



Epidemics: Neglected emergencies?

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Foreword

The Ebola outbreak that hit West Africa in 2014 dominated the headlines for months, eclipsing coverage of other medical emergencies. It was an enormously important crisis, with many lessons learned during the response phase and with much work remaining to be done. But if we focus too intently on any single disease, we risk overlooking less spectacular but far more common outbreaks of measles, malaria, cholera, and meningitis that take place every year, with profound consequences and loss of life. As we release this report, in fact, a measles epidemic is battering Democratic Republic of Congo's Katanga province, bringing with it extremely high mortality figures.

We must look at outbreaks in their totality—including but not limited to Ebola—to truly gain insight into where MSF as an emergency medical organization and others can improve our responses and better understand what has worked and what hasn't. As our report, "Epidemics: Neglected Emergencies", makes clear, current outbreak response strategies are largely incoherent and must change in some very important ways.

The fact that we are talking about this at all suggests that the prevailing preventative strategies of recent decades have failed. Epidemics continue to occur, particularly in underdeveloped countries, and when they do, they exploit weaknesses in national health systems, exhaust available resources and, in many cases, kill numerous people. This not only highlights critical flaws in national and international prevention efforts, but also makes plain how important it is to have more robust rapid response capabilities in place in order to assist those caught in the outbreaks that occur.

In addition, there are what we might call both inside-out and outside-in issues that need to be addressed. When looking outward from inside a country experiencing an outbreak, national health systems, which too often do not have the resources to respond on their own, are in fact discouraged—by fears of border closures, trade restrictions, and funding stoppages—from reporting an outbreak as quickly as they should. This allows outbreaks to gain momentum before a real response begins. Precious time and lives are lost.

Those health systems must be bolstered through training, encouragement, and other support so they are ready to evaluate,

treat, and share information when it becomes clear that something out of the ordinary is happening. This should happen in addition to—not in place of—programs that strengthen a country's medical infrastructure and ability to provide direct medical care. Public health surveillance is meaningless, after all, if there's no capacity to treat the conditions that surveillance reveals!

This will also help engender trust between a citizenry and its leaders—along with better reporting from communities about what they're seeing—and between national populations and outsiders who can offer assistance. National governments and health actors must take responsibility for their actions as well, providing real leadership and guidance for people who will need both.

From the outside-in: The nature of biomedical innovation needs to change, putting the patients first, rather than security concerns or profit motives. With Ebola, much of the research that had been done commenced only when developed nations believed that the disease might represent a security threat within their borders. It was biodefense, basically, and when the concerns dissipated, so did the research. The threat to other communities, as we saw, did not dissipate, however, and once the disease struck—especially once it reached Europe and the US—old research had to be restarted to catch up to an epidemic already underway.

Again, though, this does not only apply to Ebola. Across diseases and continents, the prevailing model of research and development (R&D) emphasizes marketability over need, profits over people. Diseases that disproportionately affect developing world populations that cannot pay high prices are frequently ignored in favour of money-making propositions. This leaves practitioners like MSF and others working with tools—drugs, diagnostics, vaccines—that are far from ideal and, in some instances, decades old. R&D around neglected diseases must be undertaken with neglected communities and their environments in mind, in order to make sure the most effective, robust, accessible and affordable treatment options get to those who need them most. This will also bolster both prevention strategies and rapid response efforts.

We discuss all of these issues in depth in our report, but we must acknowledge that true leadership at the international

“Part of the problem is a ‘defensive’ posture whereby international action is taken only when a potential threat crosses a border.”



level is necessary for any progress to be made—for patient-centred R&D to be encouraged, for effective coordination efforts to be conducted, for the necessary inside-out and outside-in steps to be taken. Without it, epidemic response will continue to be haphazard, ill-conceived, and dangerously insufficient, with costs that no one should be willing to bear.

Furthermore, we have to recognize that Ebola, other outbreaks of diseases that vaccines could have prevented, and the resurgence of polio in some countries exposed the shortcomings of the current global health regime. Part of the problem is a “defensive” posture whereby international action is taken only when a potential threat crosses a border.

The response to Ebola, for example, was woefully insufficient until larger, more developed nations got anxious enough about it washing up on their shores—and threatening their own security—to do something.

This approach is dangerously short-sighted. Maintaining “health security” should mean maintaining it for everyone, including—perhaps especially—the sickest and most vulnerable societies. That is what our medical ethics push us to do, and that is how we operate our programs in nearly 70 countries around the world.

We remain committed to improving our own contributions to public health the world over, and we therefore hope to work with all actors on the ground to do so—to promote and improve preparedness where needed, and to insist that patients’ interests are put at the heart of the research and development agenda.

But states and leaders have to demonstrate the commitment and political will to change the system, keeping the following core principles in mind at all times:

- 1 The needs of affected populations, and not just security concerns, have to be the cornerstone of any international health regime.**
- 2 Adequate resources must be provided/demanded for the building of effective emergency response systems as part of (not as a substitute for) a broader effort to help countries strengthen their medical infrastructures and capabilities.**
- 3 Rapid alert mechanisms must be accompanied by rapid response activities, actual delivery of care to patients affected by an outbreak.**
- 4 Member States and communities should incentivize and support open and prompt notification of outbreaks from within countries.**
- 5 The R&D agenda must be reoriented towards the greater public good, recognizing that market forces cannot be counted on to deliver effective tools for underserved populations.**

Reform is high on the agenda of nations and the WHO right now, but stakeholders must go beyond talking to truly address issues that, as we have seen, impede preparedness and slow emergency response. If not, we will be doomed to repeat our past mistakes, and we will bear responsibility for the consequences.

Bruno Jochum
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1. Introduction

Better vaccination coverage has been achieved over the past 40 years through the implementation of the Expanded Programme on Immunization (EPI) and increased disease control (global initiatives for HIV, tuberculosis and malaria being good examples).

This has resulted in people living longer, and this increase in life expectancy is mainly due to fewer children dying during the first five years of life. Non-communicable diseases (NCDs) and injuries are increasingly becoming the main causes of morbidity and mortality worldwide. In high- and upper-middle-income countries, more than 90% of early deaths are due to NCDs, but in lower-income countries the majority of premature deaths are still caused by infectious diseases, which are responsible for 70% or more of years of life lost (YLL).¹

Even though epidemics* affect all countries, people in low-income countries suffer the most. Fragile health systems,

insufficient investments in surveillance, early detection and response, and weak international support for emergency response hamper the identification and control of outbreaks, which results in excess morbidity and mortality.

MSF is recognised as playing an important part in epidemic response, mainly in low- and middle-income countries. These include countries where MSF has a presence through its regular medical activities, and those instances when a major epidemic is declared in an area where the organisation is not currently working. More than 60% of MSF's projects are in Africa, including in some of the most vulnerable countries in terms of high epidemic risk or weak national emergency response capacity.

Over the last 10 years, MSF has responded to scores of outbreaks in different countries where the internal and external constraints have, in some cases, led to an inability to implement a proper and

timely epidemic response. This failure to respond translates into excess mortality directly linked with the disease causing the outbreak; or to the deterioration of the health status of the population secondary to the outbreak, such as increased levels of malnutrition after a measles outbreak.²

Emergency preparedness and response at local, regional and country level is at the core of the resilience approach mentioned above, and several organisations are supporting governments to enhance their capacity on that front. However, during our interventions we have encountered serious gaps between the theory of emergency response and the reality. This paper aims to describe some of the obstacles encountered, how the response to outbreaks is sometimes delayed or impaired, and the effects of this on the population. It is hoped that this will encourage other organisations to discuss how to collectively improve epidemic response.

METHODOLOGY



Published and unpublished reports by MSF and additional external reports were reviewed.

Data included in the report was collected using publicly available documents and in some cases internal MSF project data.

SCOPE



The number of epidemic-prone diseases and contexts that could be investigated is vast and includes a large variety of causative agents, modes of transmission and vulnerable countries. Therefore it was necessary to narrow the scope of the diseases and contexts included, and this report focuses on some of the main epidemic-prone diseases that MSF responds to in Africa: malaria, measles and cholera.

Ebola was purposefully left out of the report. Several internal and external critical reviews and evaluations are ongoing, and some have been recently published. The unprecedented Ebola outbreak affecting West Africa has triggered intense debates at all levels regarding the ability of the national and international aid system's approach and policies to cope with such an extraordinary event. This report aims to complement those initiatives.

2. Outbreaks: the unknown burden

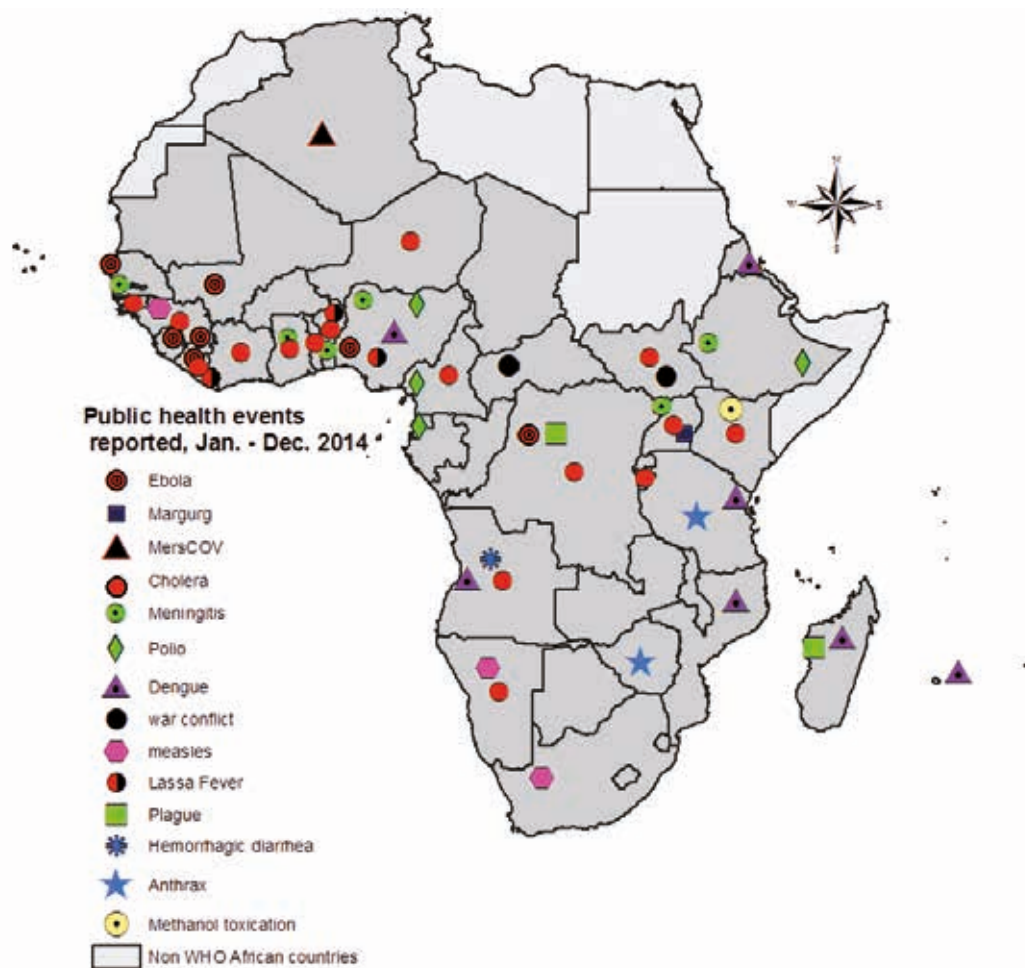
It is not easy to know how many outbreaks are occurring in the world at a given moment. The WHO-coordinated Global Outbreak Alert and Response Network (GOARN) has limited scope*, and while there are several sources of information there is no single validated and real-time database to consult. From the information available publicly, one can conclude that the majority of small outbreaks (with or without adequate response) are most likely not reported, thereby making it difficult to quantify the real number of outbreaks worldwide or their impact on the population.

Communicable diseases with epidemic potential continue to be the main cause of mortality in

children aged from one to 59 months worldwide. Sub-Saharan Africa has higher child mortality rates than any other region on the continent, and this is predominantly related to vaccine-preventable and infectious diseases.³

This confirms that epidemic-prone diseases remain a serious public health threat in Africa. Poverty, high population density and poor access to water and sanitation, together with weak vector control and limited access to primary and secondary healthcare, contribute to the current resurgence of diseases such as malaria and cholera that were previously considered to be under control.

Figure 1:
Geographic distribution of public health events by country in the WHO African Region, January – December 2014



Source: WHO-Regional Office for Africa Outbreak Bulletin, 13 February 2015

*The scope of work of the global alert and response: Avian influenza, cholera, emerging diseases (e.g. nodding disease), Hendra virus infection, influenza (seasonal, pandemic), leptospirosis, meningitis, Nipah virus infection, plague, Rift Valley fever, SARS and coronavirus infections, smallpox and human monkeypox, tularaemia, viral haemorrhagic fevers (Ebola, Marburg, Lassa, Crimean-Congo haemorrhagic fever, etc) and yellow fever.



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To make matters worse, surveillance systems are weak in large parts of Africa, making it hard to measure the true scope of the problem, or to allow for the early detection of outbreaks. This in turn jeopardises the implementation of an appropriate and timely response.

According to the 2014 report from the World Health Organization Regional Office for Africa (WHO/AFRO), 58 public health events were reported during the year. Of those, 95% (55/58) were due to infectious diseases. Cholera was the most-reported, followed by Ebola, dengue, meningitis and polio. In 2014, the number of cholera cases doubled when compared with the previous year, and 22 districts in five countries crossed

”Epidemic-prone diseases remain a serious public health threat in Africa.”

the epidemic threshold for meningitis compared with six districts in four countries for the same period in 2013.⁴

The above seems to be an underestimation of all outbreaks. The map shows that only three countries reported measles outbreaks in 2014, not including South Sudan, where MSF and other organisations responded to measles outbreaks in several camps for internally displaced people; or Uganda where, in the Arua area in January 2014, authorities declared a measles outbreak affecting the local population and South Sudanese refugees.⁵

2.1. Immunisation: current preventative strategies and their limits

Since the WHO launched the Expanded Programme on Immunization (EPI) in 1974, the use of vaccination as a public health intervention tool has been considered one of the most cost-effective ways of reducing child morbidity and mortality. Global health actors, including donors and governments, have invested heavily in prevention as the main means of fighting vaccine-preventable diseases.

The prioritisation of the prevention policy has produced some laudable achievements and has had a substantial impact. There has been an impressive amount of progress made over the last few decades with regards to better vaccination coverage through EPI, resulting in a decrease in the total number of cases of vaccine-preventable diseases and the likelihood of disease outbreaks. Yet outbreaks of vaccine-preventable diseases are still reported every year.

The global effort, which includes internationally-backed initiatives such as Gavi, the vaccine alliance; the Measles & Rubella Initiative (MRI); the Global Polio Eradication Initiative (GPEI); Universal Child Immunization (UCI) initiative; the Global Immunization Vision and Strategy (GIVS) and the Global Vaccine Action Plan (GVAP), is seen as key to meeting the Millennium Development Goals (MDGs).

Success of a national EPI is quantified using DPT3 (diphtheria-tetanus-pertussis vaccine) coverage. DPT3 coverage in the first 12 months of a child's life in Africa has increased from 5% in 1980 to 75% in 2013. Another key indicator is MCV1 (measles containing vaccine) coverage; 95% coverage is required to give herd immunity, thereby avoiding outbreaks and ensuring progress towards elimination.

Table 1:
Vaccination coverage by vaccine and WHO region*, 2013

WHO region / Région OMS	Vaccination coverage (%) / Couverture vaccinale (%)									
	BCG	DTP3/ DTC3	Polio3	MCV1	MCV2	HepB_BD/ HepB_DN	HepB3	Hib3	Rota last/ Rota dernier	PCV3
Total (worldwide)/ Total (monde entier)	90	84	84	84	53	38	81	52	14	25
African / Afrique	83	75	77	74	7	11	76	72	12	35
Americas / Amériques	94	90	90	92	46	71	89	90	70	77
Eastern Mediterranean/ Méditerranée orientale	88	82	82	78	24	65	83	60	22	36
European / Europe	95	96	96	95	81	82	81	83	3	43
South-East Asian / Asie du Sud-Est	90	77	76	78	53	26	74	27	0	0
Western Pacific / Pacifique occidentale	97	96	97	97	92	79	92	18	4	1

BCG = Bacille Calmette-Guérin; DTP3 = 3 doses of diphtheria-tetanus-pertussis vaccine; Polio3 = 3 doses of polio vaccine; MCV1 = 1st dose of measles-containing vaccine; MCV2 = 2nd dose of measles-containing vaccine; HepB_BD birth dose of hepatitis B vaccine; HepB = 3 doses of hepatitis B vaccine; Hib 3 = 3 doses of *Haemophilus influenzae* type b vaccine; Rota last= last dose of rotavirus series; PCV3= 3 doses of pneumococcal conjugate vaccine.

BCG= Bacille Calmette-Guérin; DTC3= 3 doses de vaccin antidiphthérique-antitétanique-anticoquelucheux; Polio3= 3 doses de vaccin antipoliomyélique; MCV1= Première dose de vaccin à valence rougeole; MCV2 = Deuxième dose de vaccin à valence rougeole; HepB_DN= dose à la naissance de vaccinanti-hépatite B, HepB3 = 3 doses de vaccin anti-hépatite B; Hib3 = 3 doses de vaccin anti *Haemophilus influenzae* type b; Rota dernier = dernière dose de la série de vaccins antirotavirus; PCV3= 3 doses de vaccin antipneumococcique conjugué.

* Weighted regional average - Moyenne régionale pondérée.

Currently in Africa, MCV1 coverage is at only 74%, which explains the recurrent outbreaks of measles on the continent. Improvement in vaccine coverage in Africa has slowed over the past few years, and it reached a plateau of around 80% in 2009. Currently 20–30% of children do not receive any vaccinations and are therefore unprotected from the main vaccine-preventable diseases.⁶

Vaccination coverage in Africa differs by country, with some countries better off than others. Ten countries in Africa* are home to 78% of the non-vaccinated children on the continent, and at least four of these countries suffered measles epidemics in 2014 (Chad, Democratic Republic of Congo [DRC], South Africa and South Sudan). Within a country, vaccination coverage may also vary between districts, with hard-to-reach populations having the worst coverage.

There was a sharp reduction in measles cases worldwide after the introduction of the vaccine, more specifically in developing countries, but a resurgence of measles started in 2009–2010. Twenty-eight countries (61%) in the African Region reported measles outbreaks (>100 laboratory-confirmed measles cases), after 10 of them had reported MCV1 coverage above 90% in 2009. Fifteen countries had a follow-up supplementary immunisation activity (SIA) within 24 months prior to the outbreak, with all reporting an administrative coverage above 90%. The majority of the countries (20; 71%) launched an outbreak investigation, but only half of them followed it up with a vaccination response (either outbreak response immunisation, or country-wide SIA).⁶

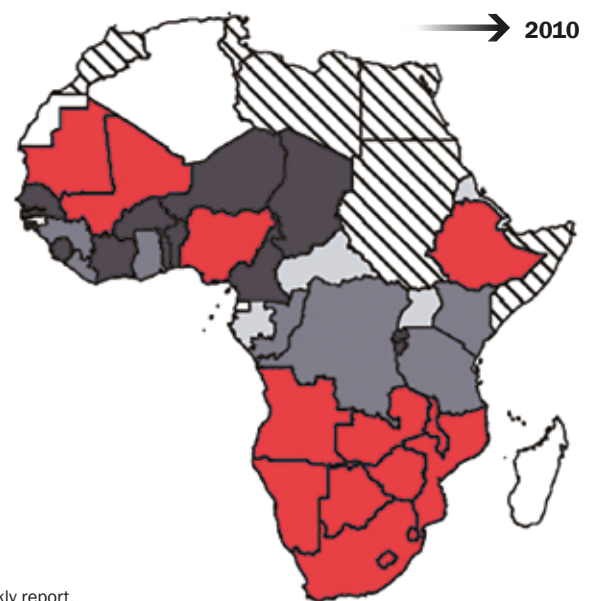
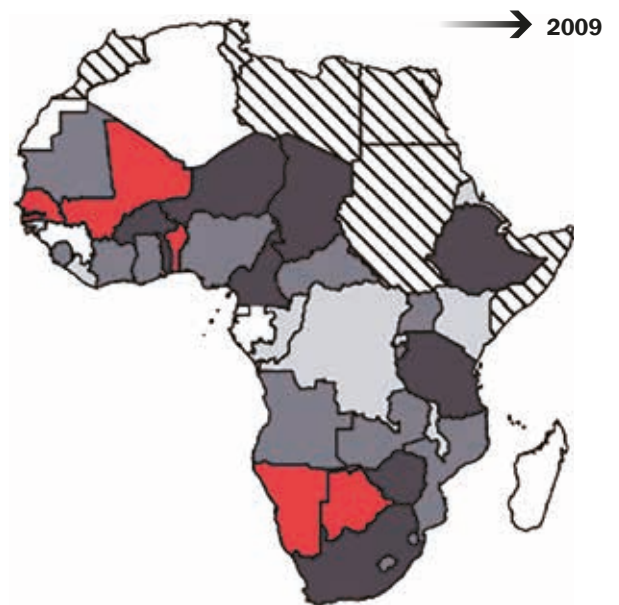
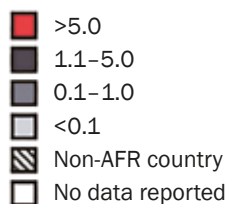
While the majority of measles cases are reported in children under five years of age—in countries with sub-optimal MCV1 coverage—the age of distribution may shift to older children and young adults. This is important to consider

when defining an outbreak response. SIA only targets young children, and routine vaccination campaigns may only target children up to the age of 15.

Even when the health system is efficient and surveillance is ensured, epidemics



can still occur and will usually be linked to sub-optimal vaccination coverage. However, the duration, range and impact in the general population and in individuals varies greatly by country.

Figure 2:
Confirmed measles incidence** – World Health Organization African Region, 2009 and 2010



Source: Morbidity and mortality weekly report, Centers for Disease Control and Prevention (CDC) 1 April 2011

Table 2: Number of measles cases, attack rate and mortality in Geneva (Switzerland) and Katanga (Democratic Republic of Congo), 2011

 Switzerland: Geneva Canton ⁷	 DRC: Katanga ⁸
Duration: January to August 2011	Duration: Full-year 2011
Total cases: 219	Total cases: 45,356
Attack rate: 47/100,000	Attack rate: 710/100,000
No deaths	1.40% Case Fatality Rate (1,085 deaths)

The emphasis given to regular preventative activities sometimes means that outbreak response is not prioritized, and as a result is delayed or prevented. Health System Strengthening (HSS) has focused on boosting resources and the capacity for routine immunisation (RI) and SIAs, and not enough has been invested in contingency planning or emergency preparation and response.

Despite the international support provided to governments to strengthen their health systems, there is still a long way to go for some African countries to be able to achieve equitable access to health. In the majority of the countries where MSF works, the health systems are still weak and care is inaccessible for a significant portion of the population in part due to distance, financial barriers or lack of adequately trained personnel. It may not be realistic at present to believe that the MoH in many of these countries can and will react quickly to an epidemic without external support.

In the majority of cases where epidemics are confined to isolated areas or small pockets of population, the MoH can expect little external support. Substantial support from the aid system is generally activated for emergency response when

the epidemic is large, affects several countries or is perceived as being out of control. The majority of vaccine-preventable disease outbreaks will never capture public attention, nor will they be labelled a large enough catastrophe for the aid system to intervene in full force. This means that the response will be led by the MoH of the affected country, with the responsibility for intervention usually decentralised at the local or regional level and the practical implementation of the response supported by few aid actors.

2.2. Infectious diseases: still the main killer in Africa

It is safe to say that infectious diseases continue to pose a major public health threat in Africa. Adding to the chronic burden of disease, regular outbreaks further challenge peoples' wellbeing. Most of the diseases that cause epidemics in Africa have been controlled or even eradicated in other areas of the world. The root causes of epidemics are diverse and include, but are not limited to, environmental factors, natural disasters, weak (or poorly functioning) public health systems, overcrowding, and social unrest with population displacement, all of which favour transmission.

In the 2015 list of fragile situations released by the World Bank, almost half of the countries identified as high-risk are in the African Region (17/36). Populations in fragile states are particularly vulnerable to outbreaks, and it has in fact been suggested that most major epidemics in the world happen in complex emergencies (man-made and natural disasters).⁹

From 2003 to 2007, member states reported to WHO-AFRO recurrent outbreaks of cholera, meningitis, yellow fever, malaria, dysentery, viral haemorrhagic fevers (Ebola, Marburg, Crimean Congo, Lassa and yellow fever), plague and rare diseases such as human monkey pox or chikungunya.¹⁰ Some of these diseases are only found in African countries due to specific environmental factors or the presence of vectors. In some of the reported outbreaks preventative measures had failed, and in others diseases such as malaria were considered under control but had resurged.

Diarrheal diseases: Cholera

While the MDG 7 target of access to an improved water source was achieved as a worldwide average in 2010, in large parts of Africa the target has still not been met.* Poor access to safe water and sanitation is the main cause of diarrheal diseases, and cholera is a prime example. It is still endemic in half of the countries in Africa, and there are also outbreaks of the disease in several other areas of the world.

Between 2010 and 2013, cholera outbreaks were reported in numerous countries. Cases were reported mainly in Africa and the Asian subcontinent, with the exception of the 2010–2011 period when the number one country reporting cholera cases was Haiti. The majority of cholera cases and resulting deaths are systematically reported in the African Region.



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In 2013 alone, 129,064 cholera cases were reported worldwide with an overall case fatality rate (CFR) below 2%. Of the 26 countries reporting deaths, 17 (65%)

were in the African Region and of those, Congo and Guinea reported a CFR significantly above average at 13% and 10%, respectively.¹¹

Figure 3: Areas reporting outbreaks of cholera 2010–2013

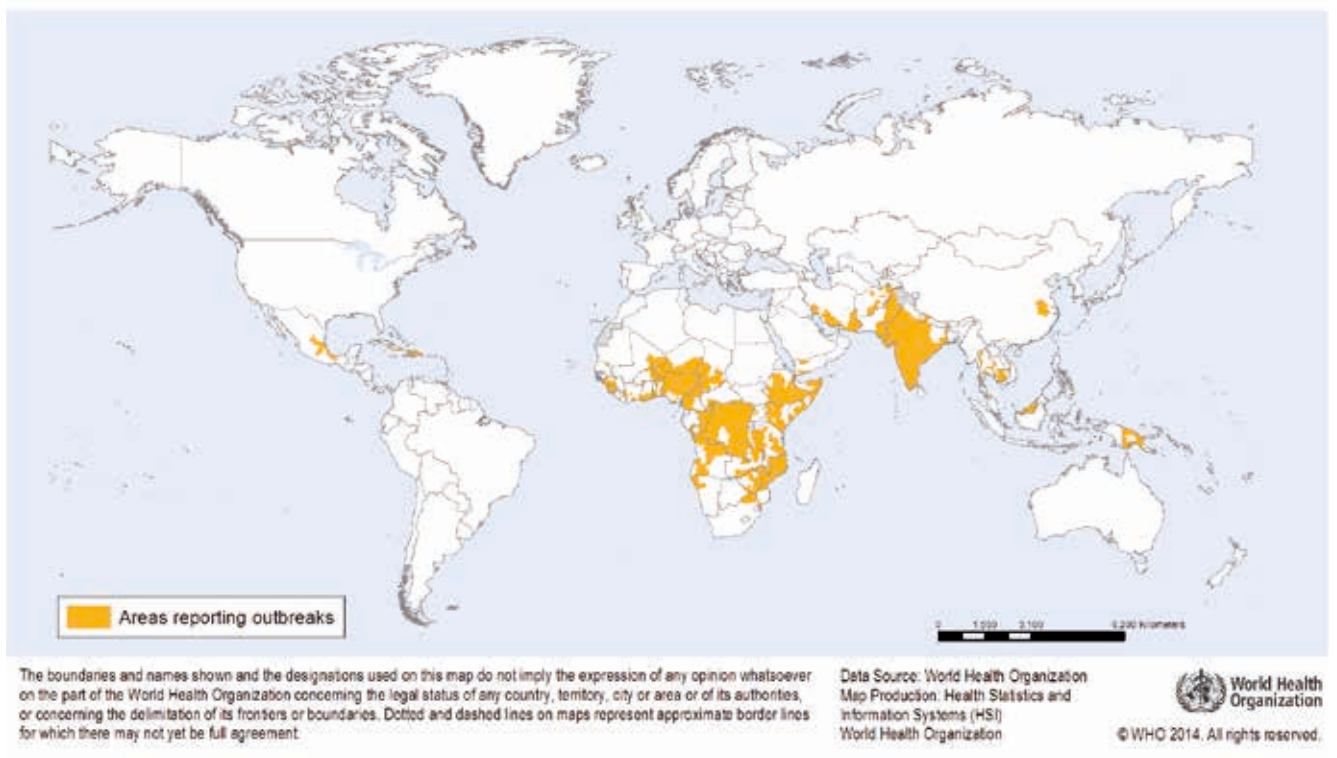


Table 3:
Distribution of cholera cases and deaths
by country, WHO African Region,
January - December 2013

Countries	Cases	Deaths	CFR%
DR Congo	26944	491	1.8
Angola	6655	86	1.3
Nigeria	6600	229	3.5
Mozambique	1869	19	1.0
Congo	1624	221	13.6
Burundi	1557	17	1.1
Guinea Bissau	969	28	2.9
Uganda	748	27	3.6
Niger	585	14	2.4
Benin	528	6	1.1
Sierra Leone	377	2	0.5
Guinea	319	31	9.7
Tanzania	270	17	6.3
Togo	166	4	2.4
Liberia	92	0	0.0
Côte d'Ivoire	56	2	3.6
Ghana	50	0	0.0
Cameroon	29	0	0.0
Mali	23	2	8.7
Namibia	3	0	0.0
South Africa	1	1	100.0
Total	49465	1197	2.4

Source: WHO-Regional Office for Africa outbreak bulletin, 31 January 2014

With appropriate medical care the CFR of cholera should be less than 1% (Sphere standard). In certain African countries the response to cholera (either outbreaks or endemic cases) is clearly suboptimal. Moreover, in several of the affected countries, despite seasonal peaks of cholera in endemic areas being predictable, preparedness is insufficient and the response can be both late and poor.





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Vector-transmitted diseases: malaria

Malaria is endemic in 97 countries in the world. There were an estimated 198 million cases in 2013, with 90% of malaria deaths occurring in Africa. Less than half of the population at risk in sub-Saharan Africa had access to an insecticide-treated net in their household, only 62% of the suspected malaria patients were tested in public health facilities, only 70% of confirmed patients could be treated with ACTs (artemisinin-based combination therapies) that had been distributed to public health facilities, and fewer than 26% of the children diagnosed received treatment.¹²

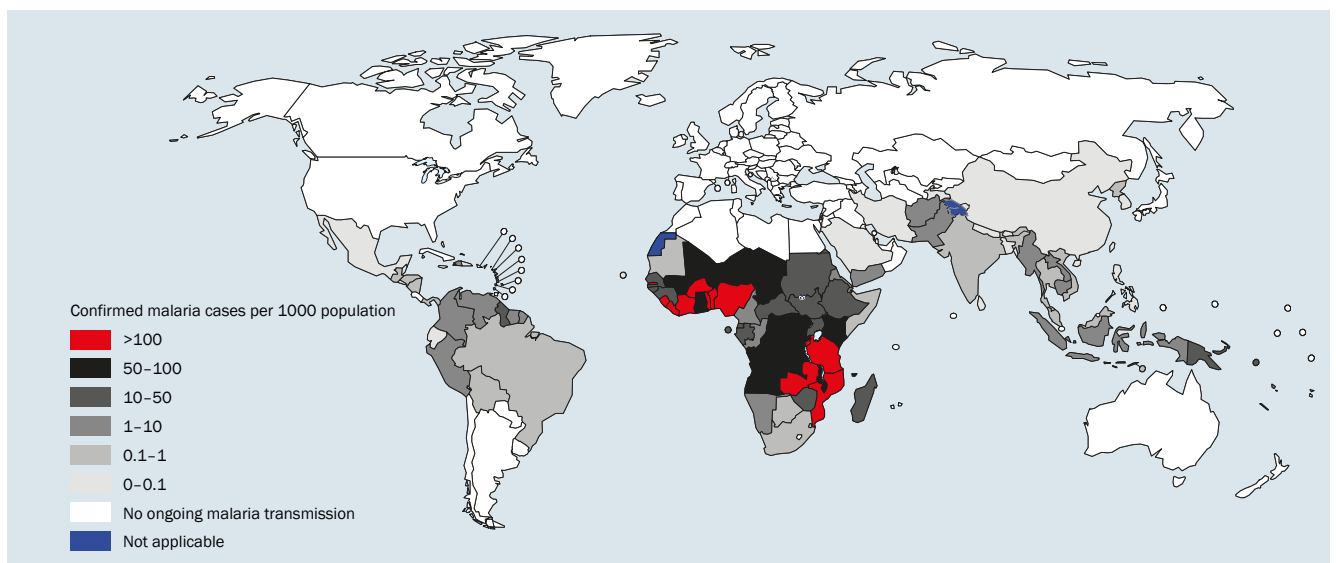
Even though progress has been made in malaria control programmes and the total number of cases and deaths has dropped significantly in the past few decades, malaria is still among the top five causes of mortality for children in several African countries. In addition, unexpected high seasonal peaks and outbreaks have been reported in recent years in the Sahel area and DRC, with high mortality rates.

The reported cases of communicable diseases are, however, probably only the tip

of the iceberg. Weak surveillance based on passive case finding at health structures in areas where the population has no access to healthcare, without a proper alert system, makes it possible for outbreaks to occur but go unnoticed. Polio is a good example. Despite having one of the more intensive surveillance systems in place under the Global Polio Eradication Initiative, according to at least one systematic review it was found that ongoing transmission of a new strain went undetected for more than a year¹³.

In addition, there are outbreaks of diseases with very low fatality rates that are not even within the scope of the MoH/WHO alert system (whooping cough, for example). Diarrheal cases not suspected of being cholera are not reported, and it is very difficult to identify lower respiratory tract infections or pneumonia outbreaks in low-income countries. However, both are listed as top-five causes of mortality in children under the age of five.¹⁴

Figure 4: Countries with ongoing malaria transmission 2013



Source: WHO (Data National malaria control programs reports)

3. Challenge of responding to outbreaks

Epidemics are often viewed as some sort of failure at a political level, and given the gaps in prevention this is in some respects true. No one likes to take ownership and acknowledge failure.

The WHO definition states: “A disease outbreak is the occurrence of cases of disease in excess of what would normally be expected in a defined community, geographical area or season. An outbreak may occur in a restricted geographical area, or may extend over several countries. It may last for a few days or weeks or for several years”.¹⁵

Declaring an outbreak can be delayed by reasons as simple as not anticipating an epidemic and/or not recognising the disease. In some cases—areas with endemic cholera or malaria, for example—there is an ‘acceptable’ seasonal rise in case numbers, or there may be late recognition of epidemic thresholds where there is ongoing, year-round transmission. Outbreaks affecting hard-

to-reach or remote populations are also difficult to identify and respond to.

The alarm is usually triggered either by analysis of trends and/or formal or informal notification of an increased number of cases. From that moment, an investigation needs to take place to confirm—or rule out—the existence of an outbreak. Once this is done the MoH must declare an outbreak and action will be taken. This timeline is sometimes not straightforward, however, and several steps may happen at the same time. An emergency response may be launched without official confirmation or without a declaration of an outbreak by the health authorities.

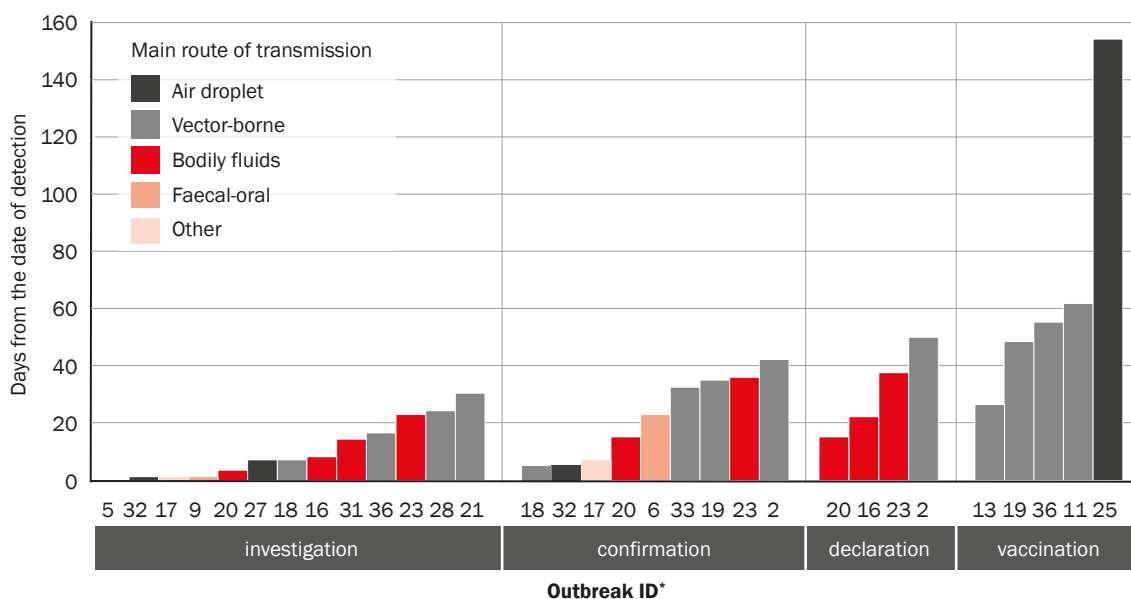
Having the outbreak identified and declared is only the first step on the path to controlling it. Adapting the response to the specific moment of the outbreak is sometimes impossible, as there may be no epidemiological curve due to poor surveillance or no possibility of

calculating attack rates due to a lack of reliable population figures.

A systematic review of infectious disease outbreaks in fragile states between 2000 and 2010 identified long delays from onset to detection, as well as further delays from detection to investigation, confirmation, declaration and control. This can translate to up to five months from the first cases to the start of control measures. In addition, only one report of the 56 analysed was issued by the national authorities; the rest were issued by external organisations. This may indicate that national ownership of surveillance, alert and outbreak control is weak, and reinforces the hypothesis that small outbreaks go underreported and most likely unnoticed.¹⁶

The review mentioned above illustrates that there are several factors that can render an emergency response ineffective.

Figure 5: Delay in days from detection to other events in the outbreak timeline, by main route of the etiologic agent



*Reference number of the outbreak for the analysis

Source: Bruckner and Checchi, Detection of infectious disease outbreaks in twenty-two fragile states, 2000–2010: a systematic review. Conflict and Health 2011.

3.1. Before the epidemic is declared

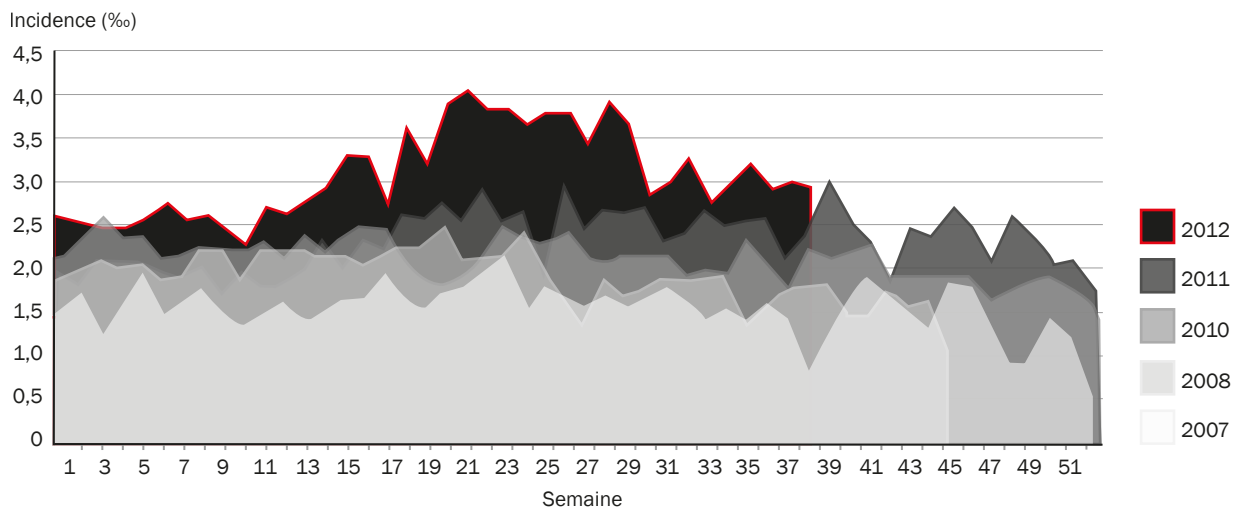
Weak surveillance systems, a lack of functional alert mechanisms and at times politically centred decisions can lead to delays in identifying and declaring an epidemic.

It is not unheard of for malaria outbreaks to go unnoticed for months,

labelled instead as ‘seasonal increases’. This occurred, for example, in the Orientale Province, DRC, where malaria transmission rates remain very high. Annual variations in case numbers are expected, making it difficult to ensure a proper early warning system. In 2012, a malaria outbreak was detected by MSF after it

peaked (an exploratory mission was launched on week 24). Despite the official data from the MoH showing increasing numbers of cases and deaths from malaria, it was the population itself that alerted MSF teams to the unusual mortality rates of children suffering from fever.¹⁷

Figure 6: Weekly Incidence of malaria in Orientale Province, DRC, 2007- 2012



Source: EPICENTRE (based on cases and deaths reported in health facilities)

MSF’s own experience shows that even an emergency organisation with the willingness to respond to outbreaks can miss them. However, reacting swiftly once the outbreak is identified will ensure that the number of people at risk is quickly reduced, and will significantly impact morbidity and mortality rates. During the four-month project in Orientale Province, 58,761 simple malaria cases were treated by mobile clinics and 3,537 severe malaria cases were treated in hospitals. In addition, 6,886 people benefited from the ‘test and treat’ strategy, 3,236 (47%) of whom tested positive for malaria and received ACT treatment.

Since 1998, when the regional strategy on Integrated Disease Surveillance and Response (IDSR) in the African Region was adopted, progress in emergency

preparedness has been seen, more laboratory capacity is available in the region, emergency plans are in place and, according to the WHO Regional Office for Africa database, the exchange of information and weekly reporting of epidemic-prone diseases has been improving. Yet the alert system remains weak, and the timeliness of identification and response needs to be reinforced. Of course, not all countries—or even areas within countries—are at the same level when it comes to surveillance and alert systems.

Surveillance systems based on health structure information will not capture all outbreaks, as access is not guaranteed

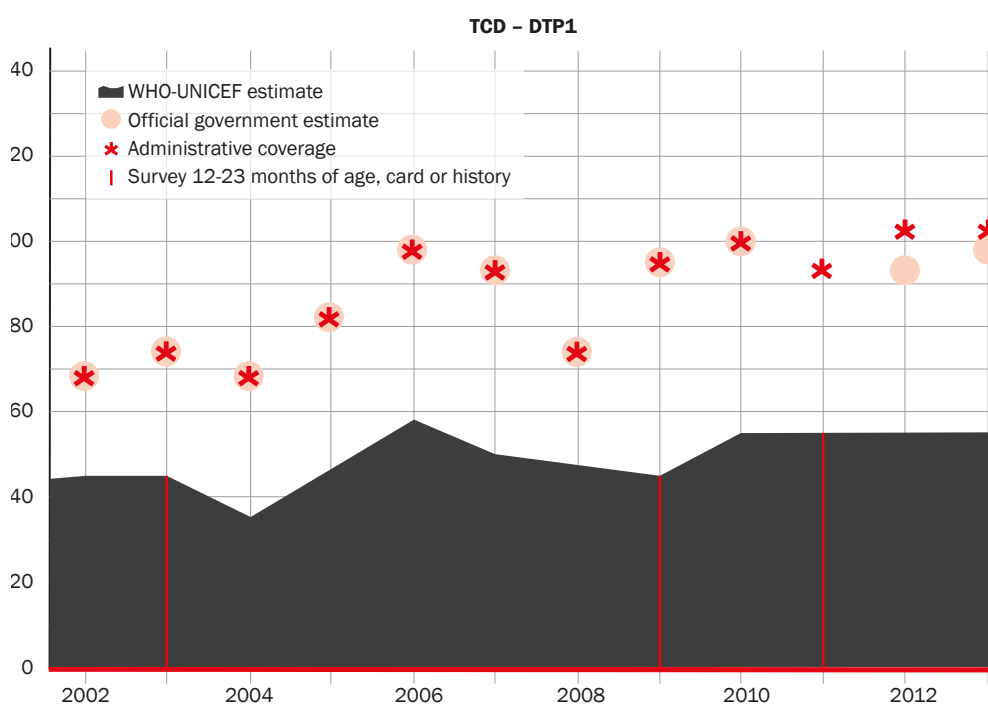
“Reacting swiftly once the outbreak is identified will ensure that the number of sick is quickly reduced.”

for the whole population. Transmission can be ongoing in the population for some time before the alert is raised. Tailored approaches between countries and within countries as an intermediate measure are required while working on long-term reinforcement of the health system, as well as surveillance and alert.

The actual declaration of an epidemic can be politically and economically sensitive, impacting international trade—as cholera does in rice-exporting nations—or on other sectors such as tourism. In some cases, there is even a refusal to acknowledge certain diseases, for example by declaring an acute watery diarrhoea (generic) outbreak instead of identifying it as cholera.¹⁸

Vaccine-preventable diseases are a special case. To qualify for external financial support, good results from EPI and SIAs are expected and official figures tend to reflect that. For example, in Chad, official DTP1 coverage in 2011 was reported as 94%, yet a vaccination coverage survey showed that only 45% of children had been vaccinated.¹⁹

**Figure 7:
Vaccination
coverage in Chad
2002-2013**



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Estimate	45	45	35	46	58	50	47	45	55	55	55	55
Estimate GoC	-	-	-	-	-	-	-	-	-	-	-	-
Official	68	74	68	82	98	93	74	95	100	NA	93	98
Administrative	68	74	68	82	98	93	74	95	100	94	103	103
Survey	NA	45	NA	NA	NA	NA	NA	45	NA	55	NA	NA

Source: Chad: WHO and UNICEF estimates of immunisation coverage, 2013 revision, 8 July 2014



This may partly be explained by a MoH reporting administrative coverage based on obsolete population figures. As the theoretical coverage is good, there is little interest in looking beyond the reported figures. In countries with weak vaccination coverage this should lead to increased efforts to improve routine vaccination, but also increase preparedness and response capacity.

As country mechanisms are more geared towards EPI and SIAs, outbreaks are politically highly sensitive as evidence of failure. A measles outbreak, for example, may imply disappointing results of the EPI due to suboptimal coverage or questionable vaccine effectiveness. Poor EPI performance translates to loss of support from donors. The majority of low-income countries are heavily dependent on international support to run their EPI programmes. It is therefore not surprising that countries are not very open about declaring outbreaks of vaccine-preventable diseases, as these may expose failures in their national programmes or raise doubts about the indicators reported and in turn put their funding at risk.

3.2. When the epidemic is declared

Even the declaration of an epidemic does not guarantee that the response will be timely or adequate. Responding to an epidemic should progress along the following lines: once an epidemic is declared, the MoH of the affected state leads the

response, the WHO provides technical advice and UNICEF supplies commodities such as vaccines and supports social mobilisation. In the case of an outbreak of a vaccine-preventable disease, the International Coordinating Group (ICG), of which MSF is a founding member, allows the responding actors to access meningitis, yellow fever and more recently oral cholera (OCV) vaccines.

Significant delays by government authorities to respond can often be symptomatic of a lack of emergency preparation, contingency planning and funds to implement an intervention. HSS support is not designed to address governmental emergency response capacity. Those responsible for epidemic response may be the same actors who undertake prevention/curative activities, but they often use different budget lines for 'emergency and disaster'. From MSF's experience in the field and from discussing the subject with other partners, many people cite the lack of quick access to funds as the main barrier for intervention or scaling up.

Even if the MoH leads the response, its ability to implement a successful intervention is sometimes limited. This is not only linked to a perceived or real lack of funds but also to limited health personnel, supplies (drugs mainly), and the already weak performance of the existing health system. Thus, the NGO sector, along with the Red Cross national societies and, if requested, the International Federation of Red Cross and Red

Crescent Societies (IFRC), play a crucial role as 'fire fighters'.

The UN itself can have restricted funds but usually its response delays are a result of slow decision-making processes. It is also worth remembering that the UN agencies and long-term partners working with the MoH are engaged in capacity building and health system strengthening. These activities usually privilege good relationships with the authorities and close collaboration, which can sometimes hamper the speed and quality of an emergency response.

Prevention activities by international health actors can also delay outbreak response; this mainly affects the response to vaccine-preventable diseases. There can be tensions between outbreak response, SIA activities and competition with other initiatives (e.g. polio). Polio is much higher up the global health governance agenda than measles or yellow fever. MSF has been forced to postpone mass measles vaccination campaigns in the past because polio days or SIAs were scheduled.

The 2012 epidemic in Cameroon was a clear example of this tension. Not only did the MoH not declare an epidemic, it also planned to harness the SIA to respond to the outbreak and did not seek to adopt a more appropriate reactive campaign modality. This demonstrates once again the tension between the need to invest in prevention and reinforce routine activities, and the need to shift gears and launch an emergency response.

Delays can be linked to problems encountered importing vaccines, obtaining authorisation for particular antigens or accessing specific areas. On at least one occasion, MSF has had difficulties obtaining measles vaccines because of a supplier shortage.²⁰

In most countries, negotiations take place at different levels—federal, state and provincial—and it is often a confusion as to who will make the final decision, with the possibility of it being blocked at any level. In the case of the yellow fever response campaign in 2013 in Darfur, Sudan, one district simply refused to cooperate with MSF.

There are also delays within NGOs. As with governments, it can be challenging to shift from a developmental approach to an emergency. The recent extreme example of this was the notable absence of other agencies besides MSF and the Cuban Medical Brigades at the start of the cholera epidemic response in Haiti in 2010. There were a plethora of actors (and funds) in the country responding to the devastating consequences of the earthquake—therefore implementing an emergency response—but the only first responders to this new emergency were the organisations that stayed outside the cluster strategy. These organisations treated 80% of all cases between 2010 and 2011. The head of the joint WHO-Pan American Health Organization



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(PAHO) office at the time of the cholera outbreak decided to support the capacity building of the Ministry of Public Health and Population to allow it to address cholera itself, and other NGOs followed suit.²¹

“There is a tension between the need to invest in prevention and reinforce routine activities, and the need to shift gears and launch an emergency response.”

little interest in attempting alternative models (based on attack rates or mortality

per age group). Adapting the response to the outbreak evolution is not easy, and to modify an already validated mode of intervention can be problematic.

If an outbreak is declared too late, investing in mass vaccination in the affected area can be inadequate. Even so, the first response from the majority of actors (MSF included) is to plan a mass vaccination campaign targeting the population living in the affected area. This approach may be difficult to challenge afterwards. Case management can also be a problem, as many organisations are first-line responders for community mobilisation and health promotion, and leave aside case management due to its greater complexity and cost.

Last but not least, the emergency response tends to be reliant on standard, ready-to-use operational procedures for almost every outbreak. Weak use of epidemiology to identify the outbreak stage, or evolution of the disease, makes it difficult to stay ahead of the spread. For example, mass vaccination campaigns targeting typical age groups are the norm and there is

²¹In Katanga 2010, when MSF’s main vaccine supplier was overwhelmed because of the Indian government’s decision to mass vaccinate

4. Conclusions

It is evident that there is no one ‘magic bullet’ to improve reactivity when there are epidemics. Many factors that have led to epidemic neglect are consequences of global health priorities. The over-arching policy priority is prevention and health system strengthening, and as there have been notable gains epidemic risk is considered to have been lowered.

Resilience is an important concept to consider when talking about emergency response. Donors, NGOs and UN agencies have embraced the notion of having resilient communities as the panacea. It is an attractive concept that puts the focus back on the affected population, but in the majority of

the contexts mentioned in this report, health systems and communities are far from achieving it. The pursuit of resilient health systems, however, should not distract from the immediate action necessary to respond to the health needs of populations affected by outbreaks, nor should it prevent governments and international actors from supporting those who are willing to launch emergency response activities.

There are many reasons why an epidemic response may be inadequate, tardy and/or

non-existent, and the only one commonly cited by all UN, governmental and/or non-governmental actors is that funds are either insufficient or late (or misused). For the actors who can respond, almost all say that there is a dearth of quick funding for intervening or scaling up. Often, there is money available but a lack of expertise and understanding about how to access the funds. There is also the issue of the

real response capacity of an organisation, which sometimes does not match up to their claims.

There is some truth to the statement that not enough financial resources are available for epidemic response. For many major donors, unless

an outbreak poses a bio/human security threat and/or is of specific geopolitical interest and/or is of such a magnitude that response is an imperative, funding can take time to be released. However, this problem is compounded by the individual choices that agencies claiming a role in emergency response make. When the WHO was said to be nearing bankruptcy, for example, it had plans to dismantle more emergency response structures, thereby further weakening its own capacity. Multi-mandate agencies are investing heavily in advocacy and programmes with

long-term development goals, even if they still claim to be very active in emergency response. Epidemic response is usually linked to specific appeals and requires human resources and logistical capacity that are not immediately available in-house, and this therefore limits the ability of multi-mandate agencies to respond at the outset.

Whilst we can anticipate some epidemics and take action to prevent them in known high-risk zones—both through strengthening EPI and other routine activities or implementing specific preventative campaigns such as seasonal malaria chemoprophylaxis—there will be times when a rapid reactive response is required.

National capacities will be challenged and aid actors (MSF included) should help to translate government contingency plans into reality to respond to the population needs. Closing the gap between theory and practical implementation is one of the main challenges for emergency response. Almost all governments have excellent emergency preparedness and contingency plans in place; however, at the time of acting upon them the gaps become apparent. Tailored approaches in different countries need to be considered to ensure that identification and control of epidemics improves.

“Closing the gap between theory and practical implementation is one of the main challenges for emergency response.”

5. Key issues identified, and recommendations

There is a wide range of practical, policy- and capacity-related reasons why epidemic declarations and responses are delayed, and where there can be no common recommendations made there is a need to challenge some political choices that may impair effective response.

The emphasis given to regular preventative activities sometimes means that outbreak response is not prioritized, and as a result is delayed or prevented. This has a substantial impact on the population, and can result in loss of life and have a negative impact on people's wellbeing. .

→ **International actors and affected governments need to ensure that there is political willingness to facilitate outbreak response.**

Some of the barriers to epidemic response are rooted in the difficulty organisations face when shifting gears in the face of an epidemic. Achievement of long-term goals is given more weight than immediate action, which is sometimes sacrificed within the frame of resilience or HSS.

→ **International actors and affected governments need to state that in the face of an outbreak developmental priorities are second to saving lives and preventing the spread of outbreaks.**

The claim that there are insufficient funds for outbreak response is generalised. Often there is money available but there is a lack of knowledge and expertise about how to access these funds in a timely manner.

→ **Faster and clearer mechanisms to release funds in an emergency are needed.**

In the low-income countries affected by epidemics, MoH reactivity is limited due to several factors such as: a lack of sufficiently qualified personnel, a weak surveillance system and insufficient funding. These translate into poor performance even when there is not an epidemic. Under these circumstances, the expectation that the MoH will be capable of detecting and responding effectively to an outbreak may prove unrealistic.

→ **A targeted/tailored approach from international institutions such as the WHO is needed. Investment to improve the surveillance system or case management system even if it requires hands-on work in some countries will improve the overall response.**

Multi-mandate organisations that present themselves as emergency responders are not living up to their discourse. There is a lack of frontline 'fire fighters' and hands-on support. MSF is one of the organisations that has the drive and expertise to lead epidemic response. This is commonly accepted and relied upon by MoH and other actors. However, this should not prevent others from investing further in enhanced capacity for epidemic response.

→ **International actors that pledge themselves as emergency responders need to maintain sufficient capacity to act. This includes not only financial resources for emergency response but also know-how and qualified personnel. Reinforcing emergency pools or rapid response capacity to be functional immediately is required.**

The response to epidemics tends to be generic. There is poor use of the outbreak's epidemiology to tailor the response.

→ **More research is required to find better and more adapted response tools such as the use of new vaccines during outbreaks (e.g. cholera, rotavirus), alternative models of intervention and new diagnostics and treatments.**

References

- ¹ World Health Organization (2014) World Health Statistics 2014: a wealth of information on global public health. Available at: www.who.int/iris/handle/10665/112739 (Accessed: 8 April 2015)
- ² Bhaskaram P. Measles & malnutrition. *Indian J Med Res* 1995; 102: pp.195–199. PubMed Abstract OpenURL
- ³ Global, regional, and national age–sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet* 2015; 385, pp.117–171. DOI: 10.1016/S0140-6736(14)61682-2
- ⁴ World Health Organization (2015) Regional Office for Africa, Disease Prevention and Control Cluster, Epidemic and Pandemic Alert and Response Programme. *Outbreak Bulletin* Vol. 4, Issue 6, 13 February 2015
- ⁵ UNHCR (2014) Uganda: UNHCR working to contain spread of measles among South Sudanese refugees. Briefing notes, 24 January 2014
- ⁶ World Health Organization (2015) African Health Observatory. Special issue: Immunization in the African Region 2015. Available at: <https://www.who.int/en/ahm/issue/19> (Accessed: 11 April 2015).
- ⁷ Delaporte E, Wyler Lazarevic CA, Iten A, Sudre P. Large measles outbreak in Geneva, Switzerland, January to August 2011: descriptive epidemiology and demonstration of quarantine effectiveness. *Eurosurveillance* 2013; 18 (6);pii=20395. Available online: www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20395
- ⁸ Grout L, et al. Measles in Democratic Republic of Congo: an outbreak description from Katanga, 2010–2011. *BMC Infectious Diseases*, 13 (1). DOI: 10.1186/1471-2334-13-232
- ⁹ Spiegel, PB, Phuoc, L, Ververs, MT and Salama, P. Occurrence and overlap of natural disasters, complex emergencies and epidemics during the past decade (1995–2004). *Conflict and Health* 2007, 1 (1). DOI: 10.1186/1752-1505-1-2
- ¹⁰ Kebede, S, Duale, S, Yokouide, A and Alemu, W. Trends of major disease outbreaks in the African region, 2003–2007. *East African Journal of Public Health* 2011, 7. DOI: 10.4314/eajph.v7i1.64672
- ¹¹ WHO Weekly epidemiological record, cholera 1 August 2013 Vol. 89, 31 (pp.345–356). Available online: www.who.int/wer/2014/wer8931/en/
- ¹² World Health Organization. World malaria report 2014 available online: www.who.int/malaria/publications/world_malaria_report_2014/en/
- ¹³ WHO Global Update on vaccine-derived polioviruses, January 2006–August 2007. *Weekly epidemiological record* 2007, 82(39);pp.337–343
- ¹⁴ WHO (2015) Media Centre, www.who.int/mediacentre/factsheets/fs178/en/
- ¹⁵ WHO (2015) Health topics, www.who.int/topics/disease_outbreaks/en
- ¹⁶ Buckner and Checchi: Detection of infectious disease outbreaks in twenty-two fragile states, 2000–2010: a systematic review. *Conflict and Health* 2011; 5:13
- ¹⁷ Koskalova A and Iscla M. Evaluation of two emergency interventions: outbreak of malaria and epidemic of measles Orientale Province, DRC, June 2012–September 2013. Vienna Evaluation Unit (Medecins Sans Frontieres) 2014
- ¹⁸ Angola 2006, Ethiopia 2007, South Sudan 2015. www.aljazeera.com/news/2015/06/south-sudan-cholera-outbreak-juba-who-150622163830851.html; www.msf.org/article/cholera-angola-almost-500-new-cases-every-day-msf-urges-government-take-much-stronger-action; www.theguardian.com/world/2007/feb/22/ethiopia
- ¹⁹ WHO and UNICEF estimates of national immunisation 2013, Revision 8 July 2014. Available at: www.who.int/immunization/monitoring_surveillance/data/tcd.pdf (Accessed: 12 May 2015)
- ²⁰ Andrea Binder. Is the Humanitarian Failure in Haiti a System Failure? *International Development Policy, Revue internationale de politique de développement* 2013; 4.3. URL: <http://poldev.revues.org/1625>. DOI : 10.4000/poldev.1625
- ²¹ Minetti, A et al. Measles Outbreak Response Immunization Is Context-Specific: Insight from the Recent Experience of Médecins Sans Frontières, *PLoS Medicine* 2013, 10 (11). DOI: 10.1371/journal.pmed.1001544

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