



Ebola IVR mLearning Course for Health Workers¹

The current Ebola epidemic in west Africa is the first Ebola epidemic in region and therefore most health workers have received no formal education on Ebola prevention, diagnosis, or care. During an epidemic, health workers are needed at their posts and there is often not time to bring them to central sites for face to face training. In addition, travel for training risks spreading the disease via health workers who are not aware they are infected. Traditional distance education approaches, such as the internet and DVD are difficult because many community-based health workers often do not have access to the internet or laptops and tablets or are illiterate or semi-literate. In order to address these issues and get information quickly to health workers in Ebola affected and at-risk countries, IntraHealth International has developed an Ebola Interactive Voice Response (IVR) course. These messages were developed based on CDC's Ebola Guidelines for Health Workers². The course is available for general use and modification under a creative commons license. We recommend that the course be adapted to meet national guidelines and language. The IVR course is especially useful for illiterate or semi-literate community health workers and for health workers who speak minority languages for which it can be difficult to find sufficient numbers of qualified face to face trainers.

The course presented below is a series of essential Ebola questions and answers. The questions and answers are voice recorded and sent daily to health workers via standard mobile phones. After listening to the recorded question, the health worker presses the number of the answer s/he believes to be correct and then hears the recorded correct answer. The health worker can control how often s/he receives new questions, what time s/he receives questions, and can take the course over a period of one to several weeks. Arrangements can be made with telecom companies so that no mobile phone fees are accrued by the health workers taking the course. The IVR information is sent to health worker mobile phone numbers using a free, open source Moodle³ platform with an iHRIS⁴ HR database or another compatible system. This course can be offered as a stand-alone course or in conjunction with Ebola courses in other modalities such as face to face, print, or SMS. The IVR course can also be repeated over time to serve as reminders for health workers after their initial Ebola training is complete. Due to the emergency nature of the situation, the content has been condensed down to the most actionable

¹ This course has been designed for IntraHealth's Interactive Voice Response mLearning system for standard mobile phones. A similar course for community members will soon be available. Contact Dr. Kate Tulenko for more information (ktulenko@intrahealth.org).

² <http://www.cdc.gov/vhf/ebola/hcp/>

³ <https://moodle.org/> Contact Dykki Settle for more information on specific Moodle code modification for IVR (dsettle@intrahealth.org).

⁴ <http://www.ihris.org/> iHRIS is currently being used by 19 countries to manage over 1 million health worker HR records.

interventions that will save lives and build trust. We also recommend the establishment of Ebola Information Hotlines for health workers as mentioned in the last question in the course.

Ebola IVR Questions and Detailed Explanations

1. What type of disease causing agent is Ebola?
 - 1) Bacteria
 - 2) Virus
 - 3) Toxin
 - 4) Parasite

Detailed Explanation

Ebola is a virus that causes Ebola hemorrhagic fever. In some communities there have been rumors that Ebola disease is caused by poison placed in water or explanations coming from traditional beliefs. These explanations are false. Although patients ill with Ebola are more likely to get secondary infections, including bacterial infections, Ebola hemorrhagic fever is a viral infection. The mortality rate of the current Ebola epidemic is about 50% with survival being lower in younger and older patients, patients with poor nutrition or chronic disease, and patients who receive delayed supportive care.

2. How is Ebola transmitted?
 - 1) Food
 - 2) Water
 - 3) Body fluids of people with Ebola
 - 4) Respiratory droplets

Detailed Explanation

Ebola is transmitted via the body fluids of people or corpses with Ebola. This includes blood, saliva, vomit, feces, urine, tears, and semen. Infection occurs when body fluids contaminated with Ebola come into contact with mucus membranes or broken skin of another person. The body fluids of people who have recently died of Ebola are very contagious and funeral traditions that involved touching the body of the dead loved one are strongly advised against. Ebola is not a food or water borne illness. Unlike influenza, Ebola is not transmitted via respiratory droplets. Fruit bats are believed to be the natural reservoir of Ebola and people are strongly advised not to eat fruit bats and to avoid all contact with fruit bats and their feces.

Health workers should avoid unnecessary physical contact such as handshaking and should maintain a 3 foot distance while interviewing patients in Ebola affected communities.



The Ebola virus is easily killed with a 0.5% chlorine solution.

3. How soon after infection will a person start to have signs and symptoms of Ebola hemorrhagic fever:
- 1) 12 hours to 2 days
 - 2) 2 to 21 days
 - 3) 2 to 10 days
 - 4) 5 to 21 days

Detailed Explanation

Signs and symptoms of Ebola infection usually appear within 2 to 21 days of infection. Appearance of Ebola signs and symptoms most commonly appear after 8 to 10 days. Due to the 21 day potential window for appearance of Ebola signs and symptoms, people suspected of having Ebola need to be monitored for 21 days following their last known exposure.

4. Properly identifying probable cases of Ebola is important so that these patients can be prioritized for treatment and isolation. The definition of a probable case of Ebola is:
- 1) Someone with a fever greater than 38.6 Celsius, at least one other symptom such as vomiting, diarrhea, headache, muscle ache, abdominal pain, or unexplained hemorrhage.
 - 2) Someone with a fever greater than 38.6 Celsius, at least one other symptom such as vomiting, diarrhea, headache, muscle ache, abdominal pain, or unexplained hemorrhage, from an affected community.
 - 3) Someone with a fever greater than 38.6 Celsius, at least one other symptom such as vomiting, diarrhea, headache, muscle ache, abdominal pain, or unexplained hemorrhage with direct contact with a known or probable Ebola case.
 - 4) None of the above.

Detailed Explanation

Under CDC guidelines a probable case of Ebola is defined as someone with a fever greater than 38.6 Celsius, at least one other symptom such as vomiting, diarrhea, headache, muscle ache, abdominal pain, or unexplained hemorrhage with direct contact with a known or probable Ebola case. Simply living in an Ebola affected community does not increase the likelihood of contracting Ebola.

Patients identified as probable Ebola cases should be isolated immediately, preferably in an individual isolation room. If individual isolation rooms are not possible, isolate probable and confirmed Ebola cases separately.

Since some laboratory confirmed cases of Ebola do not have fever, it is important to use your clinical experience and reasoning in diagnosing cases.

5. The most important treatment that can be given to a patient with Ebola to help them survive is:
 - 1) Fluids
 - 2) Antibiotics
 - 3) Antivirals
 - 4) Anti-pyretics/Anti-fever medications
 - 5) There is no care that has been found to increase survival of patients with Ebola

Detailed Explanation

Ebola infection causes significant fluid deficits due to vomiting, diarrhea, high fever, and reduced fluid intake due to weakness. Therefore increased fluids, whether oral or IV, and balancing the patient's electrolytes are an essential part of Ebola care. Proper nutrition, oxygen, and blood pressure support can also help. Anti-pyretics can help patients feel better but are not correlated with increased survival. One of the reasons for the improved survival rate in the current west African Ebola epidemic is due to patients receiving care faster than in past epidemics. There are currently no anti-virals that have been found effective against Ebola and since Ebola is a virus, antibiotics are not helpful unless they are treating a specific bacterial secondary infection. Although there are Ebola vaccines and immunotherapies in the earliest stage of testing, none are available in large quantities.

6. The majority of health workers infected by Ebola in the current epidemic have been infected due to:
 - 1) Lack of appropriate protective equipment such as glove, gowns, goggles, and masks
 - 2) Needle sticks and other sharps injuries
 - 3) Breathing in respiratory droplets
 - 4) Human error due to extreme fatigue, high patient load, and stress.

Detailed Explanation

The most common cause of Ebola infection in the current epidemic is human error due to extreme fatigue, high patient load, and stress. All of the countries affected by the Ebola epidemic were already experiencing significant health worker shortages and maldistributions before the epidemic, especially in the rural areas currently most affected. The increased patient loads due to the epidemic have exacerbated this situation. Health workers working extended hours with high patient loads, are more likely to make errors in the use of protective equipment



and hygiene practice. For example a fatigued health worker may accidentally touch his or her eyes or nose with their gloved hand. This situation highlights the need to bring in more healthcare workers to affected health facilities and communities and to ensure that health workers are well supported and allowed proper time to eat, rest, and sleep. Health workers should always be aware of their fatigue and stress levels and ask to be temporarily relieved of their duties if they feel they are not safe to work.

If a health worker receives a needlestick or sharp injury while caring for a probable or confirmed Ebola case, he or she should leave the care area immediately, properly remove his or her protective equipment, clean the affected area with soap and water and report the incident to the proper authorities. Needlesticks and sharp injuries have caused only a small number of the Ebola cases in health workers.

There is some anecdotal evidence that some health workers may not have received adequate training in how to properly remove infected protective equipment. This highlights the need for proper training and reminders on how to put on, work in, and remove protective equipment.

Ebola is not transmitted via respiratory droplets.

7. What is the proper way to remove protective equipment?
 - 1) Remove protective equipment starting from your head and working down: goggles, mask, gown, gloves.
 - 2) Removing only protective equipment that came in contact with infected patients—the rest can be used later.
 - 3) Remove equipment in this order: gloves, goggles, gown, and mask.
 - 4) Any order if acceptable as long as a health worker removes equipment consistently and carefully.

Detailed Explanation

Protective equipment should be removed in this order: gloves, goggles, gown, and mask. Gloves are removed first because they are usually the most contaminated piece of equipment. The first glove is taken off by turning it inside out with the other gloved hand and is held in the other gloved hand. The second glove is removed by placing a clean finger inside the edge of the second glove and pulling it inside out to form a ball with both gloves. The gloves are then placed

in an appropriate biohazard receptacle. Goggles are then removed by touching only the earpieces or strap. Do not touch the lenses or frame. Goggles are then placed in a biohazard receptacle, or in some facilities, in a bleach bath. In the third step, the gown is removed by untying the ties in the back, grabbing the gown from the shoulders and pulling inside out. The gown is then placed in an appropriate biohazard receptacle. Lastly the mask is removed. Although Ebola is not aerosolized, other infectious agents may be aerosolized and removing the mask last prevents infection from agents aerosolized while removing the other protective equipment. First untie the bottom strap to prevent the mask from flipping down on your chest, then untie the top strap and place the mask in a biohazard receptacle without touching the front part of the mask. The final step is hand hygiene: wash your hands with soap and water or sanitize them with an appropriate solution.

In general, in Ebola epidemics, protective equipment is not reused.

8. Asymptomatic people with high risk exposures may leave health facilities if they can commit to “conditional release” and “controlled movement” for 21 days after last known exposure.

Conditional release is defined as:

- 1) Returning daily to a health facility for fever and symptom monitoring.
- 2) Living in a non-medical quarantine facility with monitoring by public health authorities; twice-daily self-monitoring for fever; notify public health authorities if fever or other symptoms develop.
- 3) Living at their usual place of residence with monitoring by public health authorities; twice-daily self-monitoring for fever; notify public health authority if fever or other symptoms develop.
- 4) Living at their usual place of residence with twice-daily self-monitoring for fever; notify public health authorities if fever or other symptoms develop.

Detailed Explanation

The correct definition of “controlled release” is “Living at their usual place of residence with monitoring by public health authorities; twice-daily self-monitoring for fever; notify public health authorities if fever or other symptoms develop.” Asymptomatic people with high risk exposures, such as the parent of a child diagnosed with Ebola can return home on “controlled release” as long as they consent to monitoring by public health authorities, take their temperature twice daily, and notify public health authorities if they have a fever greater than 38.6 Celsius or other Ebola symptoms such as vomiting, diarrhea, headache, muscle ache, abdominal pain, or unexplained hemorrhage.

9. Asymptomatic people with high risk exposures may leave health facilities if they can commit to “conditional release” and “controlled movement” for 21 days after last known exposure.

“Controlled movement” is defined as:

- 1) No travel outside their place of residence.



- 2) No travel outside their place of residence except to the health facility which is monitoring their symptoms.
- 3) No travel by commercial conveyances such as airplanes, ships, and trains; local travel by taxi, or bus only in consultation with local public health authorities; timely access to appropriate medical care if symptoms develop.
- 4) None of the above.

Detailed Explanation

“Controlled movement” is defined as “no travel by commercial conveyances such as airplanes, ships, and trains; local travel by taxi or bus only in consultation with local public health authorities; timely access to appropriate medical care if symptoms develop.” If a person released on controlled movement lives very far from medical care, an alternate place for them to live that is close to medical care must be found.

10. Communicating with patients’ families is an essential part of Ebola care. Appropriate actions include:

- 1) Frequent updates to family members on the status of their loved one.
- 2) Education on family members on Ebola signs and symptoms.
- 3) Education of family member on Ebola transmission.
- 4) Praising family members for bringing their family member to the health facility.
- 5) All of the above.

Detailed Explanation

All of the above are appropriate actions with family members of confirmed or suspected Ebola patients. Family members should be praised for bringing the family member in---many families fear that they will never see their loved one again or that they will contract Ebola at a health facility so there can be a strong inclination to keep the sick family member at home. They need to be reassured that they made the best decision for their loved one and have increased their likelihood of survival. Frequent updates help family members cope with the situation and should be set up in a way that does not increase risk of infection to the family members. Because family members may themselves be in the early stage of infection, it is vital that they receive culturally appropriate education on prevention of Ebola transmission and Ebola signs and symptoms. Establishing a good relationship with families of Ebola patients will help build trust and makes it more likely families will give accurate information on the patient’s contacts.

11. The following is a case study. A five year old previously well girl is brought to your health facility by her family. She has a fever of 40 degrees Celsius, vomiting and diarrhea. She attended a wedding two weeks ago and one of the wedding guests was diagnosed with Ebola last week.

Your next step is to:

- 1) Diagnose her as a probable Ebola case and isolate her immediately and provide supportive care.
- 2) Diagnose her as a confirmed Ebola case, admit her to the children's ward and provide supportive care.
- 3) In this community malaria is the most common cause of fever in children. Treat her for malaria and send her home.
- 4) Diagnose her as a probable case and send her home on conditional release and controlled movement.

Detailed Explanation

The correct answer is "Diagnose her as a probable Ebola case and isolate her immediately and provide supportive care." This child has a history of contact with a probable Ebola case as well as high fever and other signs and symptoms of Ebola. Therefore she should be diagnosed as a probable Ebola case, isolated immediately, and provided supportive care, especially fluids. Although children often need special pediatric care, children with Ebola must be admitted to an isolation room and cannot be admitted to a regular pediatric floor. Even though most children with fever in Ebola affected communities will not have Ebola, they cannot automatically be presumed to have more common cause of childhood fevers such as malaria, upper-respiratory infection, or viral gastro-enteritis. A history of contact with Ebola cases must be sought.

An Ebola case is "confirmed" only with a positive Ebola lab study.

12. The following is a case study. A 50 year old previously well man has had a fever of 40 degrees Celsius, vomiting and diarrhea for the past two days. He does not come from an Ebola affected community, has not traveled to an Ebola affected community, and has had no known Ebola contacts. He has heard about the Ebola epidemic in the region and is concerned because he rides the public bus regularly. Your next step is to:

- 1) Diagnose him as a probable Ebola case and isolate him immediately and provide supportive care.
- 2) Provide reassurance and Ebola education and send him home.
- 3) He does not fit the criteria for a probable Ebola case. Diagnose and treat his illness and provide him with Ebola education.
- 4) Diagnose him as a probable case and send him home on conditional release and controlled movement.

Detailed Explanation



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The correct answer is “He does not fit the criteria for a probable Ebola case. Diagnose and treat his illness and provide him with Ebola education.” Although this man does have high fever and other signs consistent with Ebola, he has no known Ebola risk factors (such as casual contact with a known or probable Ebola case). In countries with Ebola epidemics, health facilities are at risk of being overwhelmed by the worried well and by people with non-Ebola illnesses who might not otherwise have sought care. Because this man actually is ill, it is important to diagnose and treat his illness, which in this case may be a simple viral gastroenteritis. In countries with Ebola epidemics, both community based and person to person education on Ebola risk factors, signs and symptoms, and prevention are important steps in stopping the epidemic.

If you have any questions about the prevention, diagnosis, and treatment of Ebola, please call the National Ebola Information Hotline at (XXX)XXX-XXXX