

Measles outbreak prevention, preparedness, response and recovery

MEASLES OUTBREAKS STRATEGIC RESPONSE PLAN

2021–2023



World Health
Organization

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FOREWORD

The world experienced a measles resurgence in 2018 and 2019, resulting in significant numbers of cases and deaths, overloading health systems and reversing the gains made towards regional elimination goals. In 2019, the World Health Organization (WHO) and partners responded to outbreaks of measles in all six WHO regions. In response to widespread measles outbreaks globally, the WHO Director-General recommended the development of a measles outbreaks strategic response plan (MOSRP) to guide and inform comprehensive outbreak response efforts by all stakeholders to save lives and reduce the burden on health systems, enable mobilization of resources in support of affected countries and put the world back on track with measles elimination goals.

However, an additional challenge to measles immunization, surveillance and campaigns has emerged: coronavirus disease 2019 (COVID-19). By June 2020, disruptions to the normal functioning of immunization programmes were widespread. In some countries, vaccination services were completely halted, while in others, outreach for routine immunization was stopped or decreased, and fewer children were visiting vaccination posts. In 55 countries, previously scheduled supplementary immunization activities (SIAs) for measles-containing vaccines (MCVs) and other vaccines were delayed. Immunization has been reprioritized, and immunization staff have been redirected to COVID-19 responses. In many cases, supervision activities are not taking place, and the normal distribution of vaccines into and within countries has been disrupted. Case detection, investigations and notification have been hampered as surveillance and laboratory personnel and materials were redeployed for COVID-19. These disruptions to routine immunization services, mass campaigns, surveillance and other core risk mitigation capacities have further exacerbated vulnerabilities to measles outbreaks globally.

Outbreak preparedness and timely response is a core component of the global measles elimination strategy and is embedded in the Immunization Agenda 2030 (IA2030). The seven strategic priorities are: 1) primary health care and universal health coverage, 2) commitment and demand, 3) coverage and equity, 4) life-course and integration, 5) outbreaks and emergencies, 6) supply and sustainability, and 7) research and innovation. Within the IA2030, measles vaccination coverage and measles incidence are key indicators, and measles serves as a sensitive tracer of the overall strength of immunization programmes. Additionally, the levels of coverage with measles second dose vaccine (MCV2) in routine immunization are used as indicators in the Sustainable Development Goals (SDGs).

The MOSRP consolidates strategic preparedness and response plans developed by WHO regional offices and describes priority actions. The MOSRP supports achievement of strategic priorities of the post-2020 *Measles & rubella strategic framework* (MRSF 2021–2030). The MRSF provides a high-level framework guiding the development of regional and national strategies and operational plans, highlighting key strategic pivots and focus areas for the next decade. The MOSRP is fully aligned with the MRSF and IA2030 and aims to establish convergence with other key agency strategy documents, including the 13th WHO General Programme of Work 2019–2023, the United Nations Children's Fund (UNICEF) Immunization Roadmap 2018–2030 and the Gavi Alliance 2021–2025 Strategy (Gavi 5.0).

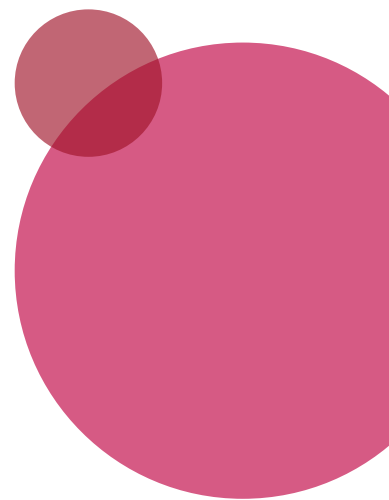


The MOSRP has been developed collaboratively with key stakeholders, including members of the Measles & Rubella Initiative (M&RI) partners [American Red Cross (Am Cross), the United States Centers for Disease Control and Prevention (CDC), the United Nations Foundation (UNF), UNICEF and WHO]; Gavi, the Vaccine Alliance; and the Bill & Melinda Gates Foundation (BMGF). These partnerships increase the effectiveness of health security governance and help strengthen health systems, making M&RI a crucial element to achieve both universal health coverage (UHC) and health security. WHO's work on measles outbreaks may warrant engagement with non-State actors who can provide services that may assist with public health efforts. Engagement with non-State actors is in line with WHO's *Framework of engagement with non-State actors* (1).

Achieving UHC is one of the targets the nations of the world set when adopting the SDGs in 2015. Advancing towards UHC also implies developing strong and sustained support for all components of UHC, including vaccinations, from domestic and donor resources. Countries that advance towards UHC will make progress towards the other health-related targets and towards other SDGs. Moving towards UHC requires strengthening health systems in all countries. Strong health systems are needed to ensure individual and global public health security. We must ensure the capacity of health systems to take on public health emergencies, mitigate disruption and continue to provide essential care as much as possible under even the most challenging circumstances. Strengthening local, provincial and national capacities under the International Health Regulations 2005 (IHR) is therefore a critical element of UHC.

The Global Health Security Agenda (GHSA), a broad partnership of governments, United Nations (UN) agencies and civil society organizations, was launched in 2014 to ensure full implementation of IHR and to promote global health security, particularly related to threats from infectious diseases. GHSA provides support to priority countries through a framework of "Prevent-Detect-Respond" that includes measles vaccination coverage as a GHSA performance indicator. The GHSA uses the WHO Joint External Evaluation (JEE) process and associated indicators as a common set of metrics to prioritize countries to improve their JEE scores. GHSA and the UHC agenda (2) can dovetail with efforts to strengthen primary health care systems, immunizations and preventive services, disease surveillance, and outbreak preparedness and response capacity, providing synergy for measles elimination efforts (3,4).

Investing in measles and rubella elimination and this health emergency preparedness approach, a key component of UHC and health security, will support quicker national outbreak detection and response capacities and mitigate the risk of measles outbreaks and their societal and economic impacts. National leadership that invests in strengthening health systems and intersectoral efforts will achieve a whole-of-society approach to measles outbreak preparedness, response and recovery.



ACRONYMS

| | |
|-----------------|--|
| AAR | After Action Review |
| Am Cross | American Red Cross |
| BMGF | Bill & Melinda Gates Foundation |
| CDC | United States Centers for Disease Control and Prevention |
| CERF | Central Emergency Response Funds |
| CFE | Contingency Fund for Emergencies |
| CI | Confidence Interval |
| COVID-19 | Coronavirus Disease 2019 |
| CSO | Civil Society Organizations |
| cVDPV | Circulating Vaccine-Derived Poliovirus |
| EOC | Emergency Operations Centre |
| ERF | Emergency Response Framework |
| Gavi | Gavi, the Vaccine Alliance |
| Gavi 5.0 | Gavi Alliance 2021–2025 Strategy |
| GHSA | Global Health Security Agenda |
| GOARN | Global Outbreak Alert and Response Network |
| GPEI | Global Polio Eradication Initiative |
| IA2030 | Immunization Agenda 2030 |
| IFRC | International Federation of the Red Cross |
| IHR | International Health Regulations |
| IMST | Incident Management Support Team |
| IPC | Infection, Prevention and Control |
| IVB | Immunization Vaccines and Biologicals |
| JEE | Joint External Evaluation |
| MCV | Measles-Containing Vaccine |
| MCV2 | Measles Second Dose |
| MIMS | Measles Incident Management System |
| MMR | Measles Mumps Rubella Vaccine |
| MoH | Ministry of Health |
| MOSRP | Measles Outbreaks Strategic Response Plan |
| MR | Measles Rubella Vaccine |

| | |
|-----------------------|--|
| M&RI | Measles & Rubella Initiative |
| MRSF 2021–2030 | Measles Rubella Strategic Framework 2021–2030 |
| MSF | Médecins Sans Frontières |
| MT | Management Team |
| NGO | Nongovernmental Organization |
| OBWG | Outbreak Response Working Group |
| ORI | Outbreak Response Immunization |
| PIWG | Programme Implementation Working Group |
| RCA | Root Cause Analysis |
| SDG | Sustainable Development Goal |
| SIA | Supplementary Immunization Activity |
| SimEx | Simulation Exercises |
| SOP | Standard Operating Procedure |
| SRP | Strategic Response Plan |
| UHC | Universal Health Coverage |
| UN | United Nations |
| UNF | United Nations Foundation |
| UNICEF | United Nations Children's Fund |
| USAID | United States Agency for International Development |
| US\$ | United States Dollars |
| WHE | World Health Organization Health Emergencies Programme |
| WHO | World Health Organization |

MOSRP FRAMEWORK

A strong, well-functioning national immunization programme that achieves high coverage with two doses of MCV is the foundation required for ensuring and sustaining high population immunity against measles. When building this foundation, supplementary activities are sometimes needed to reduce immunity gaps by reaching children who have received zero or only one dose of MCV. Rapid outbreak detection and response is a final critical tool for stopping measles virus transmission and preventing further spread.

The MOSRP presents a 4-pronged strategy to ensure outbreak and emergency preparedness and timely and effective response to limit the spread of disease and reduce its consequences under the MRSF 2021–2030: coordination, prevention, preparedness, response and recovery.

The MOSRP provides a road map for national and international stakeholders to advocate, mobilize resources and ensure adequate capacities and timely interventions to control outbreaks. The MOSRP aims to save lives and minimize the potential impact, and to use the preparedness and outbreak response efforts as entry points to strengthen routine immunization programme to increase population immunity to measles and rubella, in line with the draft *WHO measles outbreak guide (5)*, to be published. While the MOSRP focuses on preparedness, response and recovery, it lays out a framework to support preventive immunization activities in middle-income countries that are at increased risk of measles outbreaks but cannot benefit from existing funding mechanisms (that is, countries not eligible for Gavi support). Preventive immunization in Gavi-eligible countries remains a key priority intervention to achieve MRSF 2021–2030 goals. However, as these countries currently benefit from well-established financial support mechanisms, they are not considered among the targets proposed by the MOSRP.

Implementation of the MOSRP will provide a solid framework for all stakeholders to work together and achieve the plan's objectives and make a substantial contribution to strengthen community and country resilience, health security, UHC and sustainable development.

Vision

A world where all countries are equipped with robust measles outbreak prevention, preparedness and response systems.

Goals

The primary goal is that countries prevent, prepare for, respond to and recover from measles outbreaks with support from WHO and partners. The secondary goals are to improve surveillance so that outbreaks are rapidly detected and acted upon quickly, and to use outbreaks as entry points for strengthening routine immunization programmes and narrowing immunity gaps, leading to the prevention of future outbreaks.

Objectives

To achieve the goal of the MOSRP, national and international stakeholders will support national governments to implement public health actions with the following strategic objectives:

- 1 Coordination** – Enhance national, regional and global coordination mechanisms for measles outbreak preparedness and response.
- 2 Prevention** – Expand vaccination efforts in vulnerable communities through resource mobilization for risk-based national plans in countries that are not eligible for Gavi support.
- 3 Preparedness** – Enhance national capacity for outbreak preparedness in priority countries (e.g. planning, detection, readiness for investigation and response), including robust surveillance.
- 4 Response and recovery** – Improve the timeliness and effectiveness of investigation and response to measles outbreaks, including detection, root cause analysis (RCA) to identify programmatic gaps to prevent future outbreaks, after action reviews and recovery.

Core principles

People-focused: Include the gender-related perspectives and needs of all populations – including fragile, displaced and other vulnerable populations – in planning and implementing outbreak preparedness, response and recovery activities.

Country-owned: Countries take the lead to strengthen local capacity for outbreak preparedness and timely response, including the allocation of adequate technical and national financial resources and monitoring across the different levels of governance.

Partnership-based: Support countries to leverage the capacities of global, regional, and national stakeholders, including civil society organizations (CSOs), in the development of effective preparedness and response plans, with national governments in charge of coordinating the response. Explore partnerships outside the health sector (e.g. humanitarian).

Data-enabled: Utilize data to identify priority countries for strengthening national preparedness and response capacities. Support national use of information collected from outbreak investigations to guide outbreak response as well as strengthen the routine delivery of vaccination, support data-driven in-country monitoring and robust, efficient and effective nationally owned and led responses.

Rationale for investment in measles vaccination

Life-saving: The moral imperative to save lives with greater use of safe and effective tools.

Cost-effective: Measles vaccination efforts are cost effective and enable significant net economic benefits for countries.

Cost savings: Two-dose measles mumps rubella (MMR) routine vaccination schedules have demonstrated cost savings.



Targets and IA2030 alignment

Below are the MOSRP's high-level targets and IA2030 alignment, with definitions and monitoring and evaluation information subsequently provided under each strategic priority area.



- **Outbreak responders trained in measles and coordination systems**
- **Timely coordination support in measles outbreaks requiring moderate or major responses***

IA2030 strategic priority goal 5: Immunization programmes can anticipate, prepare for, detect and **rapidly respond to vaccine-preventable and emerging disease outbreaks.**



- **Countries not eligible for Gavi funding conduct risk assessments**
- **Countries not eligible for Gavi funding conduct preventive vaccination (e.g. SIAs)**

IA2030 strategic priority goal 1: Effective, efficient and resilient immunization services are accessible to all people as an essential part of primary health care, and thereby contribute to UHC.



- **National measles outbreak preparedness plans**
- **Measles outbreak preparedness score**

IA2030 strategic priority goal 5: Immunization programmes can anticipate, prepare for, detect and **rapidly respond to vaccine-preventable and emerging disease outbreaks.**



- **Countries submit measles outbreak response plans within 14 days of the start of an outbreak**
- **M&RI processes measles outbreak response plans and transfers funds within 7 days**
- **Outbreak response immunization (ORI) commences within 2 weeks of countries receiving support**

IA2030 strategic priority goal 5: Immunization programmes can anticipate, prepare for, detect and **rapidly respond to vaccine-preventable and emerging disease outbreaks.**

IA2030 strategic priority goal 5: **Establish timely and appropriate vaccination services in acute emergencies and humanitarian crises.**



- **Countries conduct an RCA within 2 months of ORI completion**
- **Countries complete recovery plans within 2 months of RCA**

IA2030 strategic priority goal 5: Immunization programmes can anticipate, prepare for, detect and **rapidly respond to vaccine-preventable and emerging disease outbreaks.**

* Under WHO's *Emergency response framework* (ERF), a graded emergency is an acute public health event or emergency that requires an operational response by WHO. There are three WHO grades for emergencies signifying the level of operational response by the organization: Grade 1 (limited response), Grade 2 (moderate response) and Grade 3 (major/maximal response).

Overview – global measles resurgence and COVID-19

Background

Despite concerted efforts and progress made towards the measles elimination goals, global measles first dose immunization coverage remained flat (~85%) during the 2010s. In response to outbreaks during 2010–2011, the M&RI created a measles outbreak response fund, supported and funded by Gavi. Starting in 2016, Gavi has expanded the range of measles control activities it supports in eligible countries, including introduction of measles rubella (MR) vaccine and MCV2, MR catch-up campaigns and follow-up MCV campaigns. The estimated number of measles cases decreased 65%, from 28 340 700 (95% confidence interval [CI] 20 045 300–64 971 300) in 2000 to 9 828 400 (95% CI 5 258 500–43 453 500) in 2019. During this period, estimated measles deaths decreased 62%, from 539 000 (95% CI 357 200–911 900) to 207 500 (95% CI 123 100–472 900). During 2000–2019, compared with no measles vaccination, measles vaccination prevented an estimated 25.5 million deaths globally (6).

Global measles resurgence of 2018–2019 and underlying factors

During 2018–2019, all WHO regions experienced at least one or more large-scale measles outbreaks necessitating response efforts by affected national governments and partners to contain and end the outbreaks. Some of these outbreaks, including the measles outbreaks in the Pacific Island Countries, Madagascar and the Democratic Republic of the Congo overwhelmed the capacities of the affected national governments and the existing mechanisms for outbreak response and necessitated unprecedented scaled-up comprehensive outbreak response measures with support from external partners, including the deployment of the Global Outbreak Alert and Response Network (GOARN) and emergency medical teams in Samoa. Major outbreaks were also reported in Brazil and other parts of the Americas, a region previously measles-free.

Complementing and supporting the work of countries and immunization partners, WHO's Health Emergencies Programme (WHE) can support and strengthen operational capacity in outbreaks and humanitarian emergencies. Established in 2016, following a major Ebola outbreak in West Africa, the new programme is designed to deliver rapid, predictable and comprehensive support to countries and communities as they prepare for, face or recover from emergencies caused by any type of hazard to human health, whether disease from outbreaks (including measles), natural or man-made disasters or conflicts. The programme provides various systems and tools applicable to measles outbreaks, including but not limited to detection systems and surveillance, risk assessment, field logistics and trained experts. The programme also oversees the four components of the IHR Monitoring and Evaluation Framework: 1) State Party Self-Assessment Annual Reporting, 2) JEEs, 3) Simulation Exercises (SimEx) and 4) After Action Reviews (AARs).

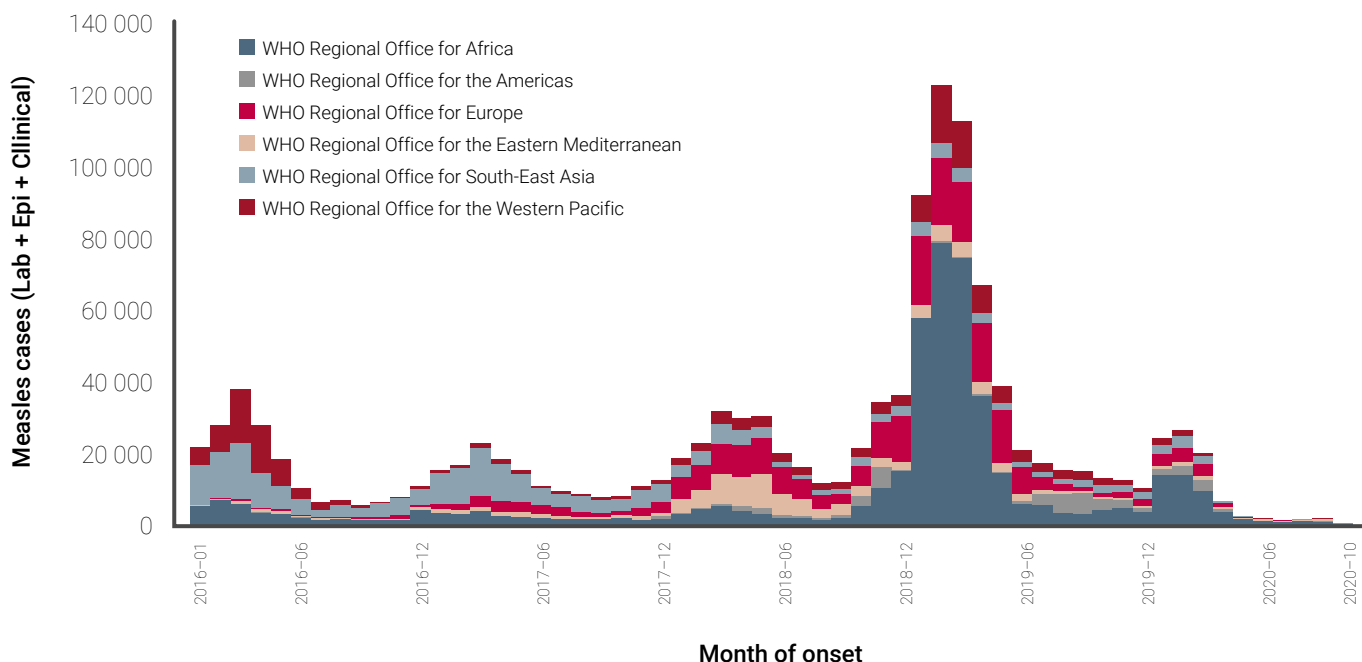
Measles outbreaks result from measles virus finding immunity gaps in the population, combined with travel-related importation and exportation of measles cases and population mixing. The proximate causes for immunity gaps differ widely depending on the national context and the characteristics of the people involved and are related to suboptimal vaccination coverage; failure to reach special subpopulations; protracted humanitarian crises; settings of fragility, conflict and violence; and forced migration. Further exacerbating these issues is vaccine hesitancy and crises of confidence related to inadequate responses to adverse events following immunization. However, the consistent theme is a failure to achieve and sustain homogenous high vaccination coverage in each birth cohort, high-quality surveillance and rapid response capacities.

Measles outbreak responses have frequently faced issues of inadequate and late planning, late detection and lack of adequate and timely resources for a comprehensive response driven by field investigation data. A lack of outbreak preparedness has been a common theme, including the absence of emergency plans or inadequate implementation of plans that should ensure implementation of measles-specific interventions, such as having adequate vaccines and devices, vaccinating infants from 6 months of age as well as training and supplies for adequate case management and infection, prevention and control (IPC) measures. Also, preparedness plans should address mechanisms to mobilize laboratory surge capacity and additional test kits and reagents for case confirmation as well as ongoing data analysis and monitoring of measles epidemiology.

COVID-19

In 2020, COVID-19 added a new dynamic to the measles situation. Since the first COVID-19 case was reported, 48 534 508 confirmed cases and more than 1.2 million deaths related to COVID-19 had been reported globally (as of 6 November 2020) (7). Against this already dangerous backdrop, as of October 2020, preventive and responsive measles vaccination campaigns were still being paused or postponed in many countries to help avert further spread of COVID-19. It was estimated that more than 94 million children in 26 countries, many of whom live in regions with ongoing measles outbreaks, could be impacted by the suspension of scheduled immunization activities. This staggering number does not include the number of infants who may not be vaccinated because of the effect of COVID-19 on routine immunization services.

Figure 1. Measles case distribution by month and by WHO region (January 2016–November 2020)



Note: based on data received 2020–11.

Data Source: WHO Immunization Vaccines and Biologicals (IVB) Database. This is surveillance data, hence for the last month(s), the data may be incomplete.

As of June 2020, it was clear that disruptions to demand and to the normal functioning of the immunization programmes were widespread and that vaccination services have been completely stopped in some countries. Immunization programmes in some countries have indicated that no or limited outreach is taking place and that fewer users are visiting vaccination posts. Often countries deprioritize work in the immunization programme and deploy immunization staff to COVID-19 responses, resulting in disruptions of supervision activities and interruption of vaccine distribution (systems) within countries. Staff also are reluctant to work, and parents are reluctant to bring their children to vaccination sessions out of concern about exposing oneself or one's children to COVID-19. In addition, public health and social measures to restrict movement have decreased the use of health services and affected the performance of surveillance systems, including detection, investigation, laboratory confirmation and reporting of measles cases. While the range of disruptions and their dynamics vary, they are impeding routine immunization services, mass campaigns and other core capacities required for elimination. Countries everywhere need to be ready to close these susceptibility gaps and to respond to measles outbreaks. In addition, the proliferation of misinformation is having serious and lethal health ramifications in the context of a global pandemic. Even as the world is laser-focused on the search for a safe, effective vaccine, misinformation continues to spread about immunization as well, including rumours that routine immunizations are cover for COVID-19 vaccine trials. This vaccination infodemic is also impacting the demand for vaccination.

WHO outbreak grading

Within WHO, the WHE oversees the organization's detection of infectious threats (including measles) and the internal processes of risk assessment and grading. Measles risk assessments are conducted across the three levels of the organization, drawing on expertise from within WHE and IVB. Risk assessment is essential for grading measles outbreaks – a process outlined in WHO's ERF (8). The entire process of detection through grading is completed within days of an event being detected. WHO support for Grade 0 and Grade 1 outbreaks is managed by the WHO country office using existing capacities and resources. For all WHO Grade 2 and Grade 3 outbreaks (Gavi and non-Gavi eligible countries) necessitating external support, the three levels of WHO will coordinate efforts by standing up an Incident Management Support Team (IMST) to support the affected country to develop the national strategic response plan (SRP). WHO risk assessment and grading processes occur irrespective of global and regional plans for specific diseases. Measles outbreaks may be graded at the country, regional or global level with a review of grading every 3 months.



Gaps in current capacities

The common gaps in current capacities, drawn from a review of AARs, outbreak investigation reports and mission reports, are given below.

Coordination

Global

- Despite all six WHO regions setting elimination targets prior to 2020, there was no mechanism to coordinate the preparedness and response to measles outbreaks globally, including information sharing platform for partners (e.g. outbreaks across borders).

National

- Sub-optimally structured outbreak coordination committees have had limited effectiveness in outbreak management. On occasions, the same committee has been responsible for managing both the outbreak response and the preparations for preventive mass vaccination campaigns.
- Low-capacity countries do not always benefit from the deployment of international, trained experts to advise on the establishment of adequate response structures and provide strategic operational advice at all times in WHO Grade 2 and Grade 3 outbreaks.
- There is a lack of regional mechanisms to exchange lessons learned and best practices to coordinate the preparedness and response to measles outbreaks, including webinars or virtual meetings or platforms for sharing this information.

Preparedness and response

Funding and plans

- No consistent financial mechanism exists to support procurement of vaccines or to cover outbreak response operational costs in non-Gavi eligible countries.
- Few (if any) priority countries have recurring budget lines for plans and activities to strengthen IHR core capacities relating to preparedness, including measles-related activities.
- Some priority countries do not have recurring budget lines for launching immediate outbreak response activities, including for measles. This lack of rapidly available funding hampers the effectiveness of subnational and national response to outbreaks.
- COVID-19 related IPC requirements have increased the costs for implementing safe and effective measles ORI and SIAs.
- Long delays can arise between the country first signalling to international partners they require support for an outbreak and financial support becoming available.

Surveillance

- At most levels of health systems, it is rare to have dedicated surveillance staff. Staff are frequently unable to focus adequately on improving surveillance due to the urgent need to focus on closing immunity gaps through SIAs. Surveillance is frequently considered a lower priority when disease burden is high.
- Important surveillance challenges exist in many priority countries. Major hurdles are experienced with measles data timeliness, completeness, reliability and utility. Slow response has been an outcome of weak national systems for early outbreak detection and response.
- Surveillance is currently largely dependent on financial support from CDC and **Global Polio Eradication Initiative (GPEI)** with inadequate country ownership. Polio surveillance is the basis for measles surveillance in many low-income countries, and a decrease in funding for polio/polio transition is a risk to sustaining measles surveillance.



- Surveillance is frequently under the purview of a communicable disease department, not the immunization team, leading to gaps when detection of one case of measles is not frequently treated as an urgent issue requiring a response.
- Additional surveillance issues include a lack of reporting by clinicians, inadequate investigations/inappropriate epidemiological linking, lack of linking with laboratory data, and lack of genotype testing.

Outbreak investigation

- The timeliness of initiating outbreak investigations is frequently suboptimal.
- Some measles outbreak investigations do not provide a thorough description of the outbreak's epidemiology in terms of person, place and time to identify immunity gaps. The root causes of the outbreak are frequently not identified and addressed, representing missed opportunities for lessons learned from the outbreak to use measles as a tracer to strengthen immunization systems.

Risk assessment

- Subnational risk assessment should be done regularly in every country to inform actions to stop the spread of measles (or rubella) virus using the analyses recommended in WHO (9) or regional tools.

Administration

- Human resource planning and management is frequently a challenge in measles outbreaks within national authorities, exacerbated by the fact that human resources experts are seldom deployed to support country responses.
- Priority countries frequently face epidemics caused by numerous pathogens at the same time, placing significant pressure on M&RI partner country offices to manage operations. Experienced administrative support staff are infrequently surged to provide support to ensure smooth operations.

Vaccine and devices

- Some priority countries have had good systems in place to enable the rapid access to vaccines and devices; however, not in all settings. Immediate vaccination responses have been delayed in several countries due to a lack of preparedness.
- Vaccine access within countries has been a challenge in some settings of outbreak response.

IPC

- Various outbreaks reported transmission of measles in health care facilities, including infections in health workers.
- There is a lack of national health care worker vaccination policies to avoid health care-acquired infections.
- There is a need to address issues of COVID-19-related IPC during measles outbreak response or SIAs.

Risk communication and community engagement

- Challenges with vaccine hesitancy have been noted during several measles outbreaks, hampering response efforts.
- Messaging about the infectiousness and severity of measles and rubella virus infections is weak in social communication plans.
- COVID-19 and the growing issues of infodemics have had important impacts on vaccine hesitancy across many settings.

Laboratory

- Gaps in specimen collection and transport materials, stockouts of test kits as well as laboratory capacity to meet the increased demands of measles outbreak confirmation and ongoing testing have been noted in priority countries in several of the last outbreaks.
- COVID-19 surveillance is placing further pressures on laboratory staff and capacity through repurposing of staff, laboratory spaces, equipment, shortage of diagnostic reagents or repurposing of these reagents and supply shortage due to shipment issues (no flights to ship supplies or transportation of clinical specimens to testing laboratory).

Clinical management

- While reported case fatality ratios in some priority countries were 1%–2%, far higher case fatality ratios were reported in some vulnerable populations (including Indigenous populations), and measles deaths are often underreported. Clinical management supplies were frequently exhausted during protracted outbreaks.

Training

- Regional measles outbreak response guides exist, and trainings have been conducted in various settings (e.g. WHO Regional Office for the Americas. WHO's global *Measles outbreak guide* (5) was recently updated in 2020; therefore, standardized trainings in line with the new guidelines are urgently needed.
- There is a lack of trained national and local experts experienced in measles outbreak control, surveillance and immunization, integral to the response.

SimEx

- SimEx are a useful way for countries to test their response plans and emergency operations platforms to then integrate lessons learned, but are infrequently conducted for measles using WHO guidelines (10).

AAR

- AARs are widely recognized as key learning and system improvement tools to enhance preparedness and response efforts; measles-specific AARs should be conducted more routinely using WHO guidance tools (11).

Prevention

Funding

- No routine global mechanism exists to provide financial support for prevention activities in priority non-Gavi countries that pose a high risk for regional spread.

Strategy

- There is no consensus among regions to promote synergies with multi-country synchronized campaigns to quickly achieve elimination.

Conflict-affected countries and fragile states

- Measles outbreaks are more likely in settings in which the health systems are disrupted or the ability to deliver vaccination and conduct surveillance and monitoring is threatened, such as in settings of fragility, conflict and migration. Many countries with recent outbreaks such as Central African Republic, Chad, the Democratic Republic of the Congo, Syrian Arab Republic and Venezuela illustrate this vulnerability. The measles outbreak in the Bolivarian Republic of Venezuela and the subsequent spread to many countries in the region (eight countries as of August 2020), due to an unprecedented migration, resulting in the loss of regional elimination status, highlights the importance of preventive measures in key fragile states for regional health security.

Cross-border

- Cross-border populations are often not included in immunization micro-plans, leading to immunity gaps in these communities. Furthermore, population movement across borders increases the risk of importation and spread of outbreaks between neighbouring countries. Increased monitoring, cross-border coordination, timely data sharing and joint action in the border areas will reduce immunity gaps in cross-border communities and mitigate risks of outbreaks.

Priority country selection

Global and regional MR partners have developed a simple two-step approach for prioritizing countries to target for enhanced risk mitigation support within the MOSRP. The countries identified through this process are subsequently referred to as the “priority countries” in this document. First, countries were selected by applying the following criteria: (i) estimated disease burden, (ii) vaccination coverage estimates, (iii) immunity profile to measles, (iv) fragility status, and (v) immunization system maturity. Second, with the emergence of the COVID-19 pandemic and its major impacts on preventive and reactive vaccination campaigns, routine immunization systems and outbreak preparedness and response, WHO regional offices

coordinated with their respective countries to collect relevant data on disruptions, which were integrated into the risk assessment process. All WHO Member States are considered for prioritization. The MOSRP-enhanced support for priority countries oriented by this global risk assessment includes: 1) preparedness interventions, and 2) preventive vaccination activities in priority non-Gavi eligible countries. Regional risk and prioritization will be (re-)assessed annually and in case of large outbreaks. Outbreak response support will be provided irrespective of the priority country list.

Table 1. Priority countries for 2021 by WHO region and Gavi eligibility

| WHO region | Gavi-eligible | Non-Gavi eligible |
|-----------------------|---|---|
| Americas | | Bolivia, Brazil, Dominican Republic, Ecuador, Honduras, Mexico, Paraguay, Venezuela |
| African | Central African Republic, Chad, Democratic Republic of the Congo, Ethiopia, Guinea, Niger, Nigeria, South Sudan | Angola, Equatorial Guinea, Gabon |
| Eastern Mediterranean | Afghanistan, Pakistan, Somalia, Sudan, Syrian Arab Republic, Yemen | Iraq, Lebanon |
| European | Kyrgyzstan, Tajikistan, Uzbekistan | Bosnia and Herzegovina, Kazakhstan, Ukraine |
| South-East Asia | Bangladesh, India, [†] Myanmar, Nepal | Indonesia, Thailand |
| Western Pacific | Cambodia, Lao People's Democratic Republic, Papua New Guinea | Malaysia, Philippines, Viet Nam |

[†] As per Gavi Board-approved India strategy for 2016–2021, India will not receive additional support for an MR follow-up campaign in this period.

Priority area 1: Coordination

Objectives

Target 1: Outbreak responders trained in measles and coordination systems

Milestones: 80% by end of 2021, 85% by end of 2022, 90% by end of 2023

Indicator type: Process

Definition: Percentage of WHO (and M&RI partners) staff deployed via GOARN to WHO Grade 2 and Grade 3 outbreaks that are trained in the WHO Incident Management System and measles prior to deployment, 2021–2023

Numerator: Number of WHO (and M&RI partners) staff deployed via GOARN to Grade 2 and Grade 3 outbreaks that are trained in the WHO Incident Management System and measles on the OpenWHO platform (or regional platforms) prior to deployment

Denominator: Number of WHO (and M&RI partners) staff deployed via GOARN to Grade 2 and Grade 3 outbreaks

Data source: OpenWHO platform

Frequency: Each outbreak

Responsibility for implementation: WHO

Responsibility for reporting: Outbreak Response Working Group (OBWG)

Target 2: Timely coordination support in measles outbreaks requiring moderate or major responses* (see ERF for grading definitions [8])

Milestones: 80% by end of 2021, 90% by end of 2022, 100% by end of 2023

Indicator type: Outcome

Definition: Percentage of WHO Grade 2 or Grade 3 outbreaks with > 1 national or international expert deployed from WHO or measles partners to support Ministry of Health (MoH) outbreak response coordination within 2 weeks of a country request for assistance, 2021–2023

Numerator: Number of WHO Grade 2 or Grade 3 outbreaks with >1 expert deployed

Denominator: Number of WHO Grade 2 or Grade 3 outbreaks

Data source: AAR report and WHO human resources data

Frequency: Each outbreak

Responsibility for implementation: MoH

Responsibility for reporting: OBWG

* Under WHO's *Emergency response framework* (ERF), a graded emergency is an acute public health event or emergency that requires an operational response by WHO. There are three WHO grades for emergencies signifying the level of operational response by the organization: Grade 1 (limited response), Grade 2 (moderate response) and Grade 3 (major/maximal response).

Global coordination

MOSRP oversight is provided by the M&RI Management Team (MT), composed of key high-level members from the core institutions that form the governance of M&RI partnership (Figure 2). The M&RI MT provides political and strategic direction to the OBWG and makes the final decision on funding country applications to the M&RI Outbreak Response Fund for Gavi-eligible countries as well as other outbreak response funding (e.g. United States Agency for International Development [USAID], CDC, UNF funds) for countries not eligible for Gavi support. It also engages and identifies partners and donors in high-level discussions related to the MOSRP.

Global implementation monitoring will be performed through the partners' measles OBWG (Figure 2). The OBWG coordinates MOSRP activities to ensure timely implementation of the strategy and achievement of goals and objectives, monitor progress towards developing country-level plans, facilitate appropriate technical assistance and provide overall technical guidance and oversight of implementation.

The OBWG provides the technical sign-off on preparedness, prevention and response plans within the MOSRP. The OBWG is chaired by one of the WHO headquarters representatives to the M&RI MT, who also is a member of the WHO Measles Outbreaks IMST. The OBWG incorporates key stakeholders that include CDC, UNICEF, Am Cross, Gavi, BMGF, USAID, Médecins Sans Frontières (MSF), International Federation of the Red Cross (IFRC), UNF, and the WHO Secretariat for GOARN, and has been established with WHO leadership and secretariat support. The OBWG is responsible for information sharing through a designated online platform. Partners will contribute to the implementation of the MOSRP based on their mandate.

In 2019, WHO headquarters activated a Measles Outbreaks IMST that brings together the staff from the IVB and WHE at different levels of the organization (country, region, global) to collaborate and join efforts to support priority and affected countries with implementing measles contingency plans and SRPs. The IMST can be stood up/down based on need. The WHO IMSTs are structured with key functions, including but not limited to health operations, security and health information (see WHO's ERF [8]). WHO headquarters IMST provides organizational support and ensures a smooth and efficient running of all activities of the OBWG and partner engagement. It collects and analyses data to monitor the MOSRP implementation and disseminates information.

CDC similarly instituted a Measles Incident Management System (MIMS) in February 2020. MIMS teams focus on measles outbreak detection, mitigation and response. MIMS teams use knowledge gained to improve measles control programmes in priority and affected countries. MIMS reviewed and revised methods for estimating measles immunity profiles and produced national measles immunity profiles for all 194 WHO Member States. These profiles were combined with programmatic and surveillance data to develop in-depth national risk assessments for selected priority countries that had delayed supplemental measles immunization activities during the COVID-19 pandemic. The WHO IMST and MIMS coordinate their collaborative support through regular meetings and joint planning.

M&RI partners at global and regional levels will also ensure proper channelling of resources and assist in delivery of interventions, provision of technical and operation support, and monitoring impact.

M&RI will collaborate with the GPEI to integrate prevention and response measures against circulating vaccine-derived poliovirus (cVDPV) and measles, both of which are indicators of poor health system performance and/or capacity, and conduct a thorough analysis of the reasons for low immunization coverage in these outbreak settings.

In humanitarian settings, existing humanitarian coordination structures (e.g. health cluster), relationships and intelligence can be leveraged to ensure effective measles outbreak preparedness, response and recovery.

Regional coordination

WHO regional offices and M&RI partners will lead efforts to coordinate the measles outbreak prevention, preparedness, response and recovery activities of the MOSRP through regional coordination platforms. Regional WHO Measles Outbreak IMSTs may elect to work with similar structures in partner organizations at global and regional levels (e.g. CDC's MIMS, UNICEF regional offices or Africa Centres for Disease Control and Prevention).

Regional offices of WHO and UNICEF are responsible for direct country support to outbreak-affected and priority countries, and each of the regional offices has developed region-specific measles SRPs that are consolidated and integrated into the MOSRP. Similar to the global level, the regional Measles Outbreaks IMSTs draw on technical staff from regional immunization and emergency departments. The regional Measles Outbreaks IMSTs will interact seamlessly with the global Measles Outbreaks IMST and work in concert to support affected and priority countries to develop and operationalize country-specific SRPs. Additionally, regions will use the current regional partners coordination mechanisms for measles and rubella to oversee and strengthen coordination in support of the rollout of regional measles SRPs (Figure 2).

Regional offices of WHO and UNICEF will coordinate regional capacity for measles and other vaccine-preventable disease rapid response to ensure analytical and operational support for affected countries, drawing on expertise within immunization partners and using streamlined early release of funding for investigation and immediate response.



Country coordination

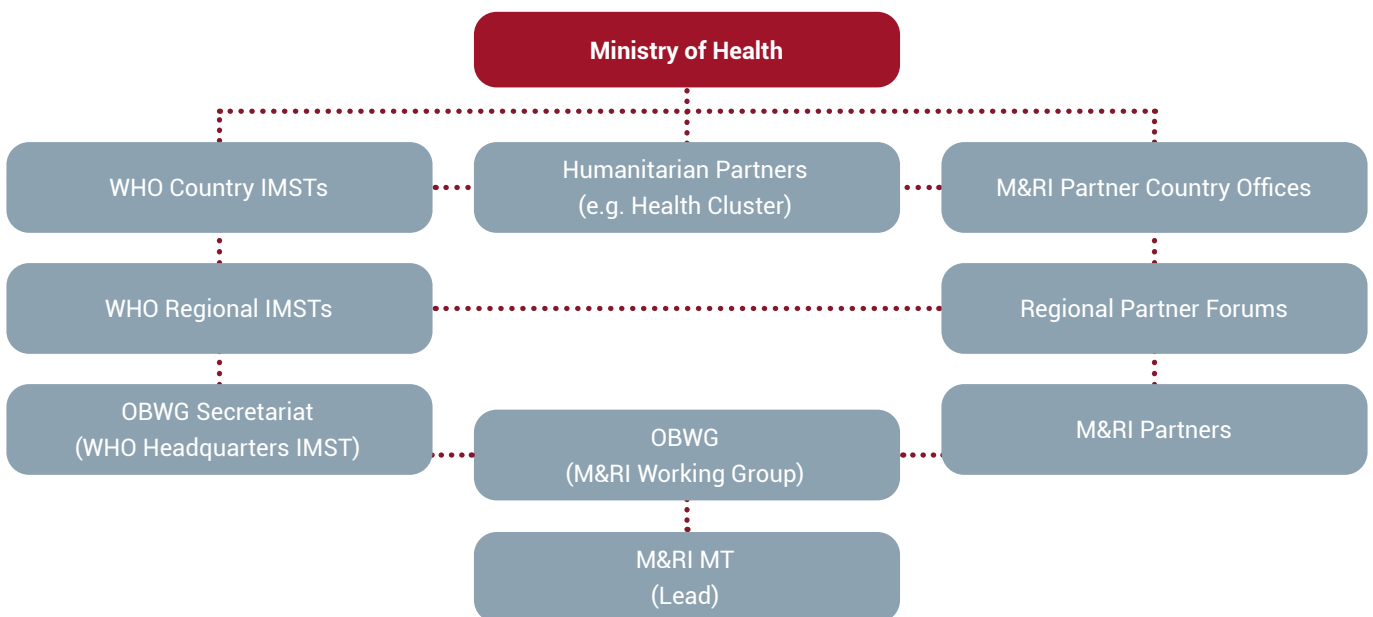
National and local health authorities are responsible for planning, implementation and evaluation of measles outbreak preparedness, prevention and response activities. M&RI partners support national response efforts through national measles outbreak coordination mechanisms (Figure 2).

WHO and partners will support the MoH of the affected country during outbreak response to activate national multisectoral coordination mechanisms, incorporating partners for the coordination of preparedness and response activities, including M&RI partner country offices, and other in-country partners such as MSF, USAID, other bilateral organizations, field epidemiology training programmes and national public health institutes. The national coordination mechanisms may further comprise working groups to facilitate the planning for, delivery, monitoring and reporting on key work streams outlined within the national contingency plans and SRP. The ability of CSOs to operate in areas beyond the reach of national governments or international agencies should be leveraged to effectively prepare for and respond to outbreaks or humanitarian emergencies as feasible. Collaboration and partnership with CSOs are key for emergency and outbreak response in countries experiencing protracted conflicts.

In line with the GHSA, response to widespread and large outbreaks of measles may also create an opportunity to support the MoH with creating or strengthening an emergency operations centre (EOC) that can provide an operational platform for coordinating preparedness and response interventions for measles outbreaks. This would enable the MoH Expanded Programme on immunization to better provide technical oversight of the coordination through the EOC that may include in-country partners. In settings responding to multiple emergencies simultaneously, the operations centre may not be at the national EOC (if available) but based within the Expanded Programme on Immunization unit. WHO will ensure a rotation of immunization experts with IMST training who will provide incident management support to MoH coordination in every Grade 2 or Grade 3 measles outbreak.

The MOSRP will also enable partners to plan, implement and monitor cross-border prevention and response activities in conflict areas, especially areas that are not under the control of national governments.

Figure 2. Measles outbreak coordination structures



Priority area 2: Prevention

Objectives

Target 3: Countries not eligible for Gavi funding conduct risk assessments

Milestones: 40% by end of 2021, 60% by end of 2022, 100% by end of 2023

Indicator type: Process

Definition: Percentage of non-Gavi eligible priority countries that conduct a national risk assessment that includes data generated by the WHO programmatic risk assessment tool (or WHO regional risk assessment tools), 2021–2023

Numerator: Number of non-Gavi eligible priority countries that conduct a national risk assessment

Denominator: Number of non-Gavi eligible priority countries

Data source: Risk assessments

Frequency: Once

Responsibility for implementation: MoH

Responsibility for reporting: WHO/UNICEF regional offices

Target 4: Countries not eligible for Gavi funding conduct preventive vaccination (e.g. SIAs)

Milestones: 60% by end of 2021, 80% by end of 2022, 100% by end of 2023

Indicator type: Outcome

Definition: Percentage of non-Gavi eligible priority countries that require preventive vaccination activities (e.g. SIAs) at national or sub-national level that conduct the needed preventive vaccination activity, 2021–2023

Numerator: Number of non-Gavi eligible priority countries that conduct the needed preventive vaccination activity

Denominator: Number of non-Gavi eligible priority countries that require preventive vaccination activities (e.g. SIAs)

Data source: SIA reports

Frequency: Once

Responsibility for implementation: MoH

Responsibility for reporting: WHO/UNICEF regional offices

Risk assessment approaches

District level risk assessments should be routinely conducted to identify at-risk localities and populations. Various methods can be used, including analyses outlined in the WHO *Measles programmatic risk assessment tool* (9), adaptations of polio risk assessment tools, analysis of surveillance data, data from SIA rapid monitoring (including reasons for non-vaccination), analyses of demographic health surveys, multiple cluster indicator surveys and other coverage survey data, and local knowledge. These assessments will be important to support decision-making and planning to address programmatic and immunity gaps at subnational level via SIAs and routine immunization strengthening activities in every country. WHO regional offices may adapt this tool when supporting priority countries for risk mitigation activities.

Within the MOSRP, as a complement to these existing in-country risk assessment processes, CDC is implementing individual country measles outbreak risk assessments in priority countries, based on WHO's *Rapid risk assessment of acute public health events* (12). This assessment provides decision-makers with an overall risk of measles outbreaks. Key elements include measles epidemiology, susceptibility, impacts of COVID-19 and recommended actions. MIMS has extended its immunity profile to provide estimated profiles in the future, based on scenarios reflecting different degrees of COVID-19 impact on routine immunization coverage and different choices in conducting campaigns early, late or not at all. These methods could be used more broadly, with support from funds raised through the MOSRP.

Each of these complementary country-level risk assessments will be used to inform national planning around SIAs and routine immunization strengthening required for risk mitigation in communities vulnerable to measles outbreaks and to justify funding applications (e.g. Gavi).

Preventive vaccination approach in non-Gavi eligible countries

Given the large role of countries that are not Gavi-eligible played in the global measles resurgence and regional spread, the MOSRP provides donors with a platform to support WHO and M&RI partners in filling immunity gaps of particular regional and global strategic importance, based on risk assessments and prioritizations. The platform will enable M&RI partners to target assistance such as technical support, planning, guidelines and specific activities like post-campaign surveys. The MOSRP funding platform will enable the identification and engagement of other funding sources that include national funding streams and other funding sources for high-priority non-Gavi eligible countries. These outbreak prevention activities will be tailored to country context and existing capabilities.

The MOSRP will support countries to use a continuous quality improvement approach to cycle through these guiding principles and identify and reduce immunity gaps in the country, adapted to context and setting (e.g. fragile, conflict and vulnerable):

- review and triangulate all available national and subnational data on the epidemiology of measles and potential immunity gaps (review of coverage data); identify, prioritize and implement interventions including identification and targeting of hard to reach groups; and assess the outcomes of interventions;
- strengthen routine vaccination as the primary strategy for increasing population immunity (e.g. routine outreach, catch-up schedules for missed doses, missed opportunities for vaccination assessments, second year of life platform strengthening, etc.);
- strengthen surveillance to enable more timely detection and to support countries striving towards elimination;
- conduct campaigns or periodic intensification of routine immunization when routine vaccination with two doses of MCV is suboptimal and to address specific gaps in immunity; and
- during and after campaigns (selective or non-selective), quickly prioritize activities to strengthen routine immunization.

The primary goal of campaigns or other preventive vaccination activities supported by the MOSRP will be to reduce immunity gaps and the risk of potential outbreaks by reaching unvaccinated (measles zero dose [i.e. has not received any MCV dose]) and under-vaccinated children using context-adapted approaches outlined in WHO guidance *Planning and implementing high-quality supplementary immunization activities for injectable vaccines (13)*. Unvaccinated and under-vaccinated children should be identified, monitored and documented so that they, their families and their communities can be followed up and provided with other missed vaccines and health interventions.

Campaigns should be used as opportunities to strengthen the immunization system and to integrate other health interventions to the extent that additional interventions or activities do not compromise the quality of the campaign.

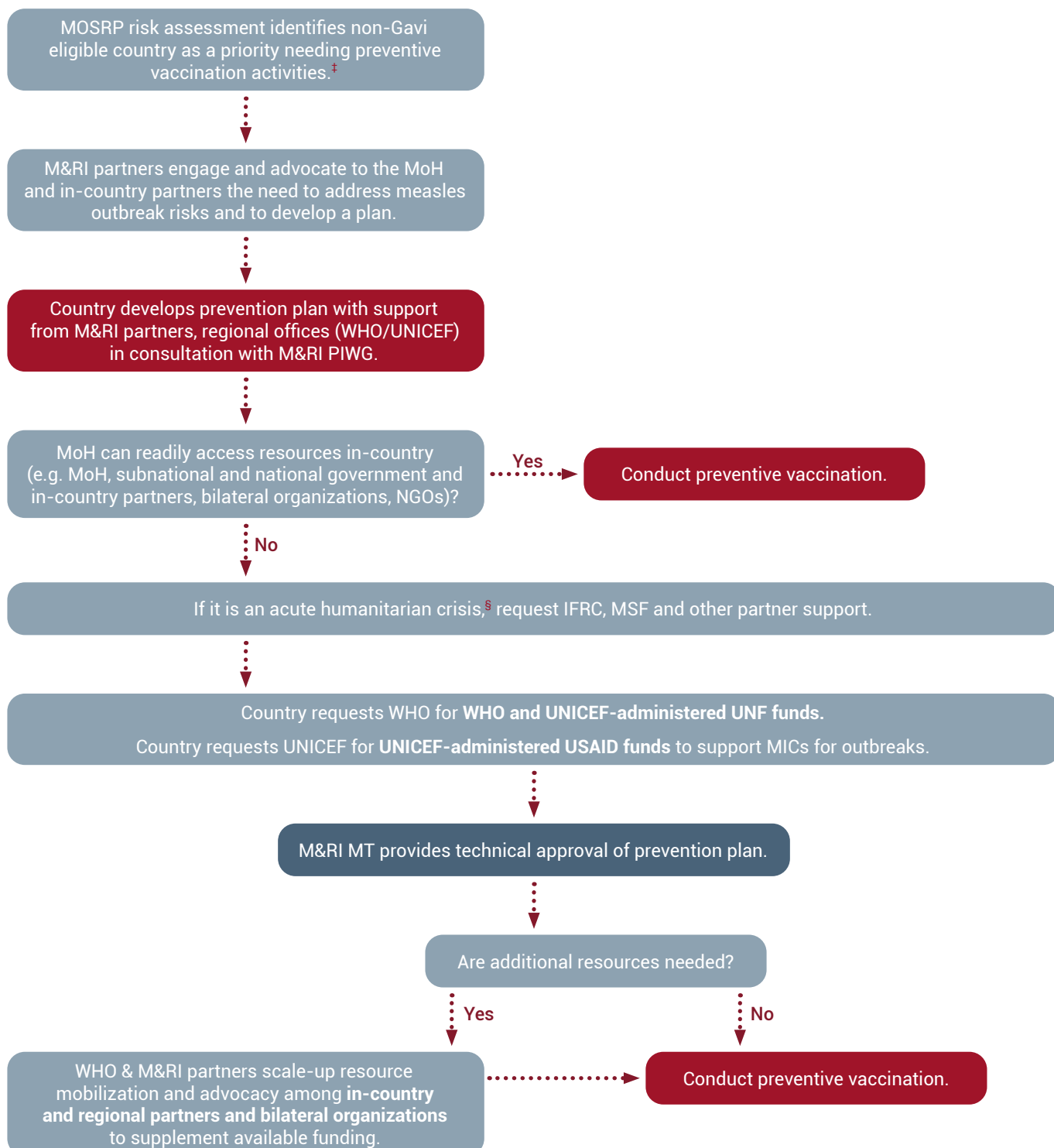
The vaccination strategy (including the identification and choice of target age group, timing, geographical scope and delivery strategy, whether selective or non-selective) will be informed by data on population immunity and epidemiology generated from surveillance data, previous outbreak epidemiology (and modelling where possible). Integration with other health interventions, such as joint delivery (where relevant) or integrated planning and coordination across activities, will be conducted in consultation with WHO and technical partners and based on country context/plans. Plans for the activities will demonstrate how missed children will be identified, vaccinated and brought back into the routine immunization system moving forward. External partner support may vary depending on the maturity of the immunization system and needs, ranging from provision of vaccine and/or operations costs to technical support, training, supervisory tools and surveys.

In the context of COVID-19, children may have missed many recommended vaccinations beyond measles. Strategies to catch-up missed vaccinations include reducing missed opportunities, both during immunization sessions and other contacts with health services, periodic intensification of routine immunization and school vaccination checks. These strategies described in the WHO guidance *Leave no one behind: guidance for planning and implementing catch-up vaccination (14)* may be supported through the MOSRP in priority countries or through other existing funding mechanisms.

As a prerequisite for MOSRP support, countries will formally agree to conduct an independent, statistically and technically sound post-campaign coverage survey following the supported campaign using probability sampling to assess levels of vaccination coverage achieved and the proportion of children who were reached for the first time with measles vaccine during the activity. The survey should be completed as soon as it is feasible and no later than 3 months after completion of the campaign. The campaign technical report (as per existing Gavi reports) and the post-campaign coverage survey report must be submitted to M&RI and should be discussed as part of the annual joint appraisal exercise to inform routine immunization planning and any additional routine immunization strengthening activities that may be required.

Estimating the funding needs for the preventive vaccination activities will be in line with what is needed to implement an effective campaign, given country capacity for self-financing. Funding will be made distinct from existing measles prevention activities conducted by country immunization programmes. Every effort will be made to identify opportunities for campaign integration and support provided for costing out campaigns which are integrated with polio or other antigens.

Figure 3. Prevention funding algorithm for non-Gavi eligible countries



‡ Gavi-eligible countries use existing alternate mechanism.

§ As listed under operations <https://www.humanitarianresponse.info>

Priority area 3: Preparedness

Objective

Target 5: National measles outbreak preparedness plans

Milestones: 60% by end of 2021, 80% by end of 2022, 100% by end of 2023

Indicator type: Process

Definition: Percentage of priority countries with a costed measles outbreak preparedness plan covering the period 2021–2023

Numerator: Number of priority countries with a costed measles outbreak preparedness plan

Denominator: Number of priority countries

Data source: Costed measles preparedness plan

Frequency: Once between 2021–2023

Responsibility for implementation: MoH

Responsibility for reporting: WHO/UNICEF regional offices

Target 6: Measles outbreak preparedness score

Milestones: 55% by end of 2021, 65% by end of 2022, 75% by end of 2023

Indicator type: Outcome

Definition: Percentage of priority countries with a measles outbreaks preparedness score of at least 75% based on the *Essentials of preparedness checklist by 2023*

Numerator: Number of priority countries with a measles outbreaks preparedness score of at least 75%

Denominator: Number of priority countries

Data source: Priority country self-assessment using essentials of preparedness checklist data, jointly conducted with or validated by WHO or UNICEF regional offices

Frequency: Annually

Responsibility for implementation: MoH

Responsibility for reporting: WHO/UNICEF regional offices



Essentials of preparedness checklist

In the MOSRP, this essentials of preparedness checklist should be used by priority countries to measure performance in achieving **Target 6**. All items are of the same value, for example, a country that ticks 6/8 boxes is considered 75% prepared for measles outbreaks according to the MOSRP.

- National plan for measles outbreak preparedness and response has been developed/reviewed in consultation with key stakeholders in the last 3 years
- National measles outbreak plan has been tested through a SimEx developed in line with WHO guidelines (10) (or a measles outbreak response) with plan and vaccination strategies adjusted based on outcomes in the last 3 years
- Country has assessed and mapped high-risk areas to target prevention and preparedness activities in the last 3 years
- Country has an established contingency fund mechanism (e.g. line item in national health budget) for measles outbreak response with a clear description how national, subnational and local levels can request support
- Measles testing is performed in a WHO accredited laboratory
- National outbreak investigation team(s) (e.g. rapid response team) is trained and equipped
- National standard operating procedures (SOPs) for 1) measles outbreak investigation and 2) case management have been developed and disseminated to respondents at relevant levels
- Country can deploy vaccines to outbreak areas within a week



Strengthening routine immunization coverage of two doses of MCV is the preferred approach for measles outbreak prevention in all countries.

All countries should introduce a second dose into their routine vaccination schedule, and policies should allow children of any age to receive two doses through routine immunization. Countries may need to implement a range of strategies to diagnose immunity gaps such as using coverage monitoring, surveillance, and surveys. Countries will close any gaps identified using periodic intensification of immunization activities, targeted preventive vaccination campaigns, and strategies to reduce missed opportunities for vaccination. Countries should monitor measles immunity in the population using standard tools. When immunity gaps remain, especially when estimated immunity gaps are reaching critical levels, high-quality campaigns are required. However, COVID-19 has hampered prevention efforts in many priority non-Gavi eligible countries. Priority countries will be supported to update and implement existing national plans for outbreak prevention. These prevention activities will be coordinated with existing country measles and rubella elimination plans.

Preparedness package for priority countries

Through the MOSRP, WHO and other M&RI and measles partners will develop a package of preparedness interventions, to be adapted by WHO/ UNICEF regional offices, for implementation by all countries prioritized during the global risk assessment process. This risk mitigation work will be undertaken with a global health security lens to strengthen IHR capacities through measles preparedness. Critically, improvement of measles surveillance to rapidly detect measles cases will be undertaken in the context of improving comprehensive vaccine-preventable disease surveillance. Resource mobilization for the implementation of preparedness activities will be conducted country-by-country by M&RI partners and disbursed via established or new financial channels and mechanisms of the M&RI partners.

WHO and UNICEF regional offices will lead the adaptation of the MOSRP preparedness intervention packages to existing needs and capacities in each country. The package for a priority country may include planning, mapping and assessments, prepositioning supplies and funding, national SOPs and training in line with the core risk mitigation capacities required by countries at different levels within their health system outlined in WHO's *Measles outbreak guide* (5). The core capacities include: leadership and coordination, preparedness and response planning, contingency finance, early warning surveillance and measles surveillance for monitoring progress towards elimination, SOPs, risk communication and community engagement, health workforce, health structures, logistics and supply chain and partner readiness. M&RI partners will support priority countries to develop a package adapted to the checklist results from the WHO guide for measles outbreaks and other relevant tools (e.g. IHR monitoring and evaluation framework).

Key elements of the package include:

Planning

- Technical assistance for identifying at-risk areas for measles outbreaks, mapping of partners, defining and tailoring interventions
- EOC/IMST – joint planning and capacity-building by WHO and partners
- SimEx – technical assistance and joint planning and implementation by WHO and partners
- Establish/define contingency funding mechanism for outbreak response

Vaccination

- Strengthening systems for access to vaccines in primary care
- Technical assistance for risk assessment, planning, vaccination and evaluation

Surveillance

- Rapid response team, including SOPs, tools and outbreak investigation training
- Laboratory, including SOPs, supply/kits procurement/prepositioning

Case management

- SOPs, supplies/kits procurement, prepositioning and training

Risk communication, community engagement and social mobilization

- SOPs, tools and training

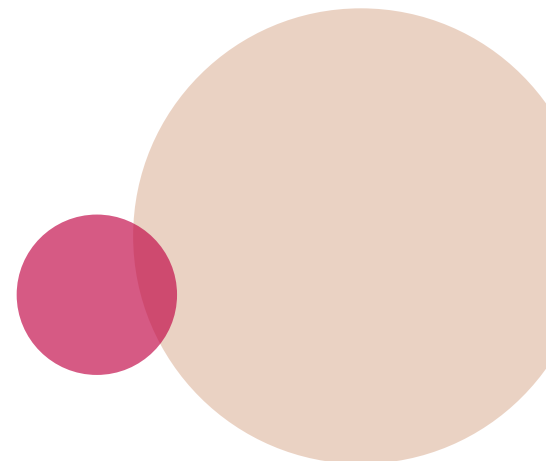
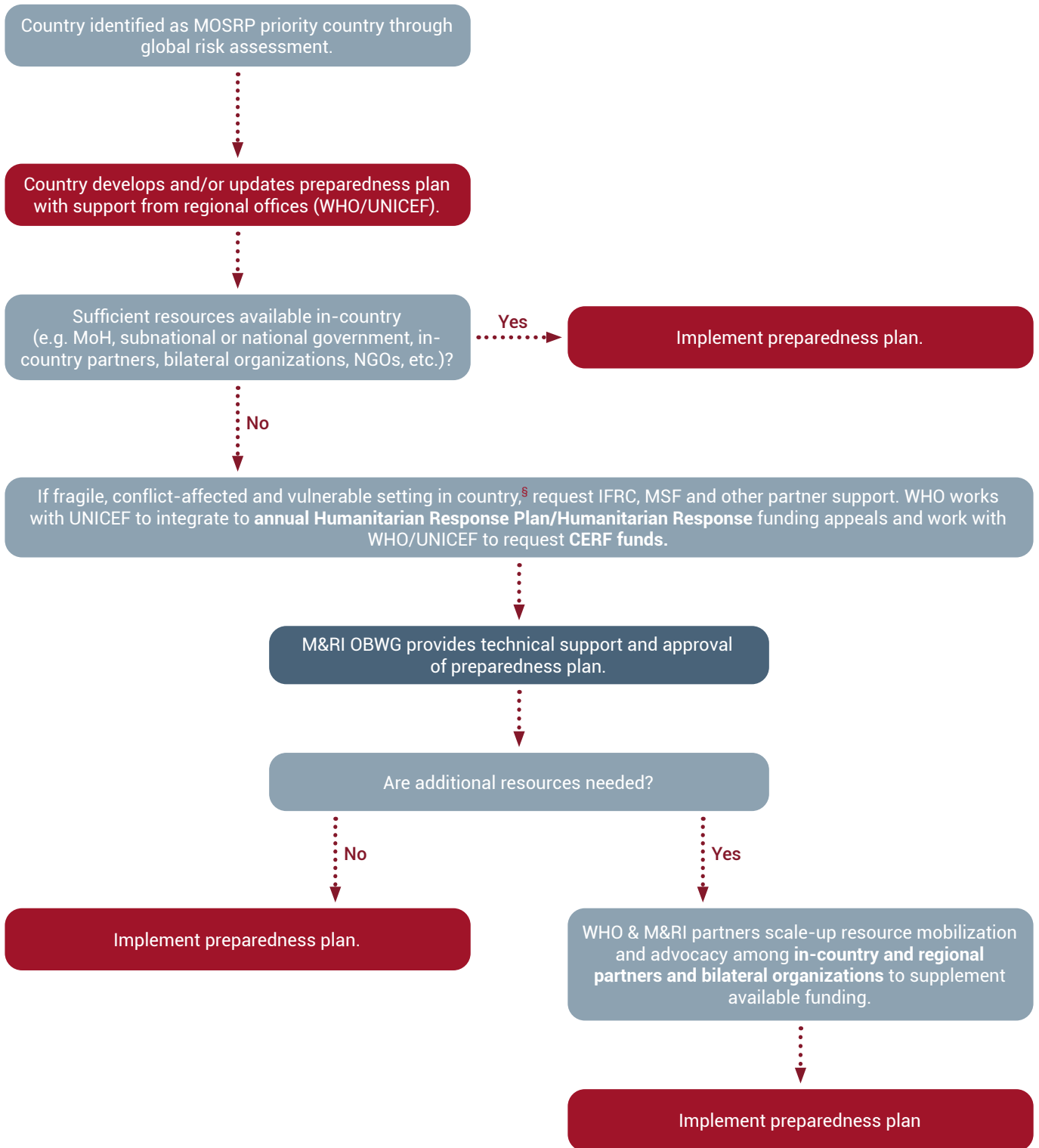


Figure 4. Preparedness funding algorithm



§ As listed under operations <https://www.humanitarianresponse.info>
Note: funding raised from MOSRP will complement the existing funding mechanism

Priority area 4: Outbreak response and recovery

Objectives

Target 7: Countries submit measles outbreak response plans within 14 days of the start of the outbreak

Milestones: 60% by end of 2021, 70% by end of 2022, 80% by end of 2023

Indicator type: Process

Definition: Percentage of countries submitting a plan for measles outbreak response support to the M&RI OBWG within 14 days of the start of an outbreak, 2021–2023. The start of an outbreak is any of the following: a) the first laboratory-confirmed case (in elimination settings), OR b) an MoH request to WHO/UNICEF country offices for technical support with writing/refining the outbreak plan, OR c) MoH notifying its intent to submit a plan via advanced notification

Numerator: Number of countries submitting a plan for measles outbreak response support to M&RI within 14 days of the start of the outbreak

Denominator: Number of countries submitting a plan for measles outbreak response support to M&RI

Data source: Measles outbreak plans

Frequency: Each outbreak

Responsibility for implementation: MoH

Responsibility for reporting: WHO/UNICEF regional offices

Target 8: M&RI processes measles outbreak response plans and transfers funds within 7 days

Milestones: 80% by end of 2021, 90% by end of 2022, 100% by end of 2023

Indicator type: Process

Definition: Percentage of outbreak response funding requests to M&RI that are processed, with funds transferred to WHO/UNICEF country offices, within 7 days of receipt of final country request by the OBWG, 2021–2023

Numerator: Number of outbreak response funding requests to M&RI that are processed, with funds transferred within 7 days of receipt by the OBWG

Denominator: Number of successful outbreak response funding requests to M&RI

Data source: OBWG minutes and M&RI communications

Frequency: Each outbreak

Responsibility for implementation: OBWG and M&RI MT

Responsibility for reporting: OBWG

Target 9: ORI commences within 14 days of countries receiving support¹

Milestones: 70% by end of 2021, 80% by end of 2022, 90% by end of 2023

Indicator type: Outcome

Definition: Percentage of outbreaks benefiting from funding and/or vaccines from the M&RI for which ORI implementation commenced within 2 weeks of these resources being made available at national level, 2021–2023

Numerator: Number of countries receiving funding and/or vaccines from the M&RI that commence ORI implementation within 2 weeks

Denominator: Number of countries receiving funding and/or vaccines from the M&RI

Data source: M&RI bank transfer records and/or vaccine shipment records

Frequency: Each outbreak

Responsible: WHO or UNICEF regional offices

Responsibility for implementation: MoH

Responsibility for reporting: WHO/UNICEF regional offices

Target 10: Countries conduct an RCA within 2 months of ORI completion

Milestones: 100% by end of 2021, 100% by end of 2022, 100% by end of 2023

Indicator type: Process

Definition: Percentage of countries that experience WHO Grade 2 or Grade 3 measles outbreaks that conduct a RCA using the WHO measles outbreak guide methods and finalize a report within 2 months of ORI completion, 2021–2023

Numerator: Number of countries that experience Grade 2 or Grade 3 measles outbreaks that conduct a RCA within 2 months of ORI completion

Denominator: Number of countries that experience Grade 2 or Grade 3 measles outbreaks

Data source: Documented RCA

Frequency: Each outbreak

Responsibility for implementation: MoH

Responsibility for reporting: WHO/UNICEF regional offices

¹ Unless there is justification not to commence immediately, as agreed by OBWG

Target 11: Countries complete recovery plans within 2 months of an RCA

Milestones: 100% by end of 2021, 100% by end of 2022, 100% by end of 2023

Indicator type: Outcome

Definition: Percentage of countries with a WHO Grade 2 or Grade 3 measles outbreak that finalize a recovery plan in line with the WHO outbreaks guide within 2 months of a RCA, 2021–2023.

Numerator: Number of countries that experience Grade 2 or Grade 3 measles outbreaks that develop a recovery plan within 2 months of the RCA

Denominator: Number of countries that experience Grade 2 or Grade 3 measles outbreaks

Data source: Recovery plans

Frequency: Each outbreak

Responsibility for implementation: MoH

Responsibility for reporting: WHO/UNICEF regional offices

Outbreaks in Gavi-eligible countries

Gavi will continue to fund the M&RI to support Gavi-eligible countries to conduct timely measles ORI. All Gavi-eligible countries that have a laboratory-confirmed measles outbreak of public health importance and cannot respond to the outbreak fast enough with in-country funding are eligible to request support from the M&RI Outbreak Response Fund for ORI that includes bundled vaccines and/or operational costs – see [here](#). Applications to the M&RI outbreak fund would be an integral part of the national SRP.

The MOSRP activities complement these existing processes by enabling additional resources to target key areas not previously covered by the M&RI outbreak response fund (e.g. case management kits, deployment of WHO case management experts). This support is not contingent on the WHO public health event grading process.

Funding sources for non-Gavi eligible countries are outlined in the algorithms in this plan.

WHO Grade 2 and Grade 3 outbreaks (all countries)

Coordination and planning

WHO country offices will ensure measles IMSTs operate within the framework provided by national coordination structures (e.g. COVID-19 taskforce, health cluster etc.), including the endorsement and planning of ORI activities outlined within the SRP. The national SRP will clearly articulate the gaps and the resources required, including surge of experts, and will inform the strategy for advocacy and resource mobilization. Current staffing of WHO field responses and projected needs in terms of international technical support will be shared by WHO with partners to enable a more coordinated and efficient surge of available resources from all partner agencies. The national SRP would be the basis of funding applications to all non-Gavi sources (e.g. CERF), with donor-specific modification in line with requirements.

Training

The WHO and measles outbreak partners will develop measles outbreak preparedness and response training tools in line with WHO's *Measles outbreak guide (5)*, which can be used for pre-service and in-service training of national health authorities. WHO will ensure that all WHO and partner staff deploying to measles incident management support teams are trained in measles incident management support.



Implementation of response activities

Depending on capacity gaps and needs, additional surge capacities will be mobilized locally, regionally and internationally to support all aspects of emergency preparedness and response. WHO will reach out to other institutions that include field epidemiology training programmes, regional networks of experts and Stop Transmission of Polio teams for possible deployments in support of outbreak response efforts. The technical assistance/surge teams comprising epidemiologists, surveillance officers, laboratory technicians, logistics officers and cold chain managers, outbreak investigation and immunization experts and supervisors, IPC and case management experts, and risk communication and community engagement experts will be recruited and deployed to affected countries based on needs and government request. Technical assistance may also be provided to enable a timely vaccination response (planning, training, implementation and monitoring). Key administrative experts will be deployed to support planning, human resources, budget and finance.

Life-saving measles case management kits will be deployed according to need to ensure early, adequate care of measles cases as well as laboratory diagnostic equipment (specimen collection, transport, diagnosis) and outbreak monitoring.

Rapid convenience monitoring

The MoH is responsible for the planning and implementation of rapid convenience monitoring to monitor for areas with unvaccinated children as well as management, analysis, presentation and interpretation of these data, with M&RI partner technical support, where relevant. WHO and partners will provide technical support in the use of rapid convenience monitoring and mop-up vaccination as an integral part of localized measles outbreak response vaccination activities. Post-campaign coverage surveys to measure immunization coverage will only be supported when outbreak response vaccination campaigns cover large geographical areas (e.g. provinces or states).

AAR

The MoH will work with WHO and partners to review the outbreak response following WHO's *Guidance for after action review (AAR)* (11). The AAR will be used to reveal and help document lessons in terms of best practices and gaps in outbreak response efforts as well as generate recommendations to improve preparedness for future outbreak responses. Any recommendations to improve preparedness will ideally be presented, discussed and adopted and inform recovery planning workshops with key government representatives and other stakeholders.

RCA and recovery

The recovery phase is to develop and implement activities to strengthen routine immunization and surveillance based on the findings of the RCA. In countries with limited capacities and weak health systems, national governments will be supported to maintain and sustain collaboration with civil society, nongovernmental organizations (NGOs), private sectors and other UN agencies in the implementation of the recovery plan. This support will be country-specific, and the modalities for the collaboration will be defined in line with national policies.

During the early recovery phase following the outbreak, WHO and partners will support affected countries to conduct RCA using global guidance. The RCA will identify the underlying causes of the outbreak and of low vaccination coverage. The results of the RCA will enable the planning and implementation of immediate and critical priority activities for improved routine immunization programme performance, focusing on lessons learned; translating lessons into plans for improved programme performance; and advocacy for commitment to strengthen the routine immunization programme.

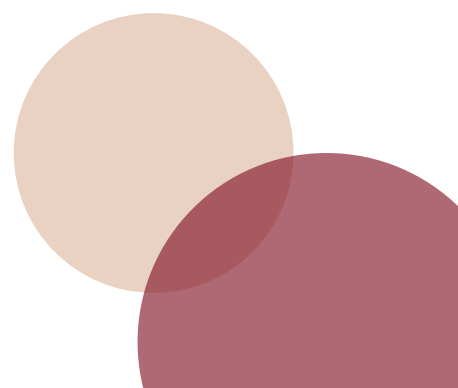
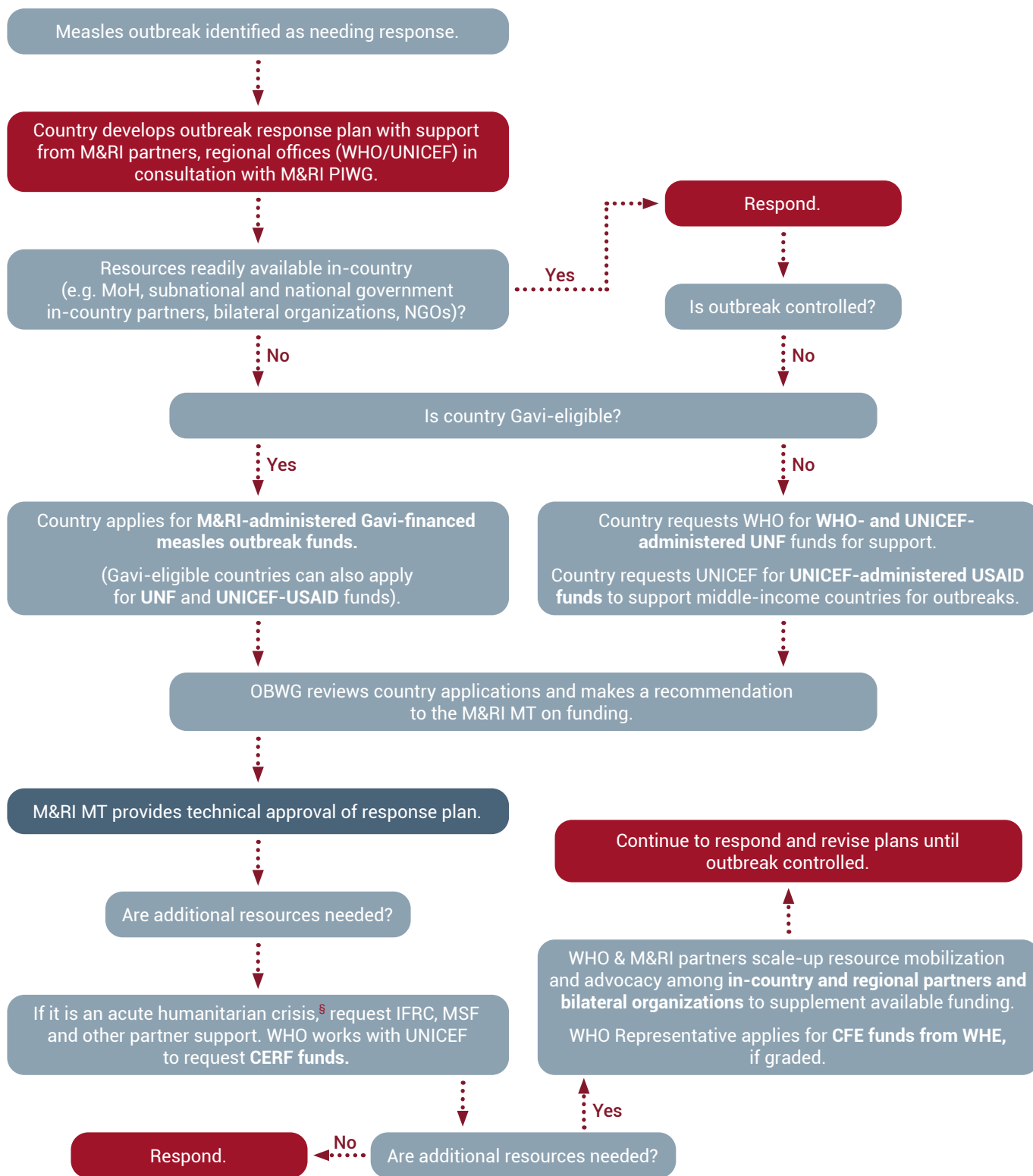


Figure 5. Outbreak response funding algorithm



^S As listed under operations <https://www.humanitarianresponse.info>

Monitoring and evaluation framework

National authorities will be responsible for ensuring the monitoring and evaluation of the MOSRP at country level, while WHO will lead the work of M&RI partners in monitoring and evaluation at regional and global levels. Systematic monitoring and evaluation of MOSRP implementation will be achieved through:

- Routine tracking of progress by objectives of the MOSRP through regular collection of data and reporting on each priority country and outbreak using high-level indicators.
- Yearly review and update of the implementation of the MOSRP by partners and stakeholders, including national representatives, will be conducted. This review meeting will be conducted as part of the annual MR programme management meetings. The review will incorporate aspects of evaluating plan implementation and its impact, including identification of innovative ways for improvement. Country-specific results of the AARs and RCAs may also contribute to the overall evaluation of plan implementation.
- Using MOSRP targets, complemented by systematic assessments of progress, by country and region.
- Tracking of operational, logistical and administrative process indicators to understand country-level barriers to implementation.

In addition, various M&RI partners have their own internal measles-related performance indicators that will complement the indicators developed within the MOSRP. For example, WHO's ERF (8) summarizes expected activities and outputs from each level of the organization by the six IMST critical functions, with concrete deliverables and indicative timelines for the first 60 days of a Grade 2 or Grade 3 measles outbreak response.

Financial resources

Estimating the resource requirements for implementing the MOSRP followed four steps: 1) determining the cost of the selected prevention, preparedness and response activities to be conducted between 2021–2023, 2) identifying and characterizing existing and projected funding support mechanisms for activities, 3) incorporating a WHO region-dependent fixed percentage country contribution and 4) and calculating the funding gap. The financial needs assessment of the MOSRP was conducted independently of the recent M&RI financial resource requirements assessment.

Costing methodology

Various approaches, including bottom-up estimation, expert judgement, analogous estimation and variations of three-point estimation methods, were used to generate the cost estimates of the MOSRP. Each key activity was costed using one or more of these methods, depending on type of activity and the available data. Key technical partners, including Gavi, MSF, UNICEF, CDC and others, have provided technical expertise and inputs on the cost assumptions.

For the preparedness interventions, WHO regional offices determined which of the activities are required in each of the priority countries, based on knowledge of country contexts. The overall costing is a combination of fixed costs and variable costs, such as those dependent on population size (e.g. for the estimated number of case management kits) or resources for developing a recovery plan.

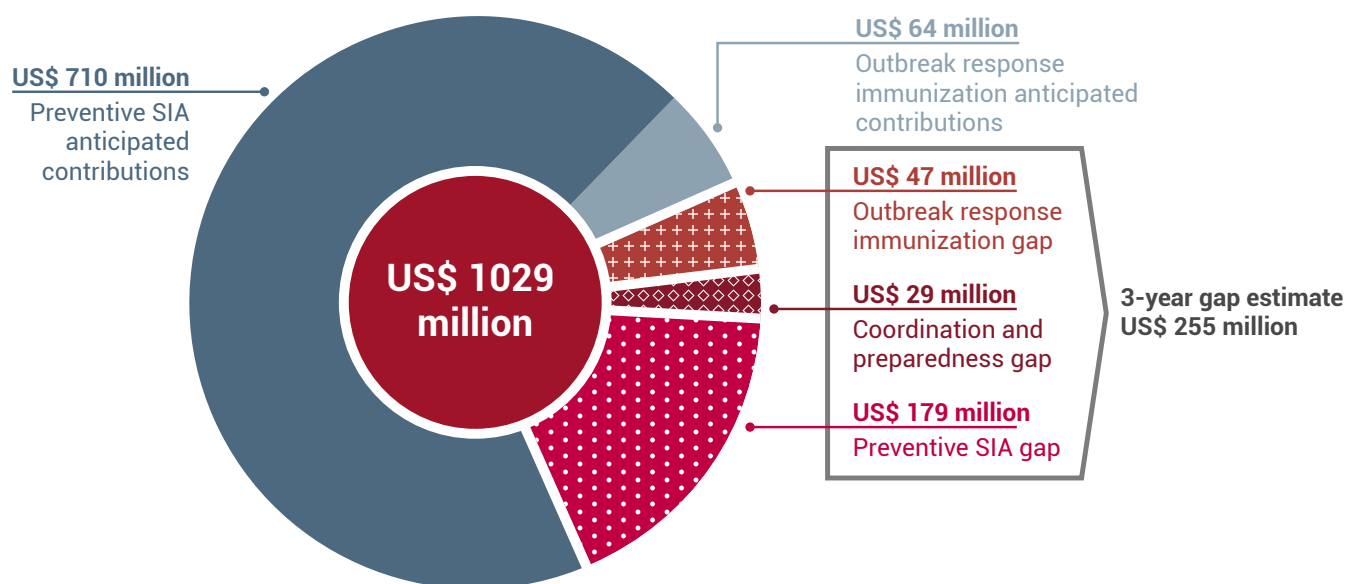
Gap estimation

The gap without additional COVID-19 costs is estimated to be US\$ 209 million. Including a 10% factor increase in operational costs due to additional COVID-19 costs, the gap is estimated to be US\$ 255 million for the period 2021–2023. These estimates assume primarily that there is no funding gap in Gavi-eligible countries.

Table 2. COVID-19 cost integration, MOSRP cost estimate and MOSRP gap estimate

| COVID-19 cost integration | MOSRP cost estimate | MOSRP gap estimate |
|---------------------------------|---------------------|--------------------|
| No | US\$ 983 million | US\$ 209 million |
| Yes (+10% on operational costs) | US\$ 1029 million | US\$ 255 million |

Figure 6. MOSRP cost and gap estimates* of 3-year total



* Including COVID-19 incremental cost increase (10% of operational costs).

Summary of funding requirements

Table 3. Summary of gap for the MOSRP, by strategic priority area, for the 3-year period

| | Strategic objectives | Gap (US\$) |
|---|---|-------------|
| 1 | Coordination – Enhance national, regional and global coordination mechanisms for measles outbreak preparedness and response. | 15 million |
| 2 | Prevention – Implement national risk assessments and targeted vaccination efforts in vulnerable communities. | 179 million |
| 3 | Preparedness – Enhance national capacity for outbreak preparedness in priority countries (e.g. detection, assessment, readiness to respond), including robust surveillance. | 14 million |
| 4 | Response and recovery – Deliver timely and effective investigation and response to measles outbreaks, including detection, response operations, RCA to identify programmatic gaps to prevent future outbreaks, AARs and recovery. | 47 million |
| | Total estimated gap* | 255 million |

* The number includes COVID-19 incremental cost estimate.

This summary of estimated budget requirements incorporates and builds on existing financing mechanisms. This budget estimate may not include all funds for outbreak control that may be provided through existing mechanisms (e.g. Gavi, M&RI fund) as the actual cost will depend on the magnitude of the outbreak and the scale of response. During resource mobilization activities, efforts will be made to raise additional resources against event-specific outbreak responses during the response interventions.

This MOSRP and the related budget therefore serve as a basis and tool for resource mobilization by all stakeholders based on their mandates and possible contributions to the implementation of the MOSRP in any of the countries, regions and globally.

The Annex provides a brief description of current funding sources for or with flexibility to support measles outbreak prevention, preparedness, response and aspects of recovery. However, these existing funding sources will need to be replenished to facilitate continued and sustained funding support in line with the mandates, obligations and additional funding support mobilized to meet the additional areas of needs outlined within the MOSRP.



ANNEX

Current funding sources

Current funding for measles outbreak prevention and control typically comes from national governments through the health sector budgets, from M&RI Outbreak Response Fund, UNICEF funds for measles outbreak response in middle-income countries and M&RI donors like Lions, Am Cross and private philanthropy. Funding from potential donors such as The Humanitarian Aid Department of the European Commission and the UN Central Emergency Response Funds (CERF) are ad-hoc and mobilized based on the scale of the event and the timing. The WHO Contingency Fund for Emergencies (CFE) is a revolving pool fund to facilitate WHO's initial and timely response to acute events as additional emergency response funds are being mobilized for the comprehensive response. The concept and principles for the CFE could be applied to measles outbreak response pool funds to facilitate timely and comprehensive outbreak response to new and confirmed outbreaks.

Government funds

National governments should normally include funding for measles outbreak prevention, preparedness, outbreak control and recovery in their routine budget. However, measles is not universally viewed as a threat in all countries and in all regions. The government funds for measles outbreak prevention and control are therefore usually not adequate and sometimes not planned for at all. Over the last few years, countries in the American and European regions that had made significant strides with the measles and rubella elimination program have experienced significant funding constraints from government budgets to the extent that it has limited capacities for measles outbreak preventions and control. Advocacy for resource mobilization should aim to increase government commitment and contributions to measles prevention through strengthening of the routine immunization programmes, and for the medium to long-term recovery interventions through increased earmark funding support for health system strengthening.

Upon identification of gaps through the IHR monitoring and evaluation framework, some countries have developed and costed national plans, including national action plans for health security. These include capacities that will support measles preparedness, such as disease surveillance and laboratory capacities. External funding to address shortfalls in these national plans can be through resource mapping exercises facilitated by WHO.

M&RI

The M&RI, a partnership dedicated to the vision of a world without measles or rubella, was founded as the Measles Initiative in 2001 by the Am Cross, U.S. CDC, UNICEF, UNF and WHO. M&RI works closely with expanded stakeholders, including Gavi, the BMGF, the IFRC and MSF. Within M&RI, UNF engages in resource mobilization according to the M&RI Financial Resource Requirements. The IFRC outlines gaps in the current global financial landscape for measles and rubella, for non-Gavi eligible countries and for surveillance needs. The allocation of UNF funds is through WHO and UNICEF and is distributed for outbreak response on an as-needed basis. For example, UNF funds channelled through WHO and UNICEF helped to support outbreak response in the Bolivarian Republic of Venezuela in 2018 and in Lebanon in 2019.

Outbreak response remains an important pillar of the measles and rubella elimination programme aimed at saving lives and ensuring appropriate clinical care in the context of weak immunization programmes. Despite the goal of the outbreak response pillar, countries affected by measles outbreaks globally often find themselves with no or limited resources for outbreak control. The MOSRP aim is to provide a framework to close the funding gap to reduce the preventable morbidity and death from measles while contributing to the overall vision of a world without measles.

Gavi funds for measles outbreak response through M&RI

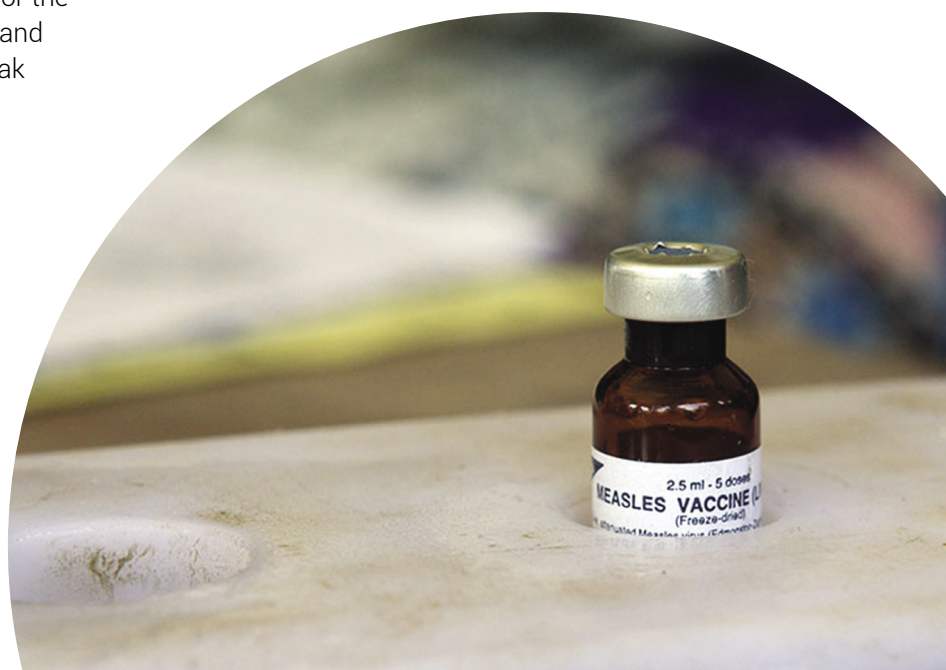
Gavi funds for measles outbreak response are available through M&RI for Gavi-eligible countries (68 in numbers), and availability is subject to the scale of the outbreak (15).

Since 2012, US\$ 10 million per year has been made available for outbreaks in Gavi-eligible countries, managed and implemented by the M&RI. These funds are in addition to the large financial commitment (approximately ~US\$ 800 million for the period 2016–2020) by Gavi to fund preventive campaigns, the introduction of second dose measles, and the introduction of rubella vaccine through wide-age range measles and rubella vaccine campaigns. For many Gavi-eligible countries, the M&RI Outbreak Response Fund has been the first source of funding support that countries request in the case of an outbreak, and the procedure for countries to access the funds is published on the M&RI website. For example, between 2016–2017, WHO received US\$ 4 557 785 (for outbreak response in Bangladesh, Chad, Democratic Republic of the Congo, Ethiopia, Guinea, Kenya, Nigeria, Sierra Leone, South Sudan, Tajikistan), and US\$ 4 956 215 in 2018–2019 (for outbreak response in Burkina Faso, Chad, Democratic Republic of the Congo, Madagascar, Pakistan). When an outbreak grows into a large-scale epidemic, additional funding is often required beyond M&RI funding. In the case of significant outbreaks necessitating comprehensive response, the Gavi-eligible countries, supported by WHO and other partners, have redirected additional funds from other sources in support of the response as was the cases for the Madagascar measles outbreak (2018–2019) and the Democratic Republic of the Congo outbreak (2019–2020).

UNICEF funds for middle-income countries

UNICEF has received US\$ 4.95 million from USAID to support measles outbreak response up to 2021, primarily in non-Gavi eligible middle-income countries. This funding comes in addition to USAID's bilateral support for vaccination activities in many countries and multilateral support to Gavi. Support for outbreak response will be considered based on the severity of the outbreak, risk of spread to other countries, and demonstrated unmet needs for financial or technical assistance. Activities to be supported as part of an outbreak response plan may include but are not limited to:

- bundled MCV (vaccine and injection and safety devices) and associated costs;
- a maximum of 50% of the generally accepted range of operational costs per targeted person, including operations, logistics and supplies, development of monitoring, plans, strengthening community-based reporting and surveillance systems, and social mobilization and communication;
- mop-up activities in low-performing areas;
- post-campaign evaluation and other assessments;
- support for care and treatment interventions.



WHO CFE

The CFE was launched in 2015 as part of WHO's health emergencies reform. It allows WHO to respond rapidly to disease outbreaks and health emergencies, including natural disasters and complex humanitarian crises – often in 24 hours or less. The CFE also allows WHO the flexibility to scale up life-saving operations in response to an escalation in a health emergency and provide funding to ensure the continuity of critical, life-saving operations in the absence of other donor funding. The CFE is intended to be a revolving fund with the seed money advanced for initial response being reimbursed as additional funds get mobilized for event-specific response. While not a primary source of funding for measles given the scale of needs, the CFE has also been used to support preparedness and readiness activities.

WHO's CFE has been used to support preparedness and readiness activities in at-risk countries, for example, during the Ebola virus disease outbreak in the Democratic Republic of the Congo.

The CFE has been widely used for response to infectious threats, including but not limited to several ongoing Grade 2 measles outbreak responses to support critical interventions in 2019 (Central African Republic: US\$ 200 000; Democratic Republic of the Congo US\$ 2.5 million; Lao People's Democratic Republic: US\$ 50 000; and Ukraine US\$ 198 500).

CERF

The CERF is a humanitarian fund with a grant component of up to US\$ 450 million and loan component of US\$ 50 million. It was officially launched in New York on 9 March 2006 by the UN Secretary-General. CERF provides seed funds to jump-start critical operations and life-saving programmes not yet funded through other sources. Traditional donor sources are still expected to step in and fund the majority of needs.

CERF supports basic vaccinations against life-threatening diseases in contexts where vaccination services are not sufficiently available or have been disrupted by the humanitarian emergency. This includes only vaccinations that can be completed within the implementation period of a CERF project. In the case of a disease outbreak, CERF may address life-threatening conditions related to communicable diseases, for example through immunizations, early outbreak response and containment. This can include short refresher training of frontline health staff, supply of drugs and material, social mobilization and targeted health education, reactive mass vaccination campaigns and preparation of specific ad-hoc treatment unit, for example, cholera treatment centres.

CERF can support activities and measures taken to effectively prepare for, mitigate, respond to and recover from the impact of hazards and includes seasonal preparedness. Preparedness means putting in place mechanisms that will allow national authorities and relief organizations to be aware of risks and deploy staff and resources quickly once a crisis strikes. While preparedness is generally speaking not an area within the CERF mandate, CERF does fund some readiness activities in emergency contexts, and a specific pilot intervention was started in 2019 named "anticipatory action" which aims at providing early action in situations with predictable risks of communicable disease outbreak (e.g. cholera). Note that anticipatory action, which CERF can and does support in line with its mandate, is distinct from preparedness.

CERF may support prevention, detection and response to health emergencies and outbreaks. In exceptional cases, this can include the establishment of health surveillance for early outbreak detection and response and basic vaccinations against life-saving diseases.

CERF support for responses to infectious threats are numerous and include the UN's Under-Secretary-General for Humanitarian Affairs and Emergency Relief Coordinator releasing US\$ 2.6 million from CERF to help fight the devastating measles outbreak in Samoa and support the wider region, including US\$ 299 600 for WHO and US\$ 259 968 for an emergency measles vaccination campaign in Djibouti in 2019 and US\$ 1.2 million for the Democratic Republic of the Congo in 2020.

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**World Health
Organization**

**World Health Organization
Avenue Appia 20
1211 Geneva 27
Switzerland**

9789240018600



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