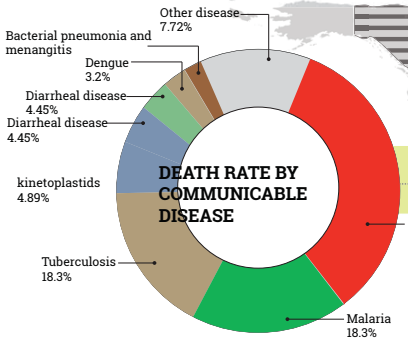
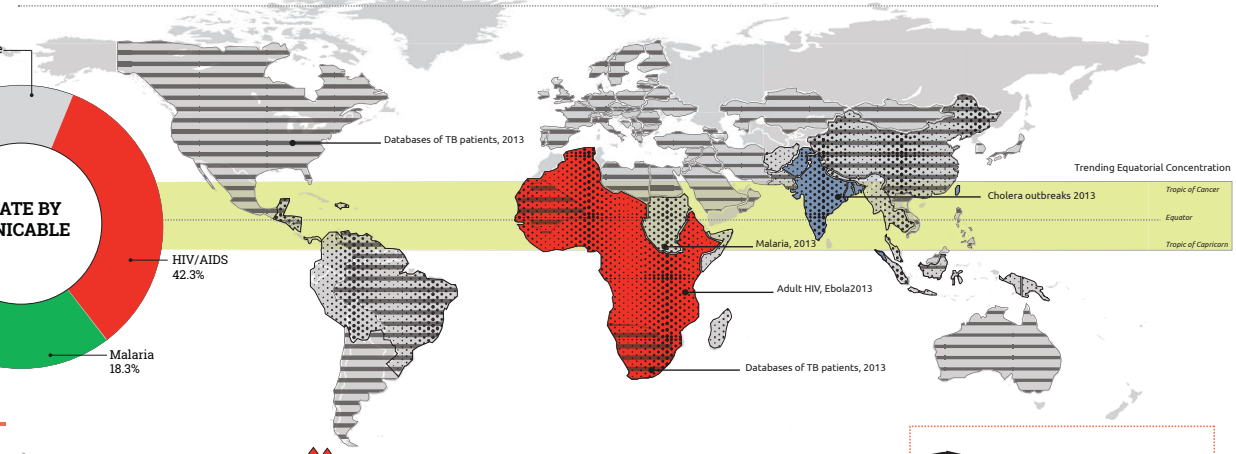
Within the Communicable Disease Context





Combative Design Strategies

WATERBORNE DISEASE

Communicable disease:
typhoid fever, cholera, leptospirosis, hepatitis A, and Diarrhoeal

Source:
Water pollution especially after natural disaster

Prevention:
Safe water, sanitation,
Surveillance/early warning system
Immunization

Built environment:
Site planning, Storm-water and sewage management, Water treatment system.

AIRBORNE DISEASE

Communicable disease:
Anthrax, Chickenpox, Influenza, Measles, Smallpox, Cryptococcosis, and Tuberculosis, Acute respiratory infections

Source:
Transmitted from person to person

Prevention:
Washing hands, using appropriate hand disinfection, getting regular immunizations against diseases believed to be locally present, wearing a respirator

Built environment:
Negative pressure isolation room, curtains as physical barriers against transmission of disease in multiple beds.

BODY FLUID

Communicable disease
HIV, EBOLA

Source:
close contact with the blood, secretions, organs or other bodily fluids of infected animals such as chimpanzees, gorillas, fruit bats, monkeys

Prevention:
hand hygiene, respiratory hygiene, use of personal protective equipment (to block splashes or other contact with infected materials), safe injection practices and safe burial practices.

Built environment:
Unidirectional flow of the caregiver, self decontaminating surfaces, wash station, negative pressure isolation room, de-gowning area.

VECTOR-BORN

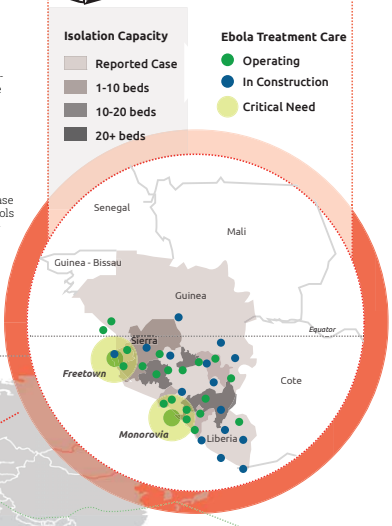
Communicable disease
Malaria, Dengue

Source:
Floods may indirectly lead to an increase in vector-borne diseases through the expansion in the number and range of vector habitats

Prevention:
Insecticides, Early detection,Free medical care

Built environment:
Protected sleeping area (bed nets), insecticides indoor environment, waste management decrease the risk of vectors breeding, sited adjacent to pools and wetlands are more susceptible to mosquito-borne disease.

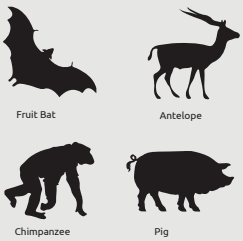
Location & Response

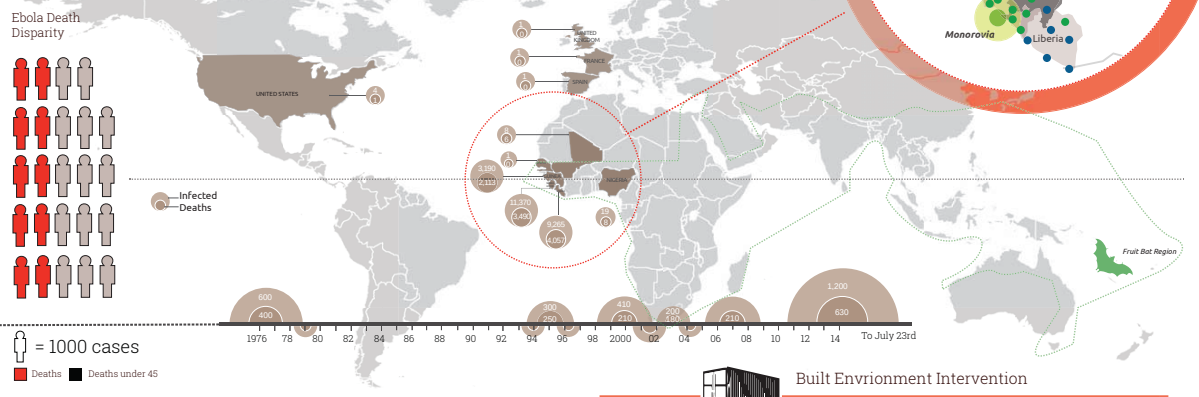


Understanding Ebola Outbreak

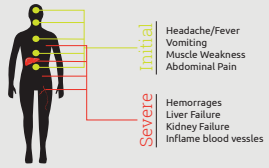
Origins

It is thought that fruit bats of the Pteropodidae family are natural Ebola virus hosts. Ebola is introduced into the human population through close contact with the blood, secretions, organs or other bodily fluids of infected animals.



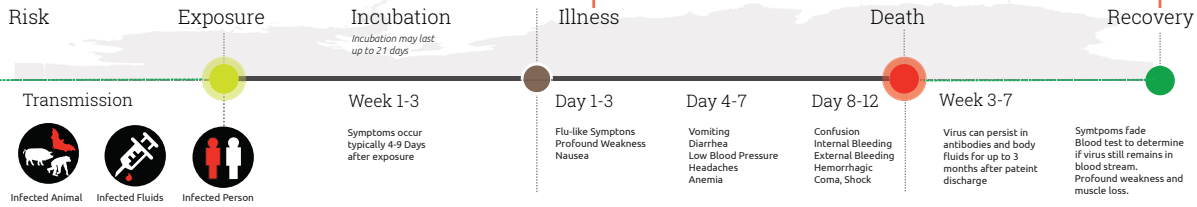


Symptoms



Recovery from Ebola depends on good supportive care and the patient's immune response. The following basic interventions, when used early, can significantly improve the chances of survival:

Built Envrionment Intervention



Sustainably Designing for Survival Outcome

Education & Outreach

Raising awareness of risk factors for Ebola infection and protective measures that individuals can take is an effective way to reduce human transmission. Risk reduction messaging should focus on several factors:

Reducing Transmission Risk

Wildlife-to-human

Human-to-human

Early Identification

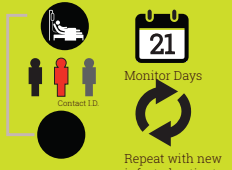
Good outbreak control relies on applying a package of interventions, namely case management, surveillance and contact tracing, a good laboratory service, safe burials and social mobilisation.

Reducing Transmission Risk

Outbreak containment measures

Contact Tracing

Finding everyoen who has come in direct contact with a sick Ebola patient. Contacts are watched for signs of illness for 21 days from contact with affected Ebola patient.



Treatment & Management

Create environments to manage sympotoms and support immunity, as well as implement preemptive measures for prevention.Early supportive care with rehydration, symptomatic treatment improves survival.

Sustainable Implementation

Design spaces that deliver dignity, improve health and well-being, and have the greatest positive impact in the communities they serve.

A Maximized Process

Vernacular Response

Community Service

Construction Process

Economic Educational Environmental

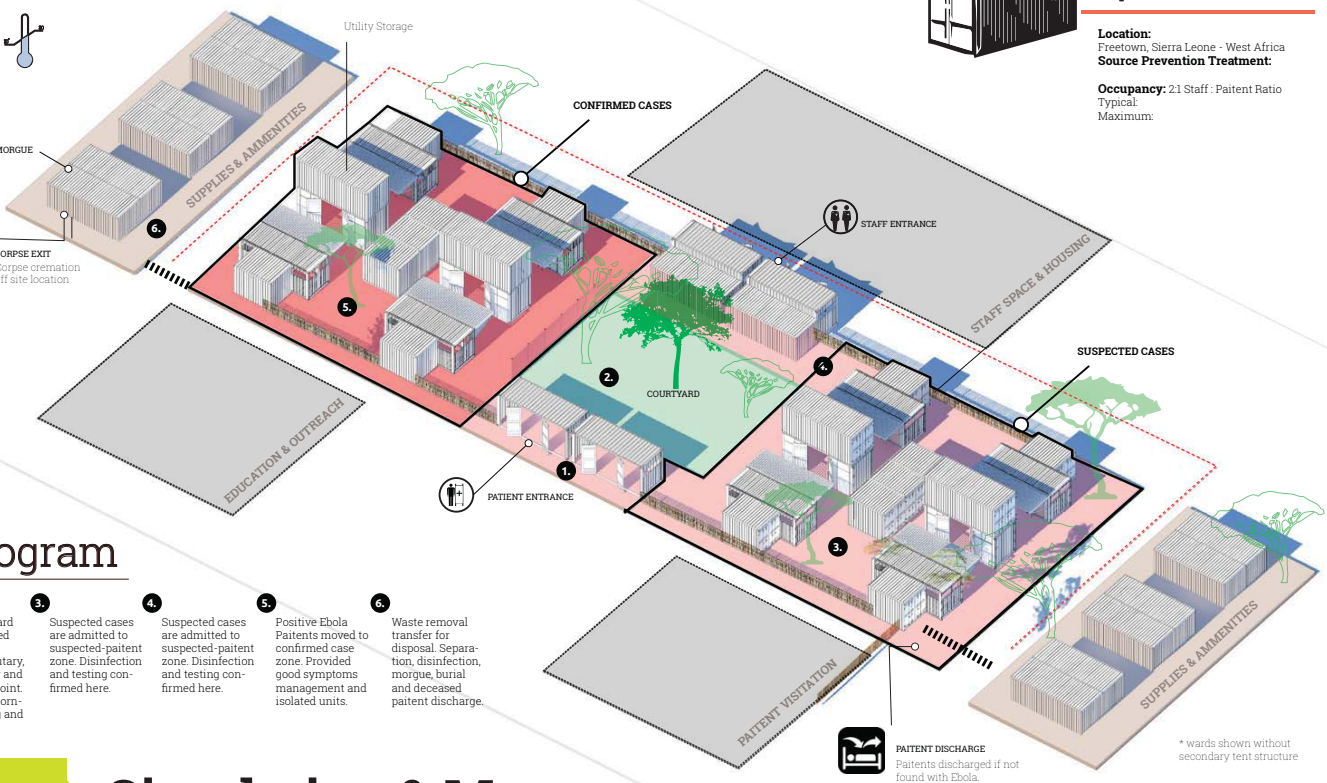
A Village Assembly

Sustainable Roots, Adaptive Response, Effective Treatment,

Arid zone
Hot and humid

Arid zone: 750mm of rain in a single short rainy season and 90 Days of Growing Period (DGP) with an extended dry season of up to 10 months

The Guinea or derived savannah zone has an annual rainfall of between 1500mm and 1800mm divided into two seasons which alternate with two dry seasons.



* wards shown without secondary tent structure

Implementation Profile

Location:
Freetown, Sierra Leone - West Africa
Source Prevention Treatment:

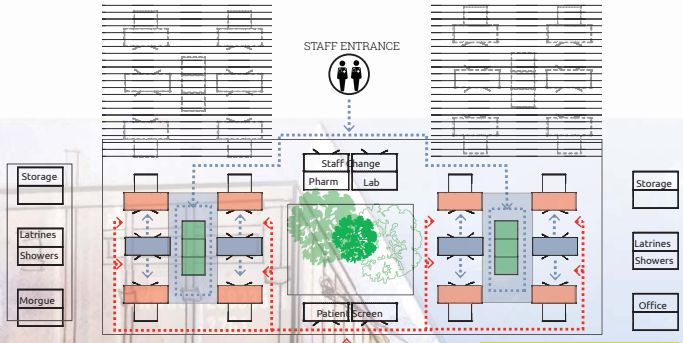
Occupancy: 2:1 Staff : Paitent Ratio
Typical:
Maximum:

Spatial Program

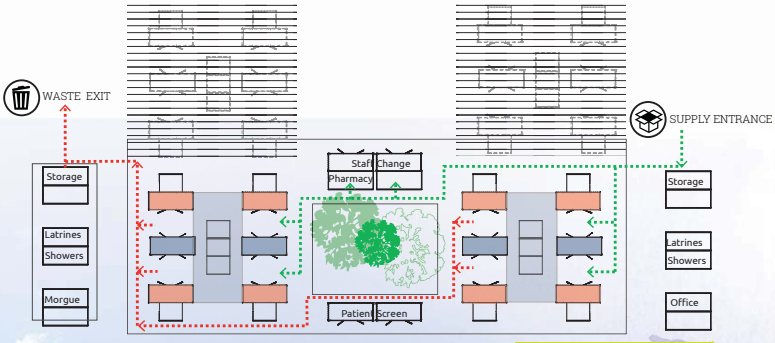
1. Potential paitents are screened and triaged. Separation, changing and disinfection between low and high risk zones.
2. Open Courtyard space provided for staff and paitent sancutary, zoning buffer and visual focal point. A place for morning gathering and prayer.
3. Suspected cases are admitted to suspected-paitent zone. Disinfection and testing confirmed here.
4. Suspected cases are admitted to suspected-paitent zone. Disinfection and testing confirmed here.
5. Positive Ebola Paitents moved to confirmed case zone. Provided good symptoms management and isolated units.
6. Waste removal transfer for disposal. Separation, disinfection, morgue, burial and deceased paitent discharge.

Circulation & Movement

Paitent, Staff, Waste Management and Environmental Systems

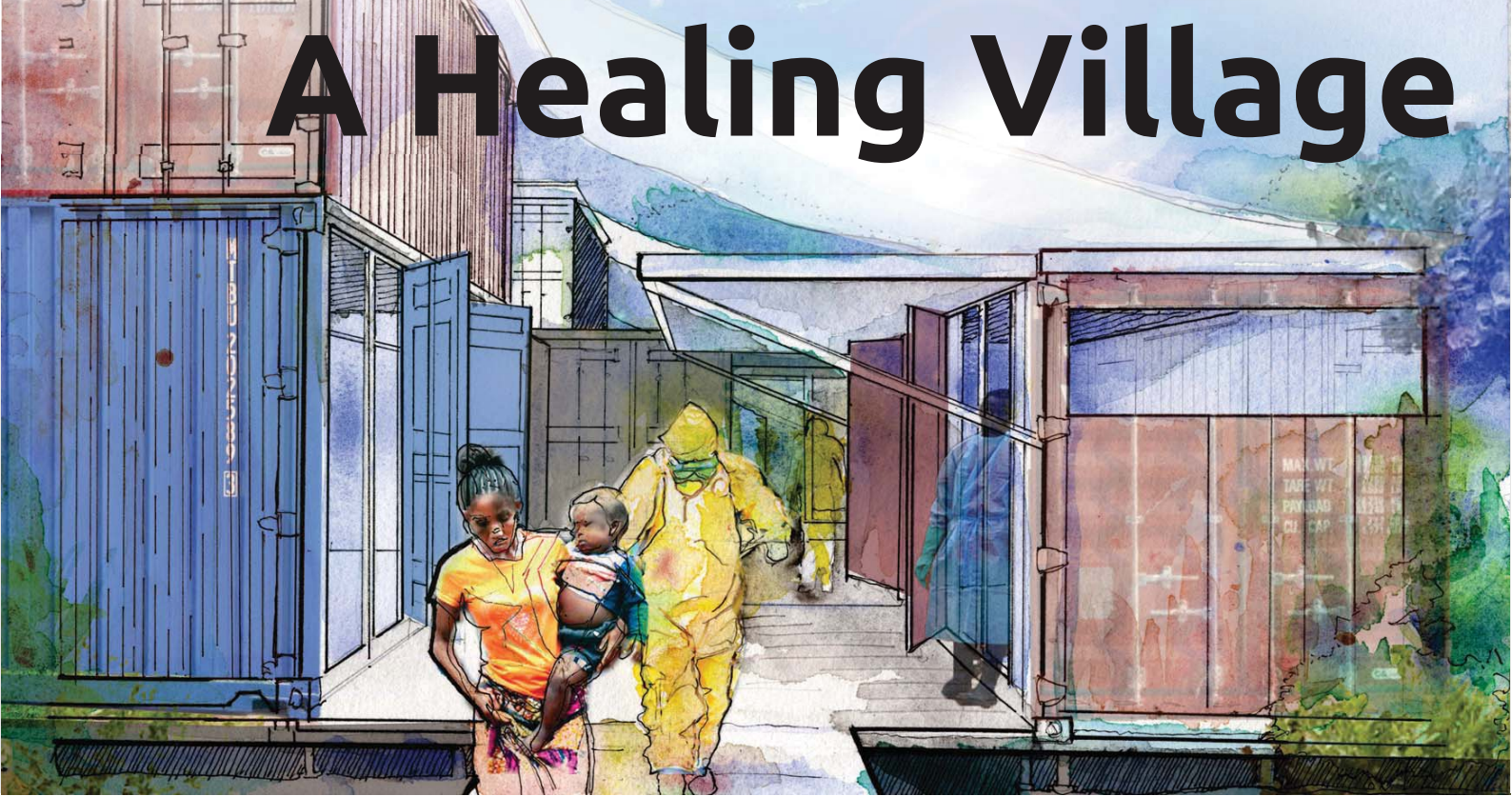


People



Materials

A Healing Village



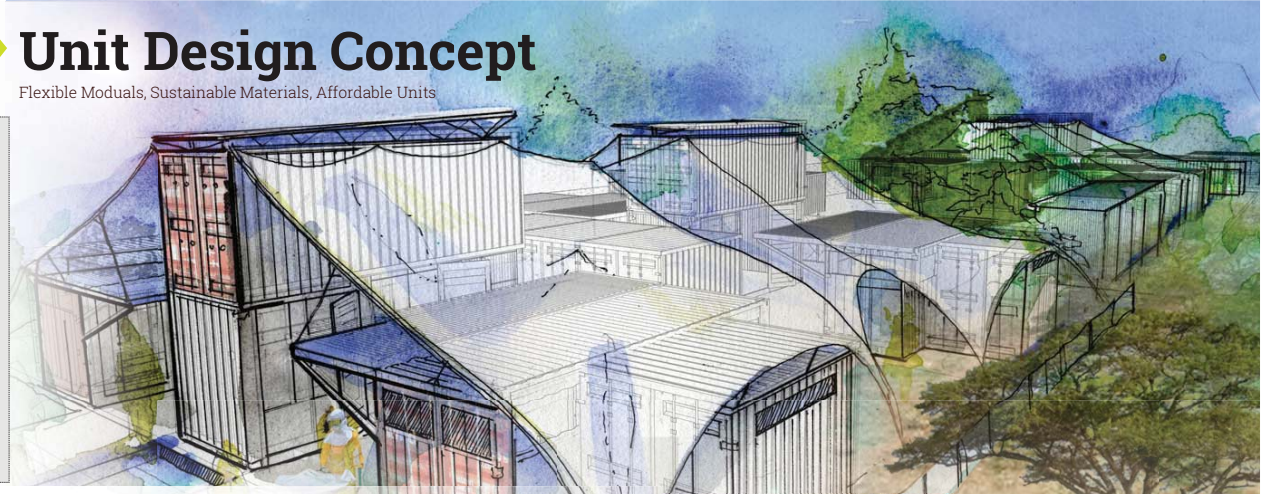
Unit Design Concept

Flexible Moduals, Sustainable Materials, Affordable Units

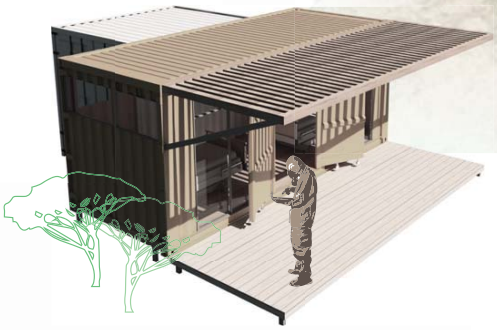
'Cargo-tecture'

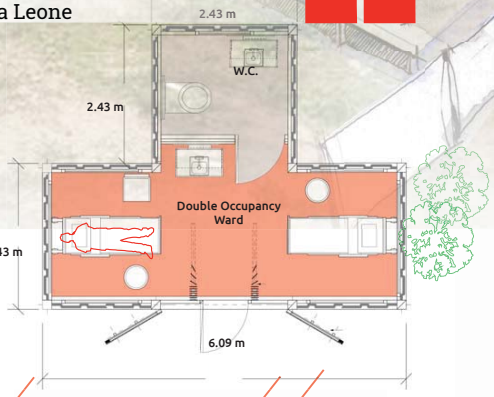
The use of shipping containers as architecture provides a sustainable response through:

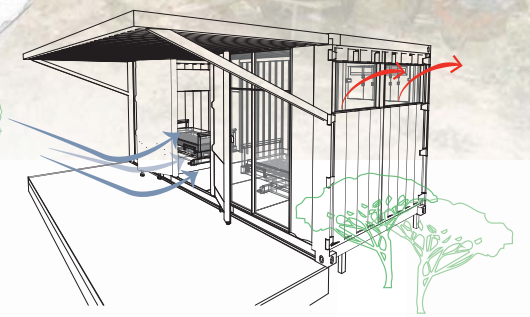
Easy Transport
Abundant Availability
Prefabrication
Modular Size
Inherent Structure
Storage Capacity
Minimal Labor
Relative Low Cost
Eco-friendly

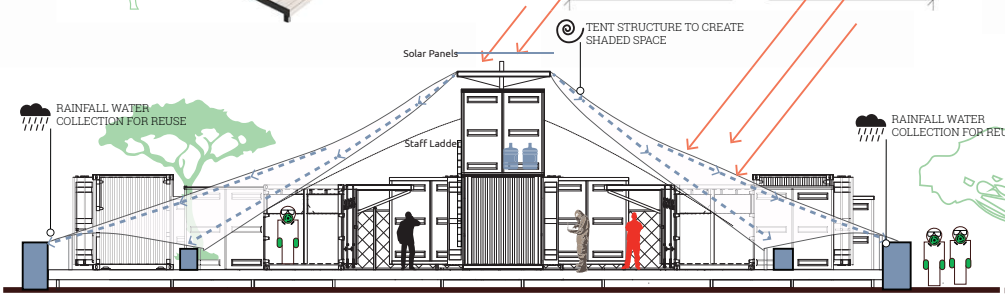


> You have to change their mindset and encourage people by telling them: you may not die here - **you may live.**
>
> - Ibrahima Kemokai, Healthcare Worker Sierra Leone



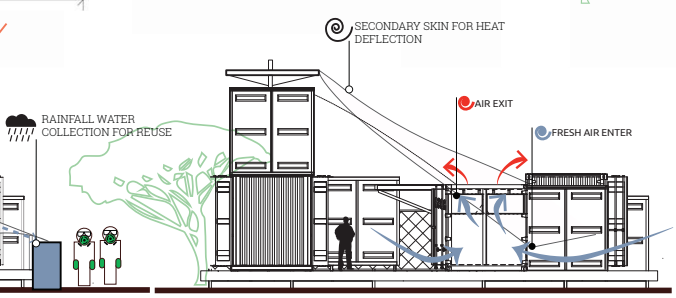






Elements

Stilted Platforms for Varying Topography & Waste Management

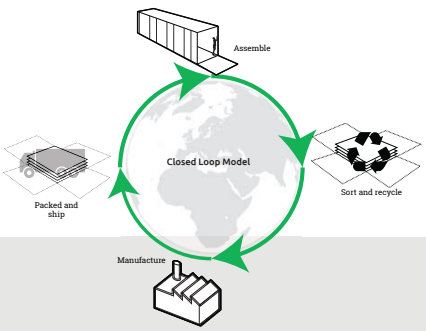


Ventilation

PATIENT UNIT VENTILATION

Mobile Isolation Unit

Concept for Ebola Epidemic



Rapid Deployment

Quick Response, Multi-transit, Flexible Solution

Military Plane

Both 20- and 40-foot containers can be placed onboard C-17 Globemaster III and C-5 Galaxy aircraft.High-wing, 4-engine, T-tailed military-transport aircraft, can carry large equipment, supplies and troops directly to small airfields.

Cargo Ships

They are a common means of commercial intermodal freight transport and now carry most seagoing non-bulk cargo. Container ship capacity is measured in twenty-foot equivalent units. Feeder or World-wide foreign-going vessels carry 10,000 containers

Land Trucks

Intermodual units seamlessly fit on the back of flat bed trucks, some of which utilize cranes to hoist and move containers on site. Carrying capacity per truck is up to 40' long containers (2 paitent units).

Helicoptors

Sky cranes provide flexible staging options to hoist and transport individual shipping containers to remote site locations. They are ideal at providing palettes and supplies to rural areas.

Site Construction

Flexible staging and packable, deployable rafters to elevate shiping containers above uneven topography. On site construction with moduals that easily pack inside shipping containers.

Sources

1-WHO | Global Health Observatory | Map Gallery (WHO | Global Health Observatory | Map Gallery)
2- Ebola virus disease (WHO)
3- Designing an Ebola Treatment Unit, and Other Industry News (Work Design Magazine)
4- http://www.hksinc.com/wp-content/uploads/Concept-Brief-An-Improved-Approach-to-Infection-Control.pdf
5- Ching, W. H., Leung, M. K. H., Leung, D. Y. C., Li, Y., & Yuen, P. L. (2008). Reducing risk of airborne transmitted infection in hospitals by use of hospital curtains. Indoor and Built Environment, 17(3), 252-259.
6- World Health Organization. (2014). 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.