

# Fighting Infectious Diseases

By SUSAN BLOOM

AS AN AMBULANCE PULLS UP to the emergency entrance at Robert Wood Johnson University Hospital in New Brunswick, paramedics emerge, clad head to toe in Tyvek suits and specialized headgear. They painstakingly wheel out a patient who is suited up in similar fashion and prepare to transfer the individual, suspected of having Ebola, to waiting medical personnel also dressed in protective wear. The paramedics work quickly to make the hand-off, knowing that time is of the essence, precision is key and meticulous attention to detail can be the difference between successful containment of an infection and widespread exposure.

While the scene may look like something out of a sci-fi movie, it is, luckily, just a drill. One that Robert Wood Johnson personnel conduct regularly to test their procedures and readiness to handle potential cases of highly infectious diseases such as Ebola, a deadly virus that has killed thousands in West Africa since last fall and has left the United States on high alert as a handful of cases crossed our borders. It is a new age of medicine, in which highly contagious and even fatal diseases can develop anywhere in the world and find their way to the opposite side of the globe within hours, exposing large populations. And hospitals need to be vigilant.

"It's a fact of life today — the spread of disease by people, food-borne outbreaks and other sources is unfortunately inevitable and something hospitals need to be

ready to address at any time," says Pat Lafaro, Robert Wood Johnson's director of infection prevention.

"With an increase in the number of companies with foreign holdings and active health care groups in the U.S. reaching out to others worldwide, people are constantly going back and forth, especially in a diverse population like New Jersey's," she says.

"We've become a multicultural society and you can be anywhere within 24 hours," says Tracy Carlino, senior vice president and chief nursing officer at Virtua in South Jersey.

And while Ebola has actually been around since the 1970s, the growth in global mobility has changed the stakes dramatically. "Years ago, an infected patient wasn't likely to be able to travel beyond their local environment," says Joseph Feldman, chairman of emergency medicine at HackensackUMC in Hackensack. "Today, one can travel from one side of the Earth to the other in hours, and an infected patient who's highly contagious can infect many people in one day."

Gaps in hygiene and immunization rates in other countries, as well as a population of Americans who continue to refuse to vaccinate their children, are also leaving society increasingly vulnerable to the spread of infectious diseases, including the resurgence of conditions once thought to be largely eradicated, such as measles, mumps and tuberculosis, according to Susan Boruchoff, hospital epidemiologist at Robert Wood Johnson University

From the common flu to deadly Ebola, hospitals have to be prepared for everything

Susan Jelvani, a nurse at Robert Wood Johnson University Hospital in New Brunswick, wears protective gear during a drill on practices for dealing with highly infectious patients.

Hospital. Antibiotic-resistant organisms and infections that Americans acquire in other countries and bring back to the United States, often through the pursuit of less expensive, foreign-based medical or dental procedures — so-called “medical tourism” — are also proving a threat. “An example of this is a type of gram-negative bacillus from India that’s resistant to nearly all of our antibiotics,” says Boruchoff, who also is an infectious diseases specialist and a professor at Robert Wood Johnson Medical School. “It causes infections in all parts of the body, but we currently have no antibiotic capable of curing it.”

Travel and commerce have facilitated the spread of infectious disease worldwide, while microbial mutations allow viruses to change and successfully adapt to their new environments, says Tina Tan, state epidemiologist at the New Jersey Department of Health in Trenton.

“Many recent and emerging infections are also believed to have some kind of zoonotic component,” Tan says of the suspected link between animals and many of the world’s more virulent infectious diseases. “For example, the weasel-like African civet has been linked to the SARS outbreak, MERS may have had camels as its initial source, the H1N1 flu pandemic was linked to pigs, and West Nile virus has been connected to mosquitoes and birds,” she says.

These are just some of the serious infectious threats that New Jersey hospitals have needed to address long before Ebola began making headlines last fall.

“Among the issues we’ve seen in the last decade include the 1999-2000 West Nile virus outbreak; a 2003 case of SARS; incidences of Lassa fever, which is similar to Ebola; the 2009 H1N1 flu pandemic; and the 2012-13 outbreak of fungal infections caused by a contaminated steroid product,” says Tan.

John Matsinger, executive vice president and chief clinical officer at Virtua, says that “after 9-11, our Virtua Memorial location in Mount Holly was one of the sites that diagnosed the outbreak of anthrax, a bacterial agent which causes pulmonary and skin complications, something no one had experienced before.” Spread through the mail via a powdery substance, the anthrax threat was evidence that “we’d entered a new age of bioterrorism,” one that changed all the rules, Matsinger says.

Until Ebola changed them all again.

“EBOLA WAS COMPLETELY DIFFERENT. We’d never seen anything so contagious, even beyond the flu,” Matsinger says of the virus, which can incubate undetected in a patient’s system for up to 21 days before symptoms such as fever, diarrhea, coughing and bleeding begin to surface.

“With Ebola, not donning or doffing (putting on or taking

off) your personal protective equipment properly could expose medical personnel, and no one was exactly sure how the nurses in Texas contracted it,” he says. “In terms of treating it, you can’t attend to it with normal staff or procedures. It requires additional resources and whole wards to take care of one patient. And it raised issues about whether the staff treating patients could or should be allowed to go home. It really made us take a step back and look at our processes.”

“Ebola has been a learning experience for all of us,” says Lou Sasso, Robert Wood Johnson’s director of emergency preparedness. Because Ebola’s main mode of transport is through bodily fluids, “staffers treating it require more than standard masks, scrubs and gloves. They need to cover and protect all areas of the skin from exposure using booties, double gloves, fluid-impervious Tyvek suits and specialized headgear that keeps the head protected while still allowing some air to circulate. These supplies were all different than the ones hospitals typically stocked,” he says.

“And back in the summer/fall of 2014, when Ebola was at the forefront of the media, there was a mad rush to acquire these items and some of the vendors had them on back order, which was another new situation we had to deal with.”

Because hospital staffers weren’t used to this level of protection, Sasso says, training has also been critically important. Using a phased approach, Robert Wood Johnson has trained several hundred adult critical care and some pediatric staffers in protocols recommended by the national Centers for Disease Control and Prevention.

“We offer classroom time for them to practice with the gear and also have them complete probable tasks, such as collecting blood, cleaning spills, operating a ventilator or disposing of garbage with the equipment on, so that they feel more comfortable maneuvering in it, and so that their first time in the gear isn’t when they’re treating patients,” Sasso says.

At Hackensack, which was designated as a state-based Tier II treatment facility during the Ebola scare, certified by the CDC to assess, test and treat patients for suspected or confirmed Ebola cases, the hospital “needed to ensure that staff was appropriately trained and that there was facility-wide preparedness,” says Feldman. “The CDC sent a team of experts to HackensackUMC to review our equipment, location and protocols, and provide technical assistance and training to our staff in order to further improve readiness.”

Like their colleagues at Robert Wood Johnson and Virtua, which trained more than 600 of its physicians and nurses in donning and doffing procedures even before facilities were categorized by tier, Hackensack continues to review all appropriate policies and protocols, and maintains

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JOSEPH FELDMAN,  
chairman of emergency medicine  
at HackensackUMC

a negative air-pressure patient isolation area in the hospital where air is exhausted outside through a HEPA filter to stop the spread of airborne infectious diseases.

Many infectious illnesses present with a similar array of symptoms, so a process of deduction and clear communication are critical when diagnosing an infectious disease. “Anything could theoretically walk through the door,” says Virtua’s Carlino. “Our emergency department physicians would look at the worst-case scenario to narrow down what you have.”

For example, says Robert Wood Johnson’s Boruchoff, “many patients present with non-specific symptoms like nausea, aches, fever, diarrhea, rash and vomiting in response to infection, and many of the people who have been screened in the U.S. for Ebola because they’ve recently returned from West Africa have actually been found to have malaria, so it’s important to test for likely things and rule out other things.”

“You don’t want to miss it in the ED,” says Virtua’s Matsinger, recalling the nationwide spread of the enterovirus-D68 pediatric respiratory illness in 2014. Multiple cases were treated at Virtua when the disease hit South Jersey last summer. “It was critical to properly identify it immediately and not send the child home as an asthma attack,” Matsinger says.

New Jersey has clear procedures in place to address infectious diseases and assist its state health care facilities in diagnosis and treatment, says Tan, of the health department. “In addition to requiring hospitals to have an emergency plan that includes preparedness for a surge, such as during flu season, the department also has regulations that require infection control processes,” she says, “and we also work with New Jersey Medical Coordination Centers across the state, which in turn work directly with their regional health care facilities to make sure they have the resources to respond to emergencies.”

Organizations such as the New Jersey Hospital Association, a Princeton-based entity that represents more than 300 acute-care hospitals and post-acute health facilities in the state, further support the process. “NJHA regularly monitors information on infectious diseases issued by the



At top, Robert Wood Johnson University Hospital nurse Eliza Espinoza dresses for a drill on handling highly infectious patients. Above, Espinoza removes duct tape from the protective suit of another hospital worker at the conclusion of the exercise.

CDC and the New Jersey department of health on a daily basis,” says Aline Holmes, senior vice president of clinical affairs for the NJHA and former director of the NJHA’s Institute for Quality and Patient Safety.

“We also use LISTSERVES to disseminate information to our network of hospitals, infection preventionists and pharmacists. We have a daily online NewsLink through which we also disseminate information and we have an infection preventionist on staff who interacts with all of the other IPs in the state.”

The state also works closely with the CDC-operated quarantine station at Newark Liberty International Airport, one of 20 stations nationwide that serve to limit the spread of contagious diseases into the United States.

While hospitals are always on alert for “emergent, unpredictable diseases” such as SARS, TB, HIV/AIDS, MERS, Ebola and antibiotic-resistant illnesses, all experts confirm that it is the more mundane infectious diseases that largely flood physicians’ offices and emergency departments.

“We shouldn’t forget about what we see on a daily basis, like influenza or norovirus, which are on an annual cycle,” Matsinger says.

“What we work with most frequently isn’t necessarily anything more exotic than the flu, which strikes millions of Americans and causes up to 200,000 hospitalizations and thousands of deaths each year,” says Lafaro, at Robert Wood Johnson. “The fact is, you’re far more

likely to get the flu or food poisoning than Ebola.” But should something new, unusual or concerning arise, “we could ramp up quickly,” Matsinger says.

“Every hospital has to be ready because it could happen at any time,” Lafaro says. “Good training, communication and screening procedures are key.”

From her statewide vantage point at the department of health, Tan believes the state’s medical centers are in a good position to respond to any breakout.

“While many infectious diseases come by surprise and with no warning, our successful track record of containment is a testament to the diligence of our hospitals. The key is to implement great control in the beginning to limit secondary cases.” @ | Photos by AMANDA BROWN

#### THE IMPORTANCE OF GOOD HYGIENE

While New Jersey hospitals are prepared to address and treat any infectious disease they’re presented with, “good respiratory etiquette” can help prevent the spread of many communicable conditions. “Coughing

and sneezing into your arm, staying on top of immunizations, and staying home from work or school when you’re sick will truly help avoid exposing others,” says Pat Lafaro, of Robert Wood Johnson University Hospital in New Brunswick.

Most of all, says Tracy Carlino of Virtua in South Jersey, “washing your hands with soap and water is the No. 1 way to prevent the spread of disease. It’s basic and may not be as ‘sexy’ as other approaches, but it can’t be emphasized enough.” — S.B.