

Médecins Sans Frontières (MSF)

# Measles

Analysis and critique of outbreak  
response in 2009-10



**Target audience:** Internal MSF

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## Description

During 2009 and 2010 there were regional outbreaks of measles in central and southern Africa. The measles outbreaks were all distinct in nature, but similar in terms of the burden they represented on health services, and in their ability to cause fatalities. This report aims to highlight the main challenges of dealing with such outbreaks and the ways in which the responses deviated from optimal response strategies, in preparation for developing advocacy strategies for outbreaks of similar scope within the region.

## Countries reviewed

1. Burkina Faso (March 2009)
- 2. Chad (April 2010)**
3. Democratic Republic of Congo (DRC) - North Kivu (November 2009)
- 4. Malawi (May 2010)**
5. Mali (July 2009)
6. Nigeria (March 2010)
7. Somalia (July 2009)
8. Yemen [non-Africa] (May 2010)
- 9. Zimbabwe (April 2010)**

The report presents a focused comparison of three countries (**Malawi, Zimbabwe, Chad**) looking primarily at the implementation of Ministry of Health (MoH) policy for outbreak control, in particular the role of the United Nations institutions responsible (UNICEF, WHO).

The selection of the three contexts was based on their significance, in terms of the size of MSF's intervention, and their potential to highlight, compare and contrast the main characteristics of measles outbreak policy for control in Africa in 2009 and 2010. Key themes were identified from both the document review and anecdotal evidence, which were merged to form common themes. Note that MSF maintained an evolving view of the problem in at least 11 of the 31 countries affected within Africa.

## Background

This report follows discussion between operational and medical directors, and a subsequent decision to collect and analyse case studies of situations where MSF has been involved in measles outbreaks. The hypothesis underlying the work is that UN agencies have played an adverse role in acknowledging and facilitating the outbreak responses.

The analysis of the case studies (focusing on recent outbreaks in Chad, Zimbabwe and Malawi, and less-recent ones in Burkina Faso and DRC), and the conclusions drawn, will be the basis for a strategic and

bilateral advocacy approach for MSF to those responsible in the relevant UN agencies.

This report has been compiled with the active participation of vaccination working group leaders, Epicentre and operational centre vaccination referents, in addition to those in operations who have raised these issues in the course of their operational duties.

## Objectives

1. To analyse the role that UN agencies have played in recent measles outbreaks in Zimbabwe, Malawi, Chad, Burkina Faso and DRC.
2. To develop an advocacy message and strategy to address the review's conclusions to the relevant UN agency for presentation and approval by the medical and operational director platform.
3. Where relevant, to highlight any lessons learned for MSF in dealing with MoH/UN agencies in outbreak responses.

## Methodology

- Internal and external documentation review.
- Collation and analysis of anecdotal evidence from key informant interviews using guiding questions, either written or oral. Informants were both internal and external (MSF, WHO, UNICEF).
- Analytical framework: Implementation of outbreak response policy will be the dependent variable, analysed at different levels of government (national and sub-national units). As well as the role of political actors and institutions (primarily ministries of health and UN institutions e.g. UNICEF and WHO), some details of the MSF response will be included in the analysis.

## Limitations

- The exercise was a desk analysis. All data presented is anecdotal or from information made available by key informants.
- The process of extracting data took longer than expected, with some case data unavailable.
- The focus of the report was limited to retrospective, current and ongoing measles outbreaks where MSF is involved in the response. It is not an analysis of the routine implementation of the WHO's Expanded Programme on Immunisation (EPI), although known limitations contributed to the analysis.
- The case study interpretation is limited to qualitative with an emphasis on anecdotal evidence. It gives one perspective or interpretation of events and is to be viewed in conjunction with other technical evaluations available.

# Introduction

Measles in sub-Saharan Africa is endemic and cyclical. During epidemics, it is responsible for killing an estimated three to five percent of children with the disease, and it contributes to childhood mortality rates of ten percent or above in malnourished populations. Case fatality rates (CFRs) may be higher in complex emergencies. Measles usually peaks during the dry season (October to March in the northern tropics, and April to September in the southern tropics).

Since 1966, control of measles within the region has been attempted in two large programmes.

The Expanded Programme on Immunisation (EPI), initiated by the WHO in 1978, also includes operational research, technical assistance, cooperation with other groups such as USAID, and the development of permanent national programmes.

## UNICEF and WHO joint strategy for measles

Since 2001, the Measles Initiative's Strategic Plan and Technical Working Group for Measles has been active in implementing a four-pronged strategy with the ambition to prevent outbreaks (see Annex 1 for more detail):

1. First dose of measles through routine vaccination to be given by nine months; 90% coverage to be achieved with 95% reduction in mortality.
2. Second opportunity to be optimised through routine and/or supplementary immunisation activities.
3. Establishment of effective case-based measles surveillance (with laboratory confirmation), good coverage data and the capacity to conduct outbreak investigations.
4. Improved management of complicated cases, optimal care of infected children (protocol).

*(WHO, UNICEF, US Centers for Disease Control and Prevention)*

In the meantime, 53 evaluation surveys have been carried out in 17 African countries on measles immunisation programmes. The obstacles found include: poor access to rural populations; an underdeveloped infrastructure; and exposure to unprotected children (susceptible) contributing to the spread of measles.

Over the past 20 years, MSF has been involved in responding to numerous measles epidemics in the region. WHO guidelines during this period

emphasised that there was not enough time to intervene with a reactive campaign, as measles epidemics spread too quickly. However, this did not coincide with field experience. From 2006, in collaboration with the WHO, MSF and Epicentre embarked on a research project aimed at documenting both the burden of measles and the length of epidemics. This series of research projects entailed retrospective mortality surveys focusing on measles mortality, outbreak investigations and mathematical modelling to estimate the potential number of cases avoided if vaccination interventions were put in place. These studies were driven by MSF, with financial support from WHO Geneva. The outcome was that MSF and Epicentre were a part of the review process that eventually led to a change in the guidelines.

## UN policy and strategy linked to outbreaks

The WHO's cornerstone for measles control is 'routine vaccination'. The WHO's regional strategy linked to measles outbreaks comes under the Division for Prevention and Control of Communicable Diseases (DDC). Epidemic and Pandemic Alert and Response (EPR) is one of the five inter-related programmes in the DCC that supports control of communicable diseases. Measles is not included on the list as it comes under the responsibility of the EPI. The strategy aims to:

- Strengthen preparedness and response to major epidemic and pandemic prone diseases.
- Reduce the risk of emerging diseases through effective health promotion activities, minimising healthcare-associated infections, and community empowerment and participation.
- Strengthen early detection of emerging infectious disease outbreaks through early warning and alert systems, enhanced public health function of laboratories, and integrated surveillance.
- Strengthen timely response to disease outbreaks.
- Strengthen technical and operational support for communicable disease control during humanitarian emergencies caused by conflict or natural disasters.
- Improve the coordination of regional and international capacity.

Before analysing the contexts where MSF has been involved in measles outbreak response in 2009 and 2010, the following summary of current dominant opinion within the technical and policy community is noted:

- Prior to 2009, supplementary attenuated measles vaccine had been given to up to 13 million children in 19 west and central African countries as part of a regional programme of measles control. It has been documented that, as a result, measles transmission has been significantly reduced in most countries and interrupted only in The Gambia (in 2008)<sup>1</sup>.
- Analysis of measles cases in the post-campaign period has identified measles in non-participants in the mass campaign, new susceptible groups (older children due to the narrowing of the age-range targeted), and in a number of those vaccinated with the first dose only.
- It is widely acknowledged that even single-dose coverage of more than 93% will not prevent measles outbreaks occurring every seven to eight years<sup>2</sup>.
- Several problems have hindered measles immunisation programmes in Africa:
  - Access to health: limited vaccination strategies that do not give regular access to vaccination; logistical constraints and difficulties, including cold chain; target group in EPI limits vaccination to children of 9 to 11 months.
  - Poor surveillance: limited confidence in estimated vaccine coverage; no regular analysis of data.
  - Acceptability: belief and resistance to vaccination etc.
  - Predictive budget lines for guaranteed funding.

## Definitions

**Selective vaccination activities:** Vaccinate all children of 6-59 months or determine the target age group according to local disease epidemiology.

**Reinforcement of routine vaccination:** District staff to rapidly assess priority areas within the affected district (eg communities with low vaccination coverage and at a high risk of morbidity and mortality).

**Non-selective mass vaccination activities:** If risk assessment indicates that there is a high risk of a large measles outbreak, then the capacity to carry out a high-quality large-scale immunisation campaign should be evaluated<sup>3</sup>.

This report will focus on the policy implementation for measles control in terms of recent outbreak response (2009, 2010) where MSF has been operational, and will highlight specific incongruent factors.

1 Annie de Groot et al. 'Measles campaign in West and Central Africa: remembering the future' editorial. Elsevier. Epivax Inc. Brown's University, US.2008.

2 Hitoshi Murakami et al. 'Epidemiological impact of Nationwide Measles Immunization Campaigns in Viet Nam: a critical review' WHO Bulletin. 2008.

3 WHO. Response to measles outbreaks for settings with a measles mortality reduction goal, 2009.

# Case studies

Countries	Key themes <sup>4</sup>
Burkina Faso, Malawi, Mali	EPI system in place; health system with higher capacity
Chad, Somalia <sup>5</sup> , Yemen	EPI system incomplete, with low coverage and recurring seasonal outbreaks; current disorder in Ministry of Health system; instability linked to conflict
Democratic Republic of Congo, Nigeria, Zimbabwe	EPI system in place; health system capacity reduced; medium to low-level political instability

(For additional case study data, see Annex 2)

## 1. Malawi - description

**Date of outbreak:** The initial onset was December 2009, with MSF able to intervene in March 2010. Measles cases were laboratory confirmed on 19 December, one month after the specimens were sent for testing, with results made available on 29 January. Blantyre district declared the outbreak in the epidemiological week four. Laboratory turnaround time (TAT) was one month to begin with but was two to three times longer in subsequent months.

**Vaccination coverage country status:** EPI vaccination coverage is reported as 85%. A supplementary immunisation activity was planned for the end of 2010 but the date was brought forward in anticipation of a potential outbreak. The national coverage trend is reported to be: 2006 65%; 2007 82%; 2008 84%; 2009 93%.

**History of outbreak:** The last large measles outbreak in Malawi in 1997 reported 11,000 cases. Malawi was the first country in Africa to achieve the Universal Childhood Immunisation of 80% coverage for all antigens in 1989. EPI is targeting children for measles immunisation aged nine to eleven months. A second strategy has been adopted to include supplementary immunisation, and the first national catch-up campaign was organised in 1998 (114% VC) with subsequent follow-up campaigns in 2002 (120%), 2005 (115%) and 2008 (100%). Despite reported high measles coverage and multiple supplementary immunisation activities (SIAs) in recent years, Malawi faced a large measles epidemic in 2010, with highest attack rates in children of six to eleven months and, for measles, exceptionally high numbers of people above 15 years affected.

**Context/area affected:** Rural and urban throughout the whole country.

### Timeline

Week 1 index case  
Week 4 lab confirmation  
Week 10-14 MOH and week 18 MSF response

**Response strategy:** MSF sections involved in the response included OCB, OCBA and OCP with support from Epicentre.

At the central authority level, there was initially some confusion with regard to the micro-planning of the outbreak response strategy at the district level - the authorities at district level thought that MSF was a funding body and not a resource for technical response to the outbreak. Higher-level planning was carried out by the MoH, WHO, UNICEF and the Centers for Disease Control and Prevention (CDC). Strategies and decision-making appeared to be contingent on funding restrictions. However, once the control measures were in full swing, communication at a district level was better. The WHO guidelines were not adequately shared with medical officers at the district level, which was confirmed by the African Regional Office for the WHO (AFRO).

From epidemiological week 10, the MoH performed the first campaigns in the country (weeks 10-14). From week 16-18, MSF was involved in sensitisation, disease surveillance, case management and expanded targeted vaccination in larger districts. The national disaster management unit was involved by week 16. The MoH carried out the first mass vaccination campaigns

<sup>4</sup> Whilst WHO ranking on health system performance presents most African countries examined as lower ranking, the proviso for influence of political stability and/or conflict has been factored in.

<sup>5</sup> It is accepted that Somalia is a unique case, but analysis does suggest that in the right circumstances, and with access, the strategy for response has the potential to be expedient, as the interplay between institutions is less intrusive.

(MVC) in Blantyre, Lilongwe and some other districts. The age range was at that time 9-59m, whilst the attack rate (AR) indicated a 6m-15y target or even 6m-30y. The selection of districts for vaccination was not based on the highest needs but on MSF presence in the area (running HIV/AIDS project). Cases were proactively reported, hence had higher AR than other districts with a less efficient surveillance and reporting system.

There was an epidemiological rationale for better surveillance and age breakdown analysis (line listing) to inform the vaccination strategy, where - in as-yet-unvaccinated areas or areas where vaccination of younger age groups failed to contain the outbreak - expanded target age groups were to be included in the vaccination campaign. However, the vaccination campaign was not initially adapted to the local epidemiological situation and children aged 6m-9m with the highest attack rates were omitted. Mass vaccination was ceased in June on the basis that SIA activities were to be advanced in order to react to the outbreak. The next SIA follow-up (9m to 59m) campaign had been planned for April 2011 in Malawi. It was brought forward, but still did not take place until August 2010. The SIA included an age range of 9m to 14y with the objective of covering 95% of the target population.

The epidemiological significance of HIV is complex. In areas where HIV is high, it may contribute to lower vaccine efficacy among HIV-positive people - the dynamics vary according to mortality rates. The strategy is to vaccinate known HIV-positive individuals unless they are severely immuno-compromised. Free healthcare was a positive aspect of the response strategy.

### Malawi - potential constraints

**Confirmation of outbreak:** There was a major time delay: the outbreak was confirmed at the end of January 2010, with a two-month delay in control strategy for MoH, and three months for MSF. AFRO reported the delay to be due to a lack of regular data harmonisation between the laboratory and surveillance EPI units.

**Organisation:** Surveillance was restricted by staff constraints and capacity.

**Capacity:** At the district or sub-office level, officers from the MoH and WHO had a poor understanding of policy or outbreak response and strategy guidelines, which slowed down the management of the outbreak.

**Resources:** The cold chain and equipment was inadequate for a mass vaccination campaign of this size, a fact overlooked by UNICEF. MSF supported the national campaign with human resources and waste management.

**Epidemiological surveillance:** There was a good potential for surveillance via the Integrated Disease Surveillance and Response, but there were delays on a district level in reporting to central level, and line-listed patient data was not entered in the main database (AFRO). Mortality data was reported inconsistently and it was difficult to get hold of the correct data or extent of the outbreak. It is clear that MSF has a key role to play in reinforcing surveillance during outbreaks.

**Case management:** Health workers received ad hoc training and support on diagnosis and protocol (some younger medical doctors had never seen measles cases). The WHO was involved in devising the case management protocol. At the district level, officials were reluctant to start implementation until they were clear that funding was available. Early in the epidemic, the MoH adopted the WHO case definition as well as treatment protocol of cases. There was good use of the case definition by health workers in some - but not all - areas; not seeing the disease for a decade has contributed to this.

**Communication/representation:** MSF had to lobby the MoH to react to the measles outbreak. One of the major problems was that nobody expected the outbreak to be of this size and importance.

**Funding:** A Measles Coordinating Committee, chaired by the Director of Preventive Services, was formed in March 2010. Members included several MoH agencies, WHO, UNICEF, members of the donors' group and MSF. Meeting four times over the next three months, activities included pleas of support from donors, with the following pledged:

- UNICEF pledged US\$183,000, of which US\$40,000 was for information communication technology (ICT) and the balance for the districts.
- USAID pledged US\$10,000 for transportation.
- WHO pledged US\$100,000, available in June.
- UNICEF also wrote and submitted, on behalf of the MoH, a Central Emergency Relief Fund (CERF) proposal for US\$2.4 million to carry out a nationwide vaccination campaign from 9-59m. Its future was considered uncertain since an official emergency - which is often a precondition for CERF funding - was never declared.

At the meeting of 28 May 2010, the government announced a budget allocation of US\$4.18 million for a national vaccination campaign, with no budget stipulated. MSF advised using the funds to continue following the WHO Outbreak Response Guidelines in the most affected districts, and was invited to be on the subcommittee to recommend strategy and budget. However, two weeks later, MSF was informed that US\$7.2 million of vaccines had been ordered for the national SIA, with US\$3 million going to vaccine purchase and the remainder to organisational support of the campaign. The CERF proposal was withdrawn

by UNICEF, despite MSF urging that it be redrafted to allow funding to be sought for case management in the rest of the country.

**Current status:** A spectacular but suspicious drop of cases throughout the country has been registered, but the number of districts properly reporting after MSF stopped the surveillance support is less than previously. The results of the measles vaccination

coverage surveys post-MSF/MoH vaccination campaigns were between 92.9% and 98.6%. In addition, the previous coverage by EPI services was assessed, which revealed that combined verbal and with-card vaccination coverage is very high in Malawi at 94.8% to 98.8%. These results suggest that the main cause of this outbreak has been a slow but steady long-term accumulation of susceptible cases, despite good vaccination coverage. A post-SIAs coverage survey report is pending.

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## 2. Chad (Njamena) - description

**Confirmation of outbreak:** The initial outbreak confirmation was in January 2010.

**Vaccination coverage country status:** This is very poor at 25%. The evolution of estimated coverage in the capital, Njamena, from 2007 to 2009 was 84%, 82% and 72% for children 0-11 months.

**History of outbreak:** There is a history of measles outbreaks occurring each year, with the last full-scale epidemic in 2005. The last SIA was in March 2008. MSF investigated the recent outbreak in collaboration with the MoH by the end of February 2010, technical support was proposed by MSF in week 9, and the decision to respond was given within a few days.

Vaccinations began in Njamena on 28 March 2010 targeting 6m-15y. The delay for vaccination campaign activities was due to vaccine supply.

**Context/area affected:** Largely urban capital. Included displaced populations.

### Timeline

Week 1 index case  
Week 4 lab confirmation  
Week 9 response

**Response strategy:** MSF was not able to respond until March, when it supported the four districts of Njamena in community sensitisation and mobilisation; non-selective mass vaccination strategy; and two measles vaccination campaigns (source: IST, AFRO). Case management of simple cases was carried out in health centres in the four districts (during the last five months of the outbreak), while complicated measles cases were managed at the hospital level. MUAC screening of children of 6m-59m was carried out, with referral of severely malnourished cases with complications to the MSF France nutritional programme.

## Chad - potential constraints

**Confirmation of outbreak:** First week of January 2010.

**Organisation:** Good. MSF supported the response per district of affected areas. Although there was a delay in reacting to the epidemic, MoH accepted MSF participation in the outbreak response.

**Capacity:** All three MSF sections coordinated response with the MoH. MSF trained MoH staff in case management.

**Resources:** MSF supplemented provision of vaccines, cold chain, treatment kits.

**Epidemiological surveillance:** Population figures were unreliable due to poor data sources. In addition, MoH surveillance was not reliable. As a result, MSF initiated a reinforced data collection system directly at the district level, while mobile phone support/SMS was used to facilitate contact and obtain information. MSF also provided drugs supply.

**Case management:** MSF was actively involved in case management/isolation at inpatient department and outpatient department level.

**Communication/representation:** Although communication between MSF and the MoH was good at the central level, it was less effective at the district level, due to the differing capacity, experience and motivation of the staff. However, using mobile phones to speak to the MoH eased implementation.

**Funding:** There was a funding shortfall of more than US\$1 million for health, which was expected to include follow-up of measles campaigns<sup>6</sup>.

**Current status:** Outbreak ceased April 2010.

**Results:** Mass campaign administrative coverage was 67.7% for Njamena and 90%, 71%, 68% and 63% in the districts of north, south, centre and east respectively. Post-vaccination coverage was done by Epicentre in mid-April with a coverage of 82.5% (based on cards and history).

### 3. Zimbabwe - description

**Initial outbreak confirmation:** September 2009. The outbreak started in the Apostolic communities in Buhera, where the first symptomatic cases appeared during week 10. By early November 2009, lab-confirmed cases were reported in Buhera. The outbreak was declared by the MoH, WHO and UNICEF in March 2010.

**Vaccination coverage country status:** In decline, falling from 67% in 1999 to 53% in 2005/6. EPI is targeting children of 9-11m. The second opportunity for measles vaccinations is offered during the SIA campaigns. Follow-up immunisation activities were organised in Zimbabwe in 2002 (85%), 2006 (95%) and 2009 (103%).

**History of outbreak:** Suspected cases were reported as early as October 2009. MSF began to lobby the MoH to start vaccinations in January 2010 but OCB was refused permission, despite an initial agreement at the district level. Not until May 2010 was a final decision made to start vaccination activities across the whole country.

**Context/area affected:** Both rural and urban communities were affected, including a number of Apostolic sects, some of whom object to specific medical interventions. Most of the hard-to-reach groups were both rural and Apostolic.

#### Timeline

Week 1 index case  
Week 6 lab confirmation  
Week 19-25 response

**Response strategy:** MSF sections involved in the response included OCA, OCB and OCBA, with epidemiological support from the Manson Unit (OCA). Measles vaccination for children of 6m-14y was included in the child health activities along with other health services. The child health days lasted from 4 May until 2 June, with mop-up days for some of the districts from 2 to 4 June. The intervention was not well planned, and MSF was kept outside the planning forums. In Buhera district, the target age group for measles, as well as the control strategy, changed on several occasions. Inter-country Support Team (IST) AFRO reported differently, reporting that a wide age-group response was carried out based on the age bracket of cases (attack rate reported as 9-11m) with specific measures to mobilise the refusals. MSF OCB supported the campaign with transport, HR and cold chain back-up. For Epworth, MSF OCA was initially involved in case management, but permission was retracted. As in Buhera, MSF was not invited to the management planning meetings with the MoH, and plans were only shared at the last minute, which had an impact on the efficiency of the response strategy. There was no MSF intersectional coordinator (unlike

in Chad). Whilst there was epidemiological support for individual sections (eg OCA), there was no cross-sectional epidemiological support. There was no possibility of collecting the HIV status of measles cases.

Sensitising and educating the local community, and carrying out mass immunisations (for measles as well as other diseases) were led by MSF, using both static teams based in health facilities and mobile teams. The number of teams was based less on needs than on the availability of staff. MSF sent out mobile teams to schools and also targeted Apostolic communities. Case management by MSF began in January, but closed a week later when the MoH took over. MSF re-opened case management in April, but the MoH reacted angrily and it was forced to close. The MoH failed to isolate all patients. MSF provided support with drug supply and the transportation of complicated cases. Outreach strategies included the targeting of hard-to-reach groups, such as the Apostolic sects, which had good results. Targeted vaccinations for susceptible groups are not a clear part of the national strategy.

#### Zimbabwe - potential constraints

**Confirmation of outbreak:** March 2010, with a five-month time-lag for case management, and a seven-month time lag for vaccinations to start.

**Organisation:** The MoH did not set priorities. Plans were not disseminated to all partners; dates were changed at the last moment; there was a poor exchange of information and a poor strategy response. The vaccination campaign included vaccinations for other diseases.

**Capacity:** Historically Zimbabwe had a good health system capacity but this is now limited due to the economic and social collapse. MSF had to intervene with direct support to case management but this was stopped.

**Resources:** Supply was reliant on UNICEF and subject to delays (blamed on the volcanic ash cloud). MSF was not allowed to import vaccines. Cold chain was provided by the MoH but supported and maintained by MSF.

**Case management:** The MoH had no clear protocols. Care for patients was frequently delayed. MSF began its response but was stopped by the MoH, resulting in muddled data on cases.

**Communication/representation:** Communication was difficult at the central level, but better at a district level. The MoH was hostile to MSF, and at one point reacted to MSF's lobbying to speed up the response by threatening to stop MSF's activities in Zimbabwe. The MoH attitude to MSF fluctuated, which may be linked

to MSF's general parallel way of working. The WHO was unassertive and over-diplomatic, while IST AFRO reports that failure to carry out regular risk assessment at the sub-national level was an issue due to the lack of skills. Both the MoH and WHO had other competing responsibilities, such as malaria, cholera and the collapsed infrastructure. There were gaps in the coordination of efforts at the national level, which led to delays in decisions, not only on strategy but also on the extent of the outbreak and the response to be undertaken. MSF was not involved in planning with UN agencies. In Buhera, MSF was perceived as an HIV organisation and it was difficult for the MoH to understand MSF's motivation for becoming involved in the measles outbreak. Before the outbreak, relations between the district authority and MSF had not been smooth.

**Epidemiological surveillance:** Poor surveillance was reported at both district and central levels.

**Funding:** There was a funding shortfall. Donors included the Consolidated Emergency Relief Fund, the European Commission and the governments of Japan, the United Kingdom, Canada and the Netherlands. IST AFRO reported a lack of funds to readily mobilise the purchase of vaccines and reinforce operations for the outbreak response.

**Current status of outbreak:** Reduced since July 2010. There have been continuous cases and a new uptake of cases at the national level. Up to August 2010, 1,319 measles infection cases had been reported. The measles vaccination campaign ended on 2 June 2010. There was a coverage survey led by the MoH with support from the WHO in July 2010, with coverage rates projected at 95%.

# Summary

UN/MoH response	Result/explanation
Timeline	In most cases the turnaround time for lab confirmation was one month. Generally there was delay thereafter for implementing the response, most significantly in Zimbabwe, which was thought to be due to the political dimension and its influence on relationships at a strategic level (ie the MoH and UN technical support level). Policy implementation was undermined by the implicit threat to stop access for international agencies. This in turn meant that very little of the guidance generated by the UN was made operational by the MoH at any level. In Zimbabwe the delay was almost double that in Malawi, an indication that knowledge was not the main factor stifling effective decision-making and response at a local level.
Target coverage 100%	Ideally this should include rapid coverage, monitoring and identification of missed groups. This is inconclusive at the time of reporting. In general, coverage surveys were carried out post-vaccination with modest results: in Malawi 92-98%, Zimbabwe projected at 95%, and Chad 68-90%. In both Malawi and Zimbabwe, whilst there has been a dramatic drop in the number of cases registered since August 2010, cases were still evident toward the end of the year.
Target population - susceptible profile	Consideration of data (on routine coverage of the population, coverage during SIAs, age-specific attack rates and risk assessments) was incremental, as opposed to progressive or reactive to the data available (Zimbabwe and Malawi). Risk assessments, in particular, did not consistently inform the best strategy for immunisation as per policy <sup>7</sup> . Decisions on widening the age range were delayed in some cases (Malawi), as was the response strategy for susceptible cases. Outside MSF activities, an overall plan to tackle the issue of access to susceptible cases was not apparent.
Clinical case management - timing of intervention	Whilst the WHO devised the case definition and management protocol, its use by health workers was subjective due to some clinicians not having seen measles before (Malawi). Implementation of the treatment strategy was reported to be late (Malawi) or protracted (Zimbabwe). The explanation for this is thought to be clarity on dispersion of funds for the response (Malawi) and the political and power dimension between the government and UN institutions (Zimbabwe). In Chad, MSF involvement in case management was higher and there were no perceived delays.
Intensifying of surveillance	Anticipated difficulties with data surveillance were observed in all cases (eg delays and discrepancies on data generated from district to capital level). There was evidence that data collection systems were being reinforced in all cases. Systematic reporting was catalysed by the presence of MSF where it was operational via a local hands-on approach to training and supervision.
Control and prevention measures	Zimbabwe did not deviate far from the routine response to measles control, choosing to continue with child health days as part of regular health services as the strategy to provide vaccination protection. Malawi, despite an initial tendency to follow a mid-way policy (neither routine nor mass vaccination), demonstrated the flexibility to adapt the approach through the implementation of supplementary immunisation campaigns. The concern is that the SIA in Malawi will not have adequate coverage, given that the population to be covered did not match with the resources.

<sup>7</sup> WHO 'Response to Measles outbreaks in Measles Mortality Reduction Settings.' 2009. Strategy for the Division for Prevention and Control of Communicable Diseases, 2009-2013.

### **National vaccination and SIAs coverage results:**

**Chad:** EPI coverage in Ndjamena from 2007 to 2009 was 84%, 82% and 72%. Country EPI coverage was 25% (WHO). SIA in 2009 was 70-80%.

**Malawi:** Country EPI coverage was reported as 85%. SIA in 1998, 2002, 2005, 2008, 2010 with retrospective results of at least 100% (99% most recent).

**Zimbabwe:** Country EPI coverage was reported as in decline, falling from 67% in 1999 to 53% in 2005/6. SIA in 2002, 2006, 2009 with coverage results of 85%, 95%, and 103% respectively.

# Analysis

The focus of the analysis is on variation in policy responses to measles outbreaks within each country reported, with the proviso that the current guidelines and strategy of WHO, UNICEF and other relevant partners is central<sup>8</sup>.

The Regional Strategy for Measles Control recommends that a second opportunity for measles immunisation is provided to all children, irrespective of their vaccination status or history of clinical measles. The preferred method of provision of a second opportunity is through supplemental immunisation activities (SIAs) targeting children of 9m-14y in catch-up campaigns and 9m-4/5y during periodic follow-up campaigns.

Chad (as with Somalia and Yemen) is included in the 47 countries prioritised for SIAs due to the serious level of missed routine vaccination. Despite the SIAs undertaken so far, the expectation is that Chad will continue to experience recurrent measles outbreaks.

For those countries that experience SIAs with perceived adequate intervals (of 3 to 4 years) and good coverage, as well as a reinforced routine vaccination (Malawi), the suspected increase in numbers of susceptible children born after SIAs may result in small-to-moderate-sized measles outbreaks, though not as widespread as Malawi's current outbreak (2010). Zimbabwe is acknowledged as having a health service in decline, and therefore cannot boast strong routine vaccination coverage. It also has significant groups within certain pockets of the country who opt out of immunisation for their children, which may explain the extent of the outbreak despite SIA coverage.

## Coordination with partners

**International level:** The key responsibility at the international level (Geneva and New York) was to provide enhanced human resources to increase the technical capacity to manage the response. Whilst acknowledging a lack of capacity and a need for training at a national level (including the dissemination of the new guidelines for outbreak response), it was also apparent that the number and extent of outbreaks in sub-Saharan Africa was not anticipated. This meant that support resources at the international level were stretched. The UN communicated publicly as part of its advocacy role about how the funding shortfall was contributing to gaps in the implementation of control strategies (see Finances section below). The ongoing dialogue between MSF and the WHO/UNICEF is established, but not sufficiently addressed at a regional level. The WHO as an organisation is changing, which requires MSF to better understand its roles and responsibilities in order to revise channels of communication with the WHO.

**National level:** Poor coordination was exacerbated by a lack of knowledge about what constituted an effective response, including risk assessment and the concurrent implementation of activities. The role of the MoH in most cases was reliant on the technical support of the relevant UN partners (WHO and UNICEF at the higher planning level), which did not have clear guidance on how to manage the different actions simultaneously. With the exception of Chad, strategic thinking, which might have led to faster decisions on how best to proceed as the outbreak spread, was also lacking. At the regional level, there was a failure to carry out regular assessments of risk, which was cited by AFRO as due to lack of skills.

<sup>8</sup> WHO 'Response to Measles outbreaks in Measles Mortality Reduction Settings.' 2009. Strategy for the Division for Prevention and Control of Communicable Diseases, 2009-2013.

An outbreak coordinating committee (the same people responsible for EPI, SIAs and outbreak response) was set up in most cases, with 'micro-planning' of key actions discussed, but with a mixed impact (confirmed by the WHO team). Zimbabwe demonstrated significant shortcomings with regard to decision-making on case management and the initiation of a mass vaccination campaign. As a result, the target age range and control strategies changed on several occasions.

In Chad, by contrast, there appeared to be a faster response (possibly linked to the stronger involvement of MSF), with key actions happening simultaneously. In addition, a decision to reinforce routine vaccination followed swiftly, with at least two non-selective mass vaccination campaigns carried out which targeted a wider age range (AFRO). The main barrier in Chad for the measles vaccination campaign was cited as the vaccine supply pipeline. Coordination with MSF was usually better at the district level and worse within countries with stronger governance (Malawi) or a reluctance to accept 'outside interference' (Zimbabwe). In addition, competing health priorities contributed to deficits in coordination (Zimbabwe).

**District level:** Once the decision had been taken to declare a measles outbreak, the actions that followed were critical in minimising the number of severe measles cases and deaths. For all countries, the turnaround time (TAT) for first specimens was on average four weeks. After this, the decision to declare the outbreak as official and start with relevant actions was most protracted in Zimbabwe, followed by Malawi and then Chad. There is no need to incur delays while waiting for laboratory confirmation (as technical support concludes), and response activities should be initiated as soon as there is a suspected outbreak<sup>9</sup>. This did not happen in any of the contexts studied, which indicates that lack of knowledge was a key factor in stifling effective decision-making and response at the local level.

## Strategy

WHO and UNICEF policy for measles outbreak response was followed to varying degrees, which was attributed to a lack of knowledge and capacity within the UN teams and the MoH, as well as to political and funding bottlenecks. In countries with the poorest functioning health infrastructure, which were therefore more reliant on international support (Chad), the process was not so drawn out.

## Response

**Surveillance:** Despite the recommendation to intensify surveillance when an outbreak is suspected, there was a problem in all countries with data reporting. In Malawi and Zimbabwe, even though weekly reporting was instituted, the line-listed cases were not entered into the central database, which limited the overview of the situation and had a negative impact on decision-making. There was effective reinforcement of surveillance in the areas where MSF gave support, which was due to enhanced supervision on the part of MSF at clinic level (Malawi) through visiting the clinic and training staff how to collate the data properly. In Malawi, the control measures initially targeted 9-59m, which did not seem to take into account the most significant attack rates (6-11m), or population affected (>5), and the need therefore to include older children and adults for vaccination.

**Treatment:** WHO officials guided the case definition protocols. However, ensuring adequate clinical case management was an issue in Zimbabwe, as the strategy seemed to stop and start and was poorly organised. Case management in Malawi resulted in a low morbidity, which was also thought to be due to the health service being both well-established and free-of-charge.

**Vaccination:** There is no evidence that the overall vaccination strategy was logically linked to the epidemiological analysis ie knowledge of the population affected, measles attack rates (age range), and absolute number of cases. This can be explained by the lack of skill for in-depth outbreak investigation and documentation (initially in Malawi and Zimbabwe) and imperfect surveillance. Malawi implemented what was described as an early SIA, which was defined as a mass vaccination campaign with a wide age range toward the end of the outbreak in August 2010. However, MSF field teams were doubtful as to the success of the campaign in reaching susceptible groups, as it was a huge undertaking in the short time allocated. Effective strategies to reach and inform the population were also mixed. In general, sensitisation was reported to have taken place (AFRO). However, success in reaching susceptible and hard-to-reach groups was only evident where MSF was present, through teams' efforts to understand the fears of certain communities (Zimbabwe), through their proximity and in some cases through their perceived impartiality (Yemen).

9 WHO 'Response to Measles Outbreaks in Measles Mortality Reduction Settings.' 2009; Strategy for the Division for Prevention and Control of Communicable Diseases, 2009-2013.

## Finances

In all countries analysed, the budget was uncertain or fell short, which contributed to delays in decision-making and resources (Zimbabwe, Malawi). AFRO cited lack of funds as a factor that delayed the purchase of vaccines and cited limited government resources as delaying the response as a whole. The lack of easily accessible funds for SIAs and outbreak response is an issue which needs further analysis. While the gaps in controlling routine prevention may be down to lack for funds, it is not so clear-cut for outbreak response, which - while not cost-effective - may have contributed to improving population immunity.

# Conclusion

The underlying challenges for measles control are complex and multifaceted, and may be experienced both during a rise in measles caseloads and during more normal situations. There are a number of potential factors that influence the success or failure of policy implementation that have been analysed and will now be concluded, in particular the role of key UN support partners. These include:

**Response strategy:** A lack of technical knowledge and skills at the coordination level in-country was a recurrent criticism of the response, in terms of priorities, technical aspects and decision-making. The choice of which mode of mass measles campaign to implement was based not on local epidemiology but on resources. A targeted response based on the attack rates of specific age groups was not made use of - or not immediately. Decision-making was not only slow but appeared to be ill-informed. So far, vaccination surveys post-campaign have shown reasonable results.

The outbreak strategies were poorly adapted to the unfolding measles epidemics at a country level. This has been acknowledged by MSF and, to a degree, by external partners<sup>10</sup> as a key factor in sub-optimal response, timeliness and delivery. The reasons for this include:

- The current WHO guidelines (2009) were poorly disseminated.
- There is a need to train staff at a national and district level.
- Technical support from WHO and UNICEF was not consistent and sometimes overridden by internal political interests (Zimbabwe).
- The influence of the UN in improving the quality of response and outcomes was less evident in contexts where the MoH had capacity, power and accountability (Malawi).
- Outbreak response was managed by EPI and not by a specific MoH department.

**Note:** The advocacy role of WHO and UNICEF has resulted in a number of press releases and public communications being released since early 2010. These have referred to the enormity of the problem, the need for more money and the challenges for measles control.

**Epidemiological surveillance:** Reinforced surveillance was necessary in all cases. MSF, with strong support from Epicentre in Malawi, was key in ensuring this came about and was well placed to micro-manage this support. In Nigeria, the WHO

played a key role, whereas in Zimbabwe all UN agencies engaged with a diplomatic or non-assertive approach that tended to delay any progress. For Malawi, more effective surveillance in the event of an emergency was possible through the localised approach of MSF teams.

**Relationships with authorities:** In some instances, good relationships and mobile phone communication between MSF, ministries of health and the UN enhanced the effectiveness of the coordination, as in Chad. In Chad, again, the existence of a general coordinator for all the MSF sections proved effective in easing communications with authorities.

In other instances MSF was not included in the MoH/UN micro-planning, as in Zimbabwe, where sudden changes in decision-making and strategy occurred, for example with the case management of patients, which had a negative impact on the timeliness of response. In Malawi, the lack of consensus toward implementation proved surprising, given that it is a context with a reported good track record of measles control for routine and supplementary activities. There is a clear need for a country-specific response for better control strategies. These need to take into account risk factors related to affected areas and also to non-affected areas that present a high epidemic risk<sup>11</sup>. Through analysis of the strategy implementation and of the inter-relationship between key institutions responsible for the implementation of the policy response, some form of understanding has been reached. Use of a comparative method between country groups has helped analysis beyond a generalised description of the situation. This especially highlighted the political and power dimension between the institutions (especially when stronger) and how this can undermine the health concern.

**Hard-to-reach groups:** Whilst MoHs and UN partners paid attention to this issue through sensitisation campaigns once outbreaks were declared, in high-security settings MSF was often better placed to gain access to specific groups due to its perceived neutrality and good community relations. For contexts where reaching susceptible children presented a barrier, MSF used a response strategy that included mobile teams; targeted sensitisation; free healthcare; and a very localised dissemination of best practice through training and supervision at the community level.

10 UNICEF 2010 cited the current 'Ethiopia study' as having the potential to inform minimum standards of vaccination response (personal communication).

11 Augusto Llosa. Measles Surveillance Report. Epicentre 2010.

# Recommendations

- 1.** To improve and build regular collaboration between operations, medical departments, the vaccination working group and Epicentre so as to have a stronger position in terms of negotiation and influence on the measles control lobby and improve outbreak response.
- 2.** To arrange workshops and technical meetings at the regional level (AFRO and inter-country office<sup>12</sup> and HQ) with those responsible on a regional and international level, with the objective of sharing lessons learned, and questioning various technical aspects of the resurgence of measles, for example strategy, funding mechanisms for the Measles Initiative and outbreak response policy.
- 3.** To systematically share an external version of the report findings and additional surveys with MoHs and partners at the country level: to organise meetings with MoHs and the WHO with the support of operations, medical departments and Epicentre after the outbreak so as to analyse the situation and address technical questions to the upper level of the WHO.
- 4.** To build a regular dialogue with the WHO, UNICEF and relevant partners at the international, regional and local levels, with a consistent message and an emphasis on visits to ISTs for AFRO.
- 5.** To define our position and added value in supporting the Measles Initiative and national mass vaccination campaigns in specific contexts and projects where we are working to prevent outbreaks.
- 6.** To carry out context analysis/mapping, including of the local health policy environment, so as to assist teams in more effective advocacy at the country level on outbreak response gaps and concerns (for example to emphasise the value of risk assessments, strengthened surveillance, epidemiological analysis to influence strategic decision-making, and improved access to susceptible groups).
- 7.** For AFRO to decentralise training and supervision of key health staff in-country at the national and district level.

<sup>12</sup> Note Somalia and Yemen come under the WHO Eastern Mediterranean group.

# Glossary

AFRO	WHO Regional Office for Africa
AR	Attack rate
CDC	US Centers for Disease Control and Prevention
CFR	Case fatality rate
CERF	Central Emergency Response Fund
EPI	Expanded Programme of Immunisation
IST	Inter-country support team
MVC	Measles vaccination campaign
MSF	Médecins Sans Frontières
SIA	Supplementary immunisation activities
UNICEF	United Nations Children's Fund
WHO	World Health Organization
WG	Working group
S&S	Signs and symptoms
TAT	Turnaround time

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# Annex 1

## Comprehensive strategy of the WHO and UNICEF

The WHO and UNICEF have developed a comprehensive strategy to sustainably reduce measles deaths. It was endorsed by the World Health Assembly in 2003 and amended in 2010. The four components of the strategy are as follows:

**Strong routine immunisation:** The first dose of measles vaccine is given to children at the age of nine months or shortly thereafter through routine immunisation services. This is the foundation of the sustainable measles mortality reduction strategy. At least 90% of children should be reached by routine immunisation services every year, in every district.

A 'second opportunity' for measles immunisation is provided to all children aged nine months to 15 years. This assures measles immunity in children who failed to receive a previous dose of measles vaccine, as well as in those who were vaccinated but failed to develop immunity following vaccination (approximately 15% of those children vaccinated at nine months of age). The second opportunity prevents the accumulation of susceptible children to dangerous levels, since many older children have missed measles vaccination and have not been infected, so they are not immune. The second opportunity for measles immunisation is given either through routine immunisation services (if high coverage can be achieved and maintained over time) or through periodic supplementary immunisation activities. These target large populations (entire nations or large regions) and aim to vaccinate all children regardless of prior vaccination history.

**Surveillance:** Standard measles surveillance guidelines have been developed and implemented. These include collection of blood from suspected cases and testing it in an accredited laboratory. Prompt recognition and investigation of measles outbreaks provide important information about programme impact and assure the implementation of appropriate outbreak response activities.

Improved clinical management of measles cases, including vitamin A supplementation and adequate treatment of complications, if needed, with antibiotics.

## Priority countries

In their joint *Global plan for reducing measles mortality, 2006-2010*,<sup>2</sup> the WHO and UNICEF have identified 47 priority countries to target. These countries account for more than 95% of global measles deaths, and are as follows:

**African region:** Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of Congo, Eritrea, Equatorial Guinea, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Mali, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Togo, Uganda, Zambia.

**Eastern Mediterranean region:** Afghanistan, Djibouti, Pakistan, Somalia, Sudan, Yemen.

**Southeast Asia region:** Bangladesh, India, Indonesia, Myanmar, Nepal, East Timor.

**Western Pacific region:** Cambodia, Laos, Papua New Guinea, Vietnam.

## The Measles Initiative

Launched in 2001, the Measles Initiative is spearheaded by the American Red Cross, the Centers for Disease Control and Prevention of the US Department of Health and Human Services, the United Nations Foundation, UNICEF and the WHO. Each partner has a clearly defined role. The WHO and UNICEF play a leading role in strategy development, consensus building and programme monitoring. The WHO provides technical leadership and strategic planning for the management, coordination and monitoring of global measles control activities and is responsible for ensuring that all components of the WHO/UNICEF strategy are technically sound and successfully implemented. UNICEF procures and delivers the measles vaccine and injection equipment to countries and assists with advocacy and community mobilisation. GAVI Alliance and most recently the International Finance Facility for Immunisation provide funding.

# Annex 2

## Additional countries and data

Note: data is presented as available and in some cases is incomplete. Yemen was included despite being outside the African region.

### Burkina Faso 2003-9

**Date of initial outbreak confirmation:** No official declaration. IST AFRO reports Feb 2009. Decision to vaccinate made April 2009 (close to peak of outbreak) Vaccination coverage country status: 99% global 2009. Gradual increase since 1999 (88%); between 79-97% in the central region.

**History of outbreak:** 1996 was last significant outbreak with 32,415 suspected cases. National campaigns carried out in 1999, 2001, 2004 and 2007 with age range of 9-59m (though 9m-14y in 2001). In January 2009, suspected cases mentioned in weekly health meeting. Reported cases decreased by 95% in 2010 compared to same period in 2009. IST AFRO reports in late 2008 two districts with a strong shift in population sheltering gold bearing sites? 89% of measles confirmed cases were not vaccinated 66% of measles confirmed cases were coming from districts not involved in 2009 measles outbreak response.

**Number of cases:** 2,440 (54,111 source AFRO)

**Number of deaths:** 25 (367 source AFRO)

**Response strategy:** Non-selective response (AFRO); vaccination campaign 6m-15y; free care; reinforced surveillance; case management and health education.

#### **Bottlenecks/constraints:**

- Poor dissemination of WHO guidelines at central and district level (WHO).
- No agreement between partners and poor decision-making on target age range & geographical zones to cover.
- Missed opportunities: tertiary level, daily measles vaccination, recall 12-23 m.
- Revision of interval between catch-up campaigns
- Need for independent vaccination coverage surveys and reinforced surveillance/early recognition of outbreak.
- Some negotiation difficulties faced by MSF.

**Current status of outbreak:** Ceased 2009

### Mali 2007-9 (OCB)

**Date of initial outbreak confirmation:** First cases Nov 2008. Case confirmed Dec 2009. Vaccination coverage country status 81% (WHO)

**History of outbreak:** No outbreaks between 2002 and 2005 - thought to be due to supplementary immunisation activities. Last SIA Dec 2007. There is elimination documented the same year as the most recent outbreak.

**Context/area affected:** Urban Timbuktu city and Gao; nomadic group.

**Absolute numbers:** 2,500 (9,011 source AFRO)

**Age range:** 6m-15y

**Number of complicated cases:** 2,500

**Number of deaths:** 5 (3 source AFRO)

**Vaccination commenced:** May 2009. 322,724 6m-15y vaccinated 123% coverage.

**Response strategy:** Health education, case management and vaccination campaign MoH/MSF.

**Other actors involved:** MoH

#### **Bottlenecks/constraints:**

- Access; cold chain (environment).
- Difficult to mobilise resources.
- Poor level of staff understanding on response strategies.
- Lack of coordination between partners.

**Current status of outbreak:** Ceased June 2009

## Nigeria: 2003-10

There is a response almost every year to recurring measles/food emergencies, which in some cases reach epidemic proportions. The most affected states are often located in the north of the country.

### **Date of initial out break confirmation:**

Protracted from mid-Dec 2009

**Vaccination coverage country status:** 67% (WHO)

**History of outbreak:** Index case Dec 2009; outbreak confirmed in Jan 2010; selective vaccination during polio campaign vaccination carried out by MoH; outbreak spread across the state.

**Context/area affected:** Kebbi.

**Absolute numbers:** 12,000 (10,164 source AFRO)

**Age range:** 0-45y; most cases <15y; highest caseload 2-4y; attack rates higher in <5s

**Number of cases:** 16,732

**Number of deaths:** 105 (54 source AFRO)

**Vaccination commenced:** April 2010; 47,596 immunised.

**Response strategy:** Reinforced surveillance, case management, vaccination.

**Other actors involved:** MoH/WHO active in surveillance support.

### **Bottlenecks/constraints:**

- Bureaucracy, with negative impact on timely decision-making.
- Measles and malnutrition are politically-sensitive issues for authorities.
- Lack of motivated staff and poor level of training on current outbreak response guidelines.
- Healthcare not free of charge. Partially functioning health system with poor surveillance.
- Poor data harmonisation and insufficiently prepared to take action.
- Poor communication, no mobile network.

## Democratic Republic of Congo 2005-9

MSF involved in 10 of the 26 provinces (Kinshasa, Bas Congo, Kasai, Lulua, Kasai Oriental, Maniema, North Kivu, Tshopo, Equateur, and Haut Katanga).

**Vaccination coverage country status:** (45% WHO)

**History of outbreak:** Last outbreak Jan-Nov 2009 in Masisi, Kisangani. MSF interventions from 2005-9 at total of 85,226 cases and 1,831,239 vaccinated 6m-15y.

**Context/area affected:** Isolated, rural and semi-urban. Displaced populations in some cases due to protracted conflict in parts of the country.

**Age range:** 6m-15y

**Number of cases:** 1,036

**Number of deaths:** 85

**Vaccination commenced:** October 2010. 600,000 children immunised 6m-15y.

**Response strategy:** Reinforced surveillance, case management, vaccination.

**Other actors involved:** MoH/WHO/UNICEF/Epicentre.

### **Bottlenecks/constraints:**

- Insecurity due to conflict/displacement.
- Hard-to-reach isolated communities.
- Lack of staff.
- Healthcare not free of charge. Collapsed health system with poor surveillance.
- Poor data harmonisation.
- Poor communication and no mobile network.

**Current status:** For measles outbreak intervention: recent workshop 2009 WHO, UNICEF, Epicentre, MSF and the Ministry of Health looked at the protracted public health phenomenon with clear and agreed recommendation to improve on strategy<sup>13</sup>. The impact can only be measured in outbreaks that follow. No breakdown to date.

13 This included: targeted and reactive immunisation (urban and rural), age range, communication, coordination, reinforced surveillance, case management protocols.

## Somalia 2007-9

**Date of initial outbreak confirmation:** Protracted March-April 2009, not lab-confirmed.

**Vaccination coverage country status:** 46% (ACF surveys) 29% (WHO).

**History of outbreak:** No cases recorded or known in the area 2007, 2008. Beled Weyne, Galgadud.

**Number of registered cases of measles in Somalia:** (WHO data through Polio surveillance)

Region	2007	2008
Central	430	71
South	14	49
Puntland	14	77
Somaliland	21	884
<b>Total Somalia</b>	<b>479</b>	<b>1,081</b>

**Context/area affected:** Rural/semi-arid drought and conflict-affected areas in Puntland, central and south Somalia. Displaced population.

**Absolute numbers:** 1560+/-

**Age range:** Up to 15 y

**Number of deaths:** 0

**Vaccination commenced:** 26,000 children 6m-15y

**Response strategy:** Curative case management; data collection analysis of time, place, person, geography for following outbreak and further decision-making; vaccinate all 6m-15y in IPD (routine protocol was < 5); WHO UNICEF Child Health Days analysis; data collection; keep MSF-H + CISP on board on same strategy; Mobile Medical Measles Investigation/active case-finding by visiting all villages in Guri el District with two cars; data collection; treatment of non-severe active cases at home; referral (by MSF car of severe cases).

**Other actors involved:** MSF, WHO

### **Bottlenecks/constraints:**

- Security/conflict.
- Poor/collapsed infrastructure and non/semi-functioning MoH. Poor surveillance, lack of human resources, poorly resourced etc.
- MSF international staff supervision is not within the country (remote control).

**Current status of outbreak:** Protracted.

## Yemen: 2005-10 (OCP)

**Date of initial outbreak confirmation:** 1 April.

**Vaccination coverage country status:** 58% (WHO) population data 20-30% disaggregate.

**History of outbreak:** 157 cases reported since March 2010. Planned campaign for Dec 2009 not possible due to fighting.

**Context/area affected:** Northern Yemeni Governorate of Saada City involving 7/15 districts in and around the city. Conflict zone (ceasefire Feb 2010). Internally displaced people.

**Absolute numbers:** 1,402

**Age range:** up to 15y

**Number of deaths:** 0

**Vaccination commenced:** 167,980 vaccinated 6m-15y.

**Response strategy:** The strategy was in collaboration with the MoH in Saada Governorate and included: sensitisation of population; case management; fixed and mobile vaccination including polio and nutrition screening. MSF vaccinated Sahar district as only group with access to the population.

**Other actors involved:** MoPHP, WHO

### **Bottlenecks/constraints:**

- Security: access for MSF had to take into account local factions. However MSF is well accepted.
- Poor surveillance system.
- Capacity of MoH limited due to insufficient human resources.
- Safety of staff.
- Difficult to establish adequate coverage.
- Coverage survey.

