



Pushed to the Limit and Beyond

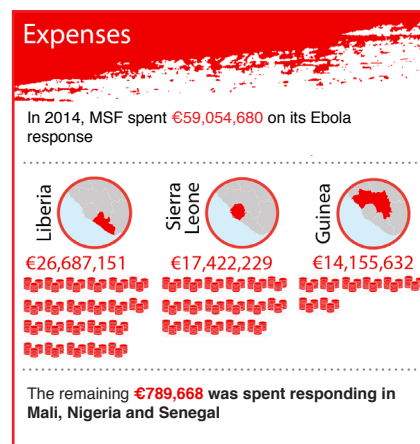
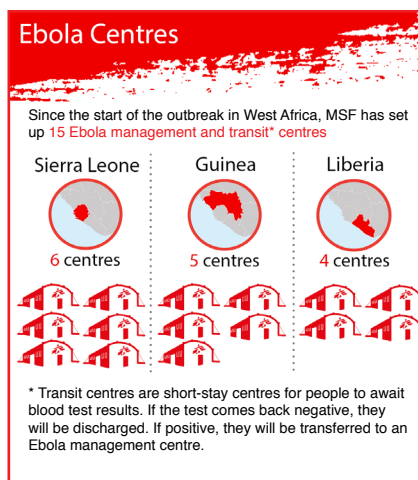
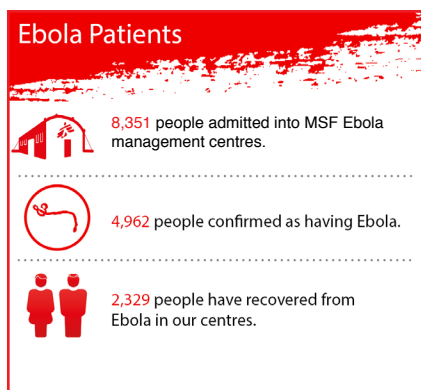
A year into the largest ever Ebola outbreak

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This year thousands of health workers have risked their lives to support patients and help control the Ebola outbreak, while facing stigma and fear in their own communities. The vulnerability of medical staff to Ebola is a double tragedy – the virus takes the lives of the very people meant to tackle it. Nearly 500 healthcare workers have died of Ebola in Guinea, Liberia and Sierra Leone to date.

This report is dedicated to them and to our 14 MSF colleagues who have lost their lives in Guinea, Sierra Leone and Liberia during this epidemic. They are sorely missed and our deepest sympathies remain with their families and friends.



COVER PICTURE

An MSF health worker in protective clothing carries a child suspected of having Ebola in the MSF treatment centre in Monrovia, Liberia on 5 October 2014.

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Introduction

We are now a year into the deadliest Ebola outbreak the world has ever seen, with at least 24,000 people infected and more than 10,000 deaths. Ebola has destroyed lives and families, left deep scars, and ripped at the social and economic fabric of Guinea, Liberia and Sierra Leone.

The virus cut a vast swathe through the three countries, in a cross-border geographical spread never seen before. Fear and panic set in, the sick and their families were desperate, and national health workers and MSF teams were overwhelmed and exhausted. Medical workers are not trained to deal with at least 50 percent of their patients dying from a disease for which no treatments exist. Nevertheless, the world at first ignored the calls for help and then belatedly decided to act. Meanwhile,

MSF Ebola management centre, Kailahun, Sierra Leone. A medical team gets ready to enter the high-risk zone.

months were wasted and lives were lost. No one knows the true number of deaths the epidemic will have ultimately caused: the resulting collapse of health services means that untreated malaria, complicated deliveries and car crashes will have multiplied the direct Ebola deaths many times over.

A year later, the atmosphere of fear and the level of misinformation still circulating continue to hamper the ability to halt the virus. In Sierra Leone, hot-spots persist, while in Guinea health workers come under violent attack due to ongoing mistrust and fear. Encouragingly, Liberia has seen the sharpest

decline in cases, yet the country will remain at risk while Ebola lives on in neighbouring Guinea and Sierra Leone.

A significant challenge remains ahead of us. To declare an end to the outbreak, we must identify every last case, requiring a level of meticulous precision that is practically unique in medical humanitarian interventions in the field. There is no room for mistakes or complacency; the number of new cases weekly is still higher than in any previous outbreak. Success in reducing the number of cases in one location can be swiftly ruined by an unexpected flare-up in an unforeseen area.

Many questions, few simple answers

A year into the outbreak, many questions abound. How did the epidemic spiral so spectacularly out of control?



Why was the world so slow to wake up to its severity and respond? Was it due to fear, lack of political will, lack of expertise, or a perfect storm of all three? Did MSF make the right choices? How could MSF have done more and saved more lives? What have we learned from this outbreak and what must be done differently in future? There are many questions and few simple answers.

MSF teams are still absorbed in tackling the ongoing outbreak, and it is difficult to draw definitive conclusions whilst lacking the necessary distance for a thorough critical review. Here we put forward initial reflections on the past year, describing key moments and challenges from the perspective of MSF staff. More in-depth reviews will certainly follow.

This paper is based on interviews with dozens of our staff who give a snapshot of the reality for MSF over the past year, both on the ground and in headquarters. We have been tested, pushed beyond our limits, and made our share of mistakes.

What also clearly emerges is that no one was prepared for the nightmarish spread and magnitude of this epidemic. The Ebola outbreak proved to be an exceptional event that exposed the reality of how inefficient and slow health and aid systems are to respond to emergencies. 'Business as usual' was exposed on the world stage, with the loss of thousands of lives. What will we have learned from these mistakes?

A SADLY UNIQUE YEAR

While MSF has helped to control Ebola outbreaks in nine countries over the past 20 years, the epidemic that has raged in west Africa proved uniquely catastrophic. In the past year, MSF has been pushed to the limits and beyond, launching a response marked by many firsts for the organisation, many of them tragic beyond words.

The first time we:

- **Lost so many patients to Ebola**, 2,547 of our patients have died, a catastrophically high number that shocked MSF teams – even in most warzones, losing so many patients in such a short time is unheard of.
- **Had MSF colleagues fall sick with Ebola**, 28 of whom became infected and 14 tragically passed away.
- **Turned Ebola patients away**, as happened at our overwhelmed facility in Monrovia.
- **Responded to viral haemorrhagic fever on such a large scale in multiple countries simultaneously** – Ebola in Guinea, Sierra Leone, Liberia, Nigeria, Mali, Senegal, in addition to an unrelated Ebola outbreak in Democratic Republic of Congo and Marburg in Uganda.
- **Mobilised against an Ebola epidemic spread** over such a vast geographic area, and in densely populated urban centres.
- **Diverted human resources** from other MSF emergency projects on such a scale. International and national staff reassigned from headquarters and other MSF projects worldwide account for 213 departures of the more than 1,300 international staff deployed to respond to Ebola.
- **Opened an Ebola management centre with 250 beds**. Prior to this epidemic, a 40-bed centre was the largest we had built to respond to a large-scale epidemic.
- **Shipped in and set up incinerators to cremate bodies**, as happened in Monrovia when the national burial teams could not cope with the number of dead.
- **Distributed approximately 70,000 home protection and disinfection kits** for 600,000 people in Monrovia.
- **Distributed antimalarial drugs to more than 650,000 people** in Monrovia and 1.8 million people in Freetown.
- **Constructed a specialised maternity unit** to care for pregnant women with Ebola.
- **Embarked on MSF's largest knowledge transfer effort**, with more than 800 MSF staff trained on safe Ebola management in headquarters, as well as 250 people from other organisations such as the World Health Organization, the US Center for Disease Control, International Medical Corps, GOAL, Save the Children, French Red Cross and others. Hundreds more were trained on-site in the affected countries.
- **Began clinical trials** of experimental treatments and vaccines in the midst of an outbreak.
- **Addressed UN member states** at the UN General Assembly, as we did in September 2014, declaring that we collectively were losing the battle against Ebola.

Sounding the **alarm**

Unprecedented, out of control: a war of words

'Mysterious disease'

On 14 March 2014, Dr Esther Sterk in MSF's Geneva office was informed of a 'mysterious disease' reported by the Ministry of Health in Guinea. Several health staff taking care of the sick had died and mortality was very high. Suspicious of Lassa viral haemorrhagic fever, she forwarded the report describing the symptoms of the cases to Dr Michel Van Herp, MSF's senior viral haemorrhagic fever epidemiologist in Brussels.

"What jumped out at me from the medical report was the hiccups, a typical symptom associated with Ebola," recalls Dr Van Herp. "After further examination, I said to my colleagues, 'We're definitely dealing with viral haemorrhagic fever, and we should be prepared for Ebola,

MSF Ebola management centre, Kailahun, Sierra Leone.

even if never seen in this region before.'" Three MSF emergency teams were deployed at once, one from Geneva, the second from Brussels, both with reinforcements and supplies. The third, an MSF team based in Sierra Leone with viral haemorrhagic fever experience, was redirected over the border with some protection materials and was the first to arrive in Guéckédou, Guinea, on 18 March.

Acting on their suspicions, the team immediately set up the priority activities for an Ebola outbreak: caring for the sick in Guéckédou hospital, training local health staff on how to protect themselves, raising awareness of the virus in the community, conducting safe burials, and running ambulances. Dr Van Herp joined them shortly after to begin outreach activities and to investigate suspected cases in the region, tracking the

virus's spread so as to contain it. On 21 March, laboratory confirmation of samples sent to Europe came through late in the evening and on 22 March, the Guinean Ministry of Health officially declared the outbreak as Ebola.

Unprecedented spread

The detective work of the epidemiologists revealed some unconnected chains of transmission in different locations in the Guinée forestière region, many of whom had family in neighbouring Liberia and Sierra Leone.

"It was dawning on us that the spread of the outbreak was something we'd never seen before. Just days after we arrived, an alert came in of suspected cases over the border in Foya, Liberia," says Marie-Christine Ferir, MSF emergency coordinator. "Then it went from bad to worse – a confirmed case showed up 650 km



away from Guéckédou in Guinea's capital, Conakry."

On 31 March, MSF publicly declared the outbreak as 'unprecedented' due to the geographic spread of the cases. What now seems obvious was, at the time, considered exaggerated and alarmist by many. On 1 April, the World Health Organization (WHO), via its chief spokesperson in Geneva, was the first to call into question MSF's declaration, objecting that the virus dynamics were not unlike those of past outbreaks, nor was the outbreak unprecedented.

"This was Zaire, the most deadly strain of Ebola, spread out in an unprepared region, while the sick and their caregivers were moving on a scale we'd never seen before. Even the dead were being transported from one village to another," recalls Dr Van Herp.

"We balanced the risks of potentially fuelling further panic against the knowledge that this epidemic would be far more complicated to control than any other before," says Dr Van Herp. "I had no doubt it was unprecedented – our alarm bells were ringing from the start."

Virus without borders

Ebola had been stealthily spreading undetected for more than three months. It is not unusual for Ebola to go undiagnosed for a substantial period of time; the past eight Ebola outbreaks each took two months on average to be discovered and investigated. Ebola's symptoms are easily confused with other diseases, such as cholera and malaria, and experts trained to recognise it are rare, both in MSF and in the world at large.

However, past outbreaks took place mostly in remote villages in central and eastern Africa, where they were more easily contained. In a twist of geographic fate, Ebola erupted at the junction of Guinea, Liberia and Sierra Leone, where people regularly move across the porous borders.

Fear and suspicion of the unknown virus, unsafe burial practices, mistrust in politicians, the hiding of cases, and a weak public health system, which lacked the



Guinea, March 31.

resources to recognise and efficiently respond to Ebola, all contributed to the virus surging through the region.

MSF teams spread thin

Within the first two weeks, more than 60 MSF international staff were deployed to Guinea and had set up three Ebola management centres in Guéckédou, Macenta and Conakry, whilst tracing alerts and trying to carry out all the other 'normal' priority activities in an Ebola outbreak.

"The problem initially was not so much the number of cases, but that the hot-spots were spread out in so many locations," says Dr Armand Sprecher, MSF public health specialist. "In the past, Ebola stood still for us and we could quickly set up operations in the same area to contain it. This time, people moved around much more and Ebola travelled with them. So we had to replicate activities and move around our handful of experienced staff like chess pieces, trying to gauge where they'd be best placed to act fast."

On 31 March, cases were confirmed in Liberia. One of the MSF teams in Guinea was redirected to set up isolation wards in Monrovia and Foya, and train health-care workers on how to tackle the virus. Only 12 cases were reported in ten days, and by mid-May the situation there seemed under control. After 21 days without new cases and having trained health staff in Liberia, the MSF team departed to reinforce those in Guinea.

"Although we also began to see a decrease of cases in Guinée forestière region in May, we stayed vigilant in case of hidden chains of transmission," says

Dr Van Herp. "Ebola outbreaks often come in waves. You can see a lull in one area, only to see the numbers spike again later. Until every last contact is followed up, victory cannot be declared."

Meanwhile, there was concern all along about the puzzling absence of confirmed cases over the border in Sierra Leone.

Undiscovered outbreak in Sierra Leone

In mid and late March, Ebola cases in Guinea were discovered that were reportedly coming from Sierra Leone. MSF immediately sent these alerts to the Ministry of Health and the WHO in Freetown to be followed up locally.

From the onset of the epidemic, the US biotechnology company Metabiota and Tulane University, partners of Sierra Leone's Kenema hospital, had the lead in supporting Sierra Leone's Ministry of Health in investigating suspected cases. Their investigations came back Ebola-negative, while their ongoing surveillance activities seem to have missed the cases of Ebola that had emerged in the country.

"We had prioritised our resources on areas with confirmed cases in Guinea and Liberia," says Ferir. "There was little room to question the formal information coming from Freetown that the investigations showed no confirmed cases in Sierra Leone."

Then, on 26 May, the first confirmed case was declared in Sierra Leone and the Ministry of Health called on MSF to intervene. MSF's priority became setting up an Ebola management centre in Kailahun, the epicentre at that time in Sierra Leone. With MSF's teams already spread thin, and due to the high number of cases, MSF lacked the capacity to simultaneously manage essential outreach activities such as awareness raising and surveillance.

"When we set up operations in Kailahun, we realised we were already too late. There were cases everywhere, and we built the centre with 60 beds, rather than the 20 we started with in Guinea,"

says Anja Wolz, MSF emergency coordinator. “The Ministry of Health and the partners of Kenema hospital refused to share data or lists of contacts with us, so we were working in the dark while cases just kept coming in.”

After a short period of raised hopes in May as cases appeared to be declining in Guinea and Liberia, the hidden outbreak in Sierra Leone mushroomed and reignited the outbreak for its neighbours.

Today, describing the epidemic as ‘unprecedented’ is stating the obvious, though for months MSF felt alone in this analysis. But MSF was not prepared for just how unprecedented the outbreak would become, both in terms of its scale and in terms of the leading role the organisation would be forced to assume.

Out of control

In late June, MSF teams counted that the virus was actively transmitting in more than 60 locations in Guinea, Liberia and Sierra Leone. Facing an exceptionally aggressive epidemic and unable to do everything, MSF teams focused on damage control and prioritised the majority of resources on running Ebola management centres. Critically it was not possible to roll out the full range of containment activities in all locations.

Across the three countries, local health-care workers were tragically dying by the dozens. In Ebola outbreaks, health facilities without proper infection control often act as multiplying chambers for the virus, and become dangerous places for both health workers and patients. This outbreak was no different, but it happened on a massive scale.

“We raised the alarm publicly again on 21 June, declaring that the epidemic was out of control and that we could not respond to the large number of new cases and locations alone,” recalls Dr Bart Janssens, MSF director of operations. “We called for qualified medical staff to be deployed, for trainings to be organised, and for contact tracing and awareness-raising activities to be stepped up. But effectively none of these things followed our appeal for help. It was like shouting into a desert.” Although the writing was on the wall, again MSF was accused of alarmism

THE SIX KEY ACTIVITIES TO BRING AN EBOLA OUTBREAK UNDER CONTROL

- 1. Isolation and care for patients:** Isolate patients in Ebola management centres staffed by trained personnel and provide supportive medical care and psychosocial support for patients and their families.
- 2. Safe burials:** Provide and encourage safe burial activities in the communities
- 3. Awareness-raising:** Conduct extensive awareness-raising activities to help communities understand the nature of the disease, how to protect themselves, and how to help stem its spread. This works best when efforts are made to understand the culture and traditions of local communities.
- 4. Disease surveillance:** Conduct and promote thorough disease surveillance in order to locate new cases, track likely pathways of transmission, and identify sites that require thorough disinfection.
- 5. Contact-tracing:** Conduct and promote thorough tracing of those who have been in contact with Ebola-infected people. If contacts are not mapped and followed up, it undermines all the other activities and the disease will continue to spread.
- 6. Non-Ebola healthcare:** Ensure that medical care remains available for people with illnesses and conditions other than Ebola (malaria, chronic diseases, obstetric care, etc). This includes implementing stringent policies to protect health facilities and health workers, particularly in areas where they might come into contact with patients.



Gbando, Guinea. MSF epidemiologist Dr Michel Van Herp explains what is Ebola, how to protect yourself and avoid transmission.

for declaring that the epidemic was out of control. At the same time, government authorities and members of the WHO in Guinea and Sierra Leone downplayed the epidemic’s spread, insisting it was under control and accusing MSF of causing unnecessary panic.

“In the end, we did not know what words to use that would make the world wake up and realise how out of control the outbreak had truly become,” recalls Dr Janssens.

Global coalition of **inaction**

Lack of political will, expertise or simply fear?

Reluctance and obstructions

The governments of Guinea and Sierra Leone were initially very reluctant to recognise the severity of the outbreak, which obstructed the early response. This is far from unusual in outbreaks of Ebola – or indeed other dangerous infectious diseases; there is often little appetite to immediately sound the alarm for fear of causing public panic, disrupting the functioning of the country and driving away visitors and investors.

On 10 May, Guinean media reported the president of Guinea complaining that MSF was spreading panic in order to raise funds. In Sierra Leone, the government instructed the WHO to report only laboratory-confirmed deaths in June, reducing the death toll count in

the country by excluding probable and suspected cases. Needless obstacles made responding more difficult for MSF teams, who were refused access to contact lists and had to start from scratch in determining which villages were affected and where and how to respond.

Faced with an explosion of Ebola cases in the summer, the Liberian authorities were transparent about the spread of cases, though few outside the country stepped forward to respond to their urgent requests for help. The government was wrongly accused of scare-mongering by its own population, who thought it might be a ploy to raise international assistance.

A vacuum of leadership

The WHO plays a leading role in protecting international public health, and it is well known that its expertise lies in

its normative work and technical advice to countries worldwide. Its ability to respond to emergencies and outbreaks is less robust, lacking the human resources and emergency preparedness to hit the ground running and care for patients.

“When it became clear early on that it was not simply the number of cases that was creating concern, but indeed the epidemic’s spread, clear direction was needed and leadership should have been taken,” says Christopher Stokes, MSF general director. “The WHO should have been fighting the virus, not MSF.”

There was little sharing of information between countries, with officials relying on the WHO to act as liaison between them. It was not until July that new leadership was brought into the WHO country offices and a regional

MSF Ebola management centre, Freetown, Sierra Leone.





MSF Ebola management centre, Guéckédou, Guinea.

operations centre was established in Conakry to oversee technical and operational support to the affected countries.

Instead of limiting its role to providing advisory support to the national authorities for months, the WHO should have recognised much earlier that this outbreak required more hands-on deployment. All the elements that led to the outbreak's resurgence in June were also present in March, but the analysis, recognition and willingness to assume responsibility to respond robustly were not.

Lack of expertise, short of staff

Given that Ebola outbreaks in the past occurred on a much smaller scale, the number of people with experience of the disease was limited; there were simply not enough experts worldwide to stem the tide of this epidemic.

For MSF, the most significant limitation was the lack of experienced staff to deal with an outbreak on this scale. The Ebola 'veterans' in MSF numbered only around 40 at the onset of the outbreak. They had to simultaneously set up and run operations on the frontline, as well as coach inexperienced staff. Now more than 1,300 international staff and more than 4,000 national staff have been deployed over the past year.

The WHO is internationally mandated to lead on global health emergencies and possesses the know-how to bring Ebola under control, as does the US Centers

for Disease Control (CDC) with its laboratory and epidemiological expertise. However, both WHO in the African Region (WHO AFRO) and its Geneva headquarters did not identify early on the need for more staff to do the hands-on work, nor did it mobilise additional human resources and invest early enough in training more personnel.

"We mobilised all our haemorrhagic fever experts and experienced medical and logistical staff, many of whom returned multiple times to the region. But we couldn't be everywhere at once, nor should it be our role to single-handedly respond," says Brice de le Vingne, MSF director of operations. "MSF does not have an Ebola army with a warehouse of personnel on standby. We rely on the availability and commitment of our volunteers."

Meanwhile, exhausted national health workers bravely and tirelessly stepped up and continued to tackle the outbreak each day, while facing stigma and fear in their own communities. Some MSF locally-hired staff were abandoned by their partners, ejected from their homes, their children ostracised by playmates. Their dedication and extraordinary hard work over the past year is parallel to none.

Liberia: SOS call in June

At the end of June, there was a meeting in Geneva of the WHO's Global Alert and Outbreak Response Network (GOARN), a key platform that pools technical and human resources in response to disease outbreaks. At the meeting, MSF

insisted on the urgent need to deploy an effective response in the region and made a dramatic call for extra support to be sent to Liberia.

"I finished my presentation at the GOARN meeting by saying that I was receiving nearly daily phone calls from the Ministry of Health in Liberia asking for support, and that MSF had no more experienced staff I could send to them," recalls Marie-Christine Ferir. "I remember emphasising that we had the chance to halt the epidemic in Liberia if help was sent now. It was early in the outbreak and there was still time. The call for help was heard but no action was taken."

While coordination was officially organised following the GOARN meeting and the regional meeting in Accra in early July, there was a clear lack of leadership from the WHO: decisions on setting priorities, attributing roles and responsibilities, ensuring accountability for the quality of activities, and mobilising the resources necessary were not taken on the necessary scale.

"Meetings happened. Action didn't," says Ferir.

Catastrophe in Liberia

In late June, MSF emergency coordinator Lindis Hurum arrived in Monrovia, Liberia. With few experienced staff left to deploy, her small team of three was sent to support the Ministry of Health with technical advice in contact tracing and water and sanitation. They assisted in setting up a 40-bed centre to be run by the US relief group Samaritan's Purse, and began providing coordination support to the Ministry of Health. As the virus began spreading like wildfire in the capital city, the centre quickly became overwhelmed with sick patients.

Then, at the end of July, two Samaritan's Purse staff, US nationals, became infected with Ebola, and the organisation suspended operations in the only two Ebola management centres in Liberia – in Monrovia and in Foya, in the northwest of the country. No one stepped forward to take their place to support the Ministry of Health in caring for patients.

“ I think it’s fair to say that we are Doctors Without Borders, but we are not without limits. And we’ve reached our limit. It’s very frustrating, because I see the huge needs but I simply don’t have the human resources. We have the money thanks to our donors. We have the will. We certainly have the motivation, but I don’t have enough people to deal with this.”

Lindis Hurum
MSF Emergency Coordinator in Monrovia
August 2014



Monrovia, Liberia. Construction teams building what would become ELWA 3, the world’s largest Ebola management centre with 250 beds.

Painful discussions ensued in MSF. We felt that we were already operating at 100 percent, with our teams already overstretched in Guinea and Sierra Leone, and there was a concern that taking over the centres in Liberia would push MSF over the limit. What if mistakes were made, staff became infected and the project collapsed? This had been the case in July in the Ministry of Health hospital in Kenema, Sierra Leone, as well as for Samaritan’s Purse in Liberia. What if pushing the limits broke MSF’s ability to respond, with no visible replacement?

“In a way the decision was made for us – we couldn’t let Monrovia sink further into hell,” recalls Brice de le Vingne. “We would have to push beyond our threshold of risk, and we would have to send coordinators without experience in Ebola, with only two days of intensive training. It would be dangerous, but we’d have to find a way to intervene in Monrovia and Foya.”

Trainings began in earnest in Brussels headquarters and in the field, embarking on the most extensive knowledge-transfer exercise in MSF’s history, with more than 1,000 people trained. At the same time, an MSF team deployed to Foya, while construction began of MSF’s ELWA 3 centre in Monrovia, eventually reaching 250 beds.

“Even though ELWA 3 was the biggest treatment centre in history, we knew it was not enough,” recalls Rosa Crestani, MSF Ebola task force coordinator. “We were desperate because we knew that we couldn’t do more, and we knew exactly what those limitations meant. It meant there would be dead bodies in homes and lying in the street. It meant sick people unable to get a bed, spreading the virus to their loved ones.”

ELWA 3 forced to close its gate 23.5 hours a day

By the end of August, ELWA 3 could only be opened for 30 minutes each morning. Only a few patients could be admitted to fill beds made empty by those who had died overnight. People were dying on the gravel outside the gates. One father brought his daughter in the boot of his car, begging MSF to take her in so as to not infect his other children at home. He was turned away.

“We had to make the horrendous decision of who we could let into the centre,” says Rosa Crestani. “We had two choices – let those in who were earlier in the disease, or take in those were who dying and the most infectious. We went for a balance. We would take in the most we safely could and the sickest. But we kept our limits too –we refused to put more than one person in each bed. We could only offer very basic palliative care and there were so many patients and so few staff that the staff had on average only

one minute per patient. It was an indescribable horror.”

The turning point – Ebola crosses the ocean

On 8 August, the WHO at last declared the outbreak a “public health emergency of international concern,” a procedure that flipped the switch to unlock funding and activate expert capability faster. By this time, more than 1,000 people had already died. What finally triggered the change to emergency response mode?

At the end of July, a US doctor working for Samaritan’s Purse tested positive for Ebola and was evacuated back to the US for medical care. Thereafter, the first case of Ebola was diagnosed outside west Africa; the patient, who had recently returned from west Africa, was treated at a hospital in Dallas, US. Then a Spanish nurse who treated a Spanish citizen infected with Ebola tested positive for the virus, becoming the first instance of human-to-human transmission of Ebola outside Africa.

“The lack of international political will was no longer an option when the realisation dawned that Ebola could cross the ocean,” says Dr Joanne Liu, MSF international president. “When Ebola became an international security threat, and no longer a humanitarian crisis affecting a handful of poor countries in

west Africa, finally the world began to wake up.”

Fear factor & global paralysis

International recognition of the severity of the outbreak finally hit home in August, but an increased response was still slow to get off the ground. Was it fear of the virus that delayed the quick response that was so desperately needed?

It is true that Ebola provokes an understandable and almost universal fear that is unequalled by any other disease. The lack of effective treatment, the painful and distressing symptoms and the high mortality rate cause extreme public anxiety, not only in the communities affected, but also among health-care workers themselves, who are often among the first to fall ill, further discouraging additional volunteers from coming forward to help.

Natural disasters like floods and earthquakes usually prompt a generous outpouring of resources and direct intervention from aid organisations and concerned states, but fear of the unknown and lack of expertise in Ebola paralysed most aid agencies and donors. The margin of error required to safely run an Ebola management centre is so slim that meticulous training is necessary to prepare for the challenge.

“I’m horrified by the scale of the centre we’re constructing and the horrible conditions inside, what people are enduring. It’s horrible what our staff are having to do, with the risk and the heat. We’re struggling to deal with the number of patients. We’re trying to adapt and build as the need increases, but we’re not keeping up. We feel tremendous guilt and shame that we can’t adequately address the needs of the people.”

Brett Adamson
MSF field coordinator in Monrovia
August 2014



Monrovia, Liberia. An MSF medical team speaking with the sick queuing outside the gates of ELWA 3 management centre. The team is assessing who can be admitted to the triage for possible admission to the centre.

"We tried to stress that not all of the response involves 'space suits.' Contact tracing, health promotion and distribution of soap, chlorine and buckets were all urgently needed," says Dr Jean-Clément Cabrol, MSF director of operations. "Not all activities are confined to the high-risk zone, but everything needed to be done by someone – and on a massive scale." However, most aid organisations were very reluctant to take on the perceived risk of working with Ebola, fearing that they would not be able to protect their staff.

MSF was also not immune. Over the years, MSF's experience with Ebola had been largely centralised within a group of experts and it was considered a specialism. Among the parts of MSF with little or no experience of Ebola, there was some initial reluctance to intervene immediately. MSF should have been faster at mobilising the full capacity

of the organisation to respond to the outbreak.

By late August, the virus had exploded across the three countries. After discussions with other aid agencies, it was calculated that it would take a minimum of two to three months for them to train and be ready to deploy. Meanwhile the clock was ticking and Ebola was winning. Funding was no longer the main problem and untrained voluntary help would clearly not be enough. Skilled and well-equipped medical teams were needed on the ground immediately.

"We were in uncharted waters and could not wait the two months necessary for other aid agencies to train up and respond," says Dr Liu. "Who else could step into the breach immediately before the epidemic spiralled further out of control?"

EBOLA CROSSES TO NIGERIA, SENEGAL AND MALI

Quick responses avert disaster

Concerns of an even wider regional outbreak were well founded. When Ebola entered Nigeria, Senegal and Mali, MSF supported their governments in containing the disease. With the epidemic already raging in neighbouring countries, all three governments were alert to its potential spread, which helped ensure an effective response.

"As our teams were overstretched in the three most affected countries, we focused on providing technical support, with the level of direct MSF management varying according to the local capacity that already existed," says Teresa Sancristoval, MSF emergency coordinator. A similar strategy had been planned for Monrovia before the epidemic spiralled out of control.

Nigeria

19 confirmed cases, 1 suspected case, 8 deaths

In late July, Ebola first arrived in Nigeria via an air passenger from Liberia. Despite the virus entering Lagos, a city of 20 million people, and Port Harcourt, with one million inhabitants, overall just 20 people were affected. The government's fast response, including deploying significant human and financial resources

and implementing rigorous infection control measures, was critical in avoiding a widespread epidemic.

Senegal

1 confirmed case, 0 deaths

MSF conducted an Ebola training in April 2014 at the request of the Senegalese government. The trained teams then took care of the Ebola case that arrived in Dakar in August. An MSF team of x advisors supported the Ministry of Health to set up an Ebola centre and train the staff in case management, contact tracing and social mobilisation. Within a week, 100 percent of the contacts had been traced. Nine regions considered most at risk were also trained in outbreak response.

Mali

8 cases, 6 deaths

The first case in Mali, a two-year-old girl, appeared on 23 October. MSF sent a team to help construct an Ebola management centre in Bamako and in the town of Kayes where the child had died, as well training local staff in case management, surveillance and social mobilisation. MSF went on to take a more hands-on approach than in the other two countries, including managing the two centres in Bamako and Kayes and carrying out safe burials and surveillance. This was due to Mali's less robust health system and a lack of sufficient resources to manage the outbreak, as well as less support from other partners.

Nigeria, Senegal and Mali all had the benefit of world-class laboratories which could produce fast test results. The experience in all three countries highlights the importance of strong surveillance and rapid response at the beginning of an outbreak.

Last hope to control the outbreak

MSF calls on the UN Member States to deploy civilian and military biohazard assets

On 2 September, Dr Joanne Liu, MSF's international president, made a fervent appeal to the UN member states in New York. In her speech, she pleaded:

"Many of the member states here today have invested heavily in chemical and biological response. To curb the epidemic, it is imperative that states immediately deploy civilian and military assets with expertise in biohazard containment. I call upon you to dispatch your disaster response teams, backed by the full weight of your logistical capabilities."

MSF Ebola management centre, Monrovia, Liberia.

"We cannot cut off the affected countries and hope this epidemic will simply burn out. To put out this fire, we must run into the burning building."

This was a very unusual call for MSF, known for keeping a safe distance from military and security agendas to protect its independence in conflict zones. However, the catastrophe unfolding on the ground could clearly not be brought under control by international aid organisations alone – a desperate call of last resort had to be made.

"We considered that the only organisations in the world that might have the means to fill the gap immediately might

be military units with some level of biological warfare expertise," says Christopher Stokes. "Faced with continuing to turn away patients at the hospital gate while waiting for other volunteers to train up and deploy, or calling for help from military agencies, the choice was clear."

After having sought agreement with the heads of state of Liberia, Sierra Leone, and Guinea, MSF called for field hospitals with isolation wards to be scaled up, trained personnel to be sent out, mobile laboratories to be deployed to improve diagnostics, and air bridges established to move people and material to and within west Africa.



BRIEFING THE UN SECURITY COUNCIL

Following the speech of MSF international president Dr Joanne Liu at the UN General Assembly in New York, Liberian MSF team leader Jackson K.P. Naimah followed suit, speaking via videoconference at the UN Security Council on 18 September:

“Right now, as I speak, people are sitting at the gates of our centres, literally begging for their lives. They rightly feel alone, neglected, denied – left to die a horrible, undignified death. We are failing the sick because there is not enough help on the ground.”

The UN Security Council ruled that the Ebola outbreak constituted a threat to international peace and security and unanimously passed a resolution urging UN member states to provide more resources to fight the outbreak.

Thereafter, taking stock of the inability of the WHO to provide the necessary leadership and coordination to combat the Ebola outbreak between April and September, UN Secretary-General Ban Ki-Moon established the creation of the first ever UN health mission, the UN Mission for Ebola Emergency Response (UNMEER).



Monrovia, Liberia. MSF team leader Jackson K. P. Naimah, who addressed the UN Security Council in September, discussing with Dr Joanne Liu, MSF's international president.

A risky call

MSF insisted that any military assets and personnel deployed should not be used for quarantine, containment or crowd control measures, because forced quarantines have been shown to breed fear and unrest, rather than stem the spread of Ebola.

“Whilst social unrest and fears of state collapse ran rampant, we feared that our call would be misconstrued or intentionally twisted into a call for armed

stabilisation,” says Stokes. “What if militaries deployed and proved more damaging than helpful? Then we would be held responsible for having called them in the first place.”

MSF also ran the risk of confirming suspicions, levelled at all aid organisations, of being part of a security or political agenda. This suspicion in armed conflict could put both aid workers and patients in the firing line of opposing forces.

Help belatedly arrives but not exactly what was asked for

Helpful pledges of equipment and logistical support came in September, yet sufficient deployment of qualified and trained medical staff to treat patients

on the ground did not. Much to MSF's disappointment, the majority of the military effort deployed in October and November was limited to support, coordination and logistics for the efforts of international aid organisations and local authorities.

Although very much needed, the medical facilities built to treat local and foreign healthcare workers were provided to help ensure that others could treat patients, rather than offering direct care themselves to the wider community.

“We insisted that simply constructing the physical structures would not be enough, and that transferring the risk to inexperienced aid workers and exhausted local health workers was unacceptable,” says Dr Liu. “There was a clear reluctance to jump in and care for patients. They wanted to help, but not to do anything risky – US helicopters would not even transport laboratory samples or healthy personnel returning from treating patients.”

Although the appeal for the deployment of biohazard teams was not met, the assistance that did arrive was welcome. This engagement marked the symbolic beginning of a substantial international response, and served to reassure people that help was finally underway.

Providing intensive treatment facilities for healthcare workers also reassured international aid agencies, who then felt able to offer stronger assurance before deploying their staff, as well as bolstering local health workers and authorities. Meanwhile some positive signs were coming from Lofa county in northwest Liberia. By late October, no new patients were being reported at MSF's centre in Foya. Other organisations came on board to take over the remaining activities and surveillance, allowing MSF teams to withdraw from Lofa county and redirect their efforts to areas with unmet needs.

“The comprehensive efforts and strong collaboration with the community certainly played a crucial role in reducing the number of cases in Lofa county,” says Dorian Job, MSF deputy emergency manager. “This was one of the first moments we felt that the epidemic could be controlled.”



© Julien Rey/MSF

MSF Ebola management centre, Conakry, Guinea. Each night all the waste from the high-risk zone that cannot be chlorinated must be burnt on site.

Cases decline

Late in 2014, by the time that the militaries were building new Ebola management centres, cases began to decline in other regions too. The reason behind the drop in cases is difficult to attribute to any single factor. Public behaviour changes, greater availability of beds, increased efforts to control infection and more safe burials have all contributed to the decrease.

“From the very outset, this epidemic has been defined by its unpredictability, reach and speed,” says Karline Kleijer, MSF emergency coordinator. “If the epidemic had not started to recede, the Ebola management centres built in the region would have been indispensable.”

In December, the international response was striving to deliver what had been promised three months before. By the time they deployed, it was difficult to adapt and adjust to the rapidly changing epidemiology of the outbreak, resulting in resources allocated to some activities that were no longer the priority.

Doctors **without a cure...** but with care

The medical challenges of Ebola

A virus that kills more than half your patients, with no available treatment to fight it, is a doctor's worst nightmare.

Still, more than 2,300 patients have emerged Ebola-free in MSF's centres in Liberia, Guinea and Sierra Leone. Each one is celebrated as a victory.

"We try to provide the best supportive care we can, as well as alleviate our patients' symptoms and suffering," says Dr Armand Sprecher. "Our experience from past outbreaks demonstrates that good clinical care can reduce overall case fatality rates by between 10 and 15

MSF Ebola management centre,
Guéckédou, Guinea.

percent. There are still many unknowns, both medically and epidemiologically, about Ebola and how to best combat it clinically."

Several elements may impact mortality: the severity of infection at admission (viral load), the age of the patient, general previous health status, coexisting infections, nutritional status, intensive supportive care, or a combination of all of these.

MSF is documenting and researching our data to examine these factors, which will be shared with the research community. So far, the main results suggest that the age of the patient (before 5 years old and after 40 years

old), and viral load (high levels of virus in the blood on admission), are factors that appear to determine the highest mortality rates.

Laboratory constraints

One of the key constraints for MSF medical teams in delivering more individualised patient care was the limitations in monitoring their biochemistry.

"Some patients are seemingly on the mend, walking, talking and eating, then sadly and inexplicably pass away an hour later. It is not yet known which factors allow some people to recover while others succumb," says Dr Sprecher. "To try to understand how aggressively the virus is attacking the body, monitoring





MSF Ebola management centre, Guéckédou, Guinea. MSF nurse in the undressing area after exiting the high-risk zone.

patients' electrolytes and analysing their blood chemistry helps define the best care you can provide."

Doing this requires advanced laboratory support capacity, which was not always available, either within MSF or through external partners, particularly in the first months of the outbreak. The laboratory capacity provided by key partners who came on board early in the epidemic was overwhelmed with the high numbers of cases that needed to be diagnosed, while some were unprepared to run biochemistry tests.

As early as April, MSF teams in Guinea were using ISTAT machines for electrolyte monitoring. However, practical challenges as well as competing priorities meant that it was not until October that they were reinstated in MSF's centres.

Working in the hot zone

In the eight-piece 'space suits' worn by MSF medical teams on the ground temperatures can reach 46 degrees Celsius. One of the most dangerous moments is removing the soiled suit, a meticulous 12-step process that is frustratingly complex, can take up to 20 minutes, and is repeated at least three times per day.

"We have to move and breathe slowly due to the overpowering heat, limiting

us to spending an hour maximum inside at a time," says Dr Hilde De Clerck. "Inside the high-risk zone, I have to plan the most crucial activities I can squeeze into that hour. It's frustrating and upsetting that that I can't spend unlimited time with my patients or connect with them as I usually would, with a smile or a comforting human touch."

On a knife-edge

In an Ebola outbreak, MSF teams work on a knife-edge addressing both patient care and staff safety.

MSF had called for help as the epidemic sped out of control because, at the most severe periods of the outbreak, teams were unable to admit more patients or provide the best possible care. This was extremely painful for an organisation of volunteer medics, leading to heated exchanges and tensions within MSF.

"Our duty of care for our staff is certainly crucial, as in any MSF project worldwide," says Henry Gray, MSF emergency coordinator. "Though we have invested heavily in personal protective equipment, training and security protocols, we have painfully learned there is never zero risk."

"We were also under pressure to set an example and show that it was possible to treat Ebola safely, in an effort to mobilise others to intervene," says Brice de le Vingne. "If we took even more risks and too many staff fell ill, we'd be unable to maintain trust with our teams or recruit new volunteers,

“We are all scared of Ebola, and rightfully so. It's something about the way it is emitted – through the blood, sweat and tears of human beings. Imagine being the patient: you're sick and scared, your doctor is fearful, and when he comes to you he's unrecognisable in a space suit. And what are my tools to heal my patient? A bed, three meals, fluids, tablets, antimalarials, painkillers. I do my best to make sure your immune system is able to fight Ebola as best it can. But in the end I'm physically isolated from my patients and, when I get to them, I can only say you have around 50 percent chance of dying and I can do very little about it for you.”

Dr Javid Abdelmoneim
MSF doctor in Sierra Leone
September–October 2014

resulting in the possible collapse of our centres with no one to take our place.” As the number of cases grew, MSF staff were challenged by having increasingly limited time with each patient. At certain times, admissions were so high that there were not enough staff to safely manage intravenous hydration, as was the case in Monrovia in September. It was not just a matter of insert a drip safely, but also of having enough team members to carry out the necessary monitoring, follow-up of fluid hydration for patients and good infection control.

When a member of staff became infected, fear had an impact, and sometimes led to more restrictive care immediately afterwards. MSF teams strived to quickly overcome these barriers and to return to optimal levels of individualised care with the minimum of delay.

Imperfect offerings

In September, when there were not enough beds in the centres in Monrovia, MSF began distributing family protection and home disinfection kits for more than 600,000 people in the city. The kits were designed to give people some protection should a family member become ill, as well as allowing people to disinfect their homes to reduce infection risk. One of the key targets was health workers, who were often asked to help care for people in their communities when treatment centres were full.

“Though we knew these kits were not the solution to the Ebola crisis in Monrovia, we were forced to take unprecedented and imperfect measures,” recalls Anna Halford, MSF coordinator for the distribution. “They were a stopgap solution to allow people to try and protect themselves from a sick family member for a short time until they could be admitted to a management centre.”

Doctors without a cure

When the outbreak began, there was no vaccine, drug or rapid diagnostic test on the market proven to be safe and effective against Ebola in humans.

Ebola had never been considered a priority for big pharmaceutical companies, as it was perceived as affecting only a limited number of economically disadvantaged patients in short-lived and remote outbreaks in Africa.



Guéckédou, Guinea. MSF nurse handling favipiravir tablets, at the MSF Ebola management centre where clinical trials of the treatment began on 17 December 2014.

Most of the research had been conducted by public institutes and small firms, supported by public defence funding, and justified by the bioterrorist risk posed by the highly infectious viral disease. The majority of research and development was dedicated to vaccines and post-exposure prophylaxis, with a focus on stockpiling products for Western markets.

But as the epidemic spiralled further out of control and repeated calls for help were slow to materialise, MSF became increasingly aware that accelerated product development was ever more urgently needed for the response.

“Research and development finally accelerated in early August, when the WHO confirmed that using Ebola products not yet tested on humans was ethical and even encouraged, given the exceptional nature of the outbreak,” says Julien Potet, policy advisor for MSF Access Campaign. “Public and private research sectors fast-forwarded the process to start clinical trials from what usually takes years to mere months.”

In August, MSF made the first-time decision to partner with research institutions, the WHO, Ministries of Health and pharmaceutical companies to trial experimental treatments and vaccines

in the midst of the outbreak. The first Ebola experimental treatment trial in west Africa, for the drug favipiravir, began at MSF’s centre in Guéckédou, Guinea on 17 December 2014.

“Starting clinical trials in a matter of months in the midst of a complex humanitarian crisis has never happened before, much less in risky bio-hazard conditions,” says Dr Micaela Serafini, MSF medical director.

The trial protocols were designed to ensure that disruption to patient care would be minimal, that internationally-accepted medical and research ethical standards were respected, and that sound scientific data would be produced and shared for the public good.

Will these ongoing efforts be the final game-changer in the current epidemic?

“Possibly not, as the notably lower number of cases may outpace the conclusive results of the studies. The virus may just escape the snare of an effective vaccine and treatment this time around,” says Dr Bertrand Draguez, MSF medical director. “But the ongoing studies are certainly not for nothing. Now, with the data collected from the trials, the momentum must be sustained to ensure that drugs, vaccines and diagnostics are ready and accessible for the next epidemic.”

To that end, it is essential that there is a real commitment from regulatory bodies, pharmaceutical companies and governments for fair access to vaccines and treatments in Ebola-affected countries. The expertise, research and results must be shared collectively.

Had an effective treatment or vaccine existed, thousands of deaths could have been avoided.

MSF INTERNAL CHALLENGES

This Ebola outbreak presented MSF with substantial internal challenges, many of which require further deliberation. Whilst others have lauded us for our response to the outbreak, we are very conscious too of where we fell short. This includes, but is not limited to:

- **A year of competing crises.** 2014 was a very demanding year for MSF, as for other frontline humanitarian organisations. Simultaneous crises in Central African Republic, South Sudan, Ukraine and Syria, all of which demanded the attention of our most experienced staff, made it hard to ensure that Ebola was given the attention and human resources it required, particularly in the first five months of the outbreak.
- **The duty of care to employees.** Even within MSF, an organisation with a higher tolerance of risk than many other aid agencies, Ebola was considered especially hazardous. The lack of treatments available to infected staff and the high mortality rate created an unparalleled fear among staff. Medical evacuations for international staff could not be guaranteed by their respective governments, and staff volunteering to go to west Africa had to accept that they might fall sick and be unable to return home. In addition, the fear of staff infections meant that MSF insisted on the most stringent safety protocols – for example limiting the time permitted in the high-risk zone – thus reducing the freedom of medical staff to determine and provide the quality of care for patients that they would have wanted. This caused much anguish amongst MSF medical staff.
- **Mobilising the full force of capacity within the wider MSF network.** Over the years, MSF's experience with viral haemorrhagic fevers had been largely centralised within a group of experts and it was considered a specialism. Among the parts of MSF with less Ebola experience, there was a reluctance to intervene immediately. MSF should have been faster at mobilising the full capacity of the organisation to respond to the outbreak.
- **Patients or public health?** There was an impossible tension between curbing the spread of the disease, and providing the best clinical care to each patient. This became particularly acute in August and September in Liberia when case numbers spiked and our facilities became overwhelmed. At times we were only providing the most basic palliative care to patients and prioritising the admission of people who were highly infectious in order to reduce the spread of Ebola in the community. We deliberately increased the number of beds, acknowledging that this would necessitate a drop in the level of care – for many an unbearable compromise.
- **Staff turnover.** Ebola outbreaks consume a huge amount of resources, particularly staff. The duration of frontline field assignments for international staff during the Ebola outbreak was much shorter than usual – a maximum of a few weeks rather than months. This was to ensure that they remained alert and did not become too exhausted or complacent. However an unintended consequence of this turnover was that details were not always handed over; lessons had to be learned, then learned again.
- **Adapting our response.** Given that our resources were overstretched, could we have adapted our strategy in deciding what to focus on in each location, or did we go into reactive, damage control mode? For example, how could we have done more to address the deep public mistrust in Guinea? And could we have pushed more forcefully in Sierra Leone at the beginning?
- **Diverted priorities.** At times it felt as if we were trying to do everything everywhere. Difficulties in organising efficient medical evacuation arrangements, fighting travel bans imposed without scientific evidence, helping to convince airlines such as Brussels Airlines to continue flights to the region, training other organisations, and managing fear and often hysterical public opinion in 'home' societies all diverted attention away from the critical needs in the field.

Looking to the future

Despite more than 40 years of working in some of the world's worst humanitarian crises, this Ebola outbreak has wrought an exceptionally heavy toll on MSF's staff, and particularly on our west African colleagues. Not since the early days of HIV care have MSF staff sustained the loss of so many patients dying in our facilities, without the tools to save them – and never in such an intense short period of time, with death fast-forwarding from 10 years to 10 days.

Although many unknowns remain about the virus, MSF has learned much over the past year, from improving the design of Ebola management centres to developing protocols for the care of pregnant women and children. Before this outbreak, Ebola was thought to be a death

Sierra Leone. Piloting began in January for a new electronic, tablet-based patient data management system in MSF's Ebola treatment centres in Sierra Leone. The specially developed hardware is easy for glove-wearing, time-pressed medics to use. The tablet allows staff to access a patient's history and collect more complete health data – such as pulse and respiration rates – to better track a patient's progress and provide them with individually tailored care.

sentence for pregnant women, while now specialised care has seen women emerging Ebola-free from MSF's centres.

Over the past year, MSF teams have had to make difficult choices in the face of competing priorities and in the absence of available treatment and enough resources. As in all MSF programmes, there have been operational and medical challenges, successes and failures, which are being evaluated in full. MSF already considers, as an initial lesson, that we should have mobilised more human resources earlier across the entire movement.

Still not over

In early 2015, cases were still on the decline, causing some speculation about the end of the epidemic. Liberia is currently on the countdown to zero cases, with no new cases presenting since early March. However the overall number of cases in the region is still fluctuating and has not significantly declined since late January.

With more organisations on the ground and enough beds for Ebola patients, MSF teams continue running centres and are able to focus on filling gaps in outreach activities such as surveillance, contact-tracing and social mobilisation.

Ebola is not over until there are zero cases in the region for a period of 42 days. Perseverance and tenacity are mandatory for the medical teams, while gaining the trust and positive collaboration of the affected communities.



© Ivan Gayton/MSF

Meanwhile a practical plan to sustain research and development for vaccines, treatments and diagnostic tools must be developed. These will be key in protecting the region from current or future resurgences of similar outbreaks.

Rebooting health services in Guinea, Sierra Leone and Liberia

The trauma of Ebola has left people distrustful of health facilities, has left health workers demoralised and fearful of resuming services, and has left communities bereaved, impoverished and suspicious.

Nearly 500 healthcare workers have lost their lives in this epidemic, a disastrous blow to an already serious shortfall of staff in the three countries before the Ebola crisis hit.

The basic relaunching of health services is urgent. Children have missed vaccinations, HIV patients have had their treatment interrupted and pregnant women need a safe place to deliver their babies.

However, restoring healthcare systems to pre-Ebola levels without addressing the underlying flaws and weaknesses is not enough. Improving access to healthcare, and improving the quality of services on offer, will be necessary to allow early detection of any future outbreaks of Ebola and other infectious diseases, as well as a more effective response. It is unreasonable to expect different results when applying similar strategies and approaches.

The risk that lessons won't be learnt

After every large-scale humanitarian emergency, there is the hope that lessons from it will be learned. However, this feel-good rhetoric is often not enough.

"For months, ill-equipped national health authorities and volunteers from a few private aid organisations bore the brunt of care in this epidemic. There is something profoundly wrong with that," says Dr Liu.

Health authorities in Guinea, Liberia and Sierra Leone now possess the knowhow to detect, investigate and tackle Ebola, while laboratories are in place

in the capitals. But beyond having the means, political will is crucial to put this knowledge into practice.

More aid organisations have now been trained on Ebola management by MSF, the WHO and CDC. The knowledge has been shared, but it risks being of little use if it is not immediately deployed at the onset of another epidemic.

"The flexibility and agility for a fast, hands-on emergency response still does not sufficiently exist in the global health and aid systems," says Dr Liu. "Lessons that should have been learned in the mass cholera epidemic in Haiti four years ago were not."

Though the WHO Executive Board has passed a resolution to enact reforms for epidemic response and address internal incoherence, it seems unlikely that radical reform will happen overnight. Realistically, few member states have any interest in empowering an outside international body to respond to epidemics in their territories. However, it is clear that member states must engage more swiftly and strongly to support those countries that lack the capacity to respond to infectious disease outbreaks.

But let us avoid jumping to convenient conclusions. It would be a mistake to attribute full responsibility for the dysfunctional response to just one agency. Instead, the age-old failures of the humanitarian aid system have also been laid bare for the world to see, rather than buried in underreported crises like those in Central African Republic and South Sudan.

Global failures have been brutally exposed in this epidemic and thousands of people have paid for it with their lives. The world is more interconnected today than ever before and world leaders cannot turn their backs on health crises in the hope that they remain confined to poor countries far away. It is to everyone's benefit that lessons be learned from this outbreak, from the weakness of health systems in developing countries, to the paralysis and sluggishness of international aid.

"The Ebola outbreak has been often described as a perfect storm: a cross-border epidemic in countries with weak public health systems that had never seen Ebola before," says Christopher Stokes. "Yet this is too convenient an explanation. For the Ebola outbreak to spiral this far out of control required many institutions to fail. And they did, with tragic and avoidable consequences."

Map of the region

