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**Hygiene promotion in Ebola: embedding best practices  
for safe and dignified burials,  
the case of Freetown, Sierra Leone**

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*Good hygiene practices are crucial for avoiding Ebola contamination during the transport and burial of deceased persons potentially infected by Ebola. In Freetown, Sierra Leone, Concern Worldwide worked with CDC (Centers for Disease Control) experts to define a quality assessment check list for the day-to-day follow-up of burial team workers. The present paper stressed the difficulty of defining new norms while running an existing service as well as the need to allow sufficient time to understand workers practices and their perceptions of Ebola to obtain good compliance to the newly defined standards.*

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**Background**

Direct contact with a person who died from Ebola plays a significant role in the transmission of the Ebola virus. In Sierra Leone (SL), 78% of confirmed cases with known exposures reported attending a funeral and/or being exposed to a dead body; suggesting these were significant sources of infection in Sierra Leone (surveillance data as of October 1, 2014). During an Ebola outbreak, containment measures include prompt and safe medical burials of the deceased (WHO, 2014).

Concern Worldwide started its Ebola response in Sierra Leone in June 2014 shortly after the first reported cases in Sierra Leone in May.

In October 2014, Sierra Leone was experiencing a large-scale outbreak with more than 400 new cases reported each week (WHO field situation, 2014). As part of its response, Concern commenced a safe and dignified burial programme taking responsibility for two cemeteries and Dead Body Management (DBM) for all deceased persons in the Western Area of Sierra Leone. Western Area includes the capital Freetown and has a population of approximately 1.2 million. National public health measures put in place in SL required that all dead bodies be medically buried regardless of the cause of death. At the peak of our activities in November 2014, Concern were burying 290 bodies per week. To ensure the safety of the workers and prevent further contamination, a review of existing practices around dead body management was conducted and a quality assurance system was developed.

**Methodology**

A review of the existing system of safe and dignified burials was conducted by CDC and Concern. DBM teams were employees of the Ministry of Health and up to the point Concern took over the programme it was managed by the MoHs. No quality assurance system was in existence and the level of training of the DBM teams was variable. The review team directly observed a number of burials to assess adherence by the DBM team to Infection Prevention and Control (IPC) protocols from collection of the body at the home to burial at the cemetery and all steps in between. The team also interviewed DBM teams to discuss their current process, their perceptions of their safety and the acceptability of adapting these practices. The team also discussed with the community their perceptions of the process and any adaptations they would like to see.

Small changes were implemented and observed as to their acceptability and practicality over the course of three weeks. This resulted in production of a quality assurance (QA) checklist which was rolled out to all

DBM teams and all supervisors were trained in its use. This was followed by refresher training in IPC protocols for the DBM teams and production of a detailed protocol for all stages of the body collection and burial process.

## Results

The results of the review showed that a substantial part of the risk practices identified were related to overprotection rather than under-protection. The fear of Ebola put staff in an “as-much- as- possible” attitude when protecting themselves from contamination. For instance, wearing three or four pairs of gloves instead of the recommended two (more than two can lead to tearing by friction and be less safe than just two pairs). Another example of overprotection was the overuse of strong chlorine (0,5%), in particular for washing bare hands and sometimes even faces. The perceptions associated with the words “strong” and “weak” led the staff to undervalue the power of weak chlorine solution (0,05 %), despite the fact it is proven to be effective against Ebola. “No one wants to be protected by a weak” as one worker put it (Field notes, Oct 2014).

It was found that DBM teams (largely uneducated and unskilled young men) could not identify with posters giving instruction on how to make chlorine solutions. This was because the receptacles used in the posters were not widely available and the characters used were mainly nurses. The protocols for the preparation of strong and weak chlorine solution were revised to fit with the receptacles that could easily be found at the local markets: A new set of posters displaying the use of tomato tins as a measuring jar and using burial team workers as models were designed.

In response to these observations, discussions were organised with staff to clarify the ways of transmission of the Ebola virus - in particular the fact that it cannot be spread through the airborne route, which clearly remained unclear for some staff as observations showed some of them were covering their mouth when passing nearby coffins - and the risks associated with overprotection.

Failure to respect the safety procedures were mostly occurring at the end of the day. The study helped to understand the burden that constantly having to put on and take off the full Personal Protective Equipment (PPE) represents in such a challenging context (twice putting in/removing PPE for each burial, around 10 burials per day per team in tropical and humid weather). Disinfection and cleaning of the vehicles was also neglected because staff were eager to return home after work. To address this issue, the opening and closing times of the cemeteries were changed as well as working time arrangements, especially rotation of the different teams to allow for rest days.

The review found that communities, without denying the urgent nature of the situation stressed the importance of ensuring dignity at each step of the body removal. For example they asked that collection vehicles travel at a crawl when arriving in the compound, that time is allowed for remembrance of the dead when disinfecting, and that the waste bags are placed gently above the bodies in the grave.

All these findings were used to develop a quality assurance checklist, a refresher training programme for the DBM teams and a detailed safe and dignified burials protocol. Supervisors were trained on the QA checklist which they were expected to fill for each burial and which included aspects such as burial team composition, chlorine preparation, dignity of practices, any problems with the community and practices in the cemetery.. At the end of each day the overall programme manager reviewed all the checklists for compliance and where breaches were noted specific refresher training was conducted for that team.

The final QA list reflects the double aspect of dignified and safe burials:

(November 2014 version)

*Preliminary remark: the reason for the two columns below was to allow the Quality Assurance supervisor to watch two collection and burials and check all procedures twice on the same day. The reason this was considered was because if watching one collection and burial, the team may make particular effort not to “cut corners” or to do it particularly well because they are being watched however if they are watched for a longer period of time and being monitored over the course of a few hours the assessment is more likely to be a truer reflection of reality.*

<b>Key points summary</b>			
Report any breach in the safety and dignity procedure:			
<b>Burial team composition</b>			
The burial team is composed of 12 members	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
2 supervisors	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
6 stretcher bearers	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
2 sprayers	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
2 drivers	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
<b>Material</b>			
The burial team has refilled his stock and has all the equipment required for their work (see the list in annex)	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
If any equipment item is missing, report it here and explain why: a/ The item was not available in stock ; b/ The team forgot to refill the stock of this particular item ; c/Any other reason (to be explained):			
If the team is using a different type of equipment than reported in the list, describe the item(s):			
<b>Chlorine preparation</b>			
The sprayers prepare 2 disinfectant solutions (strong and weak chlorine)	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
The sprayer use the adequate quantity for the two dilutions 1	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
The sprayers stir the solution thoroughly before use	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
<b>At household level</b>			
On arrival, the supervisor contacts the community chairman and the family members, exchanges with them in a respectful way, and provides them with information on body removal and burial procedure to follow – see SoP in annex	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
If required by the family, a religious prayer is organized and led by the community representative	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
A phone number is provided to the family for any further questions regarding the burial	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
The investigation form is filled (by the information officer)	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
If any problem with the community/family occurs report it (explaining why):			
The stretcher carriers and sprayers wear their full PPE2	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
When putting on their PPE, the staff respects the procedure as described in the picture book	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
Report any breach in the protocol for putting on the PPE:			
The sprayer disinfects from the direct outside of the home up to the inside of the dead person room	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
A swab is collected from the body (by the swab team)	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
If agreed with the family, beddings, towels, clothes from the dead person is collected and put in a Waste bag which is then sealed with a cable tie	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
The family is provided with information regarding the need to wait a couple of hours before using the room again, and not mixing chlorine with any other cleaning products, washing hands with soap thoroughly if come into contact with any object, surface touched by the deceased person	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
The mattress is sprayed thoroughly (10 seconds on both side) and advice is given to the family to wait 1 or 2 hours before drying it out in the sun	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
The body is placed in an appropriate 2 body bag, the bag is closed and its outer surface sprayed thoroughly and correctly labelled	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
If the family provides a coffin the body is first put in a body bag before being put in the coffin	<input type="checkbox"/> YES <input type="checkbox"/> NO (don't fill if no coffin)	<input type="checkbox"/> YES <input type="checkbox"/> NO	
Once the body is in the hearse, each team member removed his PPE according to the procedure described in the picture book	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
The team only washes their bare hands and face with weak chlorine solution	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
The waste bags are sealed and sprayed thoroughly (inside and outer surface)	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
Report any breach in the procedure for safe removing of the PPE:			
<b>If the body is collected at EHT/ETC level</b>			

Use the same procedure as above for PPE (putting on / removal) and waste bags			
The body bag to collect is properly labelled and sealed	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
<b>During the travel</b>			
The drivers are driving safely (=no constant overpassing, bipping and high speed)	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
<b>At cemetery level</b>			
The family attending the burial is politely welcomed and is provided with information about the burial process	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
Before removing the body(ies) from the back of the vehicle, the stretcher bearers and the sprayers puts on their full PPE	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
At any time and if presents the family remains at 5 meters from the body	<input type="checkbox"/> YES <input type="checkbox"/> NO (don't fill if no family)	<input type="checkbox"/> YES <input type="checkbox"/> NO	
The body lowered carefully into the grave	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
Once the body is in the grave, each team member removed his PPE according to the procedure described in the picture book	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
The PPE are put in waste bags that are sealed and sprayed (inside/outside) before being put in the grave in a dignified way with the other waste bags at the back of the hearse	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
The team only washes their bare hands and face with weak chlorine solution	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
The inside of the hearse is disinfected and the team waits 10 minutes for the inside to dry out before leaving	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
A plaque or grave marker is added to the grave and the registration is completed	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	

<sup>1</sup> For strong chlorine: 1 and a half tomato cup for 12 L ; 2 tomato cups for 16L ; 2 and an half tomato cup for 20L. For weak chlorine: 1:10 dilution => into another sprayer , pour 1 L of strong chlorine solution, then add up to 10 L.

<sup>2</sup> 2 pairs of gloves, rubber boots, 1 disposable scrub/Gown, 1 suit with hood , 1 apron, 1 mask, 1 pair of goggles or faceshield.

<sup>3</sup> The "Chinese" yellow bags are only for young children and should not be used for adults.

## Discussions

Dead body management is a high risk job that requires constant monitoring to ensure the team are following the safety measures in place. The QA checklist has been defined to ensure any breach in protocol can be quickly identified and action could be taken in response.

Nevertheless, the Ebola outbreak occurring in West Africa being an unprecedented crisis, local adaptations of the existing protocols were sought.

As an example and for the activities related to disinfection, an issue arose regarding the waste management of the contaminated items: Existing norms were advising (Sierra Leone emergency management programme, 2014) to burn each mattress of the deceased to avoid any risk of contamination but the communities affected were strongly resistant to this idea because of the cost of the mattress and the fear that the smoke could contain Ebola. Initially, a system of collection and reimbursement was conceived as a potential response but the lack of space for mattresses in the vehicles and the lack of safe incineration sites in Freetown made it impractical. The question was then to determine whether spraying the mattress thoroughly with strong chlorine before drying it out in the sun was a safe enough practice to recommend.

Answering this question was not easy, even for a CDC expert, as no experimentation has been carried out to determine the survival of Ebola in mattress fibres. Suggestions were strong that Ebola would not survive both treatments (strong chlorine and sun drying) but without absolute guarantee.

These concerns were shared with the response agencies and in the end, due to the uncertainty mentioned above, the Standard Operating Procedure (SOP) was never changed regarding decontamination and it continued to be advised that mattresses were removed and burnt. Nevertheless, during December when the Western Area Surge programme was commenced and there was increased pressure to secure all areas of operation, a partner agency agreed to take on decontamination and now work "against" the approved SOP to remove mattresses and replace (along with other items).

This example demonstrates that in the absence of long term tested norms, each particular situation causes problems as scientific evidence is not yet strong enough for defining clear recommendations.

Unlike for well-known diseases where staffs are used to working with standards that are well established, this tragic Ebola outbreak is unique as it requires constant adaptation of existing norms to the reality of the situation found in the field.

Concern and other agencies feed all relevant information through the national burial pillar committee which is the body to review and alter SOPs. The Safe and Dignified Medical Burial SOP was recently revised (January 2015) based on partner feedback including information from Concern.

At the time of writing this paper is writing, none of the DBM teams managed by Concern has contracted Ebola.

## Conclusions

The study has clearly demonstrated that many aspects others than technical factors need to be taken into account to secure adherence to safety protocols: Perceptions of the contamination risk, cultural and social aspects as well as practical ones. It also demonstrates that even in emergencies, sufficient time should be allocated to allow an iterative process of exchange between users and experts.

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