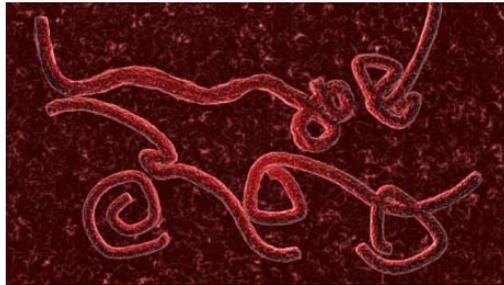


The Ebola Virus: Infection Control Precautions



*A brief guide for Health Care Workers
in West Africa*

David Murana

The purpose of this brief document is to provide guidance for Health Care Workers in implementing Universal/Standard Infection Control Precautions, whilst caring for and treating patients suspected of or infected with the Ebola virus. In order to provide the most up to date guidance, reference has been made to the World Health Organization (WHO) 2014 publication, - Clinical Management of Patients with Viral Haemorrhagic Fever: A Pocket Guide for the Front-Line Health Worker. The term Health Care Worker has been used in this brief document to refer to Doctors, Nurses, and other workers who assist directly with patient care and treatment.

Index

1. Introduction.....	1
1.1 Transmission routes.....	1
2. Prevention and control.....	1
3. Patient isolation.....	2
4. Restricted movement.....	2
5. Hand Hygiene.....	3
6. Personal Protective Equipment (PPE).....	4
7. Prevention of injuries from needles and other sharp instruments.....	6
8. Cleaning and disinfection of the environment.....	7
9. Safe handling and disposal of contaminated linens and other items.....	7
10. Cleaning and disinfection of patient - care equipment.....	8
11. Other.....	8

Compiled by David Murana©

Faculty of Infectious and Tropical Diseases

Department of Clinical Research

London School of Hygiene and Tropical Medicine

University of London

Keppel Street

London WC1E 7HT

United Kingdom

August 2014

1. Introduction.

There is currently no specific treatment to cure Ebola, therefore preventing and controlling its spread is the most important way of combating the disease. Health Care Workers are central to the prevention and control of Ebola, they have to ensure that the disease does not spread from patients to Health Care Workers, Health Care Workers to Health Care Workers, and from the patient to the rest of the community. Health Care Workers must always remind themselves of these 3 words when preventing and controlling infection; **what, when and how**. As we progress you will see the significance of these 3 commonly used but very important words.

1.1 Transmission routes.

The first thing that Health Care Workers need to remind themselves about is **how** does the Ebola disease spread? **what** are the routes of transmission? What we know for now is that the risk of infection increases with direct exposure to blood or bodily fluids (stool, urine, saliva, semen) of a dead or living infected person or animal.

After handling blood or body fluids of an infected person, infection is easily transmitted through broken skin, or by touching certain areas such as the eyes, nose and mouth. Transmission also occurs by having unprotected sexual contact with infected individuals up to seven weeks after they have recovered. The environment in which an infected person is cared for or lives should not be forgotten about, that is because areas within that environment may be contaminated. Think about the surfaces, clothes, linen, equipment etc. If you work in the lab handling specimens, you will need to take precautions almost equally as Health Care Workers caring directly for patients.

2. Prevention and Control.

Now that we know how the disease spreads we can progress further on **how** to prevent and control the spread. Listed below should be the main focus;

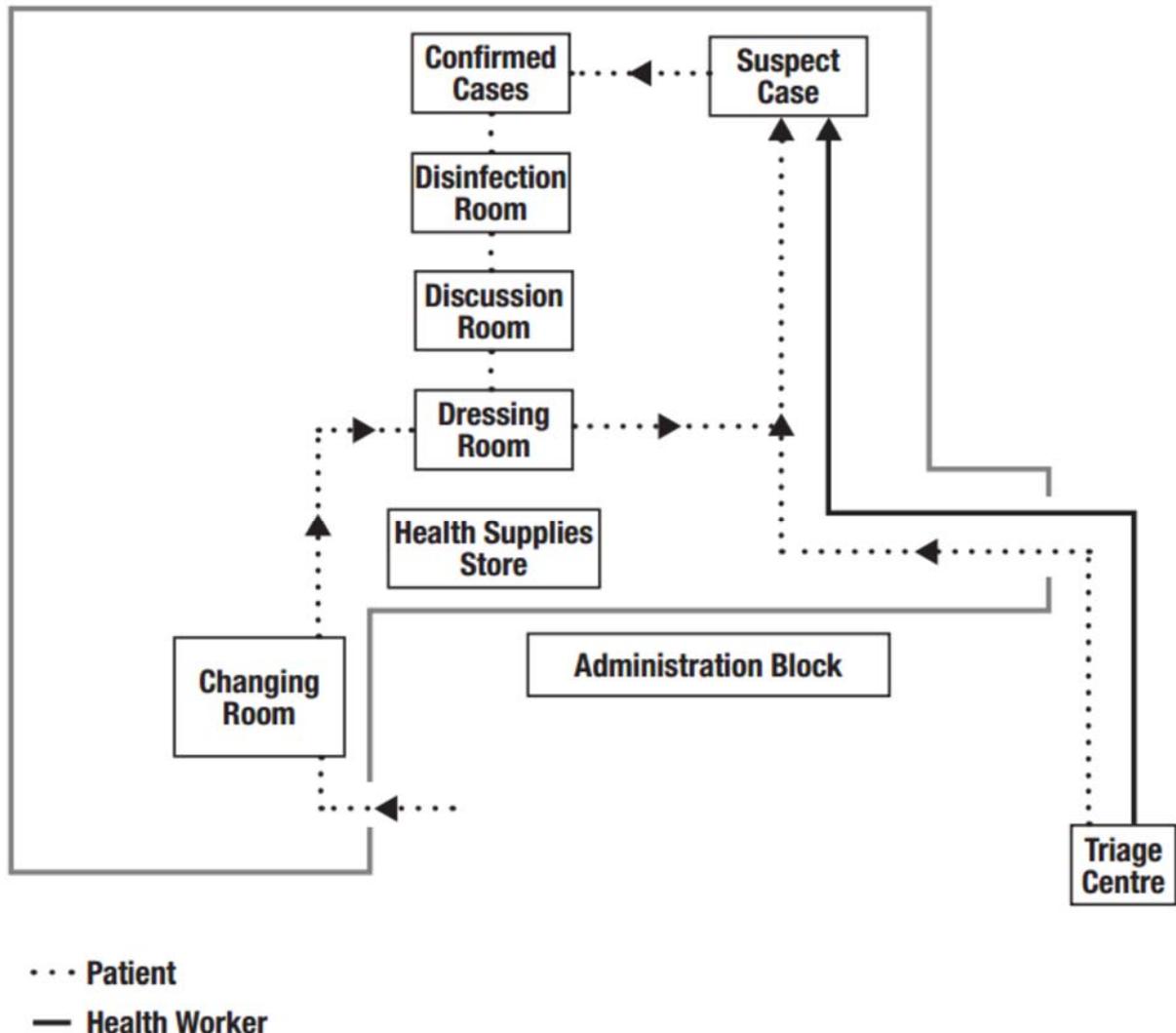
- Patient Isolation.
- Restricted movement.
- Hand hygiene.
- Appropriate personal protective equipment (PPE) based on risk assessment at the point of care.
- Prevention of injuries from needles and other sharp instruments.
- Safe waste disposal of used items.
- Cleaning and disinfection of the environment.
- Safe handling and disposal of contaminated linens and other items.
- Cleaning and disinfection of patient-care equipment.

(Adapted from World Health Organisation (WHO), 2014)

3. Patient Isolation.

It is important that patients are kept in isolation bays, rooms or cubicles, to help minimise the spread of the disease.

The flow chart below taken from the WHO (2014) should help you with setting up and using isolation facilities.



4. Restrict Movement

How do you restrict movement when relatives are longing to see their loved ones? It is important that only Health Care Workers looking after patients have access to the area in which patients are looked after. This will be frustrating for relatives but if you have a trained person (s) to brief them away from the care area about **what** is going on and **why** you are taking the steps that you are taking, that should hopefully lessen their anxieties or worries. Take one step back and in your mind, put yourself in the position of the relative (s), and now think about **how** you would like to be treated. Always treat relatives with compassion.

5. Hand Hygiene

Hand Hygiene is one of the most effective ways in preventing and controlling the spread of infections in general. To ensure good hand hygiene you must have the following; Soap, running water (- / + adequately diluted with chlorine) and paper towels (disposable).

So **when** should you wash your hands?

You should wash your hands;

- Before and after you have had contact with an infected person or suspected case.
- Don't forget that as you move around you will be touching areas or surfaces, these may be contaminated.
- Just because you have been wearing gloves does not mean that you should not wash your hands after you have taken the gloves off. You must in addition wash your hands immediately after taking your gloves off.

Washing your hands should be done in a way that removes any pathogen that is present on them. So **how** should you wash your hands? Let us forget about words for now and move on to pictures.



- Do not keep long finger nails.
- Do not wear rings, watches or bracelets.
- Always dry your hands properly.
- Cover all cuts or scratches with a waterproof plaster or covering.

6. Personal Protective Equipment (PPE)

You are working in a tropical climate, so wearing too many items at the same time on your head, face, body and feet is not the most comfortable thing to do. You need to bear in mind that your safety comes first. If you become infected then you will not be able to help the patients and you yourself will become a patient. So **what** items do you need to protect yourself? Cotton tunics (scrubs), long sleeve gowns, medical face masks, face shields, head cover, gloves, goggles, waterproof aprons and wellington boots.



Wellington boots

scrubs

apron

face shield

gown



gloves

head cover

goggles

Now **when** do you put on these personal protective equipment? It is important that you do so before you handle a confirmed or suspected case of Ebola.

In **what** order do you put on and remove your equipment? What I have done again is to take the steps that the WHO has recommended and which is usually followed by many clinical settings around the world, in the prevention and control of infection. The key things that you should remember are:

- You must get another trained colleague to help you put on your PPE.
- Make sure you wear correctly sized gloves when entering the patient care area. If possible avoid latex gloves and use nitrile gloves. This is because people do have or develop latex allergy.
- Make sure you wear a disposable, impermeable gown to cover clothing and exposed skin. If the gown is permeable then a waterproof apron over the permeable gown must be worn.
- The facial protection is to prevent splashes of body fluids to the nose, mouth, and eyes or you touching these areas (medical mask and eye goggle or a face shield and medical mask).

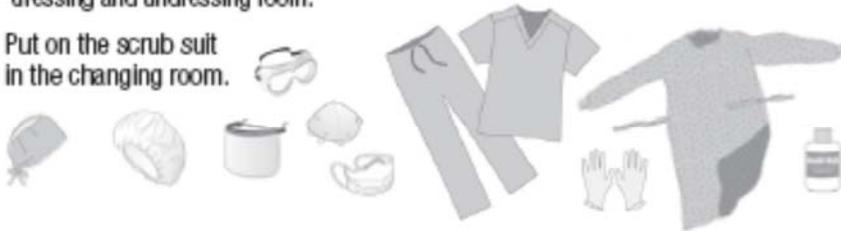
- Don't forget that PPE must also be worn by; support staff who clean the isolation rooms and handle contaminated supplies and equipment, laboratory staff who handle specimens and burial teams.
- Following the correct steps to put on PPE to protect yourself is important, but equally important also is taking off the PPE after you have been in contact with an infected patient, suspected case, contaminated items or deceased person. Be careful to avoid any contact between the soiled items (e.g. gloves, gowns) and any area of the face (eyes, nose, or mouth).
- Before leaving the isolation area where you have cared for a patient, carefully remove and dispose of protective equipment.

7.3 Steps to put on and remove essential required PPE

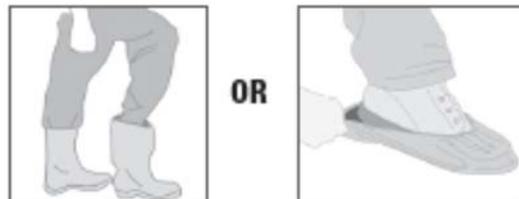
Steps to put on essential required PPE

- 1** Always put on essential required PPE when handling either a suspect, probable or confirmed case of VHF. Gather all the necessary items of the PPE beforehand.
- 2** The dressing and undressing of PPE should be supervised by another trained member of the team. These instructions should be displayed on the wall in the dressing and undressing room.

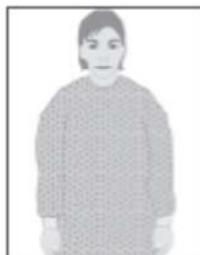
- 3** Put on the scrub suit in the changing room.



- 4** Put on slip-on shoes with protective covers. If you will be working in wet settings with bodily fluids, water, detergent, waste, etc., use gum boots instead.



- 5** Place the gown over the scrubs.

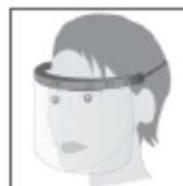


- 6** Put on face protection:

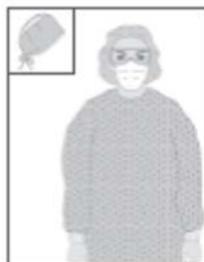
- 6a** Put on a medical mask and goggles. **OR**



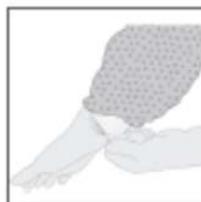
- 6b** Put on a face shield (preferred). If the patient has respiratory symptoms or the design of the face shield does not stop you from touching your face (eyes, nose, and mouth), first put on a medical mask and then put the face shield over your face and the medical mask.



7 If you have any abrasions on your scalp or you have concern for splashing fluids, also place a head cover at this time.



8 Put on gloves (over cuff).



9 If gown is permeable or if you expect strenuous activity with an exposed patient, place waterproof plastic apron over gown.



Whilst wearing PPE:

- Avoid touching or adjusting PPE
- Remove gloves if they become torn or damaged
- Change gloves between patients
- Perform hand hygiene before donning new gloves

Steps to remove PPE

1 Peel off plastic apron and dispose of safely, (if the apron is to be reused, place in a container with disinfectant)



2 If wearing protective shoe covers, please remove them with your gloves still on. (If wearing gum boots, see step 5).



7. Prevention of injuries from needles and other sharp instruments.

Infection is also possible to occur if injuries are sustained from contaminated needles or sharp objects. To protect yourself and your colleagues, you must pay attention to items such as needles, scalpels scissors etc. which you have used whilst treating a patient. Make sure that you dispose of them safely after use, do not leave items lying around and do not recap needles. Sharps must not be passed from hand to hand, or carried in your own hands, always use a tray. **How** do you go about disposing of needles and sharp items safely? There are specially designed containers known as sharps boxes, you must dispose of items in there. Needles and syringes must not be disassembled by hand before disposal. If you do not have one, then you can improvise by using containers made from hard plastic, such as a

used plastic gallon. Make sure that you do not allow sharp boxes to become too full and incinerate them to dispose of the used needles or sharp items. Now let's look at the pictures below and see how they can help us in dealing with used needles and sharp items.



Sharps bin.



Overfilled & dangerous sharps bin.



Safe disposal of a needle.

8. Cleaning and disinfection of the environment

Inside the clinical environment where you are caring for infected patients needs to be cleaned and disinfected. This is because floors and other surface may have blood or body fluids on them. **How** often should you clean the floors and surfaces? Floors and surfaces should be cleaned and disinfected at least twice a day with chlorine based disinfectant or whenever there has been an incident such as bleeding or vomit on to the floor or surface. So **how** do you go about cleaning and disinfecting floors and surfaces?

- Do not sweep with a dry broom or brush because you will lift pathogens into the air, do not use dry rags or cloths because the same will happen.
- Use a moistened cloth or mop to first clean. Thereafter you should use chlorine based disinfectant to disinfect.
- Make sure that you change and dispose of cleaning items frequently, and safely because they will become contaminated quickly.
- If you have auxiliary workers doing the cleaning, then make sure that you educate and train them.

9. Safe handling and disposal of contaminated linens and other items

In the process of looking after patients suspected or infected with the Ebola virus, waste will be generated such as; cleaning items, vomit bowls, empty intra venous fluid bags, used gauze and bandages, used PPE, soiled or worn patient clothing and linen, used utensils etc. **How** do you get rid of these safely?

- Flush urine, vomit and faecal matter down toilets. Disinfect toilets often with chlorine based disinfectant. If normal toilets are not available then dispose of these safely and carefully in any special facility that has been constructed such as a pit. If

you have to go far distances, then there is the risk of spillage and you must point this out.

- Items should be segregated before they leave the clinical area. Single use items must be placed in separate heavy duty bright coloured polythene bags, bags must be half full and not overloaded. Remove safely through specific corridors or channels avoiding the general public or other workers and incinerated immediately. Ideally incineration should take place on site. If not waste must be transported safely in a secure vehicle.
- Items for laundry or sterilisation should also be segregated and removed taking the same precautions above.
- If sharp items are to be sent for sterilisation then they must be placed and transported in robust sealed plastic or metal containers.
- It is important that there is strong communication and coordination between the clinical area and those receiving contaminated items.
- Contaminated items must be marked with 'danger' warning signs.
- If possible procure and use single use items all the time such as; cups, plates, cutlery, PPE, vomit bowls, linen and forceps. They are easier to dispose of.

10. Cleaning and disinfection of patient-care equipment.

The equipment that you use to monitor patients should not be forgotten and must also be cleaned and disinfected. Equipment such as blood pressure monitors and thermometers must be disinfected every time they are used between patients.

11. Other

- All specimens leaving the clinical area must be handled with care. Specimens must be contained in a leak proof container and then placed in a sealed polythene bag. Ensure that the outside of the container is not visibly contaminated with blood or body fluids.
- Care must be taken in the removal process of the deceased. Leakage from any wounds or other orifice must be contained. A body bag must be used for the removal process via secure corridors to a vehicle for immediate burial or cremation.
- All vehicles used to transport corpses must be washed and disinfected throughout at regular intervals, in designated locations away from the public.

Conclusion

It is hoped that this brief document would help with these basic but nevertheless important points in preventing and controlling infection, when caring for or treating patients suspected of or infected with the Ebola virus. It is important that when you are faced with infection control and prevention challenges, you should keep asking yourself - **what** should I be doing? **when** should I do it? and **how** should I do it?