EMS Transport and Management of Patients With Confirmed or Suspected EVD

Dr Oumo Joseph (MD)

MBChB, MMED-OBGY, MPH

Outline

- Education and training
- Roles and responsibilities
- Medical Dispatch
- Vehicle Preparation
- Patient Preparation
- Health Care Worker PPE
- Work Practices
- Decontamination, Disinfection of the Ambulance, and Doffing of PPE
- Transport of Patients Under Investigation For Having EVD
- Conclusion

Education and Training.

- Complete competency-based training, with special attention to the proper donning and doffing of a variety of personal protective equipment in the presence of a trained observer.
- Careful attention is paid to compliance because a seemingly minor lapse in technique can put health care workers at risk for infecting themselves or spreading dangerous pathogens to others.

- Introduction and overview of transport of patients with serious communicable disease
  - Education and training
  - Equipment
  - Concept of operations
- Tenets of infection control
  - Standard precautions
    - Hand hygiene
    - PPE
    - Patient care equipment
    - Environmental controls
    - Injury prevention
  - Transmission-based precautions (contact, droplet, aerosol)
    - PPE
    - Patient care equipment
    - Patient placement
    - Categorization of common pathogens
- Education about serious communicable pathogens
  - Epidemiology of illness
  - Microbiology of pathogen
  - Methods of acquisition/transmission
  - Natural disease course
    - Incubation
    - Signs and symptoms
    - Transmission
    - Recovery
  - Preventing transmission/infection control
  - Treatment
  - Vaccine/prophylaxis
- Operational planning and procedures
  - Clinical care guidelines
  - Crew composition and roles
  - Vehicle preparation
  - Special equipment
  - PPE
    - Selection
    - Donning
    - Doffing
  - Decontamination and disinfection procedures
  - Waste management
  - Partnership with receiving facilities
  - Postmission surveillance

Roles and responsibilities

- CHS/EMS
- National Coordinator Ambulance Call & Dispatch
- Regional Emergency Care Coordinator
- Medical Dispatcher
- Call Agent
- EMTs

- Transport team consists of 4 members: 2 primary health care workers (paramedic or critical care nurse), team leader, and EMS physician
  - HCW 1
    - Dons hands-free radio; footed impervious suit; hooded, powered, air-purifying respirator system; double gloves
    - Provides assessment and care for patient in the ambulance
    - Responsible for patient record
  - HCW 2
    - Don radio with hands-free communications, footed impervious suit, N-95 mask, eye protection, double gloves
    - Designated to drive the ambulance
    - If patient is nonambulatory, will don PPE ensemble that matches that of HCW 1 and assists with patient loading and care
  - Team leader
    - Operates the supervisory vehicle
    - Coordinates with supporting agencies
    - Serves as safety officer
    - Will don same PPE ensemble as HCW 2 and serve as ambulance operator if HCW 2 is needed for patient care
    - Standard uniform, radio and cell telephone communications, ready to don higher-level PPE if needed
  - EMS physician
    - Provides oversight of patient care
    - Manages clinical communications between transport teams and receiving facility
    - Provides contemporaneous clinical decisionmaking and direct medical control as necessary
    - May operate the supervisory vehicle if the team leader is redirected to drive the ambulance
    - Standard uniform, radio and cell telephone communications, ready to don higher-level PPE if needed

Medical Dispatch

- Headed by Regional EMS coordinator
- The tasks include:
  - Calling the referring clinician and/or patient contact person concerning the transfer
  - Triaging and determining the care needs of the patient
  - Selecting and notifying the EVD destination facility of choice
  - Selecting an appropriately skilled transfer team and ambulance
  - Obtaining updates on the patient's clinical status from the ambulance team while on-scene
  - Liaison between ambulance teams and the Regional EMS Coordinator or EMS specialist supervisors for medical support and other escalations
  - Updating the facility receiving team concerning the patient status and the expected time of arrival

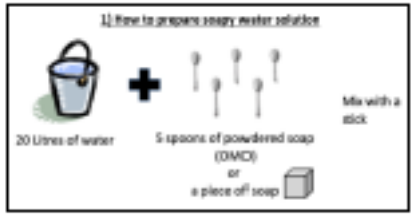
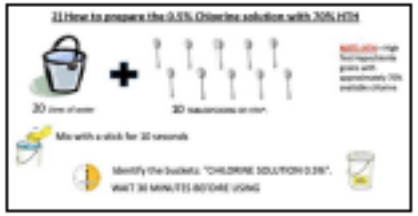
- All EVD alerts channeled through the alert mgt desk.
- Verified and validated EVD cases
- Regional EMS Coordinator dispatches for EVD response ambulances to evacuate high-risk contacts, suspects and confirmed cases from the community or facilities.

Vehicle Preparation

- Team medics learn to prepare the ambulance in advance to facilitate decontamination and disinfection after patient contact
- Separate the driver compartment from the passenger compartment such that the driver compartment is always considered clean.

Decontamination of ambulances – Ebola Virus Disease (EVD) job aide

Summary of the process for decontamination of ambulances used to transport patients with confirmed or suspected EVD to avoid the contamination of health workers, other patients and caregivers. This procedure should be performed after each patient transport.

Step 1: Prepare the team	• Ambulance crew OR Cleaning agent OR hygienist (ideally at least two individuals) and observer/supporter	
Step 2: Prepare equipment	**PPE for each hygienist:** • latex or nitrile gloves • thick rubber gloves/heavy duty gloves • protective goggles or face shield • medical masks • rubber boots • gown or coveralls • aprons • hair nets/head gear	**Cleaning and disinfection products:** • Signaling device for contaminated area (e.g.: easel floor signaling) • 4 plastic buckets: Bucket 1 (water + soap), bucket 2 (water), bucket 3 (chlorine 0.5%), bucket 4 (water) • Cleaning cloths and absorbent paper (e.g. paper towel) • Waste bags 50l (at least 4) • Plastic bag 100l (for linen, if any) (at least 2) • Plastic bag 100l for reusable PPE • 1 bin to collect waste • 1 bin to collect linen • 1 bin to collect reusable PPE • Hand hygiene resources (alcohol hand rub) • Mop with detachable and replaceable pads OR floor squeegee + cleaning cloth
Step 3: Prepare the ambulance	• Move the ambulance to ambulance washing area. Establish a secure perimeter for safety of the public and decontamination personnel. Install the signaling device to alert the disinfection procedure is ongoing. The driver's cabin should receive regular cleaning. There is no need to apply disinfectant.	
Step 4: Prepare chlorinated water and soapy water	• Lay out and organize all materials/equipment on plastic sheeting outside the ambulance and prepare the chlorinated water and soapy water solutions: Bucket 1 (water + soap), bucket 2 (water), bucket 3 (chlorine 0.5%), bucket 4 (water)  	
Step 6: Perform hand hygiene and put on PPE	• Perform hand hygiene. Put on PPE according to WHO procedure (gloves, goggles or face shield, face mask, coveralls or gowns, apron, rubber boots). Heavy rubber gloves should be worn over latex/nitrile gloves. Ask the observer to review if there are breaches in the PPE.	
Step 7: Identify waste collection area	• Identify the area for collection of waste and soiled linen outside the ambulance. One person should be outside the ambulance with the container open (bag or bin) to collect the waste and linen. This will be the clean outer container. A bin/bag to collect the contaminated PPE should be installed in this area	
Step 8: Remove contaminated waste	• Leave the rear doors of the ambulance open to allow proper ventilation • A person inside the ambulance carefully remove contaminated waste and put in the waste bag. • Carefully remove all the linen and put in the plastic bag. • Carefully transfer the bagged waste and linen to the outside bins. • Carefully inspect the inner part of the ambulance for organic material (blood or body fluids, e.g. vomiting) • Remove all the excess of organic material by using absorbent paper, handling with care to avoid splashes and making unidirectional movement to not disperse the organic material	
Step 9: Perform cleaning and disinfection (internal surfaces)	• Start the cleaning of the internal ambulance surfaces from the end to the front door and from the top to the bottom ○ Step 1: Clean with soap and water ○ Step 2: Disinfect with 0.5% chlorine ○ Step 3: After contact time (10 mins), remove chlorine residue with clean water	

Patient Preparation

If patient is ambulatory, he or she will be asked to wear impervious suit, surgical mask, and gloves if tolerated.

If patient is having large volumes of diarrhea, he o she will be asked to wear an adult undergarment.

If patient is nonambulatory, he or she will be shrouded in impervious sheet as tolerated, and surgical mask will be applied.

Health Care Worker PPE

- Personal protective equipment must be donned, in the presence of a trained observer, to protect the medic from exposure to blood or infectious bodily fluid.
- Include aerosol protection should an aerosol-producing procedure be required.
- A footed suit, gloves, and a hooded, powered, air-purifying respirator for eye and mucous membrane protection.
- Goggles and a surgical mask technically meet the requirement for mucous membrane protection from droplets and that the hooded, powered, air-purifying respirator was not strictly required.
- PPE should accommodate the condition of the patient, the anticipated mission requirements, and the work environment and be in concert with the requisite competencies to properly use the equipment

Work Practices

- Policies and procedures are implemented to prevent exposure to blood and infectious bodily fluids
- Patient contact is limited to the least number of persons required to provide care for the patient.
- This frees the treating medic to focus on patient assessment and adherence to sound infection control practice.
- Communications are facilitated by hands-free push-to-talk radios, which are worn inside the impervious suit, to protect against exposure to blood and bodily fluids.
- The transport team is careful to protect privileged health information

- Transport team consists of 4 members: 2 primary health care workers (paramedic or critical care nurse), team leader, and EMS physician
  - HCW 1
    - Dons hands-free radio; footed impervious suit; hooded, powered, air-purifying respirator system; double gloves
    - Provides assessment and care for patient in the ambulance
    - Responsible for patient record
  - HCW 2
    - Don radio with hands-free communications, footed impervious suit, N-95 mask, eye protection, double gloves
    - Designated to drive the ambulance
    - If patient is nonambulatory, will don PPE ensemble that matches that of HCW 1 and assists with patient loading and care
  - Team leader
    - Operates the supervisory vehicle
    - Coordinates with supporting agencies
    - Serves as safety officer
    - Will don same PPE ensemble as HCW 2 and serve as ambulance operator if HCW 2 is needed for patient care
    - Standard uniform, radio and cell telephone communications, ready to don higher-level PPE if needed
  - EMS physician
    - Provides oversight of patient care
    - Manages clinical communications between transport teams and receiving facility
    - Provides contemporaneous clinical decisionmaking and direct medical control as necessary
    - May operate the supervisory vehicle if the team leader is redirected to drive the ambulance
    - Standard uniform, radio and cell telephone communications, ready to don higher-level PPE if needed

The team leader and EMS physician support the mission by managing communications and logistics with involved agencies (which may include law enforcement, airport operations, public health, and emergency management), managing safety, and providing clinical decision-making and direct medical control when required.

Decontamination, Disinfection of the Ambulance, and Doffing of PPE

- Isolating the driver compartment and the application of impermeable barriers to keep interior surfaces of the ambulance clean facilitate decontamination and disinfection of the ambulance.
- All waste is double bagged and clearly marked a biohazard.
- The interior of the ambulance, the stretcher, any exposed equipment, and all exterior surfaces of the waste bags are disinfected
- Surfaces are disinfected by wiping; sprays are not used to avoid inadvertent splash or droplet generation and to prevent uncontrolled running of fluid into crevices.
- Special attention is given to ensuring the appropriate contact time for the selected disinfectant agent.
- To limit creation of multiple waste streams, all waste produced by the transport is managed by the hospital isolation unit

All doffing of PPE will be observed/supervised by personnel who have been similarly trained and have demonstrated competency in the procedure.

Any person physically assisting with doffing will be required to wear at a minimum footed impervious suit, surgical mask, eye protection, and double gloves.

If health care provider is in hooded, powered, air-purifying respirator and full impervious suit, assistant will wipe down all surfaces of the PPE ensemble with an EPA-registered hospital disinfectant, including external gloves.

Remove any stay-down tape.

Remove external gloves and discard.

Disinfect gloves with EPA-registered hospital disinfectant.

Remove protective suit, careful to not come in contact with any exterior surfaces.

Disinfect gloves with EPA-registered hospital disinfectant.

Remove eye and respiratory protection.

Disinfect gloves with EPA-registered hospital disinfectant.

Remove gloves and disinfect hands with an alcohol-based hand disinfectant.

Transport of Patients Under Investigation For Having EVD

- A person under investigation is an individual who develops signs and symptoms of illness and also has some epidemiologic risk of exposure to EVD in the preceding 21 days.

- Patient evaluation assists in selecting the appropriate procedures and PPE
  - Complemented by an assessment of the patient's clinical condition and the risk that the health care worker could be exposed to bodily fluids
    - "dry" patient - fever, no vomiting or diarrhea, and is lucid and conversational
    - "wet" patient - active vomiting and diarrhea; **a greater risk of transmission**

PPE should be selected according to known routes of transmission, condition of the patient, and operational requirements; for example, the PPE selected for protection against blood and bodily fluid exposure for a patient with fever only will likely be different than what is selected for the patient with uncontrolled vomiting and diarrhea.[15,21]

Travelers from Ebola-affected countries who develop generalized signs of illness are still more likely to have malaria, acute diarrheal illness, or other infectious disease than they are to have Ebola virus disease.[17]

Supervised/observed decontamination, disinfection, and doffing of PPE may help avoid breaches in infection control practice.

Conclusion

- EMS responders must be prepared to respond.
- Education and training are essential for effective standard and transmission-based infection control practice.
- The foundation of safe care for patients with confirmed or suspected EVD is effective IPC.
  - Not simply donning a particular PPE.
  - It requires implementation of: -
    - Administrative policies,
    - Work practices,
    - Environmental controls,
    - Focused education, training, and supervision