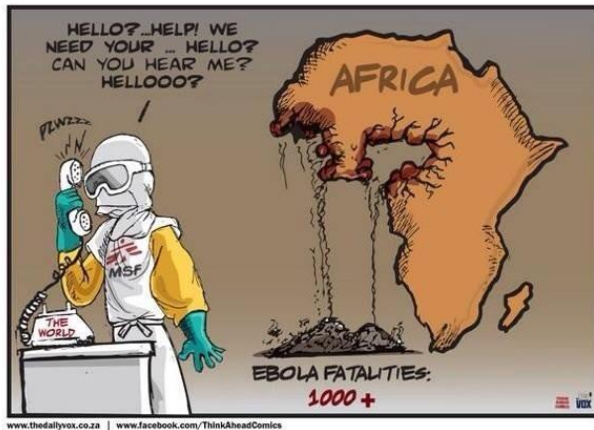


Humanitarian consequences of a shortfall in emergency logistics: the response to the Ebola epidemic as a case-study.



Through the response brought to the Ebola crisis and affecting several countries in West Africa, this article brings to light the humanitarian consequences that can reach dramatic levels when international organizations do not possess sufficiently powerful logistic services to intervene efficiently in emergency situations.

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A predictable breakdown Although many Governments and humanitarian agencies were surprised by the magnitude and the severity of the Ebola outbreak that has been striking Western Africa since March 2014, the weakness of the international response to this epidemic, out of control since July, was unfortunately predictable. In a few months alone, and despite the mobilization of a few international organizations attempting to contain it, this hemorrhagic fever epidemic will have caused the death of several thousand people at its peak¹ and will have further weakened the health systems of the most affected countries. With close to 5.600 deaths attributed to the virus and recorded eight months after the confirmation of the first cases in Guinea, the epidemiological experts were until recently still predicting high mortality rates in the long run. In October 2014, Peter Maurer, the President of the International Committee of the Red Cross (ICRC) deplored that *“the aid arriving in the field is too slow, with insufficient quantity and is not effective enough”*² and this despite the calls for mobilization addressed by the President of Médecins Sans Frontières to the Security Council of the United Nations, as well as their call for the help from armed forces, a rare request for this organization. This unusual step was taken in the wake of chaotic situations experienced by the health personnel of the organization who found themselves having to refuse infected patients during high influx arrivals for lack of room in some of their Ebola treatment centers (ETCs).

Some international organizations tried to justify the lack of intervention by the lateness of the international community’s financial mobilization, whilst others argued that the aid community was overwhelmed with other major crises at the time the outbreak was confirmed. Others still incriminated the lack of reactivity and coordination by the World Health Organization (WHO) despite the repeated warnings on the uncontrolled effects of this unprecedented epidemic. Finally, the medical complexity of the Ebola response and the extremely high level of exposure to the risk of contamination faced by the

¹During the peak of the outbreak, the number of confirmed cases was multiplied by 2,5 every month

²« Le Monde » Newspaper – 24th October 2014

healthcare workers³ were additional arguments put forward to justify the agencies reluctance to intervene.

Whilst all these elements may indeed, shed some light on the reasons behind the failings of international aid in regards to Ebola victims, they only partially explain it. Some organizations have, for a number of years now, tried to raise the alarm on the lack of efficiency and operational impact of international responses to major humanitarian crises.

Undersized Logistics

An MSF study on emergency responses to major crises⁴ between 2012 and 2013 identified aid organization's inability to deal with logistical challenges, as well as security issues, as two of the main constraining factors when it comes to the ability to bring an efficient international response. A similar analysis came out of the evaluations conducted on the humanitarian responses deployed in the wake of the earthquake in Haiti in 2010 but also following the unprecedented cholera epidemic that contaminated thousands of people and killed 7.000 Haitians nine months later. Indeed, a rare number of organizations were capable of rapidly setting up and supplying functional cholera treatment units (CTUs) or to organize pick-up services for infected people during that particular epidemic. The ability of international humanitarian organizations to bring emergency assistance without depending on more operational local actors has been raised more recently in Syria, by Syrian aid networks, who feel that these humanitarian organizations are behaving more as institutional donors from their base in neighboring countries rather than as field actors. The argument of high level of security constraints – mainly with regards to the threat of kidnapping- is a more recent development than the general immobilism demonstrated outside the conflict zone and that has left the Syrian diaspora and the local hospitals on the front line since the beginning of the conflict.



MSF Field Hospital – Jabel Akrad – Northern Syria

Here again, the lack of logistical capacity of the humanitarian agencies is a major obstacle in the organization of trans-border operations into Syria as well as the setting up of autonomous hospital structures. In view of the logistical weakness of a good number of humanitarian actors and despite the level of financial means cleared for the circumstances, the chances that this reality would suddenly change when the WHO declared Ebola an international public health emergency last August were weak. Efficient emergency humanitarian logistics (EHL) cannot be created in a few weeks, especially when the objective is to support atypical intervention programs on a large scale, proof of this being the astronomical salaries offered by some humanitarian organizations in order to poach the few logisticians able to operate in this type of context⁵. It is also difficult to out-source this EHL. As from last September, through attractive salaries proposed by the United-Nations, some agencies such as the World Food Program (WFP) have recruited emergency logisticians from medical NGOs who were able to setup ready-to-use ETC to aid organizations. Unfortunately, this has proven insufficient as an incentive to significantly increase the number of new actors in the field.

³ According to WHO, in November, the number of health workers killed by the Ebola virus exceeded 300.

⁴ "Where is Everyone? Responding to emergencies in the most difficult places". July 2014 – Médecins Sans Frontières

⁵ Some logisticians working in Monrovia received offers 15 time higher than the average salary proposed by international NGOs in order to build an ETC

It is therefore interesting to analyze the deployment of MSF's logistical services during their response to the Ebola epidemic in order to understand how important these services are in a humanitarian operation.

A know-how acquired through direct experience The epidemic in West Africa is by far the most important hemorrhagic fever epidemic ever recorded since the virus was discovered in 1976 near the Congolese river whose name it bears. Since MSF's first intervention in DRC in Kikwit in 1995, it has regularly been responding to hemorrhagic fever epidemics. MSF has had operations in about fifteen different Ebola outbreaks so far, mainly in Central Africa. The initial reason behind these interventions was to protect the doctors operating in the affected areas. However, with a mortality rate that could go up to 90% if the patient went untreated, a high risk of contamination and an unprecedented level of viral propagation, the initial reason for intervention was rapidly replaced by the need to address a public health emergency. The ability to respond to this kind of epidemic improved over time and through the accumulation of emergency interventions set up by the organization every two to three years.

Improvements were noticeable with regards to the admission criteria in the treatment centers, the quality of palliative care provided and the tracing techniques of suspected cases. The logistics and supply support to this type of program were also improved over the years. So much so that when the epidemiologists confirmed the first cases of Ebola last March, a classic low intensity emergency deployment was put in place in Guinea. The teams in the field did not imagine at that stage, when they were setting up the first treatment centers, the scale this epidemic would reach, nor the scope of the response that would need to be put in place.

MSF's massive response

Between March and November 2014, more than 1.000 MSF workers, coming from 70 different countries had volunteered to fight this epidemic which, at its peak, mobilized permanent teams of more than 300 international workers and 3.300 national workers spread



over the most affected countries. Between April and November 2014, more than 1.200 tons of medical material and Personal Protective Equipment (PPE) were sent from the MSF Humanitarian Procurement Centre (HPC) based in Brussels.

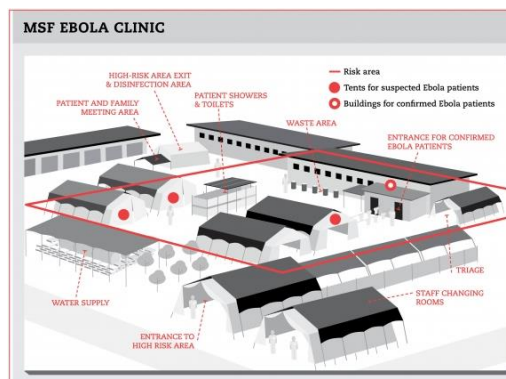
MSF health worker – Ebola treatment center – Paynesville/Liberia

During that same time, MSF built six treatment centers as well as two transit centers with a total capacity of 600 beds that could yet be extended to 900 beds through the inbuilt extension capacity. From March to November, 6.000 patients were admitted in the MSF centers, 3.800 of which were confirmed cases. 1.600 patients were cured. The budget for this operation was evaluated at 130 Mo euros spread over 2014 and 2015. Whilst the assistance brought by this medical organization was impressive, so was the human loss engendered by this epidemic as it affected three capital cities simultaneously. By November 2014, more than 2.200 patients had died in MSF's health structures, and 13 employees did not survive their own contamination.

Logistics response as applied to hemorrhagic fevers

The logistical response put in place by MSF at the beginning of the epidemic was based on the model used for previous emergencies. This logistics approach is integrated into the medical operations and covers the setup and outfitting of the health structures, the work sites and the accommodation of the teams as well as food provision and maintenance. This logistics service is also in charge of organizing the transportation of personnel – including the outreach activities, as well as the transport of patients. Last but not least, it must also provide communication means that are adapted to the activity and security of the teams. The logistics

support provided in situations of hemorrhagic fever is a costly one⁶ yet relatively basic when compared to the support necessary to other programs like orthopedic surgery for instance. The installation of an ETC follows a pre-established Masterplan that will guide the logistics services through the identification and site preparation tasks, the installation of the structures for each activity within the ETC, the marking of the site's boundaries and the flow control. The ETC will then rapidly become operational⁷ once the electricity and the water supply systems are set up as well as a waste disposal area.



Once the site is up and running, and if the installation has been conducted properly, the logistics team will hardly need to intervene in the high or medium risk areas of the ETC. This is not to say that the job of a logistician in an Ebola context is easy, but the tasks at hand remain rather basic. The teams can count on emergency kits specifically designed and improved over the years that will facilitate the rapid set-up of the programs. The bulk of the supply is made up of a limited number of strategic articles, about ten items, and mainly linked to protection equipment, chlorination articles and mortuary bags.

Adaptation to a non-standard emergency

One can easily say that the main logistical challenges of this intervention were not linked to acute technical constraints but rather to the ability of the organizations to adapt their logistics and supply services to respond to a crisis whose scale was both unpredictable and fluctuating as it evolved in waves of contamination of variable intensity. Prior epidemics would occur in remote areas, with low human density and poor transport infrastructures and would eventually die out two to four months after first appearing. In a way, the hemorrhagic fever epidemics encountered in the past were self-contained by natural barriers.

Whilst the first emergency response deployed in March 2014 was consistent with the usual response to low-intensity hemorrhagic fever, it appeared as soon as April 2014 that this epidemic, by taking place in urban settings, would not resorb itself as easily as others and that the health workers had to prepare themselves to tackle an exceptional number of contaminated people on an unprecedented timescale. From then on, the major challenge for the rare humanitarian organizations willing to help the overwhelmed local health authorities would be their ability to adapt to a situation that was beyond anything encountered so far. As such, the flexibility of the logistic services of these organizations would immediately be tested with three main challenges: the ability to absorb a striking increase in the number of ongoing emergency programs, the ability to reduce the consequences of the weakening of the supply chain and finally, the ability to provide working conditions that would be as acceptable as possible for the health workers.

Absorbing the surge in emergency programs

The number of treatment centers that were to be constructed was going to be very high with the consequence that the medical workforce in charge of looking after the patients would be more limited than usual⁸.

The pre-established Masterplan used for setting up ETCs in the past had to be urgently revised in order to accommodate more patients with reduced medical staff, thereby also reducing the exposure levels of the health workers. In May, and following the request of the emergency teams, MSF's logistics department in Brussels produced a number of theoretical models, one of which was eventually validated

⁶Prior to this outbreak, each patient in a hemorrhagic fever response cost an estimated 10.000 USD

⁷The first ETC was built by MSF on the 23rd March in Guékédou, the 2nd one two days after in Conakry.

⁸Before this intervention, there was little skilled medical staff able to respond to hemorrhagic fever outbreaks

three weeks later by the medical and WASH⁹ experts before being distributed to the field teams. These architectural drawings would become the standard plan and the reference in terms of patient, personnel and goods flow control in all ETCs set-up by the logistics services. These plans included integrated layouts for water and electricity supply systems. As an example, standard 45m² dispensary tents used as hospitalization rooms were replaced by warehouse tents of 250m².

This new Masterplan enabled the emergency teams to increase the initial ETC's admission capacity from 20 to 100 or even 200 beds without having to multiply the number of health workers exponentially. In order to optimize the supply chain and to simplify the purchase orders issued by the field teams to the procurement centers, an indicative list of the daily consumption of all strategic articles was drawn up based on MSF's catalogue. The standard daily consumption lists, as well as the Masterplan were also distributed to all organizations wishing to partake in the fight against this epidemic.

Developing new logistics competencies With the perspective of having to deal with the sudden request for very large scale mobilization of human resources and bearing in mind the high HR turn-over level in Ebola contexts¹⁰, a great number of logisticians were detached from their original mission in order to be urgently transferred to Liberia, Guinea or Sierra Leone. Whilst the recruitment units were busy looking for extra human resources, intensive training sessions were organized in the field and at the MSF Logistics Training Centre in Brussels. Last June, when the epidemic went out of control while the number of humanitarian organizations active on the ground was still very small, it became urgent to systematically open up these training sessions to other organizations. Between August and October 2014, at a rate of two training sessions per week, almost 300 volunteers went through MSF's Training Centre to take an Ebola response crash course. However, very few of the 20 organizations present during these training sessions would end up opening new projects in West Africa despite the massive availability of funds. Clearly, other obstacles were blocking the involvement of new actors in the fight against this epidemic. Constraints linked to international supply would prove to be one of the major ones.

Reducing the vulnerability of the supply chain Faced with a situation that was rapidly spiraling out of control in the most affected areas and with teams having to sometimes refuse access to infected patients, a request was made to the logistics services to accelerate the setting up of new ETCs in Sierra Leone, but most of all in Liberia. In the summer of 2014, the admission capacity in Monrovia would be increased to 450 beds thanks also to the construction of the largest Ebola treatment center ever set-up¹¹. <https://www.youtube.com/watch?v=loUQWgf00Uc>

In September, the outreach activities also accelerated outside MSF's 6 treatment centers and included the large-scale distribution of family protection kits in areas that were most affected. With the intensification of operations, the supply chain initially drawn up quickly found itself overwhelmed on four issues:

- A sudden increase of orders;
- Limited capacity for procurement of critical items;
- Harsh competition between agencies with regards to procurement;
- Important restrictions on international transport.

➤ A sudden and unexpected increase in emergency orders: the MSF HPCs were quickly submerged by the emergency orders emanating from the Ebola programs. In the space of a few weeks, the average monthly level of orders of 350 tons of material was almost doubled with almost 120.000 non-reusable

⁹Water, Sanitation and Hygiene

¹⁰Between 4 & 6 weeks as an average, not counting the 21 isolation days imposed after coming back from mission

¹¹The Elwa3 ETC was offering an admission capacity of 250 beds with the possibility to be increased to 400 beds if needed

PPEs' items bought every month¹² in addition to a request to produce 75.000 protection kits for distribution. From June 2014 onwards, the logistics team of the procurement centers had no other choice than to work on a reactive basis for the production and the shipping of kits. They adopted a PUSH strategy and an automated replenishment approach also enabled by the massive hiring of interim logisticians. It is only in September that a centralized approach of orders with targeted dispatch could be installed based on real consumption. A few weeks later, a PULL strategy prevailed with proactive forecast of orders established by the field teams and based on planned consumption. Between the two phases (PUSH and PULL) a strict policy for buffer stocks limited to six weeks was implemented in each program.

➤ Limited capacity regarding procurement of critical articles: the main PPE producers, whose core market is supplying the chemical industry, were also confronted to this sudden increase of demand. The monthly production-line capacity for the coveralls in line with the MSF specifications stood at 30.000 units whereas MSF's needs stood at 120,000 per month. Since most of the critical items had only one source due to low little consumption outside Ebola contexts, a search for other potential suppliers was put in place in order to prevent shortages in the supply of PPEs, chlorine or body-bags. A shortage in these so-called critical items would mean an immediate halt to MSF's activities in the Ebola centers.

There are usually three main reasons why it is difficult for humanitarian organizations to rely on multiple suppliers:

- Some of the items used in the field are very specific to humanitarian assistance operations and generally meet high quality standards (the last thing one needs in an ETC is protective gear of uncertain quality...);
- The selection of suppliers and of their products is a painstaking job that requires an analysis and validation capacity that most humanitarian organizations do not possess, especially with regards to the validation of medical articles that require a specific pharmaceutical expertise;
- One will generally find strong resistance at field level when it comes to test and use new items with different handling specifications¹³. This resistance was clearly felt when new PPE models were shipped to the field once the MSF procurement services had identified a new supplier.

➤ Harsh competition with regards to procurement: the other major factor that pushes for diversifying supply sources when it comes to critical items is directly linked to the merciless competition that generally takes place amongst organizations when it comes to acquiring critical humanitarian goods in crisis situations. Within a few weeks, due to an ineffective coordination from the logistics and supply clusters, several UN agencies, institutional donors and some humanitarian organizations went into competition to win an already limited market. As most of these agencies were not operating as direct implementing actors, i.e. they were not in charge of patients in treatment centers; they only had a very limited idea of the daily consumption of these items, leading sometimes to an overestimation of their needs when placing their orders with the suppliers¹⁴. This race became even more frantic when the first cases registered outside West Africa were announced. Led mainly by panic, some countries sought to buy large quantities of PPEs. Whether motivated by panic, by the will to gain media visibility or in order to justify the use of funds allocated to this epidemic, this fierce competition accelerated the market saturation in an already vulnerable market but also jeopardized MSF's contracts with their usual suppliers. In order to relieve this constant pressure, the MSF procurement unit was

¹² Out of the boots, goggles and aprons, the rest of the protective gears is single use, i.e. must be burnt after each usage (average monthly consumption of 120.000 coveralls, 120.000 hoods and 400.000 gloves)

¹³For instance, the dilution protocols for chlorine vary according to the type of chlorine in use.

¹⁴Some purchasers ordered up to six times the quantity of PPE per bed used in the MSF ETC

compelled in November 2014 to pass a firm order of PPEs until March 2015 on the basis of an uncertain assessment of 900 occupied beds per month.

- Important restrictions on international transport: the gradual restrictions put in place by airline companies for transport to the Ebola-affected countries, or by the governments who ceased to deliver landing authorizations to flights coming from these countries both largely contributed to render air chartering increasingly difficult thereby weakening the humanitarian organization's ability to transport emergency material, as well as health workers, even in case of medical evacuation.



Medical evacuation from Freetown

Maritime transport for the heavier items, such as rehydration pouches, with its lower cost and relatively fast delivery delays¹⁵ could only be considered at a later stage, when the planning of orders was made possible once a stock availability was ensured by the MSF HPCs. Furthermore, harbor authorities, for a significant period of time, could not guarantee the stopover authorizations in other destinations once freight had been unloaded in Conakry, Freetown or Monrovia. In order to reduce the cost of air transport at the height of the epidemic, MSF chartered two air-cargos per week from Brussels¹⁶. Restrictions regarding the movement of the international workers, with up to 50 departures per week, were even harsher when it came to medical repatriation onto mainly European or American soil of health workers who had been exposed to the virus. The idea to charter an aircraft for 50 to 100 passengers that would have been entirely sponsored was considered at MSF as an option to overcome these gradual restrictions but was eventually abandoned. The logistics department also chartered a helicopter in order to enable fast movement between the three countries for the experts in charge of investigating incidents in the aftermath of contamination of health personnel in the treatment centers. The international transport of contaminated personnel was sub-contracted to the rare companies specialized in this type of medical evacuation.

Improving the working conditions of health workers From April onwards, when the scale of this epidemic was understood by MSF to be unprecedented, it became clear that the response to such an epidemic would require a very high mobilization of health personnel. Theoretically, one counts an average of three health workers per bed – this already corresponds to an important level of mobilization taking into account the total admission capacity for infected patients, the presence limited to one or two hours maximum in the high risk zones due to the high temperatures of the protection suits and hence the need for rapid turnover for the medical teams working in pairs for mutual control. Taking into account the preparation time, the dressing-up and undressing time needed by the teams before and after interventions in the high risk zones, only two to three shifts per day can be considered for one team, thereby explaining the high number of health personnel required in an Ebola intervention in a tropical context.

¹⁵ Expected delivery dates between 3 to 4 weeks for sea fret from Europe to Western Africa with transportation costs six times cheaper than through air fret

¹⁶ One Boeing 747 at cost price through a cargo company that regularly collaborates with MSF + One MD11 at commercial cost

Several initiatives were put in place by the logistics services in order to improve the working conditions and reduce the amount and hardship of the work of the teams. These include barcode scanners for bed identification and PDA (Personnel Digital Assistant)¹⁷ interconnected through Wi-Fi in order to synchronize the medical data exchange between two shifts. Tablets were also distributed to the patients admitted in the Ebola centers to enable them to communicate with their relatives through the help of connections such as Skype, video exchanges and messages of support.

Furthermore, alternative options had to be found rapidly for the admissions tents as their temperature was reaching 45°C (113°F) with high levels of humidity. Cooling systems through air-conditioning were momentarily put in place in the temporary structures, requiring more complex electrical systems and more powerful generators, to be used until completion of the research conducted on thermo-insulating materials. The emergency equipment – initially designed for rapid and intensive use – also suffered from the longer than usual exposure to elements. The prolonged exposure of the material in the ETC, for the tents as an example, to high levels of chlorine used for the disinfection of the structures accelerated their deterioration through oxidation thereby forcing the logistics services to innovate and come up with more resistant materials.

Finally, the handling of dead bodies also created sizeable challenges with a high workload and high exposure risks for the personnel in charge of dealing with the waste zones. In order to reduce the contamination risks throughout the handling of the bodies, specific and more heavy-duty aprons were put at their disposal notably during the cremation process. In view of the very important amount of wood required for each cremation (more or less 1 m³ per body) and the unprecedented number of deaths in emergency structures¹⁸, the procurement services at headquarter negotiated the acquisition of powerful incinerators from British¹⁹ suppliers specialized in the destruction of waste emanating from the food-processing industry.



MSF health worker – ETC Kailahun/Sierra Leone

However, the setting up of these incinerators seems to have produced strong resistance from the affected communities with some people refusing to go to treatment centers equipped with such incinerators.

The consequences of humanitarian assistance that is limited due to non-adapted logistics Even though it is still premature to seek any lessons-learned from the logistics response brought to the Ebola crisis in West Africa as the emergency is still on-going, this description of the realities of the emergency attempts to illustrate as best possible the main challenges faced by the logistic teams confronted to this type of emergency. As a conclusion, it also aims to warn of the sometimes dramatic consequences when logistic capacities are not on par with the operational ambitions put forth by international humanitarian organizations. There are two main risks directly linked to the chronic lack of efficiency of emergency actors during major crisis:

The lack of efficiency and impact of humanitarian organizations is of vital importance to the populations that are victims of armed conflicts, natural catastrophes as well as those affected by an epidemic or

¹⁷Not to be confused with Public Display of affection' knowing that a 'No touch' policy is strictly imposed to the field teams during the Ebola response.

¹⁸During the peak of the outbreak, the number of dead bodies could exceed 50 in a day per center

¹⁹Those incinerators with high burning capacity have been developed in the 90's in the UK in response to the mad cow disease

nutritional crises. All too often, the people wounded or infected by a virus die without having had the possibility to access adequate humanitarian aid.

This failure of the international response to emergencies also represents a risk for the humanitarian workers who, due to the lack of other actors, find themselves all too often isolated in their emergency response with consequences in regards to their own security. The isolation of the MSF teams in its response to the Ebola or cholera epidemic regularly leads to a stigmatization of their activities and can lead to targeted violence from the affected communities who are sometimes misled to believe that the virus was brought purposely by the health workers. This stigmatization is also present in conflict situations, as was the case in Syria, where all of the parties involved in the conflict put forward their suspicions in regards to the legitimacy of the MSF hospitals because of their isolation in the north of Syria with again violent actions perpetrated against the health workers.

Finally, the level of exposure of the humanitarian personnel to risk also generates feelings of fatigue and of being overwhelmed inherent to a situation of isolation in emergency response. This sense of being overwhelmed can be observed through rash and uncontrolled gestures of the health workers in the admission zones of overburdened ETCs, thereby increasing the risks of contamination of the exposed personnel. The chaos of the triage zones in the emergency rooms during massive influx of wounded people also regularly generates tensions with the armed groups, or with the affected families, tensions that can degenerate when there is no possibility to organize medical referrals to other hospitals for lack of humanitarian actors.

To conclude and in case this still needs to be highlighted, an adequate and appropriate logistical response when it comes to humanitarian emergency responses can save many lives.

https://www.youtube.com/watch?v=M_4aUpdplUE

A French version of this article is available on <http://emergency-log.weebly.com>

NB Views expressed in this paper are those of the authors alone and do not reflect the official position of Doctors Without Borders.

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