General Process Overview: Setting up an Ebola Treatment Centre (ETC)

Joint discussion with WCO/WR & MOH to brief on current situation and map out important local structures, community points of contact, etc.

WHO/MOH engagement & discussion with community leaders to gain acceptance and cooperation needed to carry out effective needs assessment.

Joint Needs Assessment (carried out by WHO/MOH with assistance from local community leaders)

Determine number of beds needed and size of ETCs (based on needs assessment, epi data, and other knowledge of the situation and local area/structure)

Map-based Site Scoping: Through discussion with MOH, identify possible suitable sites

Social mobilisation and messaging with community for acceptance of ETC

Physical Site Scoping and Ground Assessment: In-person visits to identified possible sites

Road access: flooding, security, ability to receive supply trucks, ambulance, etc.

Security assessment of site location

Contains existing water points

Close proximity to health facilities

Large, flat area that can be easily paved in short time frame

Potential ground preparation needed: Earth-exposed (to use gravel) or Green field (to be paved)
Key Considerations in ETC design & planning

- Site location & community acceptance
- Secure physical perimeter barrier (including guards)
- Flood lighting & generator maintenance
- Clear communication channels across site
- Staff security & safety protocols adhered to and strictly monitored

STAFF FLOW & PATIENT FLOW

External: Triage

- Green Zone
  - Patient Latrines & showers (separate for suspect & confirmed patients, and large enough for staff access if patient collapses)

- Yellow Zone
  - Low-risk area waste disposal/management and incineration

- Red Zone
  - High-risk area waste management & incineration

STAFF IPC SAFETY

- De-contamination (spray areas)
- “Cool Room” (air-conditioning in seated rest area) for cooling & hydration of staff that have just exited PPE
- Safe staff changing, shower, & rest areas
- Staff Latrines (separate from patient areas)

WATER

- Potable Water Storage/Management
- Water treated to 0.5% and 0.05% chlorine
- Reticulated supply to all areas & zones of the ETC (staff, suspect, and confirmed areas)

LABORATORY

- Laboratory location (ideally adjacent or within short drive from ETC)

DEAD BODIES: SAFE HANDLING/PREPARATION AND BURIAL/CREMATION

- Site location & community acceptance
- Secure physical perimeter barrier (including guards)
- Flood lighting & generator maintenance
- Clear communication channels across site
- Staff security & safety protocols adhered to and strictly monitored
Continued social mobilisation and community messaging throughout building process (as community fears, rumours, and Ebola stigma can affect building arrangements)

Contracting of local builders, building equipment & supplies

Site & planning agreement with MOH, other Ministries, and local community

Ensure supply line will be available for constructed site once completed; Ensure partner for staffing and management of ETC are identified (or begin discussion/identification process)

Begin construction

During Construction:

- Continued communication with MOH, other Ministries, local authorities and community throughout building process to ensure political, security, environmental, social, economic, etc. issues that might affect the construction are understood and addressed effectively.
- Procurement of supplies to be delivered in time for completion of construction
- Preparation of staffing and management partner (including training) /or continued partner identification process (if site does not yet have)

Construction completed

Opening of ETC (slowly making beds available in increments to ensure staff operational confidence and safety)
Setting up an Ebola Treatment Centre (ETC)

ETC requirements

ETCs design and planning follows the following principles:

- ETCs are best placed near existing health facilities to allow triage of Ebola and non-Ebola presentations more easily, and to allow those testing negative for Ebola to be admitted to the adjacent hospital.
- Laboratory access for Ebola testing is crucial for the functioning of ETCs. Ideally laboratories should be available adjacent or within a short drive from ETCs.
- ETCs are best placed in tented facilities, but occasionally facilities are found that are readily adapted to two separate and distinct wards (suspect and confirmed) as is the case in option 4 above.
- ETCs must have strict access control, triage and security.
- ETC staff and logistics areas must be separate from the patient areas.
- ETC infection control procedures must be of the highest standard, with the design and flow of staff and patients pre-designed to mitigate against contamination.
- Large volumes of water and waste must be managed on-site and with infection control principles applied strictly.
- Water treated to 0.5% and 0.05% Chlorine, and potable water in large volumes must be available, with an estimated daily consumption of at least 20,000 Litres. (stored on site and delivered by either mains or truck).
- Latrines must be separate for suspect and confirmed and completely separate from staff latrines. They should be large enough to allow access for staff in case of collapse by patients.
- Waste management from suspect area, confirmed area and all discarded PPE and other contaminated material must be incinerated on site in the “high risk” area. Sharps management must be as per WHO standard. (high temperature incineration)
- Separate low risk waste management must occur in the low risk area.
- Staff ratios and numbers are very large, and staff must be afforded safe changing and rest areas, and where relevant (eg remote or rural sites) safe accommodation and food etc.
- Staff should have access to a “cool room”, providing air-conditioning in a seated rest area, for use and reserved for those who have just exited PPE and require cooling and hydration.
Ideal ETU sites are located close to health facilities, provide a large flat area that can be easily paved in 2-3 days, and contain existing water points.
Use of gravel to prepare the ground for ETU construction on earth-exposed areas
### Key areas and facilities required: **High Risk Area**

- 4 Patient ward areas in large Mass Storage Unit (MSU) tents of either 24 x 10 or 32 x 10 metres. Concrete floor with basic drainage to outside spoon drains. Each ward will start with no more than 25 patients and expand to higher numbers if considered safe.
  - Simple stretchers, mattresses etc will be procured through WHO and partners
- Separate ward and open areas for both suspect and confirmed patients must be provided, with flow of staff in the direction from suspect to confirmed, never reversed. All waste and other materials must move in this same direction.
- Separate latrines, showers, laundry and rest/recreation areas are required in both suspect and confirmed areas, without cross-over of patients.
- It is recommended a convalescent area in a separate tent, beyond the confirmed area is established for those patients who are recovering from Ebola but who have not yet received negative test results (i.e. are still infective).
- A high risk incinerator is required within the confirmed area, as well as capability to burn sharps to required heat
- A Morgue or body holding tent is required, as well as body preparation and bagging area and possibly a cool storage area while awaiting transfer to the crematorium or for burial depending on access and location.
- Visitor areas are required separated at least 2 metres from the perimeter fence to prevent accidental exposure of the public/visitors, for both suspect and confirmed patient areas.

### Key areas and facilities required: **Low risk area**

- Spraying of shoes on entry and exit, as well as security control is required at the main entrance to the site through the low risk area.
- Major facility tents (or other temporary structures) required:
  - Male changing room
  - Female changing room
  - PPE donning room
  - Entry point and final check area before entry to suspect area
  - Exit point and spraying area on exit from confirmed side
  - PPE removal area, inspection staff area and safe disposal of PPE into infected waste zone.
  - Staff toilets and showers, male and female
  - Staff cooling room in air-conditioning if possible, with cool fluids/ORS etc. available (demountable building)
  - Office and administration area (demountable building)
  - Staff outdoor rest area
  - Laundry for staff uniforms (ideally two washers two dryers)
  - Kitchen area
- Food storage
- General and heavy logistics storage
- PPE and consumables storage
- Pharmacy storage
  - Fuel and generator area (with enough power for flood lighting, patient area lighting, air-conditioning and machinery/pumps and appliances).
  - Water storage and ready access to either mains or trucked supply.
    - 10,000 Litre fresh water tank
    - 4 x 5,000 Litre tanks
      - 2 x 0.5% Chlorine
      - 2 x 0.05% Chlorine
    - Reticulated supply of fresh, 0.5% and 0.05% to at least 3 sites across area (low risk, and high risk suspect and confirmed areas)
    - Reticulated supply of fresh water to shower areas on site (staff, suspect and confirmed)
  - Incinerator and garbage disposal area for low risk waste
  - Optional staff sleeping areas
  - Optional staff training areas/meeting room

**Key areas and facilities required: External areas**

- Triage manned 24/7
- Vehicle and ambulance spraying area
- Family psycho-social tented area for interview, support and education on home cleaning, including giving of equipment and PPE for this task.
- Side entrance for confirmed patients acceptance direct into confirmed zone
- Rear exit from morgue area
- External perimeter guards
- Vehicles for use by staff and for logistics etc
ETC design and clear delineation of Green and Red zone dramatically decreases the risk of infection to Health staff. The design allows staff entering to work to be in a safe “green zone” which is kept secure from the general public and from patients. They dress to scrub suits in gender specific change areas before attending briefings and/or teaching sessions etc and getting dressed in their PPE using a buddy system and using mirrors and other tools to ensure correct PPE donning. Staff flow is from suspect to confirmed areas to ensure less cross contamination between patients. On finishing a rotation staff doff in the specifically designed PPE removal areas with close supervision by the spray team. All contaminated single use PPE is left within the red zone bins while reusable equipment is placed in buckets of chlorine, boots are dipped and hands are washed.

Red zone waste must remain and be destroyed within the red zone including all unused food and materials that have had patient contact are not amenable to cleaning. Green zone waste is generally managed in the green zone or nearby. The emergency response requires extraordinary measures, including burning of all waste, but a transition to more environmentally acceptable practices is encouraged over time. This may include high rather than low temperature incineration and the use of autoclave/shredder systems for the destruction of high volume plastic waste. Test systems will be placed in country with the assistance of UN agencies (UNDP) and if found suitable will be rolled out across multiple sites.

Infection control procedures and significant breaches will be investigated with assistance by the WHO ETC/RRT coordination team. This team will also provide clinical and other practical advice and assistance on frequent site visits and on request by the RRT.
ETU infection control procedures must be of the highest standard, with the design and flow of staff and patients pre-designed to mitigate against contamination.

Water treated to 0.5% and 0.05% Chlorine

LOGISTICS: Supplies used in an ETC

WHO Essential Medicines and Health Products Department: [http://www.who.int/medical_devices/meddev_ebola/en/]
**Staffing requirements for 100 bed facility**

- Managerial staff with austere medical deployment experience and camp management skills. Experience with strict Infection control procedures is required within the management team, or can be requested through WHO for technical IPC support. Suggested senior staff include overall team leader, clinical lead, nursing lead, logistics and WASH lead plus external liaison below. WHO liaison and technical expert staff on secondment should contribute to the management team. It is strongly suggested a partnership arrangement is established with MoH for the provision of local medical and nursing staff/hygienists to work as part of the deployed team.

- Liaison and point of contact for external relations and in particular for linkage with other medical teams, WHO and Ministry of Health representatives and staff co-deployed.

- Clinical team (for 24 hour cover) with mixture of national (MoH) and international staff
  - Nurses and or paramedics to at least 50.
  - Hygienists and nurses aids to at least 50.
  - Doctors at least 10.

- Support staff (at least 100) as follows
  - Logistics supervisors
  - Water and sanitation
  - Power and fuel management
  - Camp waste team (including trained team for body prep and bagging for collection)
  - Sprayers and clean-up crews
  - Cooks
  - Laundry and cleaners
  - Security guards
  - Drivers
# How does a Rapid Response Team (RRT) fit into the structure of an ETC?

<table>
<thead>
<tr>
<th>Services provided</th>
<th>Ebola Treatment Centre (ETC)</th>
<th>Rapid Response Team</th>
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<tbody>
<tr>
<td></td>
<td>In-patient care providing:</td>
<td>RRT to lead and ensure all services are provided to safety standards for both staff and patients in the ETC.</td>
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<tr>
<td></td>
<td>- Intravenous and/or oral rehydration therapy.</td>
<td><strong>WHO Guidelines &amp; electronic links:</strong></td>
</tr>
</tbody>
</table>
|                   | - Strict infection control measures. | 3. Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings, with Focus on Ebola - [http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1](http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1)
|                   | - Proper waste disposal. | 5. Ebola and Marburg virus disease epidemics: preparedness, alert, control and evaluation – Interim manual version 1.2 - [http://apps.who.int/iris/bitstream/10665/130160/1/WHO_HSE_PED_CED_2014.05_eng.pdf?ua=1&ua=1&ua=1](http://apps.who.int/iris/bitstream/10665/130160/1/WHO_HSE_PED_CED_2014.05_eng.pdf?ua=1&ua=1&ua=1)
|                   | - Handling of dead bodies. | |

## Staffing

<table>
<thead>
<tr>
<th>Medical staff required (comprised of FMT International staff and National staff)</th>
<th>Average total of 200-250 staff per 100 bed ETC</th>
<th>Suggested that at least 10% of total ETC clinical staff are provided by RRT (estimated minimum of 10-15 nurses + 3-5 doctors)</th>
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<tbody>
<tr>
<td>Minimum 1 Nurse/Paramedic per patient bed</td>
<td><strong>International RRT of at least 25 personnel is best:</strong></td>
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<tr>
<td><strong>Designated Leadership Positions (5)</strong></td>
<td>Team Leader, deputy team leader and leaders of medical, nursing and logistics</td>
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<tr>
<td>Role</td>
<td>Requirements</td>
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<td><strong>Infection Control</strong></td>
<td>Equipment to ensure hygiene and infection control, Personal Protective Equipment (PPE), and extensive supplies of such equipment for several months of activity.</td>
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<tr>
<td><strong>Logistics &amp; Equipment</strong></td>
<td>Medical supplies and consumables required to run an inpatient facility with case load can be delivered through logistics support (eg UNMEER) if required and articulated by RRT.</td>
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<tr>
<td><strong>Nurses (and or paramedics) (10-20)</strong></td>
<td>- Experience in emergency and/or critical care, with ability to insert peripheral intra-venous catheters. At least two should be experts in infection control measures. At least one per shift should have experience in paediatric practice.</td>
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<tr>
<td><strong>Doctors (3-5)</strong></td>
<td>- Expertise in infectious disease management, acute/critical care, emergency medicine or similar. Ideally several will have specific tropical medicine experience and all should be clinically current to practice and of senior or specialist level.</td>
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<tr>
<td><strong>Logistics, Water &amp; Sanitation, and Security (3-5)</strong></td>
<td>Technical experts in logistics, water and sanitation in field hospitals to lead national staff, and oversee and ensure</td>
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<td>- The final set-up of ETC, and water, sanitation, &amp; power to the unit.</td>
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<td>- The security of the ETC (to ensure red and green zones are controlled and theft is discouraged).</td>
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**Minimum 1 Doctor per ten Nurses.**

For example: 100 bed ETC = 100 Nurses/Paramedics/Hygienists & 10 Doctors

**Logistic support staff**

(over 100 national staff, led by FMT technical experts in logistics, water and sanitation in field hospitals)

- Cleaners
- Sprayers
- Security
- Drivers
- Laundry
- Cooks
- Etc…

**Other roles required:**

- Infection control
- Psychological support
- Community liaison (5)
- Etc…

- Team competent in PPE and infectious control measures appropriate for the ETC as per published WHO standard, for the duration of deployment.
- Specialised water & sanitation support for the treatment/isolation unit.
- Ambulance capacity or through national providers.
- Safe dead body handling protocol must be adhered to.
**Laboratory Support**

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<tr>
<th>Support</th>
<th>Details</th>
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<tr>
<td><strong>supportive clinical care of severe gastro intestinal infection and fluid losses. This will be provided for the responding FMT by Donor Government and UN partners to ensure smooth functioning of the facility.</strong></td>
<td>quality standards and drug donation guidelines.</td>
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<tr>
<td>Each ETC has an identified laboratory designated to provide Ebola testing services to the ETC as required. These laboratories are in separate locations from the ETC itself.</td>
<td>Laboratory- point of care and rapid testing for electrolytes, Malaria etc. (Ebola testing done by specialised labs and is not the responsibility of the RRT).</td>
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