

Air Ambulance Transportation of Contagious Pathogens

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Overview

What are we going to talk about?

- General Principles
- Logistical & Operational considerations
- Guidelines & Risk Assessment
- Portable Medical Isolation Units
- Aeromedical Biological Containment Systems
- Ground Transport
- Closure: Executing the mission

IN THE EVENT OF ZOMBIE ATTACK 3 STEPS TO SURVIVING INFESTATION

1. Avoidance
2. Termination
3. Disposal

1. AVOIDANCE

At zombie infestations, survival is the primary objective. The officer's first duty is to verify the area and proceed immediately to an authorized Rescue Station. Once authorized Z.E.R.O. personnel will manage relocation - but, the key to an effective evacuation is COMPLETE AVOIDANCE OF UNAUTHORIZED CONTACT WITH ANY ZOMBIES.

EVACUATE Gather family and essential small valuables only. DO NOT attempt to secure or defend property or possessions.

RELOCATE Proceed immediately to the Rescue Station assigned to your area. In the absence of Z.E.R.O. Relocation Management personnel, receive local radio instructions for direction.

DO NOT ENGAGE! It is critical to remember that any zombies encountered during relocation are NOT friendly or harmless but REANIMATED CORPSES INFECTED WITH A DEADLY CONTAGION. Under NO circumstances should you engage with in any form of interaction. Contact is transmitted via bite, and ANY interaction with a zombie results in repeated attempts to bite.

IN THE EVENT OF A BITE. Apply pressure to the wound with padding found in the supplied kit. DO NOT wash or irrigate. If the individual survives, medical attention can be assessed. If the individual survives, IMMEDIATELY inform nearby units. VACATE THE PREMISES IMMEDIATELY or evacuate guidelines found in next section.

2. TERMINATION

Engage this step only if in an unsecured location, and ONLY if you have positively identified a zombie by using the Zombie Classification Cards (zombie). Observe any requirements should be referred to and executed by a duly authorized member of Z.E.R.O. or your local law enforcement partner.

CEREBRAL NEUTRALIZATION The ONLY proven method for effectively terminating a zombie, either by cerebral penetration or blunt force trauma (A, B, C).

CENTER MASS For stopping or slowing down target ONLY when distance does not permit a head shot. NOT an effective termination method.

LOWER EXTREMITIES For stopping or slowing down target ONLY when distance does not permit a head shot. NOT an effective termination method.

3. DISPOSAL

After terminating the zombie(s), mark the perimeter to enable Z.E.R.O. Disposal Unit personnel to locate the remains and ship to a Mobile Acid Chlorination (M.A.C.) unit for decontamination. This can be completed in two simple "Tape & Tag" steps.

"TAPE & TAG"

1. Mark area surrounding the remains with an appropriate length of CAUTION ZOMBIE CONTAMINATION ZONE tape (included).
2. Attach a FORM 280 tag (included) to the top of the corpse.

DO NOT INCINERATE! Incineration releases airborne toxins which spread infection to the uninfected deceased or in areas of heavy humidity or precipitation, the nearby natural ecosystem. This opportunity removes infection levels.

What are we *really* going to talk about today?



Principles

People movement

- Why even transport a patient with a HCP?
 - Significant improvements in outcome with better medical care
 - Vast difference in case fatality rates
 - 1967 Marburg outbreak – 21%
 - Organisations have a Duty-of-Care towards their staff
- Understand pathogenesis & clinical progression
- Local, Regional & International movement
- Multi-Disciplinary support, collaboration & co-operation



Figure 4. Medical evacuations and repatriations due to infection by or exposure to Ebola virus, as of 24 June 2015



General considerations

Context: 2014 West Africa Ebola Outbreak

Things *have* improved somewhat

- Many Aircraft operators and Air Ambulance providers initially decided not to fly to countries with ongoing outbreaks of Ebola.
- Numerous countries refused entry of passengers from Ebola affected countries.
- Commercial airline transportation options out of Ebola affected countries were extremely limited.

NEWS

Ebola: SA issues travel ban

21 August 2014 16:21

Tweet 1

Cabinet has issued a travel ban for non-South Africans from countries that have cases of Ebola, says Health Minister Aaron Motsoaledi.

Reality

- Since the Ebola outbreak, it is now more complicated to move people with non-Ebola illnesses across international borders for treatment.
- Anyone who appears ill or is febrile may be placed in isolation and quarantined with Ebola patients.
- Several non-Ebola cases (Malaria, Gastroenteritis, Appendicitis) have been refused entry or denied receiving care in European & African countries



Operational & Logistic Considerations

- Authorisation of Health & Aviation Authorities is required
- Acceptance by authorities and adequate receiving facility can be difficult (or impossible) to achieve.
- Availability of isolation equipment/appropriate infection control and trained medical team is required – a limited resource.
 - Part 138 (SA-CAA) operator with capability
- Landing approvals from the country concerned and over flight clearances from any country enroute can be challenging to secure.



Operational & Logistic Considerations

- Countries with Ebola cases involving their own citizens are generally more likely to favourably consider such requests.
- Willingness to accept patients of other nationalities is limited.
- Requirements from Authorities may not necessarily reflect scientific/medical fact – there *are* other issues to consider.

Preparedness 101: Zombie Apocalypse

Categories: General

May 16th, 2011 11:48 am ET - Ali S. Khan



There are all kinds of emergencies out there that we can prepare for. Take a zombie apocalypse for example. That's right, I said z-o-m-b-i-e a-p-o-c-a-l-y-p-s-e. You may laugh now, but when it happens you'll be happy you read this, and hey, maybe you'll even learn a thing or two about how to prepare for a *real* emergency.



Guidelines & Risk Assessment

CDC & ECDC

ECDC TECHNICAL REPORT

Assessing and planning medical evacuation flights to Europe for patients with Ebola virus disease and people exposed to Ebola virus

21 October 2014

Link – <http://www.cdc.gov/vhf/ebola/exposure/monitoring-and-movement-of-persons-with-exposure.html>

Interim U.S. Guidance for Monitoring and Movement of Persons with Potential Ebola Virus Exposure

Updated: December 24, 2014



Guidelines & Risk Assessment

Key Points - CDC

- Exposure Category
 - High Risk
 - Some Risk
 - Low (but not zero) Risk
 - No Identifiable Risk
- Clinical Criteria
 - Symptomatic vs Asymptomatic
- Public Health Actions & Movement Recommendations
 - Consideration of all of the above to formulate appropriate solution
 - Some examples...



Charter flight – Healthy persons



Charter Flight – Exposed persons



Portable Medical Isolation Units

- Origins - Air Transport Isolator, RAF
- SARS 2003
- 2015 – numerous PMIU's available
- Need bigger than a PMIU? ABCS / TIS – but more about that later...

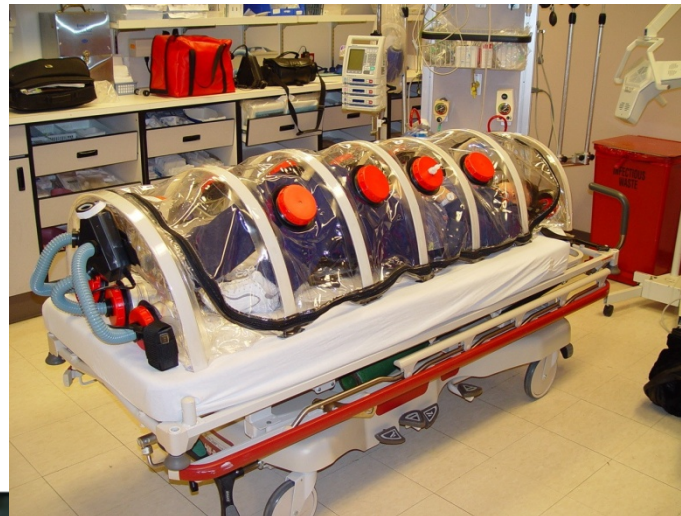


<http://www.raf.mod.uk/PMRAFNS/organisation/airtransportisolator.cfm>

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Portable Medical Isolation Units

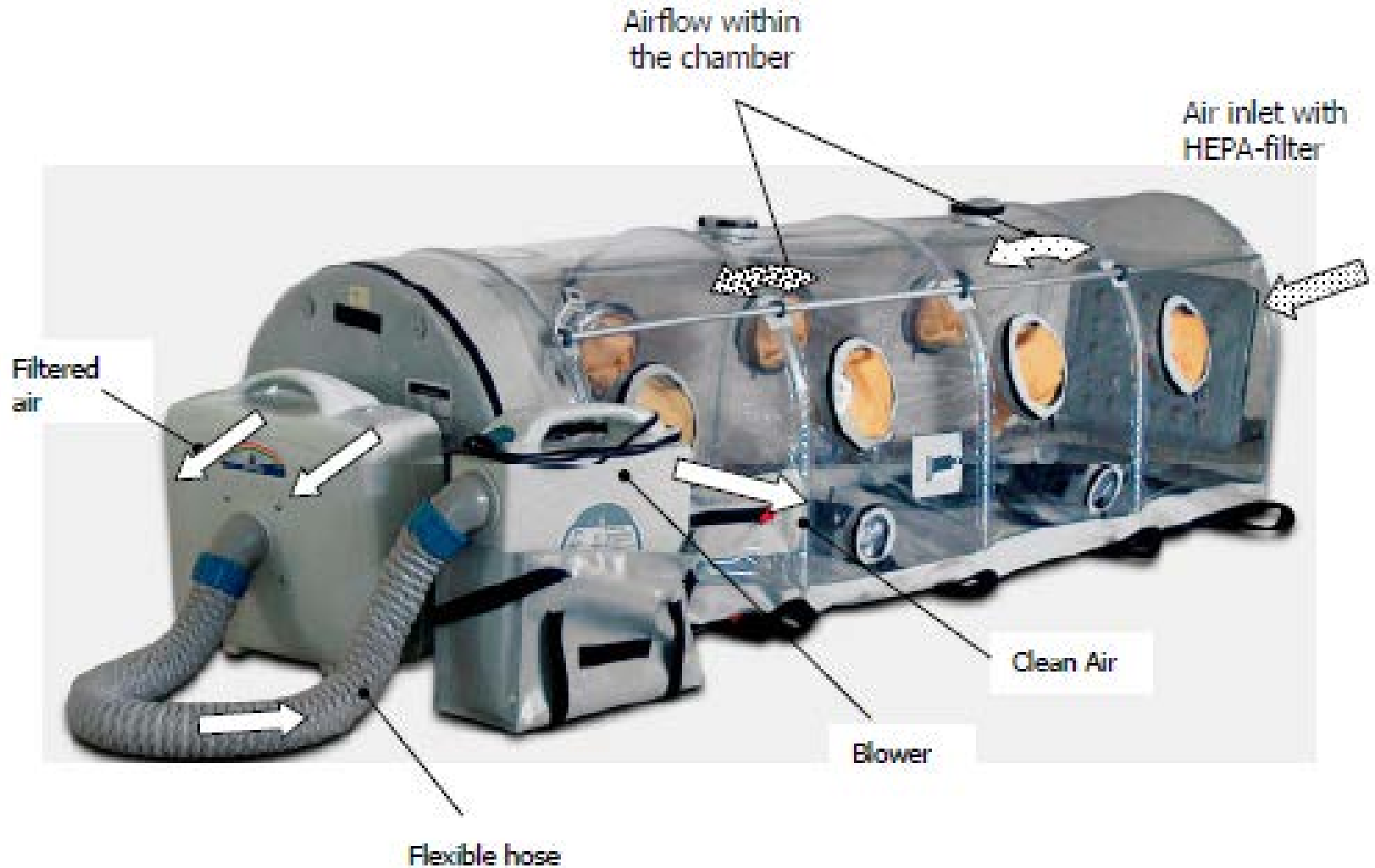


Isolation Unit



Portable Medical Isolation Units

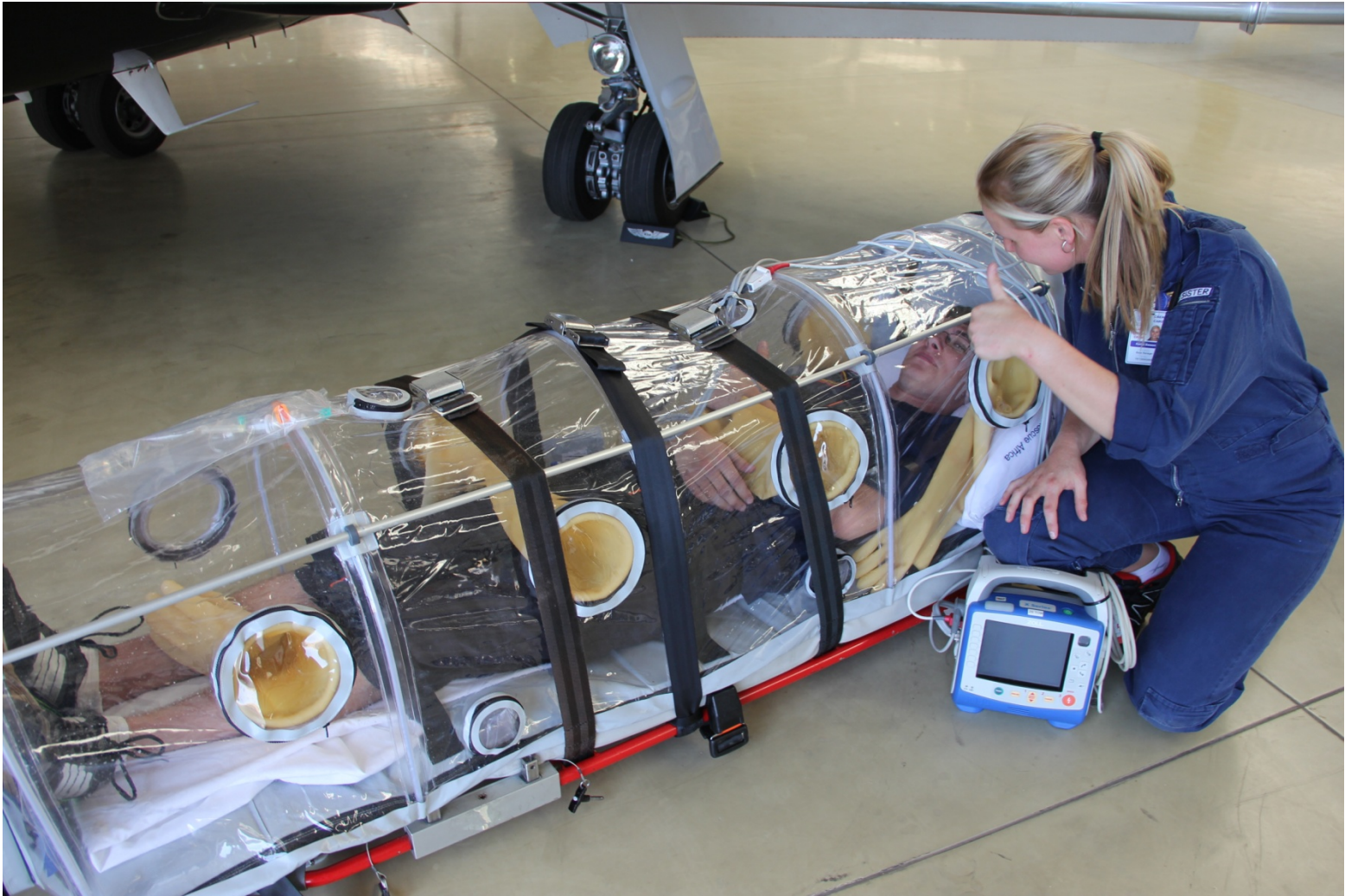
IsoArk N 36-4: Portable negative pressure isolation chamber



Beth-El Zikhron Yaaqov Industries. 2010. Technical Manual: IsoArk N 36-4

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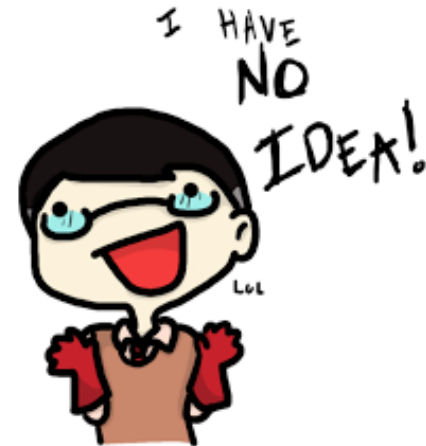




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Portable Medical Isolation Units

What can be done? What can't be done?



- When to consider using the isolation unit?
 - Risk Assessment & Evaluation
- Particle Filter:
 - 0.3 μ m
 - $\geq 99.9995\%$
- Ventilated, unstable patients, secretions and fluids, or predicted deterioration
- Claustrophobic, uncooperative patients
- Patient counselling essential
- If you open the unit...

Portable Medical Isolation Units

There's a lot more to it than just the PMIU



Decontamination & Cleaning



Aeromedical Biological Containment System



<http://www.abc.net.au/news/2014-08-03/capsule-used-to-transport-patients-infected-with-ebola-virus/5644112>

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Aeromedical Biological Containment System



http://en.wikipedia.org/wiki/Aeromedical_Biological_Containment_System

<http://www.theatlantic.com/technology/archive/2014/08/this-jet-was-transformed-into-an-ebola-quarantine-unit/375584/>

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Ground transportation



<http://www.theguardian.com/society/2014/oct/28/uk-can-defend-against-ebola-locally> (image: A-M Sanderson)

<http://www.ems1.com/ebola/articles/1962467-How-Grady-EMS-managed-2-Ebola-patient-transport/>

(Image: Brady EMS)

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Executing the mission

Things to think about

- Risk Assessment
- Guidelines
- Logistic & Operational considerations
- Available equipment/resources
- Available Staff – skillset, experience & willingness
- High-level command & control with comprehensive oversight
- Well planned & tightly controlled communications
 - Internal & External



Absolute Clarity & Transparency

What you can/will or can't/won't do



Thank you

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