Highly infectious diseases pose a threat to global health, be it SARS, MERS, Ebola, or other or infectious disease of public health concern. Further, the ongoing threat of antibiotic-resistant infections continues to challenge modern health care, and the global problem of multi-resistant tuberculosis is increasing.

Adequate preparedness for biological incidents is a demanding task for health care services. Personnel must be protected, and environmental contamination avoided. Pre-hospital transportation of infectious patients is particularly challenging, and the barrier protecting healthcare workers, may increase.

We have developed the patient transport isolator EpiShuttle®, with a unique design that provides access to the patient for intensive care treatment and emergency procedures, including intubation and insertion of central venous catheters. It is compatible with most mechanical ventilator circuits, and offers easy communication and patient comfort. It can be safely decontaminated after use. In negative-pressure mode, it provides environmental protection from particulate cross-contamination of highly infectious diseases. In positive pressure mode, the isolator protects immune compromised patients, or protects from hazardous environmental agents through the use of CBRN filters. To be released in 2017, it will be compatible with transport in ambulances, medium & large-sized helicopters as well as most aircrafts.

Description of the device

The base has several functions integrated:
1. Integrated stretcher and mattress with adjustable backrest and knee angle
2. Safety belts: Quick release upper torso hip restraint, chest strap, and upper/lower leg strap
3. Alumium support frame, 6 tracks and carrying handles
4. Air ventilation and filter system
5. Air inlet filters
6. Wire port manifold for IV lines, monitoring cables and similar equipment
7. Ventilator port: Generic port for all types of mechanical ventilator circuits
8. Quick looks ensuring the heading to the door

The hardtop has 8 operator ports for gloves, waste bag or sluice bag configurations.
- Above the half patient area, and on the roof.
- Above the half medical port for the patient (from outside to the isolator)
- Above the half medical port for the patient equipment (from inside to the isolator)
- More low ports to allow access to the patient equipment from outside the isolator

Medical ports

The two medical ports are located at the head end of the EpiShuttle base. These ports can be equipped with a medical wire membrane for IV lines, monitoring cables, or oxygen lines.

The ventilator port

The ventilator sleeve is a flexible and transparent hose for the delivery of mechanical ventilator bypass. The sleeve comes with the length, width and access to the ventilation circuit via the clean side and the unfiltered side. The patient can be fully ventilated in either mode. TheEpiShuttle is compatible with all types of mechanical ventilator circuits.

Air ventilation and filter system

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Operator ports

The operator ports are designed in a unique manner. They are curved and can be equipped with a medical wire membrane for IV lines, monitoring cables, or oxygen lines.

The wire port

The medical wire membrane is made of a highly flexible rubber material, permitting a passage of IV lines, monitoring cables, or oxygen lines.

The air ventilation system generates more than 15 air exchanges per hour to ensure maximum patient comfort and safety.

Specifications

Technical data:
- Patient dimensions: L 570 mm, W 1010 mm, H 1010 mm
- Weight: 13 kg

Power source:
- Rechargeable Li-ion battery 14.4V 2.6 Ah, CE1024
- Motor unit: CleanAIR® Chemical 2F

Air system:
- Blower and CleanAIR® Chemical 2F Power source: Rechargeable Li-ion battery 14.4V 2.6 Ah, CE1024
- Air exchange: More than 15 air exchanges per hour
- Operating: Positive pressure: min 15 Pa relative
- Operating: Negative pressure: min 15 Pa relative

Access ports:
- Operator ports: 8 ports for gloves, waste bag or sluice bag configuration
- Patient retention/safety belts: Quick release upper torso, hip restraint, chest strap, and upper/lower leg strap
- Wire ports: Membrane inlet for IV lines, monitoring cables and similar equipment

EpiShuttle® is a registered product owned by EpiGuard (www.epiguard.com). EpiGuard is owned by Oslo University Hospital/Inven2, five innovators, Elkor Design and Hansen Protection. The project is funded by The Norwegian Research Council, Helge Sørlie Innovation funding, and Innovation Norway.