

Where Ebola battles are won

October 22 2014, by Dennis Thompson, Healthday Reporter



Four special U.S. medical centers are first-line treatment choices, but many local hospitals up to the challenge, experts say.

(HealthDay)—Four hospitals that are home to advanced biocontainment facilities have become America's ground zero in the treatment of Ebola patients.

Their special isolation units feature layer upon layer of safety measures to prevent the spread of nightmare pathogens, not just Ebola. They include special air filters, dunk tanks full of antiseptic, dedicated lab equipment and so-called autoclaves to sterilize any medical waste before it is transported from the unit.

But they also feature limited bed space—just enough to treat 11 patients, nationwide.

As a result, many community hospitals across the country are now studying these units and figuring out which infection-control protocols can be quickly adopted if a patient is diagnosed with Ebola.

The most important features of these units can be embraced by local hospitals if need be, said Dr. Craig Smith, medical director of infectious diseases at University Health Care System in Augusta, Ga., and a spokesman for the Infectious Diseases Society of America.

"The idea of isolation itself is well-trained and well-ingrained in all of us," Smith said, noting that [hospital](#) workers routinely deal with virulent diseases like meningitis, tuberculosis and MRSA. "Every hospital can come up with a contingency plan to handle a highly contagious disease. We take care of scary diseases every day, all the time. The problem is the logistics. It takes money, it takes equipment, it takes people being trained and practice."

The four U.S. hospitals with biocontainment units are Emory University Hospital in Atlanta, the U.S. National Institutes of Health Clinical Center in Bethesda, Md., Nebraska Medical Center in Omaha and St. Patrick Hospital in Missoula, Mont.

The two Dallas nurses who contracted Ebola from the first patient diagnosed in the United States have each been sent to one of these hospitals. Nina Pham, 26, took one of the two beds available at the NIH Clinical Center, while Amber Vinson, 29, occupies one of three beds at the Emory isolation unit.

These hospitals have already successfully treated a handful of people who contracted the deadly virus while serving as aid workers in West Africa, site of the worst Ebola epidemic in history.

The special isolation units are all located near laboratories where researchers study some of the world's most dangerous viruses and bacteria, Smith said.

"These units weren't designed to be part of an Ebola response. They were

designed to support research, primarily, and then if something ever happened we would have them available," he said. "They have been functional and practicing. They have had patients you've never heard about."

The units' protective features start with their location in the hospital, explained Dr. Mark Rupp, director of infection control at the Nebraska Medical Center.

"It's removed from the usual places we care for patients," he said. "It's someplace that's physically removed and secure, and no one comes down that hallway who isn't authorized."

The units have negative air pressure, meaning that air always flows into the patient room from outside rooms—a feature intended to prevent the spread of airborne germs. The air also is scrubbed by filters before being expelled through the exhaust system.

Objects leaving the patient rooms are sterilized by being placed into "dunk tanks" full of a germ-killing agent. "If we do have to take something out of the unit, it goes through a tank full of disinfectant and is pulled out of the other end," Rupp said.

The units also feature an autoclave that uses steam to sterilize all medical waste before it's disposed, and a special anteroom in which health care workers can safely don and remove protective suits.

"It's not the facility that's the most important part," Rupp said. "It's the team and the training that has gone into preparing these folks."

For example, Nebraska Medical Center has a very specific set of safety equipment that workers wear when entering a patient's room. But there's also a person called the "Donner" whose only job is to help workers put

the gear on correctly, Rupp said. A "Doffer" waits outside and does nothing but help people take off gear without contaminating themselves.

The new guidelines for the safe care of Ebola patients issued by the federal Centers for Disease Control and Prevention on Monday reflect this emphasis on personnel. They ask hospitals to rigorously train workers on taking on and off the safety gear, and to appoint a trained monitor who does nothing but help workers put on and remove their gear.

Many of these units' technological features can also be adapted for Ebola by local hospitals, Rupp said.

Since Ebola isn't airborne, special ventilation systems aren't necessary. A bucket with a bleach solution can double for the antiseptic dunk tank. Hospitals can purchase or borrow an autoclave big enough to handle [medical waste](#), or store the waste in a separate area until pickup arrangements are made, he said.

Hospitals do need to set aside a remote and secure area for their isolation units, and that area needs to be large. In treating its first Ebola patient, survivor and medical missionary Dr. Rick Sacra, Nebraska Medical Center learned that "it takes a lot more physical space than we first thought," Rupp said.

Advanced medical equipment sent into the isolation area should remain there, because it's too much to ask that the devices be thoroughly sterilized after every use. Nebraska soon found its isolation room cluttered with a portable X-ray, an EKG, an ultrasound, a dialysis unit and other equipment, Rupp said.

Workers also need plenty of room to take off their gear safely, and to separate clean protective equipment from contaminated pieces.

"It takes a lot of space for all the equipment and all the waste that's generated," he said.

But mainly, running such an isolation unit requires common sense and planning. Take the issue of human waste, which at the height of infection is swarming with Ebola virus.

"We put it into the toilet bowl, and then we treat that waste with a disinfectant," Rupp said. Workers pour antiseptic into the toilet and let it sit long enough to kill off the virus, before flushing the waste into the sanitary sewer system, he said.

More information: For more on Ebola, visit the [U.S. Centers for Disease Control and Prevention](https://www.cdc.gov/eid/index.htm).

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Citation: Where Ebola battles are won (2014, October 22) retrieved 2 May 2024 from <https://medicalxpress.com/news/2014-10-ebola-won.html>

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