The transport of patients harboring highly hazardous communicable diseases (HHCDs), as well those under investigation for high-risk exposures to these diseases, is a unique, challenging, and high-risk process. It is unlikely that a patient will initially present at a facility equipped with biocontainment and high-level containment care (HLCC) capabilities; instead, these patients are likely to require ground and/or air transport to a designated HLCC facility. Distinct from the stability of a clinical arena that offers advanced equipment, staffing teams, and specialized infrastructure, the transportation of patients infected with an HHCD in an aircraft or ground vehicle is conducted in a risky and fluctuating environment. A successful transport relies on extensive coordination and preplanning among a multitude of agencies (e.g., public health, law enforcement, transport agencies) and institutions (e.g., referring and receiving facilities); depending on the situation, participating groups can span local, state, federal, and international levels and may cross both geographical and political boundaries.

As an unpredictable environment, HHCD transport demands strict adherence to infection control principles, clear lines of communication, well-defined operational and tactical command, and the ability to ad-
just accordingly when necessary. Transportation of an HHCD patient should be well exercised, where possible, to ensure that proper protocols, procedures, and transportation routes are in place. Designated, trained transport teams with proven competence in infection control and patient loading and offloading procedures, as well as the necessary skill sets (e.g., medical, security, command, emergency response), increase the likelihood of a safe and successful transport and improve decision-making capacities during patient management en route. The appropriate selection and use of personal protective equipment (PPE) during the journey should be predetermined by expert risk assessment and thoroughly exercised. Waste disposal and vehicle decontamination following all phases of transport should be considered and discussed by appropriate parties. Monitoring of the patient transport team for signs of exposure and infection should be discussed in advance with the team; transport organization; and federal, state, and local health officials. A successfully executed HHCD patient transport will, of course, move the patient safely to their destination; however, it should also safeguard the workers conducting the transport, and in so doing safeguard the communities involved and minimize both the actual and perceived disruption to the public.

Ground Transport

Ground transport of patients with HHCDs requires highly detailed, planned protocols and involves coordination of multiple personnel and agencies. Procedures might encompass interfacility ground transport, airport-to-medical-facility transit, and movement from entry to patient placement within the medical facility. The entities involved in such transport might include the receiving medical facility, the referring medical facility, EMS services, aircraft transport teams, airport authorities, state and local health departments, state patrol and local police departments, the Federal Bureau of Investigation, the US State Department, county emergency management agencies, and the receiving medical facility’s security team. Equipment will include appropriate PPE for transport personnel (e.g., powered air-purifying respirator [PAPR], Tychem® suit),
individual patient isolation systems, communication devices (e.g., cell phones, radios), spill cleanup kits, and decontamination equipment.

*Ground Transport Vehicles.* A chase vehicle should follow the patient ambulance to coordinate communication between the ambulance and involved entities (e.g., police department, receiving medical facility) and provide supportive equipment and personnel as needed by the primary transport ambulance. For example, the chase vehicle might carry a spill cleanup kit, an individual patient isolation system, and duplicate PPE for staff within the ambulance as well as PPE for support personnel. Personnel in the chase vehicle might include an EMS captain, EMS physician, receiving medical facility staff, and referring medical facility staff. In some cases, a second ambulance may act as a chase vehicle to provide immediate redundancy if an issue arises with the primary transport ambulance.

*Preparing the Ambulance.* Personnel should consider preparing two ambulances for patient transport, one for primary transit and the other ready on standby. Of note, the use of a portable isolation system may negate the need for additional barrier protections to the ambulance. There are a variety of ways to prepare the ambulance; the authors have used the following process successfully. The patient compartment of the ambulance is draped ceiling to floor for barrier protection using one continuous piece of 6mm plastic sheeting, separating the driver compartment from the patient area. Every edge of the plastic sheeting should be sealed with duct tape, where the walls and ceiling meet and around the rear doors (figure 18.1). Lighting should not be covered, as it may heat the plastic and cause a fire hazard, and it may create a disorienting effect for the transport team. Medical equipment should be removed or stored in the patient compartment behind the plastic sheeting. A breach emergency box or other medical equipment needed for transport care should be stowed behind the plastic barrier in the patient compartment, cutting a flap in the plastic sheeting to allow access to stowed items but sealing the flap with duct tape until access is required. Ventilation in the driver's compartment should be operated for transport without use of recirculating air, while the exhaust vent in the patient compartment should be on. A disposable PPE barrier is placed on the stretcher. For the possibility of
patient emesis, a bag for containment should be provided and the pillow and patient wrapped in an impermeable sheet to reduce contamination (e.g., an “adult transport cocoon” or “burrito wrap”). As an additional precaution, the patient may also be “self-contained” in PPE such as a Tychem® suit, procedure mask or N-95 respirator, gloves, and face shield; however, the patient must be able to tolerate these items. Given that the transport of a patient with an HHCD may garner media coverage, considerations should be made for covering the rear ambulance windows for patient privacy.

*Interfacility Ground Transport Considerations.* Local, state, and regional health departments cooperatively coordinate interfacility ground transport between receiving and referring medical facilities and EMS providers. Preparations for interfacility ground transport of patients with an HHCD must consider varying lengths in transport distance and time. The use of a chase vehicle/secondary ambulance might provide logistics support, health care personnel relief, assistance with refueling (if necessary), and emergency support. Paramedics and direct patient care staff should rotate out of direct patient care roles at least every 4 hours during transport. Long transports may require multiple EMS/ambulance teams with predetermined, safe patient transfer zones, designated PPE donning/doffing areas, and secure ambulance decontamination capacity. Locations for refueling, refueling procedures, and any potential jurisdictional issues should be addressed in advance of transport.

*Medical Treatment Considerations.* Care during transport of a patient with an HHCD must balance the benefits of treatment to a patient and the risks of contamination and infection to providers. Any altered standards of care should be outlined in advance with the transport organization’s medical director, transport team, and referring and receiving physicians. A transfer consent form accompanies the patient from a referring facility and designates the receiving physician as the medical care provider. The referring and receiving physicians will direct treatment protocols and coordinate with the EMS medical director who guides EMS care during transport; the receiving physician should be immediately notified of any change in the patient’s condition. Ideally, direct lines of communication should be established among the transport team, the EMS medical director, and the referring and receiving physicians. This will enable the
Figure 18.1. 6mm Plastic Sheeting Draping the Patient Compartment of an Ambulance with Duct Tape Sealing the Edges between Walls and Ceiling (Courtesy of UNMC)
provision of updates on medical status and guidance on care to be rendered by the transport team. Sharps use and invasive procedures should be minimized during transport and appropriate PPE worn by providers. If resuscitation is required, this should occur once the ambulance has stopped moving; however, it is also possible that compressions might be avoided during transport due to altered standards of care and patient acuity. Procedures should incorporate plans to safely contain bodily remains should a patient die during transit, likely continuing to the receiving facility where final remains processing could securely proceed.

*Decontaminating the Ambulance.* A location that is isolated, secure, and protected from the elements should be chosen for ambulance decontamination. Processes and plans for decontamination, packaging, and disposal of Category A waste and PPE, as well as facility security, should be established in advance. Although the authors successfully utilized the process presented, other decontamination processes are effective and may vary depending on causal pathogens. Personnel performing decontamination of the ambulance should wear appropriate PPE (e.g., full-face respirator with chemical and biological filters with Tychem® suit). Chemical and biological filters are recommended as ambulance space is confined and chemical fumes can accumulate quickly. Body fluid spills should first be contained, cleaned, and disinfected. While removing the 6mm plastic sheeting, sections should be rolled inward to prevent contamination of the outward ambulance surfaces and properly disposed of in biohazard bags. The plastic sheeting may need to be cut into smaller sections to safely fit inside biohazard bags or otherwise disposed of as Category A waste. If cutting of the plastic is necessary, trauma shears can be used to reduce the risk of injury to the worker. All surfaces within the ambulance should be cleaned with bleach wipes (or other Environmental Protection Agency [EPA]–approved disinfectant) twice, starting in “clean” areas (driver compartment) and finishing with “dirty” areas (patient compartment). A quality assurance observer should be present for decontamination to document the process and identify any breaches or potential contamination. Depending on the pathogen, a desiccation period may commence to allow organism inactivation. As a tertiary decontamination step, the patient compartment might be treated with ultraviolet germicidal irradiation or other gaseous (chlorine dioxide) or
vaporous agents (hydrogen peroxide) that are EPA-approved for the causative agent.

**Ground Transport Systems.** Portable isolation systems contain a patient during ground transport and provide an extra layer of exposure protection for providers, particularly when used for very “wet” patients (i.e., patients with vomiting or diarrhea or otherwise emitting body fluids). However, as small and enclosed spaces, these systems are uncomfortable to the patient and limit direct patient care; as such, they may not be suitable for critically ill patients. In most HHCD cases, these portable isolators are single-use but may be reused if the disease is treatable and the unit can be decontaminated. The determination to reuse an isolator will be made in coordination with the local public health department and technical and clinical experts.

The ground transport systems described below are single-person isolation units that do not allow for direct patient care; rather, isolators are equipped with glove ports and sleeves for intravenous tubing for medical personnel external to the isolator to access the patient. Many of the commercially available patient isolation systems may be approved for ground transport but are not approved by the Federal Aviation Administration (FAA) for air transport. As large medical equipment will not fit into glove ports, it must be prepositioned within the isolator prior to patient placement. Each system is negatively pressurized and equipped with high-efficiency particulate air (HEPA) filtration.

The Patient Isolation Unit (PIU; figure 18.2) was first developed to protect US military service members from biological and chemical weapons in Iraq and Afghanistan. The single-occupancy, single-use containment unit is equipped with three HEPA filters that provide up to 12 air exchanges per hour. Exhaust ports are fitted with two chemical, biological, radiological, and nuclear (CBRN) filter cartridges. The base unit
enables interface with standard litter systems but includes 8 straps when litters are unavailable. Batteries enable the filter blowers to run for 16 hours, and a patient can be contained within the unit for up to 12 hours. The PIU was intended for use in both air and ground transportation.

The ISO-POD® (figure 18.3) is the brand name of an individual patient isolation system manufactured by Airboss of America Corporation. It is a lightweight, vinyl enclosure; the system and its components fit into a duffel bag and are assembled immediately prior to use. The ISO-POD® consists of two components: an isolation module and a filtration blower system capable of providing 21 air exchanges per hour. Restraint straps secure the patient during transport, and the durable, reinforced PVC lining is puncture resistant. ISO-POD® blowers run on a lithium ion battery that can provide up to 8 hours of operation; however, due to the small

Figure 18.3. ISOPOD® Individual Patient Transport System (Courtesy of Nebraska Medicine)
space and inability to control internal temperature, the ISO-POD® is unsuitable for lengthy transports. In recent years, several companies have produced different models of the individual patient isolation systems.

**Route Selection.** The selection of the most appropriate ground transport route is a decision based on extensive planning, coordination, and rehearsal. Selected and alternative transport routes should be preapproved by local and state authorities and the decision made in collaboration with local law enforcement, the state’s transportation department, emergency management, and public health officials. Considerations for determining the most suitable route include jurisdictional authority and approval, the directness of the route to the receiving facility, the ability of road maintenance crews to respond to inclement weather, and traffic flow patterns. If applicable, the crossing of county and/or state borders should be minimized and routes selected so as to avoid entering governmental jurisdictions where the transport team does not have permission.

Local law enforcement agencies should be included in discussions on securing the selected route during transport, deciding if a law enforcement escort is needed, and responding to unanticipated problems or threats that may arise en route. Involvement of law enforcement agencies may also reduce transit times through traffic. During transport, predetermined communications methods (e.g., cell phones, secure radio channel) should be available to select participating agencies; these may include the receiving facility, transport team, law enforcement, and incident command.

Contingency plans should be thoroughly discussed prior to transport and should address issues that may arise en route; these may include vehicular accidents or failure, poor weather conditions, exposure of providers during transport, or breaches in PPE or isolator. Consider coordination with county emergency management during adverse weather to provide services such as snow plowing or road salting as necessary along the transport route.

**Air Transport**

The first documented aeromedical transportation of a patient infected with an HHCD was in 1970, when a patient infected with Lassa fever
was transported from Nigeria to the United States for treatment. The patient was isolated in the first-class cabin of a scheduled Lufthansa flight without safety precautions for other passengers or crew; no secondary cases occurred. A second patient with Lassa fever was evacuated from Nigeria to Germany in 1974, utilizing barrier precautions and PPE. Around the same time, individualized patient isolators were developed to minimize transmission risks to evacuation staff. Over the last four decades, air transport technologies and systems have been developed to advance safety for transport teams while enabling access to the patient for en route care. During the 2014–16 outbreak of EVD in West Africa, at least 24 patients infected with EVD were transported to high-level isolation units in the United States and Europe with no secondary exposures en route.

Aeromedical transportation demands extensive coordination and collaboration. In the United States, the State Department is the coordinating agency for the transport of patients with confirmed or high-risk exposure to an HHCD from outside the continental United States, while the Department of Health and Human Services (HHS) is the coordinating agency for HHCD transports within the United States; other departments and agencies provide transport support. For transportation of a military service member, the Department of Defense (DoD) is the lead coordinating agency.

Aeromedical transport of patients infected with an HHCD can span lengthy time frames while adding stressors on the body, during which time patient status can significantly deteriorate and demand interventions that may heighten exposure risks to care providers and others on the aircraft. As such, systems have been developed with advanced capabilities to enable direct care of patients with an HHCD during an aeromedical evacuation while providing an environment that minimizes risks to health care professionals, other transport staff, and bystanders, and reduces the potential for aircraft contamination.

Air Transport Systems. Historically, individual containment systems were used to repatriate patients infected with HHCDs. Despite confined patient space and limited patient care capabilities, individual isolators, such as the PIU and air transport isolator (ATI; figure 18.4), have been used for decades and could be employed for both air and ground trans-
During the 2014–16 EVD outbreak, the system used for the majority of aeromedical evacuations of infected patients, known as the aeromedical biological containment system (ABCS; figure 18.5), allowed for direct patient care; however, it too was a single-patient system.

Limitations to a single-person system exist. A single transport capability requires prioritization of patient acuity, increased expenses, and potential delays in treatment of a second patient due to time needed to conduct the first transport, as well as the need to decontaminate the aircraft, reset staff, and return to impacted areas. These limitations have since led to the development of systems capable of transporting multiple patients. In most cases, these devices will need FAA approval to be utilized on an aircraft. However, use on military aircraft or outside of the United States may have different standards for which devices are considered safe to fly.

The British Royal Air Force (RAF) developed the ATI in the 1970s, and a similar system (Vickers Air Transport Isolator [VATI]) was used by the US military for several decades. Prior to the 2014–16 outbreak of EVD, the RAF maintained three isolators that were used on four occasions; however, a reassessment during the EVD outbreak led to the development of an additional 25 ATIs. In 2014, the RAF transported a patient infected with EVD from West Africa to Britain in the ATI. Smaller than the units detailed below, the ATI and VATI can be used for both in-flight and ground transport: the isolator can be transferred from the aircraft.
to an awaiting ground vehicle and transported to the treatment facility with the patient only leaving the isolator on admission into the containment unit. A negative pressure unit equipped with HEPA filtration, the system includes an intubation suit with gloves and a face shield to allow greater airway support, and ports enable equipment and drugs to be passed into the isolator. A tube extension at the foot of the unit allows clinical waste to be isolated from the patient during transport.

The ABCS was developed through a cooperative agreement between the Centers for Disease Control and Prevention (CDC), DoD, and Phoenix Air Group (PAG). First operationalized in 2007, the system had not been used until the 2014–16 outbreak in West Africa, during which the system was employed by PAG for the aeromedical transport of 41 patients, including 24 to high-level isolation units in the United States and Europe. Designed to prevent the escape of airborne pathogens, the ABCS consists of an anteroom and a patient chamber with negative pressure and a redundant HEPA-filtered ventilation system. A metal frame supports a clear polyvinyl chloride liner that enables medical professionals to provide direct care to the patient inside the unit. The ABCS is designed for the transport of a single patient; following patient transport, the system is disassembled and the liner, waste, and HEPA filters sent to an incinerator via a licensed Category A waste vendor.

In 2015, to address the limitation of a single-patient transport system, the US Department of State partnered with the Paul G. Allen Foundation in a public-private partnership with MRIGlobal to develop, fabricate, and certify a next-generation HHCD transport system with the capability of moving multiple patients in a single system. As of 2018, two containerized biological containment systems (CBCSs, figure 18.6)
have been constructed; both are owned and operated by the US State Department and maintained by PAG. The CBCS consists of a medical staff room, an anteroom, and a patient treatment room with area to provide critical care for up to 4 patients for 16 hours. The system is equipped with negative pressure, HEPA filtration, and video monitoring. Built within a 40-foot shipping container, the hard, rigid surfaces of the CBCS facilitate ease of decontamination using combined quaternary ammonium disinfectant and vaporous hydrogen peroxide.

In 2014, the DoD contracted Productions Product to develop a system that provided multipatient isolation capabilities for service members who may have had a high-risk exposure to EVD. A modular, expandable system, the Transport Isolation System (TIS, figure 18.7) includes an anteroom and one or more patient care modules equipped with negative pressure, HEPA filtration, and watertight enclosures to protect the aircraft and exterior crew. TIS modules utilize the Standard Patient Support Pallet system, allowing for adjustable configuration of seats and litters. Multiple ports for oxygen tubing, monitoring cables, and electric cords allow for large medical equipment and devices to be placed external to the TIS while maintaining the ability for aeromedical evacuation crews and critical care teams to provide direct patient care. Production Products manufactured 25 TISs in 2015; the systems are positioned in 4 bases across the contiguous United States.

**Air Transport Platforms.** There are a variety of both fixed-wing and rotary aircraft that can be utilized to transport patients with HHCDs; the selection of aircraft will depend on factors that include availability, aircraft range, and the capability to hold the air transportation systems and associated support equipment and staff. Smaller fixed-wing aircraft
and rotary aircraft can be used to move the individual patient isolators (e.g., PIU and ATI), as was the case in 2014 when both an unspecified helicopter and a Cessna 208 transported patients with EVD within Guinea one at a time in an individual patient isolation system they referred to as a Human Stretcher Transit Isolation-total Containment (Oxford) Limited. PAG has utilized a modified Gulfstream G3 for transportation of patients within their ABCS intercontinentally and within the United States and Europe. The DoS’s CBCS can be moved within a Boeing 747 aircraft, drastically increasing the flight range to 7,260 nautical miles and thus allowing for intercontinental transports without the need for a refueling stop. The TIS has been approved for use on the USAF C17 Globemaster III and the USAF C-130, which have an unfueled range of 2,400 and 1,800 nautical miles, respectively; however, both systems have midair refueling capabilities and therefore an almost unlimited range. The C-130 requires a smaller takeoff and landing distance and thus can use smaller and less robust airfields than both the C17 and 747, providing accessibility to more remote locations.

The geopolitical aspects regarding the flight path and refueling stops must be addressed in advance with a number of parties, including the CDC, DoS, and FAA. For example, the modified Gulfstream G3 air ambulance operated by PAG during the 2014 EVD outbreak required two stops for refueling and had to pass through US Customs Service during its trip from West Africa to the continental United States, both of which needed permission from the appropriate national authorities. These landings had to be delicately coordinated in advance to minimize the actual and political disruption to the airports and communities in which they are situated. Some countries (or even US states) could potentially refuse to permit the landing of aircraft with HHCD patients onboard.

If there is a need to decontaminate any portion of the aircraft, only methods (chemical and physical) approved by the FAA and the aircraft manufacturer should be used to ensure aircraft airworthiness is not compromised. For example, many chemical disinfectants may deteriorate seals and other components of an aircraft that help maintain its pressurization, which could lead to catastrophic failure.

Air-to-Ground Handoff. The handoff of a patient from an arriving air-
craft to an awaiting ground transport team requires extensive preplanning and communication. Identifying the location of patient transition is important to reduce handoff time, minimize environmental exposure, and conceal the process from media and bystanders both for their safety and for the privacy of the patient. All involved parties should be updated on clinical status during the air transport to aid in ground crew preparation and expectations (e.g., transport of ambulatory or litter patient). On arrival, a team lead from the air evacuation team should brief awaiting ground transport crews on patient status and changes that may have occurred in-flight. Patients should be offloaded in protective PPE or in an isolator, as indicated. Ground transport teams should notify the receiving facility of patient status and estimated time of arrival.

**Movement of the PUI to Isolation**

A person or patient under investigation (PUI) is an individual who is both symptomatic and has had exposure to an HHCD. The PUI has not been confirmed as having the disease in question through laboratory testing, but an HHCD is suspected and has not been ruled out. Another individual category of concern is a person who has had a high-risk exposure (HRE) to an HHCD (i.e., needlestick or contaminated fluid splash to the eyes), but is not currently exhibiting symptoms. Both the PUI and the person with an HRE require extensive coordination among public health officials and clinicians to determine the best course of action for both the PUI/HRE and the potentially impacted communities. Transporting a PUI or person with an HRE to a location in close proximity of an HLCC facility may be preferable in certain situations; for example, when the PUI or person with an HRE is early in the disease course or asymptomatic and are located in an environment with insufficient resources to provide effective care on escalated symptoms and confirmed disease. If a PUI or individual with an HRE is a health care provider responding to an outbreak, movement may also be sought; treatment of a known colleague could be detrimental to the morale of health care workers (many of whom are likely to be volunteers) and subsequently the overall mission.
Despite a lack of laboratory confirmation, PUI movement should proceed as though the PUI were a confirmed patient in order to protect transport teams and communities involved. If disease was later confirmed, no additional exposures should have arisen from the transport process. Similar to a confirmed case, the suspected disease and the transmissibility of the causal pathogen will drive the level of precautions, such as PPE and engineering controls.

Waste infected with certain highly hazardous pathogens must be transported and disposed of as Category A waste according to the US Department of Transportation (DOT). The waste produced during transport of a PUI will likely be considered Category A waste (such was the case with EVD); therefore, it should be handled and packaged as such, following DOT and other applicable state and local regulations. If an HHCD is later ruled out, state and local government regulations would determine whether the associated patient waste would still be handled as Category A waste or if it could be disposed of as Category B medical waste.

The transport of an individual with an HRE, in contrast, may allow for some flexibility in the amount and types of controls utilized. By definition, these persons are asymptomatic. If the disease is only transmitted while symptomatic, as is the case with the vast majority of infectious diseases, the individual might be transported with less stringent precautions; however, a contingency plan should be available if symptoms develop. For example, numerous individuals with HREs to EVD were transported in a private aircraft with isolation capabilities. Although these individuals remained outside the isolation unit, the contingency plan involved their movement into the onboard unit if they became symptomatic. Moreover, if transport is conducted within the established incubation period for a known causal pathogen, additional precautions may be unnecessary. For example, the known incubation period for Lassa virus is 6 to 21 days. If an individual were exposed via needlestick and was rapidly transported by ambulance to a facility within hours, the transit may be completed with little or no controls as it would be completed well before the established incubation period; again, contingency plans should still be in place. Depending on state and local regulations, waste generated by an HRE may not require special disposal methodologies.
**Intramural Transport**

Transport of a patient with an HHCD from the entrance of a medical facility into an HLCC unit necessitates prioritization of the safety of those within the medical facility, emphasizing security, decontamination procedures, and rapid patient movement. Intramural routes should utilize direct pathways while minimizing environmental exposure risks. If ambulatory, the patient may walk or be moved by wheelchair into the isolation unit via the most direct route. The receiving medical facility should assemble a receiving team composed of isolation unit staff experienced in decontamination procedures. Wearing appropriate PPE based on patient acuity and containment, the transport team escorts the patient from facility entry until isolation unit placement. Facility security restricts all public access to the patient transport route until decontamination is complete and should be positioned greater than 15 feet from the patient route at all times; security is instructed not to approach the patient and transport team but to keep the public away. The receiving team should clean spills immediately with prepared spill kits (e.g., bleach wipes, mop and bucket, absorbent wipes). After the patient is placed in the isolation unit, the receiving team performs a full decontamination of the transport route within the medical facility, from the patient entry point to within the isolation unit.

**Conclusion**

Extensive planning and exercising of transportation procedures ensures that comprehensive procedures exist and communication structures for numerous agencies have been tested.

Isolation systems developed for aeromedical and ground transport minimize secondary transmission risks to transport teams. Single-use, individual patient isolators for ground transportation encase a patient in a negative-pressure environment while glove ports enable access for patient care. The development of larger, multipatient transport systems for aeromedical isolation provide biocontainment-level infrastructure, enable direct care, and expand the capacity of transports to four or more
suspected or confirmed HHCD patients. However, few such systems are currently available. While the EVD outbreak in 2014–16 resulted in relatively few international evacuations that were within the means of one organization, a larger outbreak requiring aeromedical evacuation of more patients would demand greater global capacity.

Although significant developments have been made in transportation capabilities since the 2014–16 outbreak of EVD, the transportation of patients with HHCDs is underexplored. Research and development into this area is needed to advance methods and systems to protect transport teams while supporting sophisticated patient care.