

An overview of aeromedical evacuation of patients with high consequence infectious disease

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Air Transportable Isolator (ATI)



Overview

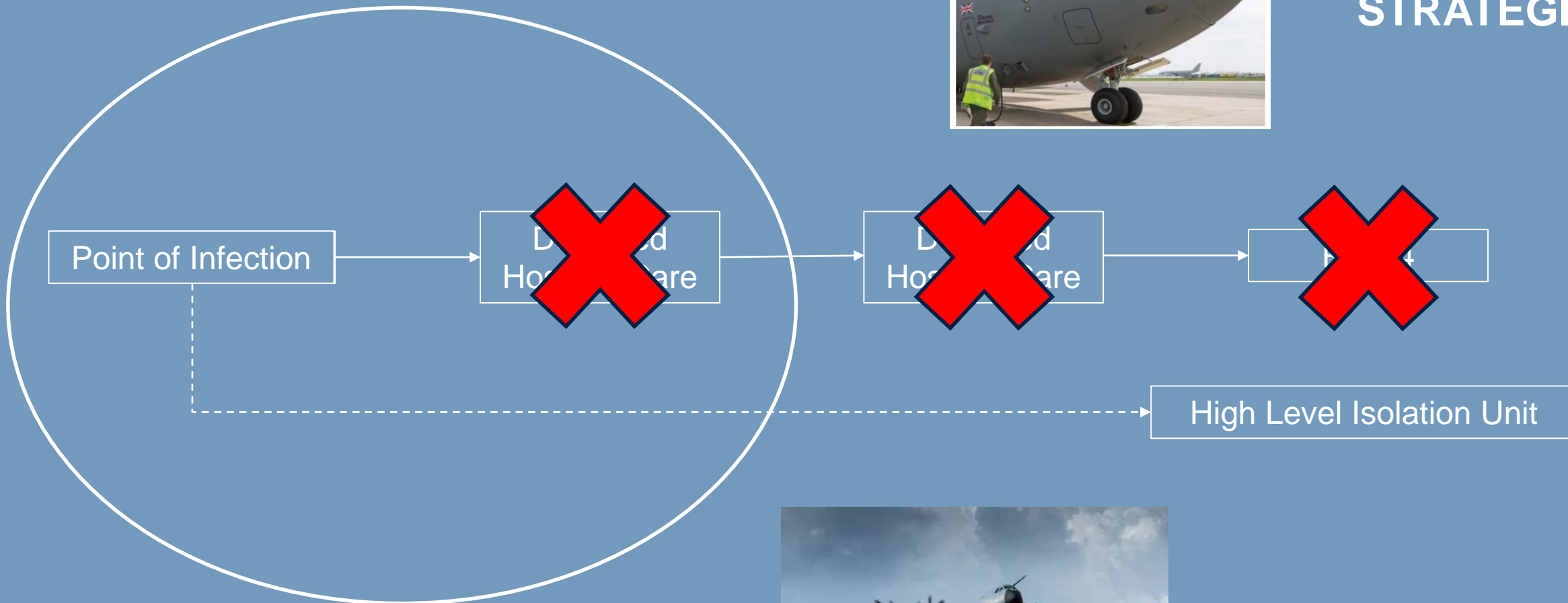
- Conceptual Framework for HCID AE
- The question
- Methodology
- Results
- Impact and lessons from COVID-19

Operational Patient Care Pathway (OPCP)

[JSP 950 Ed 2: Operational Patient Care Pathway \(publishing.service.gov.uk\)](http://publishing.service.gov.uk)



STRATEGIC



TACTICAL



QUESTION

Can we deliver the seamless, safe, high quality transfer of a patient with a high consequence infectious disease from point of infection to high level isolation unit?



Issues:

Aircraft type

Disease type

Clinical condition



Method

Identify the issues/gaps in current capability.

Undertake review of options to fill gaps/address requirements.

What options are available for:

- Tactical moves using ground/maritime/rotary assets?
- Respiratory pathogens?
- Significantly unwell patient?

Assessment Process:

1. Contact key suppliers and other military partners.
2. Review options – including documents, commercial websites, media reports, hands-on where possible
3. Assess options – pros/cons

Strategic



AIR MOBILITY COMMAND



[Transport Isolation System \(TIS\) > Air Mobility Command > Display \(af.mil\)](https://www.af.mil/Display)

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Overview of Strategic Options

Pros	Cons
Good quality patient care	Expensive
More than one patient moved	Resource intensive
	Large size
	Care givers in PPE



CONTAGIOUS DISEASE TRANSPORT

Phoenix Air is currently the only company in the world with the capability to transport patients with a Highly Infectious Disease in an ICU environment and as such, has become the go-to resource for the U.S. Government and World Health Organization (WHO) to perform these missions. A cooperative effort between the CDC, the Department of Defense and Phoenix Air in 2007 led to the development of the ABCS (Airborne Biological Containment System), a single patient, negative pressure isolation unit, designed and certified to be used in our G-III aircraft. The ABCS unit was used successfully during the Ebola outbreak of 2014-2015 to transport 41 patients without incident to hospitals in the U.S. and Europe.

This led to the development of a multi patient transport unit, the CBCS (Containerized Biological Containment System), which has the capacity to transport four highly contagious patients in an ICU environment. The size of the CBCS requires it to be flown inside a B747-400 cargo aircraft. Training exercises are conducted several times annually, flying multiple aircraft to Africa, to maintain the high level of skills required to perform these missions. The Contagious Disease program is operated under a multi-year contract with the U.S. Department of State (DOS).



Overview of Airborne Biological Containment System

Pros	Cons
Reasonable quality care	Expensive
Tactical & Strategic elements	Resource intensive
	Care givers in PPE
	Transfer of patient

Transfers of care

- High risk – taking someone out of the isolator, or putting them into an isolator
- Aim should be to minimise transfers between transport modalities and make them as efficient as possible.

Tactical



[IsoArk portable systems \(beind.com\)](http://beind.com)



[Product – EpiGuard](#)



[Securotec | Child Pic - Portable Isolation Chamber](#)



[Company specialized in high biocontainment Biosafety level 4 \(bioisolation.co.uk\)](http://bioisolation.co.uk)



[IC2Feeniks Tuote Infectiouspatientisol ationPod.pdf](#)



[Home - Isovac Products](#)

Overview of Tactical Options

Pros	Cons
Small size	Cramped
Cheap	Poor quality care
Small team	Transfer of patient
No requirement for team in PPE	
Tested on various airframes	

Summary

- No single piece of equipment could provide seamless PoI to HLIU transfer.
- Advantages/disadvantages to all solutions
- Cost versus utility important consideration

From the Ministry of Defence : Repatriation flight from Wuhan in China lands at RAF Brize Norton

February 11, 2020 defenseadmin 0

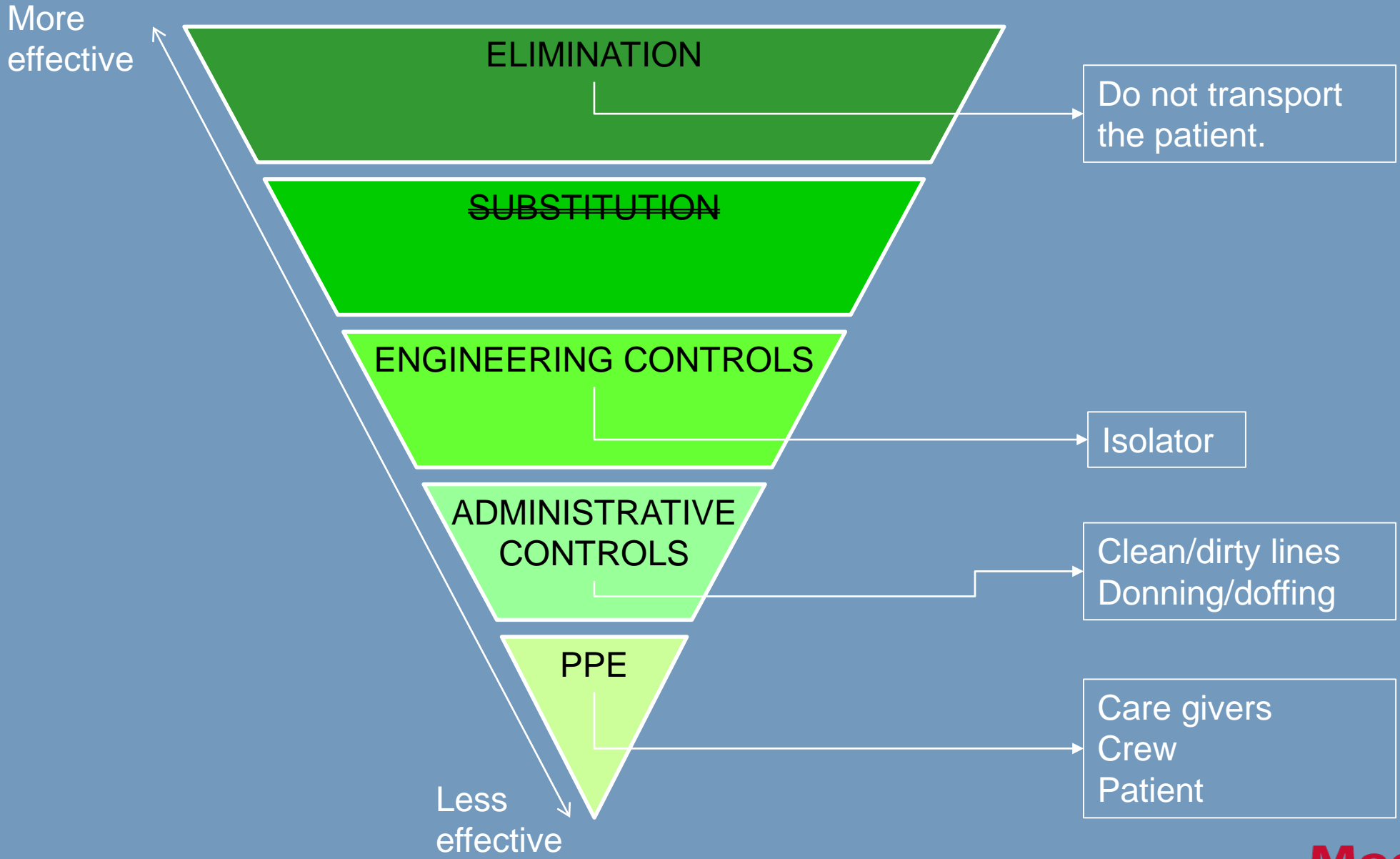


On Sunday the 9th of February 2020, various personnel including medical staff from the UK's National Health Service (NHS) and Royal Air Force (RAF) were recovered from Wuhan, China. Also on the Wamos Air 747 were personnel from other nations such as France, Italy and Denmark. Many on board were women and children.

COVID-19

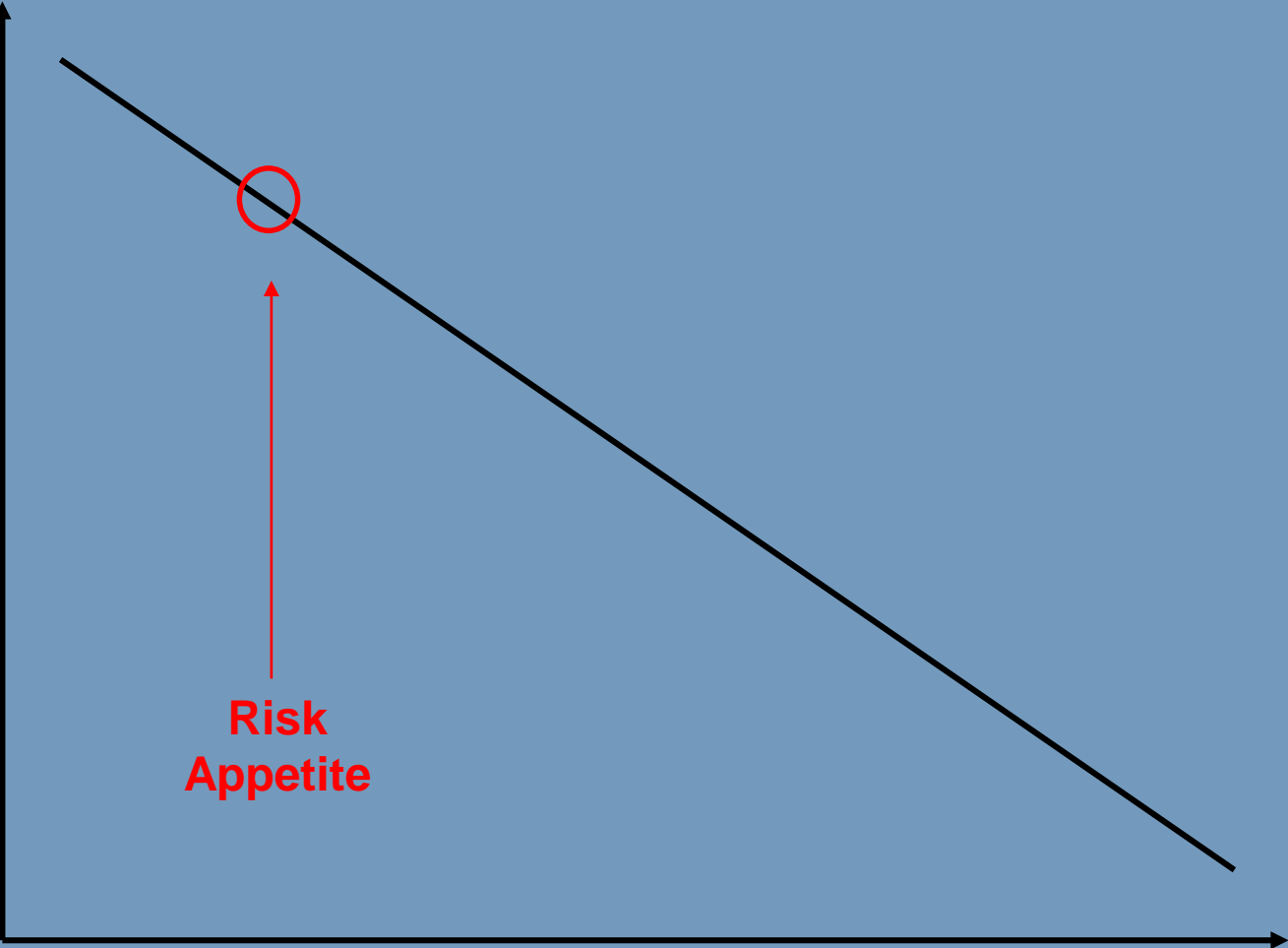
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Applying the hierarchy of controls to HCID AE



Balance between quality of care and control measures

Quality of patient care



Increased controls

Intellectual Property

Public Health Specialists

Aeromedical Evacuation Specialists

Capability ≠ Kit

Infection prevention and control specialists

Infectious disease specialists

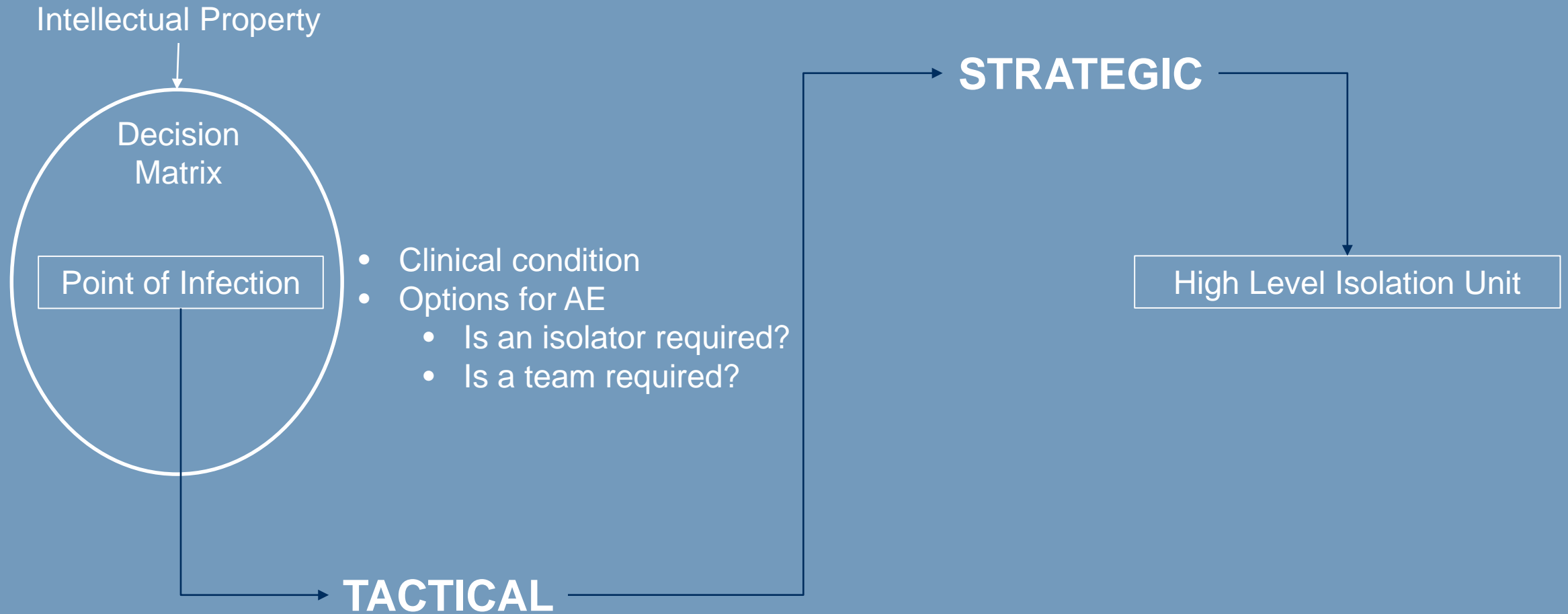


Command and Control



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RAF Aircraft Adapted For Medical Use in Record Time

A Royal Air Force transport aircraft has been adapted to carry medical patients in record time and at no cost.

In just two months two BAe146 Mk.3 aircraft operated by 32 (The Royal) Squadron at [RAF Northolt](#) have been adapted to transport critically ill patients and RAF medical staff for the first time.



RAF Helicopters Support Scottish Ambulance Service Trials

[RAF Puma](#) helicopters based at Kinloss Barracks in Moray have been supporting the Scottish Ambulance Service with the trials of the EpiShuttle medical isolation and transportation system as part of the Scottish Government's coronavirus response.

[Mobility Airmen Conduct First Transport Isolation System Medevac Mission > U.S. Department of Defense > Defense Department News](#)

Summary

- There are a wide range of options for isolators – however none deliver seamless, high quality aeromedical evacuation.
- Isolators are not the answer – consider intellectual property and organisation as more important.
- One solution does not fit every circumstance – aim to maximise patient care whilst minimising risk to care givers, passengers and vehicle.
- The COVID-19 pandemic offered the opportunity for rapid innovation and experimentation as well as the experience of moving patients with a respiratory pathogen.

Further work

- Defence and Security Accelerator (DASA) Market Capability Report in 2021 – identified a range of options for isolators.
- RAF refining National requirements with wider Government partners.
- NATO Nations:
 - Aim to set up an HCID AE Working Panel to better understand National capabilities and coordinate standards.
 - Please contact me if interested – dhsc.epi1@coemed.org