreaks (Department of Disease Control, 2024). Effective management requires immune healthcare workers, adequate ventilation, and physical separation from other patient areas. In outpatient settings, early detection is prioritised through screening for fever and the “3C” symptoms (cough, coryza, and conjunctivitis) followed by prompt isolation and infection control measures.

Control strategies are also adapted to community settings. In schools, vaccination records are verified and catch-up doses provided, while suspected cases are excluded for at least four days after

rash onset and monitored for two incubation periods (Department of Disease Control, 2024). In air travel, rapid case identification supports timely contact tracing, post-exposure prophylaxis within 72 hours, and symptom monitoring for up to 21 days. For mass gatherings, risk is assessed based on population immunity and participant demographics, with international coordination in place to manage cross-border transmission.

Figure 28 shows that between 2015 and 2024, Thailand saw declining measles vaccine coverage followed by rising incidence. MCV1 remained at 99% and MCV2 at 95% through 2017, keeping cases low, but MCV2 dropped to 87% in 2018, preceding a 2019 peak of 75 cases per million (WHO, 2026a). Although incidence was near zero during 2021 to 2023, coverage continued to weaken, with MCV1 falling to 93% since 2021. This led to a sharp resurgence in 2024, reaching about 114 cases per million.

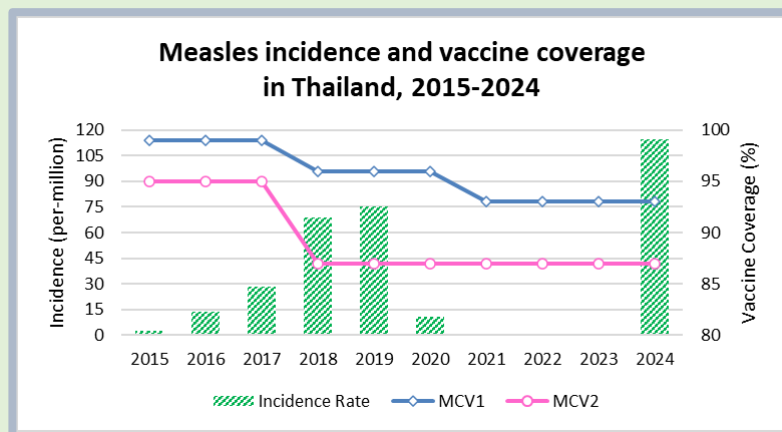


Figure 28. Trend of measles incidence and vaccine coverage in Thailand, 2015-2024 (Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

## Timor-Leste

Timor-Leste is advancing its immunization efforts with a new costed National Immunization Strategy for 2026–2030, designed to sustain and build on past successes in controlling measles and other vaccine-preventable diseases (WHO, 2025c). At a national workshop spearheaded by the Ministry of Health, with technical support from WHO and UNICEF, stakeholders reviewed the

immunization landscape and began shaping a strategic roadmap that prioritizes expanding vaccine access, strengthening cold chain systems, and bolstering surveillance and regulatory capacities—all essential to prevent measles resurgence. Timor-Leste has previously eliminated measles, and the new strategy aims to protect those gains by ensuring that immunization services

remain resilient, equitable, and adequately funded, helping to maintain high coverage and guard against outbreaks in the years ahead.

Between 2015 and 2024, Timor-Leste showed steady improvement in measles immunization, particularly MCV2 (Figure 29). MCV1 rose from 70% in 2015 to 77%

in 2018, then declined and stabilized at around 72% from 2021 (WHO, 2026a). MCV2 increased from 30% in 2016 to 72% by 2021, strengthening population protection. Despite this, incidence peaked in 2019 at over 25 cases per million. From 2021 to 2024, incidence remained low (1–7 per million), underscoring the impact of expanded second-dose coverage

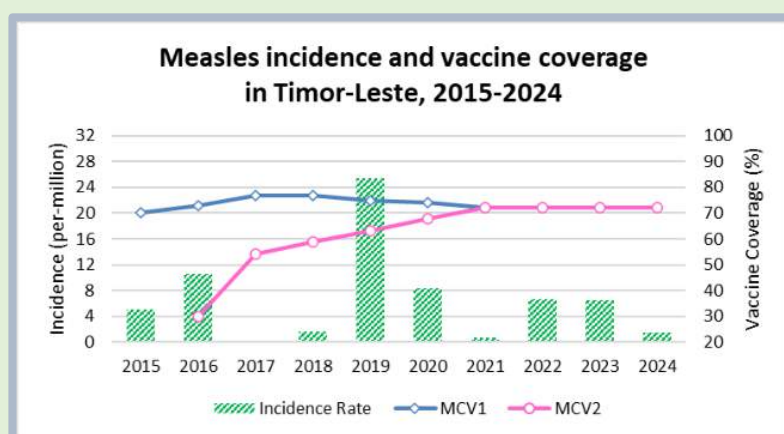


Figure 29. Trend of measles incidence and vaccine coverage in Timor-Leste, 2015-2024 (Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))

## Viet Nam

Viet Nam has strengthened its measles control efforts through expanded vaccination campaigns targeting children aged 9 months to 10 years. Routine immunization has been reinforced with support from international partners, while free domestically produced vaccines have helped sustain access, available since 2011 (WHO, 2014).

In response to recent risks, a nationwide campaign launched in September 2024 now covers 31 provinces and cities (Ministry of Health of Viet Nam, 2025).

Initial phases have been completed in several provinces, with others still underway. For 2025, efforts are being scaled based on risk assessments, including expanded vaccination for children aged 1–10 years and a supplementary programme targeting infants aged 6–9 months in high-risk areas.

Figure 30 shows that Viet Nam experienced notable fluctuations in measles vaccine coverage and incidence between 2015 and 2024. Coverage peaked

in 2016 at 99% (MCV1) and 95% (MCV2), then declined to 82% and 81% by 2022–2023 (WHO, 2026a). A major surge occurred in 2019, with incidence reaching nearly 60 cases per million. Although

transmission remained low during 2021–2023, cases rose again in 2024 to about 20 per million despite coverage rebounding to 98% and 95%.

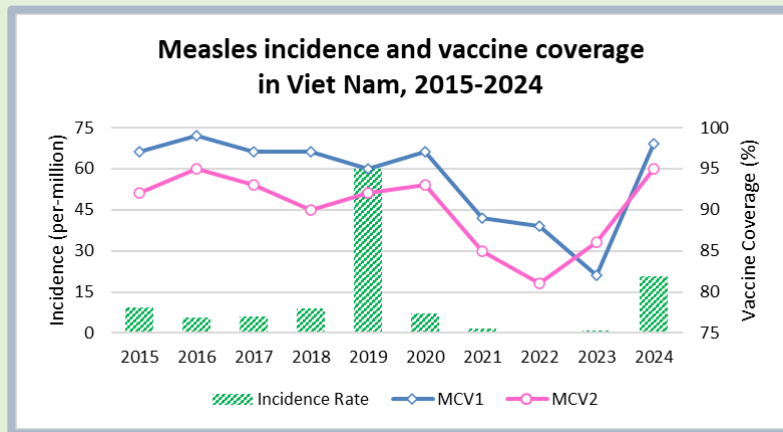


Figure 30. Trend of measles incidence and vaccine coverage in Viet Nam, 2015-2024 (Source: WHO immunization data (<https://immunizationdata.who.int/global?topic=Provisional-measles-and-rubella-data&location=>))



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*Email: [data@aseanbiosurveillance.org](mailto:data@aseanbiosurveillance.org)*  
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