



News

Out of Ebola

This summer, in Liberia, a 33-year-old medical missionary named **Kent Brantly** became the first-ever American to contract Ebola. And while he wouldn't be the only one, this story of his survival—in the words of those responsible for the unprecedented rescue mission—is the rare cause for celebration as the epidemic rages on

BY SEAN FLYNN | ILLUSTRATIONS BY JEFFREY SMITH

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The world's worst outbreak of the Ebola virus began late last winter in Guinea, on the west coast of Africa. By early summer, the virus—and the horrific disease it causes—had spread south through Sierra Leone and into Liberia. Kent Brantly, M.D., was eight months into a two-year tour as a medical missionary with the aid group Samaritan's Purse when the first Ebola patient arrived at his hospital in Monrovia, Liberia's capital, on June 11. Within weeks, Brantly and the staff were overwhelmed with the sick and dying.

Then Brantly got sick. He woke up with a fever on July 23; three days later, a blood test confirmed he had contracted Ebola.

Remaining in West Africa would almost certainly mean dying there. U.S. officials and Samaritan's Purse began planning a rescue mission almost immediately. Brantly would be flown to the States in a modified Gulfstream III equipped with a unique biological-containment system—a high-tech tent, basically—to prevent the virus from

spreading. On the ground, he would be transported by EMS workers who'd trained for such a mission for more than a decade. Finally, he would be treated by doctors and nurses cloaked in impermeable suits in a specially designed isolation unit at Emory University Hospital, one of only four outfitted for such an undertaking in the country. While preparations were made, Brantly was treated with an experimental drug that appeared to stabilize him.

On July 30, the modified jet, operated by Phoenix Air, landed in Liberia.



Vance Ferebee (CHIEF FLIGHT NURSE, PHOENIX AIR): They brought Dr. Brantly to the airport in a stake-bed pickup truck covered with a blue tarp. It was midnight. He's lying in the back in a yellow outfit, a full set of protective gear. It was vinyl, very hot. We walked him up the steps with just a little bit of assistance, and then he walked through the aircraft. As soon as he got in the tent, we got him out of his outfit, because first of all, he didn't need it, and plus it was very hot. The humidity there is ugly.

He had an IV, because he had received the experimental medication and he had also received a transfusion from a 14-year-old, I think it was, that had Ebola and got past it. But with the heat and everything, the bandage just wanted to come off, because nothing sticks. So I restarted his IV, and we gave him fluids. It's pretty straightforward, just like if you had a patient in the hospital.

Bruce Ribner, M.D. (MEDICAL DIRECTOR, INFECTIOUS DISEASE UNIT, EMORY): It's not like a plane crashes in your backyard and you've got twenty minutes to prepare for the arrival of the patient. It's fourteen hours over, fourteen hours rest, and fourteen hours back. So you get a minimum of a day-and-a-half warning. In this case, I got called on Wednesday, and Kent didn't come back till Saturday. So we had three days to implement all that we had been planning.

Ferebee: He tried to sleep on the plane. Just knowing you're going home makes a big difference. But there was so much concern and angst, and just the unknown of getting a patient with Ebola back into the U.S., that it wouldn't have happened without heavy, heavy government influence. That involved landing at a U.S. Air Force base on the way back—in the Azores, but on sovereign Portuguese territory. And then dealing with customs in Bangor, Maine; Dobbins Air Reserve Base; FAA; Department of Agriculture... All the different agencies had to be dealt with.



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Alex Isakov, M.D. (EXECUTIVE DIRECTOR, OFFICE OF CRITICAL EVENT PREPAREDNESS AND RESPONSE, EMORY): Having an isolation unit is step one. Step two is: How are we going to get patients here? We have all the logistics in place to do it in a way that you're not exposing the public, you're not putting any other patients or visitors at risk, and that provides the best care for the patient while protecting the health care workers. The idea is that nobody else can get the disease in the course of that transport, and no environmental surfaces are contaminated.

John Arevalo (PARAMEDIC, GRADY MEMORIAL HOSPITAL E.M.S.): We would train about twice a year. We used to have about twelve members, but people move on, finish school, go overseas. Right now there are only two of us in the field, Gail Stallings and me.

It had been three weeks to a month since our last exercise. Then—*boom!*—we get the text: "We have a mission." We didn't get a lot of details until we came in. They said, "Listen, we have a patient infected with Ebola, and he's coming in at this time. This is the real deal."

Robin Brown-Haithco (DIRECTOR, SPIRITUAL HEALTH AND STAFF SUPPORT, EMORY): Media were everywhere. News was getting out before we could get it out. Staff were getting pretty anxious. Ninety-five percent said, "This is great. This is what we're here for." The challenge was the 5 percent who were paying attention, I think,

more to what they were hearing from the media. Their fear was primarily, "What if this thing spreads? What if I take it home to my family? What if what is happening in West Africa starts happening here and we're responsible because we opened the doors?"

Ribner: Certainly some of our employees needed some better education. This is not some highly contagious disease that places a lot of people at risk. It's a pretty wimpy virus, as viruses go. I mean, almost any disinfectant wipes it out in ten to fifteen seconds. As viral pathogens go, it's much less hardy than, say, the norovirus, which causes the diarrhea outbreaks on cruise ships. Which is why you need direct exposure to body fluids relatively soon after they come out, because it doesn't survive in the environment very long.

Isakov: When caring for patients with a serious communicable disease, you have zero tolerance for lapses in procedure. You have to be meticulous. And you have to make selections around your personal protective equipment that are effective and comfortable and let you get your job done without a lot of other stress. You don't want to find out the day you're moving a patient who's vomiting or having a large volume of diarrhea that the personal protective equipment is not robust, that when you walk out on pavement it shreds. You don't want to learn that the eyewear to protect your face from splashes is going to fog up in the Atlanta humidity. You don't want to learn that when you put all this stuff on, you can't talk to your partners and your patient. That's a bad time to learn all that stuff. Over more than ten years, we tried different equipment, we tried different ways of communication that would allow, through bone-conduction radio, for the medics to talk with one another and the supervisors and still communicate with the patient. We sorted out all those kinks.

Arevalo: We go above, as far as protective gear. We knew Ebola was transmitted by contact only, not airborne. But if they were to splatter or start vomiting and you get hit, it's going to get you. To minimize that, we always train in a PAPR [powered air-purifying respirator] suit. It gets you used to being in it, so you're conditioned. If you never train in it, thirty, forty minutes or an hour in, you can pass out. Then you have a down medic who's contaminated, and somebody else has to get in. Then you'd run into problems of having way more people exposed.

We went through our regular SOPs, checked our equipment. Then we dressed the truck out. We pull everything out—the stretcher mount, the cabinets, the seat belts off the benches—and we cover the inside from the ceiling down with a waterproof thick material. We create a bucket, basically, so if there's any spillage, any fluids, it would be contained. We dressed two trucks so there was a backup. Some people didn't want Ebola coming into the country, so we were planning for the worst. If somebody tried to ram the ambulance and we flipped, then we're in the middle of highway 285, waiting for...what? So we always have a backup and a chase vehicle.

Ferebee: Once we landed, we put him in the suit. The purpose of the suit is to protect everyone else from him. But the fact that we put him in a clean suit in the tent means, technically, the outside of his suit is contaminated. So then we have to protect the cabin when he walks out. We put pads down and fluid-resistant drapes along the sides that cover the seats and our equipment.



Arevalo: It was really hot. You could see steam coming off the runway. Gail and I, we suit each other. We've been training for years together, so we trust each other. I'll put gloves on. She'll put gloves on. She'll tape me. I'll tape her. We check, recheck, and then double-glove again. She gets into the suit all the way except for the PAPR. She has a PAPR up front. Worst-case scenario, if I needed assistance, all she's gotta do is pop her hood on and she's good to go.

I stepped into the plane. A nurse was holding Dr. Brantly's hand. That first look into his eyes, it was like I could feel his pain, I could feel that fear. He mentioned in some of his interviews, there were days he thought he wasn't going to make it. Just



walk backwards so that I can see. And if he falls, I would rather him fall on me, where I can catch him. I hit my com and said, "Hey, guys, somebody's gotta count the steps for me, because I can't see."

We went down step-by-step, real slow, to the ground. He was weak, but he wasn't wobbly or falling. I sat him in the stretcher, buckled him in, and told him, "Welcome home. It's a pleasure to have you back."

Ribner: In a different part of Africa is Marburg-virus disease. Not quite as lethal, but a hemorrhagic fever. About six years ago, a CDC employee working an outbreak in Angola was transported to our unit for presumed Marburg-virus disease. We were able to determine that in fact he did not have it. But no one even knew that person came and went. That's the way I thought it would be when Kent came over. I said, "We've done this before. No big deal, right?"

Arevalo: The ride was, um... It was calm, but you could hear the commotion everywhere outside. We couldn't see through the windows, because everything was covered, but you could hear sirens to the right, sirens to the left. You could hear helicopters.

Ribner: Usually the ambulance calls us with progress reports, but we just watched it on TV. *Oh yeah, they just turned off 85. Now they're coming around the corner.*

Isakov: We bring the patient right into the isolation unit. We don't stop at the ER. We don't come through crowded hallways. None of that would make any sense. Having the most direct route into the unit is critical.

Arevalo: I step out of the ambulance, and then I help him out. As soon as we come out and I hear the helicopters, the first thought was *Please don't fall*. I was coaching him through: "Let's be careful. Let me hold you."

They had the door open for us—it's usually locked when we do the training, so that's already different. We go in, and right when we got to the steps, he was not moving as fast. I asked, "Do you need to take a break?" He kind of nodded his head. He went to reach for the railing, and I was like, "No, no, no, just hold on to me," because we can't touch anything, right? "Just take a breather. I have you. If you're gonna fall, you fall on me."

We went up the steps. Every time we do the training, a lot of people will fly in to see, because we're the only ones in the nation that do the transport. They're taking pictures, and there are doctors everywhere. But as soon as we turned that corner, it was dead silence. No one was around. I was like, "Okay, this is real." That's when it actually hits you. We walk up to the door in the unit, and I push through with my elbow, and there were three people in full PAPR there, all suited up. It looked like *Contagion*. So it hits you again, where you're just like, "Okay...this is bad. This is really bad."

Brown-Haithco: Thirty minutes later, Dr. Brantly's family ran into the waiting area. They knew they wouldn't be able to touch him, but Dr. Ribner and his team made sure they could go into the anteroom, pick up a phone, and look at him and talk to him. That was very important. I felt their anxiety ease as soon as they were escorted back. Then, when Dr. Ribner came out and talked with them, you could feel the anxiety getting lower and lower. Now, he didn't make any promises. He basically said, "Here's what we're going to do. There is no cure. There is no treatment. We just want to support his immune system so it can fight off the virus on its own."

Jason Slabach (cardiac-ICU nurse, Emory): When they realized they were going to have multiple patients here [a second patient, Nancy Writebol], they needed to add to the team and wanted ICU nurses. I had to talk to my wife—she's a nurse here as well—and we had questions. You know, if they were taking the same precautions in Africa, how did they get it? Would we be quarantined? How will they keep us safe? But we had people from the CDC train us,

seeing that will probably stick with me for the rest of my life.

I took his hands, and it was really tight quarters up there. With the PAPR, you know, the suit's a little big. It *should* be a little big, because you don't want it too snug in case you bend over and it tears, defeats the whole purpose. I was walking backwards, so it was really hard for me to see the steps. I was like, All right, now I have his hands, now I'm contaminated, potentially, and I don't want to make him

and they deal with things way worse than Ebola every day and go home to their families and aren't worried about it. So that made me feel better.

I worked Sunday morning. Dr. Brantly was really sick. I had never taken care of an Ebola patient before, so I didn't know what to expect, but in a lot of ways it was like a normal nursing day—except I was very, very paranoid of everything that I did.

Dustin Hillis (*neuroscience-ICU nurse, Emory*): On our normal units—I'm neuro, Slabach's cardiac—you're kind of a jack-of-all-trades, master of none. But down there, you have to be a master of everything. It's the difference between going home without anything and going home with Ebola.

Slabach: We draw blood all the time. We clean up diarrhea, poop, vomit all the time. You don't think about it. But when you're taking care of an Ebola patient, everything is done 100 percent by the book. I normally joke around a lot, but definitely that first day I was very serious with everything that I did.

Hillis: The biggest thing those first few days was controlling fever and cleaning up diarrhea and trying not to spill it all over the room. But the number one thing you control fever with is Tylenol, and these people's livers are already shot, so you have to balance that out. Sometimes you may permit them to have a low to medium fever.

Colleen Kraft, M.D. (*infectious-disease specialist, Emory*): Before we took care of anybody with a VHF [viral hemorrhagic fever], I thought it was bleeding to death, right? But there are so many more things before that. People have a septic kind of phase where their body's trying to fight the virus so hard, all your immune cells are activated; you can have organ failure and die just from being septic. Then there's a gastroenteritis phase with cholera-like diarrhea that can lead to severe dehydration, which can also kill you. And then you have electrolyte abnormalities. Kent Brantly said that people in Africa would sit up and clutch their chests and die, keel over. And that was probably an arrhythmia caused by low potassium. They were probably having electrolyte abnormalities because they're having such profuse vomiting and diarrhea, just continuous, for days.

What we do for any syndrome like that is, we measure what's coming out and put it back in. We measure their sodium, potassium, calcium, and magnesium and give those things back. It's not like a bottle of Gatorade or a few sips. It's probably six liters a day.

Ribner: Our poor colleagues in Africa, they've got an Ebola-treatment center with maybe forty to sixty patients in it, and they've got one or two physicians and maybe a nurse taking care of these hideously critically ill patients. Frankly, the biggest thing that we never really had a good model on was how intensive the required care was. Our normal model in the ICUs is one nurse takes care of two patients. In the isolation unit, we needed two nurses for each patient. Similarly, we had one physician who was always on, physically present in the unit, taking care of one patient.

Slabach: Technically, all you need are contact-droplet precautions, which means wearing a fluid-impermeable gown, gloves, and a mask with face shield. That would protect you if you just walked in a room. But if someone's having spontaneous diarrhea, you can't trust that something won't land on your shoe or your leg below your gown and you touch it later and then you touch your mouth. Because nothing is always done 100 percent perfect, we just have to go above and beyond.

Hillis: That makes the nurses and the doctors more comfortable. And if you're more comfortable doing your job, you're less likely to make mistakes. Speaking of that, right under taking care of the patient is taking care of yourself and taking care of whoever's working with you. You're always watching each other—"Hey, you forgot this"—and, you know, we don't take it personally.

Slabach: We had to memorize the symptoms, because we have to watch ourselves and report, twice a day, all of our symptoms and our temperature. And a good part of the training was just practicing putting on and taking off the protective equipment and doing it correctly, in the right order, because that's really what keeps you safe. And whoever was in the anteroom, after they sanitize your stuff, they would wipe down all the surfaces on the door that you just came through, and they would mop the floor.

Hillis: If you're not charting or taking care of the patient, you're constantly cleaning. I always joke with people I work with, "Don't you dare tell my wife I clean this well."

Brown-Haitheo: I came in on Sunday, and Dr. Brantly's father was sitting there. He began to share his son's story, about how his son got to Liberia, how as a teenager he became aware that he had a calling to be a doctor and that that

calling, which was couched in his faith, led him to Liberia. Hearing his father tell me that story painted a picture of Dr. Brantly—that his faith and his vocation were connected, they were linked. His father said to me, "You know, I'm not sure why I'm talking so much." And I said, "Because you need to. You need to let us know who your son is, and why he did what he did, and how he got to be where he is, and how that's connected to his faith and to yours."

Slabach: Dr. Brantly took a shower the third or fourth day. I worked the evening shift, and I knew he was feeling a lot better. His diarrhea slowed down. When that happened and he ate a real meal, I felt a lot better.

Hillis: He had his wife go out and buy him clothes so he didn't have to run around in a little hospital gown. Sweatpants and T-shirts.

Slabach: I told him he was a diva, though. They couldn't wash anything, because it would be contaminated. So he would only wear a T-shirt once, like he's a Hollywood star.

One nurse, Jill, she brought in a Nerf basketball goal, and I set it up in the room, and over the shifts we would play Nerf basketball with him. We called it "Kent's man cave." If, like, his wife came in and was like, "You're not out of bed yet?" we'd be like, "Whoa, whoa, whoa—this is his man cave. He does what he wants."

Kraft: Patients have to test negative in their blood for Ebola virus twice before they're discharged. That's how we know they're ready to go home—two negative viral loads in their blood over a couple of days. But that's not even a requirement necessarily in the field, so both of them were feeling a lot, lot better for a long time before they could go home.

Hillis: The day he was discharged, he took a shower and put on his nice clothes. He had his press-conference statement typed up and was having us look it over. And then, once he left the unit, we were all lined up, giving him high fives as he ran out.



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Slabach: Oh, and one of our guys, just to give him props—his name's Josia—he brought in a sampler of body wash so he'd smell good for his wife. So his last shower, he used that. Versace. Smelled very nice.

Ribner: We didn't really need this level facility. You could in theory take care of a patient in any standard hospital room, as long as you're very fastidious about your personal protective equipment and following the isolation guidelines. Any hospital could do this.

We'll get 3,000 Department of Defense personnel out there and several hundred CDC personnel; they're recruiting physician volunteers to go out there. As the numbers go up, as we have more potential exposures, there are going to be more people getting ill, and at least over the short term, there will not be facilities to care for them in Africa.

The analogy I use is the 1980s with HIV. We had the same sort of hysteria, even in the medical profession. We had prominent surgeons saying, "I think it's unethical to ask us to operate on patients with HIV infection." You don't hear those kinds of comments about HIV today, and my guess would be that over the next six months, you guys won't even bother to come over and interview us. It's going to be like, "Monday, Oh yeah, another Ebola patient. Big deal." Right?

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