A Day in the Life of an Ebola Fighter

My cell phone alarm goes off at 7am, but I am already awake. The five Americans sharing a tent with me are early risers, and my sleeping pad does not give much relief from the hard Sierra Leone dry season earth below. The Danish organization International Humanitarian Partnership erected this tent city in an open field next to a now closed Port Loko secondary school, and despite some tossing and turning in the night, I could not have imagined a tent city being much more luxurious. Upright and stretching my arms, I am immediately aware of my overfull bladder and scramble to put on my sandals.

The Danish erected this ex-pat canvas refuge in about a month's time to accommodate the world's dysfunctional family of disaster relief responders. Using the blueprint and experience of tent cities built amidst other world crises, the Danes provided a remarkable semblance of first world living to return to each night after days full of third world death.

I swiftly walk past the La Vida Loko Tiki Bar to relieve myself, then head towards the shower on cleanly raked gravel paths below WIFI emitting towers. A hot water shower is priceless on the cool December morning before the sun is high, and is far beyond my expectations of bucket baths based on my prior African experiences and accommodations. I am careful in my movements while washing up as there is a sharp metal edge in front of my soap where I deposited some skin a few days ago. Any opening of the skin provides an open door for Ebola, and my hands, which will be handling sweat, vomit, feces and blood in a few hours, are the most vulnerable. Any cut or scratch on my hands has to be evaluated by our clinical lead, who will decide if I am allowed to enter the Red Zone.

The mess hall hosts the many members of the disaster response family sitting at their own tables and occasionally intermingling. At one table sits GOAL, from Ireland, but staffed mainly by Brits, who run the lab that processes all the Ebola blood tests and dead body swabs. The vest wearing WHO spoon oatmeal at another table and discuss policies and procedures. CDC staffers sip coffee and enjoy Excel and numbers for breakfast. Then there is us, Partners in Health, quickly scarfing salami and Nutella on bread to power another day of hands on Ebola patient care at the Maforki Ebola Treatment Center.

My relationship with Partners in Health is young. In September 2014 I heard a NPR radio story detailing the underwhelming response of health care workers to treat the spreading Ebola epidemic, and a few nights later I applied to every organization that I could find online. Partners in Health (PIH) was the first to respond. After months of uncertainty and confusion, PIH got me to Boston for training at their headquarters prior to deployment in Sierra Leone, the new epicenter of the quickly evolving epidemic. PIH has an impressive history of bolstering some of the world's most inept health care systems in Rwanda, Haiti and elsewhere, doing so alongside the public sector to improve each country's capacity and competency to allow for long term sustainable improvement in their health care infrastructure. The partnership between Sierra Leone and PIH was just being arranged prior to Ebola, and when the epidemic surged into the country in October, PIH, an organization that does not specialize in disaster response, was faced with the moral imperative to run directly into the fire.

Each week a cohort of reinforcement PIH firefighters have been sent to Sierra Leone, each bigger than the last, and the group sitting around my breakfast table was the sixth cohort deployed, counting six in number, to be on the ground for six weeks. We are three nurses, one nurse practitioner, and two

doctors from Portland, New Mexico, Minnesota, Saint Louis, Philadelphia and New York. Our skills, experience and personalities all vary, but our presence together in Sierra Leone identifies a unique commonality, however individually derived. And that commonality gives me uncommon respect and trust in those I have known for only weeks.

Our driver is here, off to work. The drive from tent city to our Ebola Treatment Center (ETC) is three miles through the heart of Port Loko. The children spot my pale skin and wave yelling "Opato!", the Timni, Port Loko's local language, word for "white man". Children are everywhere, running around homes and stick built roadside kiosks. School is not in session. It has not been for a year since Ebola hit. The universities are closed too. The congregation of children or adults in any form has been outlawed. So many of the joys of life are forbidden. In this football (soccer) crazed country I have not seen a single game being played. Not one. The ubiquitous football fields are all empty, weeds growing tall. The beloved English Premier League games are no longer showing at the cinema or on TVs at the local bars. Restaurants have limited hours or have closed completely. Travel around the country is not possible without Ebola Response passes dispersed by the Ministry of Health which are high in demand. Routine "lockdowns" forbid business to take place at the markers, and the streets are eerily devoid of the bustling commerce that is the charm of urban Africa. No one is to have a wedding. No one is to have a funeral. To live proper, to die proper, not allowed.

We arrive at Maforki ETC, our battleground. Ebola swept into the city of Port Loko in October, and the district's incredibly fragile health care infrastructure immediately crumbled. Patients sick with Ebola came to the district hospital which had no ability to safely triage Ebola patients away from others. Disease spread throughout the hospital. Doctors and nurses became infected and died. Bodies were stacking in the chaotic hospital, and President Koroma decreed that the Maforki Ebola Treatment Center should be opened immediately. The Red Cross hastily built Maforki by converting an abandoned school. There was no time for a ground up well organized center to be built, despite the unique needs and layout of a safely operating ETC. Hundreds of patients were dropped off by ambulances to be handled by the minimally trained Sierra Leonean staff. Partners in Health, with only an infant footprint in the country, vowed to accompany the Sierra Leoneans into the fire.

Out of the car and over to the day's first hand washing station. Chlorine has become my best friend and greatest foe. From the time you step off the airplane in Freetown you are confronted by 0.05% chlorine hand washing stations. They give comfort in their potential Ebola killing power and despair in the endless cracking and eroding of my body's only natural barrier against the virus. From the hand washing station over to the temperature check. The no touch thermometer is pointed at my forehead execution style and trigger pulled. 36.6 Celsius. I am learning that I average a cool 36.5C and I take comfort in the number, well below a fever of 38.0C. Fevers here are terrifying, and their causes many. Malaria, typhoid, hepatitis, food poisoning, Lassa fever… Ebola. I use prophylactic medications and vaccinate against what I can; malaria, typhoid, Hepatitis A, and hope to avoid the rest. My previous traveling tendency toward reckless abandon around chowing down on street meat has to be reined in here to avoid dubious diarrhea. Allergies to the constant haze of dry dust can cause a curious cough. Backseat rides over horrendous roads leads to nervous nausea. Ebola leads to many symptoms, including anxiety.

Maforki is operated by the collaboration of Sierra Leonean health care workers, a team of doctors and nurses sent by the Cuban government, and Americans from PIH. We all crowd together around the newly installed white boards to review the patients, which are divided into the categories of Suspect and

Confirmed. Once a blood test comes back positive for a patient in Suspect Ward, they are moved into the Confirmed Ward. The community health officer (CHO) who has less than a nursing degree, gives the morning report on patients after he rounded on them in the night. The CHO and Sierra Leonean nurses do a quick check on patients overnight, nothing more. PIH, now numbering about 14 in total staff, does not yet have capacity to take shifts at night. No IV fluids are hung, no meds given, no bodies taken to the morgue. Stray dogs roam the wards among the living and dead looking for a meal.

The CHO proceeds through all 60 patients giving a one word update on each: Dry (no vomiting/diarrhea/bleeding), Wet, or Dead. Those who died overnight have their piece of paper passed to the Deaths white board, and await the burial team. Burials are dangerous as the bodies are highly infectious. Rural village burial traditions including washing and paying respects to the deceased have led to many more infections and deaths, and billboards are seen throughout the country discouraging these common practices. Burial teams dressed in full personal protective equipment (PPE) are called to handle all deaths reported in the country, whether at the ETC or in individual homes. Every dead body is then swabbed and the sample tested at the lab for Ebola. Despite the fact that Ebola deaths have only been accounting for about 6% of all deaths occurring in the country, every person who dies from one of the many daily dangers of life in Sierra Leone, be it malaria or child birth or tuberculosis or trauma, has their body taken away from loved ones and is buried by strangers. No mourning. No final respects. Drenched in chlorine and covered with earth to separate Ebola, present or not, from the living.

After morning report, I look at my assignment for the day: Suspect Ward. 15 patients to see. Our team consists of two PIH staff, two Sierra Leonean nurses, and a Cuban nurse and doctor. We review what we know and remember about these patients from the previous days. No documentation is allowed to leave the Red Zone of the ETC, and therefore record keeping is difficult and mostly committed to memory. We make a plan for our rounds, and start assembling whatever supplies are available from the store room. All patients receive antimalarial medicine to treat possible malaria being confused with Ebola or the more dangerous scenario of malaria concomitant with Ebola. Antibiotics are given as well to treat any possible bacterial infection. Neither of these medications kill Ebola. We do not know what does.

We mix oral rehydration solution (ORS) containing essential electrolytes lost through vomiting and diarrhea in empty 1.5 liter water bottles that have been drank by our thirsty staff. The salt water tasting solution is our first line of defense against Ebola, and all patients are encouraged whenever possible to drink more ORS. There is no cure for Ebola. No pill to take. All we can provide is supportive care, which includes trying to replace the 11 liters of fluid patients lose in diarrhea and vomit every day. ORS can only do so much to make up this deficit, especially when patients are too weak or nauseated to drink.

The Cubans congregate in their own well-kept nursing station, and I walk in to recruit a nurse and doctor. “Hola doctor!” they all greet and look back at me through wide lensed designer sunglasses. I give an elbow bump to Dr. Pepe and Nurse Sanchez. The elbow bump is the only acceptable greeting during Ebola times. Africans, in my experience, traditionally love their warm and sometimes elaborate handshakes, but now introductions and greetings feel awkward and standoffish, arms rigid at one’s sides. Avoid Body Contact is the reincarnation of the ABC rule (Abstinence, Be Faithful, and Condoms) for this African health crisis, and another reason why day to day life feels so far from natural. Dr. Pepe and Sanchez agree to meet the team in the donning room in five minutes.

It is almost time to head into the Red Zone, and I need to start my ritual. After drinking water from my Nalgene bottle all morning, I supplement with some ORS. A Gatorade lover since it was used by my mom to nurse me back to health from childhood illnesses, I drink the salty sweet fluid down easily and give my immune system a nostalgic boost of confidence. Wristwatch off. Pockets emptied. My scrub pant legs are tucked inside long socks and my feet slip into black rubber boots which state my name in white nail polish. The final and most important step is the trip to the toilet to empty my again full bladder. There are no bathrooms where I'm going.

Our team is assembled and we head into the donning (PPE putting on) room joined by Jack "The Eboladozer", our energetic chlorine sprayer. The 8x8 foot space is dressing room anarchy as 10 people apply layer upon layer, bumping and dancing about each other. Despite the sardine can's rising temperature, the process provides a feeling of familiarity and calm. Size 8 gloves. Coverall suit. Size 8 gloves. N95 mask. Hood up. Apron. Face shield. PPE on. Nothing can happen to me in here. This is my fortress.

Nothing comes in… nothing comes out!? I can't breathe, oh shit I can't breathe. The mask and the suit and the face shield are too much on my face I can't breathe! Just breathe faster, you'll get more air, agghhh - I still can't breathe! My face shield is fogging, I can't see. Did that patient just vomit on the floor, I can't see! I can't breathe, feeling dizzy, can't breeat…

Panic attacks happen in PPE. Other staff members have been held out of the Red zone after freaking out in their suits. The situation becomes dangerous for everyone around. PIH now has a policy for how to deal with unconscious staff in the Red Zone for this reason.

The first time I suited up in training, the anxiety of seeing my first Ebola patient coupled with a claustrophobic sensation and quickly diminishing vision from a fogged face shield got my heart racing. My respiratory rate increased. I wondered if I could do this. Gradually I was able to talk myself into a calming mindfulness, and my heart and lungs slowed. My thoughts stopped racing. The fear was overcome. I could do this, I had to. By now, two weeks since my first time in the Red Zone, I have complete comfort and familiarity inside my space suit.

I look into the mirror in the donning room and check to make sure my PPE is complete. Fatmata, matron of the donning room, writes "Dr. Nick" on my apron chest with black marker and writes the current time, 10:15, on my sleeve. One hour inside is what is recommended to prevent overheating in the 90 degree Fahrenheit weather, but is never close to a sufficient amount of time to care for our patients. I look over my team to make certain everyone has properly donned. We pick up our supplies from the staging area and head single file past the point of no return.

We go down a long corridor and approach the open courtyard surrounded by classrooms turned Ebola wards. The outside world is kept out by bright blue tarpaulin walls on all sides of the ETC. This is the Suspect Ward, where patients are suspected of having Ebola but their blood test is pending. This area is always entered first, prior to Confirmed Ward. The flow for health care workers is unidirectional, you can never go back to Suspect from Confirmed. The intent is to prevent cross infection of suspect patients by confirmed by the hands of health care workers, since not everyone at an Ebola Treatment Center necessarily has Ebola. Poorly run centers around the country have been mixing the two, and without a doubt are causing new infections. Patients with malaria who are taken to an ETC by their concerned family members are being admitted because their symptoms are indistinguishable from

Ebola, and are then contracting the disease from the vomiting Ebola patient in the bed next to them. Poorly operated Ebola centers are breeding more infections and deaths. This is why an ETC specifically built from the ground up and perfectly organized to manage Ebola is ideal, but a school turned ETC in the blink of an eye is what we have to work with at Maforki.

The healthier suspect patients sense the danger posed by the sicker ones, and congregate in the courtyard far from the bodily fluids flowing on the floors of the classrooms/wards. We wave to them and let them know we will be with them soon, but sickest patients come first.

Enter Ward 1. I scan the room for moving chests. An eight year old boy is lying naked and motionless on a sheetless bed, vomit and diarrhea staining his skin. Dead. There is no sheet to cover him. He lies as a constant reminder to the other three children in the ward of what is coming.

The two girls in the next two beds have pulled out their IVs overnight, a routine occurrence. The five year old boy in the next bed yanked his out too, and left a blood trail across the room to where he now lies sharing a mattress on the floor with an elderly woman too sick and weak to care for him or move away from his likely infected blood. I pick him up from a pool of blood and carry him back to his sheetless bed. His arm continues to bleed from the site of the IV, as bleeding is common in the late stages of Ebola, and I hold pressure with my hands. There is no gauze available at Maforki, six weeks after opening. There is no medical tape available. There are no wound dressings. There are no chucks (large absorbable towels) to soak up the blood. We find a large cotton ball and tie over the bleeding vessel with the strings from a yellow safety gown. Jack the Eboladozer sprays the blood off my hands, and we move to the next patient.

A thin 35 year old woman lies in the corner, dying. She appears to have a chronic disease, possibly HIV or tuberculosis, based on how frail she is, but I was not there when she was questioned at triage and thus I do not know if she was at particular risk for Ebola or was dying from another condition and brought to the ETC. She is naked except for a diaper, full of feces. Thick mucus runs from her nose. She is too weak to sit up, unable to talk. She needs an IV.

One of our Sierra Leonean nurses, Mariatu, says she feels confident starting the IV. Intravenous fluids have been a point of contention throughout the outbreak. Heads of MSF (Medecins Sans Frontieres/Doctors Without Borders) and PIH have duked it out on the pages of the New York Times over how aggressive to be with placing IVs or interosseous (catheter straight into the bone) lines. Any Ebola patient in the United States would get two or three IVs. Saving a patient's life is dependent upon replacing fluid loss, and oral replacement alone is not a sufficient option. We know this. But placing IVs is dangerous. Any exposed needle within this environment is a potential death warrant for a health care worker. A needle stick, in which a needle pokes through your gloves or any part of your PPE and then through the skin, with a needle exposed to Ebola blood is an immediate evacuation home. The odds of the stuck health care worker contracting the disease are very high.

At least 230 health care workers in Sierra Leone have died. 10 of the 136 doctors in the country died. Yes, Sierra Leone has 136 doctors for a population of 6 million people. That is 0.02 doctors per 1,000 people (the US ratio is 2.42:1000). Many Sierra Leonean doctors are now refusing to do patient care, and who can blame them. If I were to get sick with Ebola, I have a PIH provided insurance policy and agreement with the US State Department to book me a direct $50,000+ evacuation flight out of the country which would get me back to a state of the art first world medical facility. No American has died

from Ebola. Sierra Leoneans with Ebola, doctor or not, die alongside their countrymen, with no insurance policy or access to high quality care.

Mariatu holds down the frail woman's arm, ties around a tourniquet and finds a small vein as her target. She uncaps the needle and plunges in. Once there is blood return from the catheter, she quickly pulls the needle out of the skin, and stabs it into the mattress. In any US hospital, this dangerous practice would not even be an issue because the IV catheters have retractable needles that disappear once the catheter is in place, minimizing risk. But here, in the most dangerous of environments, the deadly weapon is stabbed into the mattress, a practice Mariatu likely just learned in nursing school. I ask her to please remove it and place it into the cardboard needles container that I am holding.

The IV is secured with "plaster", Sierra Leonean medical tape that must have been the first tape ever discovered after glue was spilt upon a sheet of paper. The incredibly sticky plaster is devastating to our latex gloves, and slow movements are critical to prevent the gloves from tearing. With the IV in place we hang a bag of lactated ringer's fluid and give IV antibiotics. I wonder if we are doing her any good or just prolonging her death.

We tend to the other sick patients in Ward 1 and then walk outside. The Eboladozer follows us and sprays down our hands before we see the patients congregating in the courtyard. These are the patients who likely do not have Ebola, but had symptoms concerning for Ebola that bought them a stay within this death trap. I must be sure that my hands are clean from the Ebola containing bodily fluids that I was just handling. Bintu stands up from her chair in the shade and greets me. "Doctor, I want to go home! I feel strong." She does a dance for me and smiles. "I'm sorry but your blood test is not back yet, and we want to make sure it is safe for you to go home."

Her blood was taken four days ago. Blood test results take anywhere from one to five days to come back to us, and we have little insight into the cause for delays. The process is complex. All blood draws are done by a single phlebotomist, who has the most dangerous job in Sierra Leone, but collects the same hazard pay as everyone else. After his draw, careful transport must be arranged. Up until recently, this meant a ride into the lab in Freetown. Now, the non-governmental organization GOAL has setup a lab in Port Loko to handle our samples. From start to finish in the lab the Ebola PCR test should take no more than six hours. Obtaining the results is the last hurdle, as they are often emailed and internet access at the hospital is inconsistent at best.

"Hopefully tomorrow. Do you need some more ORS?" She slumps her shoulders but nods her head, and I hand over a bottle of ORS colored with red flavoring. It is little consolation for the risk she is taking with every passing minute inside these tarpaulin walls.

We medicate the rest of the patients and talk to them briefly. Dr. Pepe and Nurse Sanchez join us after seeing some patients on their own. "Dr. Nick," Dr. Pepe says and points to the watch not on his wrist. It has been one hour, and the Cubans are under strict directions from their director to exit after 60 minutes. The Cuban contingent is stationed in Pork Loko for 6 months and I understand their need for pace and self-control to maintain the physical stamina to last here for half a year. I agree that the two of them should head towards the doffing (PPE taking off) station.

Before leaving the Suspect Ward, we have to gather any patients whose blood test has come back positive for Ebola and take them with us through a gate to Confirmed Ward. A 24 year old, Aminata, is

positive. She came to the ETC two days ago with her two month old baby, Jiah. Aminata had been feeling symptoms, but her baby was doing fine. She was given a choice, bring her baby inside the ETC with her, or leave him outside. Several of her family members had died already from Ebola, and she had no one to care for him. She brought him inside with her and hoped for the best.

After her first night in Ward 1, we learned that she was still breast feeding him. Ebola virus can be passed in breast milk, so we counseled her on the dangers of breastfeeding and put Jiah in a cardboard box across the room from her. Her diarrhea and fevers continued over the last two days and I was not surprised by the positive result we received today. We go into Ward 1 to deliver the news.

“Aminata, your test came back positive for Ebola.” “We need to move you to another room.”

“Am I going to die?”

“No, you are going to drink ORS and stay strong for your baby.”

“Is he staying here?”

“Yes, we are still waiting on his test and we want him to stay safe and far away from the patients with Ebola. We will take care of him and feed him.”

Before walking her to Confirmed Ward, I wash my hands and go over to Jiah. He needs to get out of Ward 1. Too many people are dying in here. I pick up the cardboard box bassinet and walk to the empty Ward 7 and place it down on the steel frame of a bed. His diaper is dirty so I give it a quick change, as we thankfully have Pampers now. He looks up at me, rolling around on his back, and smiles. Healthy. Life.

We help Aminata out of bed and slowly escort her to a new bed in Confirmed Ward. We pass both recovering and deathly sick patients, hope and despair for this mother who has just left her only child behind. She is situated and encouraged and we step outside into the high noon sun. I can feel the sweat dripping down my back. “Mariatu, are you OK?” “Yes.” “Jack, you OK?” “Yes sir.” “Bill?” “Hanging in.” “Ok, let’s get out of here.”

Time for doffing. The most dangerous place in the ETC. There are eight health care workers standing in line to doff, as other teams have been rounding on patients at the same time as us and are exiting at the same time as well. There are two doffing lanes, and only one person can proceed out of the Red Zone at a time. Everyone in line looks for shade and sweats patiently.

Doffing is where health care workers get Ebola. Ebola virus cannot be seen, but is living in the fluids that our hands have touched and in the vomit that sprayed onto our legs. It is there, somewhere. Each piece of PPE must be taken off systematically in a manner that ensures any of the surfaces that might contain the virus do not come into contact with our bare skin or scrubs. Slow, mindful technique is critical. The chlorine is a crutch, but studies have shown that chlorine needs to be in contact with the virus for more than two minutes to actually kill it, and even longer for virus contained within organic material such as vomit. We douse ourselves in chlorine regardless, but proper doffing if the only way to guarantee safety.

First, spray down. A sprayer stands three feet away and sprays a stiff mist of 0.5% chlorine over almost every inch of our PPE coverall suit. Turn, and the backside is sprayed. If the sprayer goes too high an

overwhelming olfactory sting of chlorine hits the nostrils as spray comes inside the face shield. Boots lifted, soles sprayed. Apron off. Front side sprayed. Spraying complete.

Next, into the chlorine foot bath. 60 second hand wash. Outer gloves off. 60 second hand wash. Face shield off, dunk in chlorine three times and place in chlorine bath. 60 second hand wash. Coverall suit unzipped down the front and taken off via individually trademarked Ebola dance, each dance taking great care to never touch the inside of the suit with the outside. 60 second hand wash. Face mask off. 60 second hand wash. Inner gloves off. Do not touch anything. Moonwalk out of the doffing lane, soles of boots sprayed after each step-slide by a sprayer in the Green Zone. Wash hands in weak 0.05% chlorine for 60 seconds. Wash hands with soap and water for 60 seconds. Sigh.

When done correctly, each person takes nearly 10 minutes to doff. This is witnessed by each person's buddy, who will yell out reminders before mistakes are made, hopefully. After two hours in PPE, exhaustion hinders memorization of the process. Mistakes are made. Shortcuts are taken. Some were never properly trained to doff in the first place, such as the six Sierra Leonean carpenters who were thrown into PPE to make some repairs inside the Confirmed Ward, and then came to doffing without a clue of how to safely get out. People get infected here.

After 20 minutes of waiting in line, I make it through doffing and walk back towards the PIH break room. Every square inch of my scrubs is saturated through with sweat, which are now a new darker color of navy blue. I head to the water spigot and put my head underneath, rubbing my face and hair with the cool water. Boots off and into the break room, I make up a bottle of ORS and chug it down. The Danish tent city prepares a bag lunch for us, and I retrieve mine and head over to the ETC Triage Area. I make some notes on the white boards about our patients: wet/dry/IV/sicker. The staff assignments for the day are written on the board, and I am assigned to admitting for the PM. I will assess and admit any new patients that present to the ETC. But first, life.

40% of our Ebola positive patients will survive. After they are slowly nursed back to health, their blood is tested again for Ebola. Once it is found to be negative, they are no longer carrying the virus in a high enough load to infect anyone, and they are safe to reenter society. PIH staff will come to a patient in the Confirmed Ward and tell them they are ready to go home, and they smile. They leave behind any belongings that they entered the ETC with; cell phone, money, jackets, necklaces, wallets, pictures. All of these items are burned. We take them to the showers where they strip naked, and give us their clothes to burn. They wash their entire bodies thoroughly with soap and water, put on newly provided clothing, and exit the ETC walls.

The discharge process is involved and takes most of the morning to arrange, and by lunch time today there are five patients sitting in plastic chairs in front of the ETC, ready to go home. They look fatigued, bewildered, relieved and scared. For the past one to four weeks they have been considered too dangerous to touch without the protection of a space suit, but today, with the flip of a switch, we tell them that they are OK to come back out to the world and live amongst us once again.

Many of them will return to homes now devoid of family members and possessions. Survivors were often infected while caring for loved ones who died in their home. Their homes, modest as they are, are stripped of potential Ebola containing items. Clothes, bedding, and cookware are seized by a team of PPE wearing workers and burned or buried. Then there is the question of how they will be received by their local community. Many are feared or shunned as their neighbors are unable to understand how

this Ebola patient, who they were warned about on the radio and by posters and billboards, is now safe to welcome back home, and touch.

Our survivors for today sit near a bundle of goods that PIH has procured to send them home with, including some basic cookware, bedding, clothes, large sacks of rice and other food provisions. These items cannot begin to replace the contacts in their phone, their single and favorite pair of Levi's jeans, or their cousin who still lies dying inside the Confirmed Ward, but it is a start.

PIH staff gather around as each survivor is awarded an official Ebola Survivor certificate to a round of applause and cheers. Each of them takes pictures with their certificate which will serve as a necessary passport to allow acceptance back into society. They are then each given a small piece of a colorful cloth torn from a lappa, the traditional dress of Sierra Leonean women, and tie it to the small trunk of a young tree growing in front of the hospital. The Survivor Tree.

After being surrounded by sickness and death most of the day, this opportunity to smile and cheer and laugh and give bare handshakes gives us the lift of spirit needed to continue on. These survivors have gotten past their biggest challenge, and now face a whole host of new ones. But they have life, and that is a reason to celebrate, if only for a few minutes.

Since I am on duty for new admissions in the afternoon, I want to go back into the Red Zone to check on my patients before admissions start to show up. Admissions come either as walk ups, people who feel sick and are concerned they might have Ebola, or by ambulance. The majority of patients come via the latter, as contact tracers hunt down possible patients throughout the district of Port Loko.

Treating Ebola patients at the ETC does not end the epidemic of Ebola. Contract tracers, surveillance officers, community health workers, and public education will end this epidemic. For every patient we take care of at Maforki, there might be another one to 20 possible new patients out in the community who had contact with the patient we are caring for. Contact tracers are responsible for going out to these villages and doing the investigative work to see who else is at risk. Those with known exposures to bodily fluids are put into quarantine, and others are checked upon daily for 21 days after possible contact. As contact tracers and ambulances show up in small isolated villages, many community members flee out of fear that they are going to be taken to the ETC, the place where everyone dies.

There are many pillars requiring thousands of workers to conduct a full and effective Ebola response. That infrastructure takes time and money and people and organization. There is not an Ebola organization, there is the WHO, UNICEF, CDC, PIH, DFID, USAID, GOAL, MSF, IMC, ICRC, ETC. This is the dysfunctional family of alphabet soup that comprises an international disaster response, or at least this one. Each organization has its own area of expertise, supply chain, standards, policy statements, PPE, donors, reporting mandates and accents. It is complete chaos.

In Port Loko, the British military has setup daily family meetings to bring some structure to the landscape of so many well-meaning international partners. Over time, this organization has led to a robust program of contact tracing and surveillance that has led to the peak and downward trend of new Ebola cases within Pork Loko District. Without these efforts of so many people, many of whom will never don PPE and who have zero medical training, this epidemic will never come to an end.

I recruit an afternoon team to go into the Red Zone to treat our patients. Mariatu agrees although her shift ends at 4pm. One of her fellow nurses here at Maforki was diagnosed with Ebola just a few days

ago, and no one knows how she was exposed, as she did not report a breach (a tear or some doffing mistake) of her PPE. All the nurses are more hesitant now. Mariatu yells down to where the sprayers congregate to recruit someone for our team. No one readily volunteers. The sprayers have not been paid in weeks. Partners in Health is adamant about working with the Ministry of Health, to be partners with the country of Sierra Leone, and this leaves responsibilities such as paying the sprayers in the control of the government. Despite no pay in weeks, they still show up each day and risk their lives. There are rumors of a strike coming, and I would not blame them. Eventually, Muhammad volunteers to join us.

After preparing our medications, ORS bottles and other supplies, we head to the donning room. I tear open a plastic bag containing my PPE coverall suit and put one leg through. Hundreds of coverall suits are needed each day, and our supply has run thin. There is a worldwide shortage of appropriate PPE, which is very expensive. The World Health Organization (WHO) has endorsed the use of a different suit, which we also have in supply, but Quality Assurance officials with PIH are not comfortable with the safety rating on the suit, as it has not been shown to be completely effective against blood borne pathogens. One of my coworkers wore the suit one day and had vomit seep through it, down his scrubs. Other PPE has been supplied by the United Nations International Children's Emergency Fund (UNICEF) but it is far different from what we were trained to use, and it leaves your legs exposed. This is the PPE that UNICEF has shipped to 50 small Ebola Community Care Centers across the country to be used by Sierra Leonean and international staff. Members of the dysfunctional family have been giving PPE hand me downs to other family members. Big brother is lying when he says you look good in that suit.

The face shields are not available and Fatmata yells for more to be brought. I take one with my bare hands and set it aside. I trust that this face shield, which was in the Red Zone probably one hour ago, was just soaked in properly made 0.5% chlorine for 30 minutes, washed with soap and water, and left in the sun to dry. I did not see any of this actually happen. The system for face shield cleaning was in place when I arrived at Maforki and devised by someone else. I do not know how well the cleaners were trained or how strictly they adhere to a 30 minute soak. I put the face shield on and tighten the band around my head. Blind faith is all I have, as I continue to realize that much of my safety is entirely out of my hands.

I think about the supplies we are carrying before entering the Red Zone, "Did we get some more Coartem?"

"No, it's still out."

Coartem is the oral medication given for malaria, a medication that should be easily attainable in Sierra Leone. We are out. The supply chain to Maforki has been a complete embarrassment. American cohorts started arriving here six weeks ago, assessed the needs, and started making requests for the supplies necessary to run the ETC, save lives, and provide dignified care to the dying. Bed sheets, gowns, retractable IVs, medical tape, detachable IV tubing, morphine, blankets, rags, portable electrolyte machines. We have none of the above. I do not understand what it takes to get these things from where they are sold to here, but it has been six weeks, and it is enraging every time my glove gets stuck to the "plaster" we are using and nearly tears open because we lack these simple items available in every US hospital and clinic.

Back inside the Suspect Ward and we check on our patients, give afternoon meds and hang new bags of fluids. Jenny, a PIH colleague, is in Triage and yells from over the fence that we are receiving two new patients. Contact tracers had identified two people who were exposed to other Ebola patients and were feeling sick and called for an ambulance to come to their village and pick them up. They are arriving now at the ETC. I am on PM admissions duty with Bill, another PIH staff and palliative care nurse by trade, and we walk a man and a woman inside the Suspect Ward from triage.

Bill takes the woman inside Ward 3, and I stay with the man. He tells me his name, Komba, and his age, 25. He looks very weak and is certainly sick, probably a positive Ebola case. At this point he is still walking and talking though. Bill emerges and takes Komba and his admission items; a bodily fluid bucket, a cup, soap, a lappa, and some admission medications, and starts walking across the courtyard to Ward 5.

I step inside Ward 3 to see another patient and I hear Bill yelling, "Nick! Nick!" I swiftly walk across the courtyard to Ward 5 where I find Bill crouching down in his PPE beside Komba, lying flat on the floor, just inside the doorway. "He walked in the room and just started seizing and fell over and hit his head on the floor!"

We turn him over and lift him into the nearest bed. He is post ictal, a period of non-responsiveness after a seizure. I am not exactly sure why he seized, likely an electrolyte disturbance from profound diarrhea and vomiting, but we do have Valium tablets which can be used to treat seizures. We turn him on his side and gave the Valium rectally, then turn him back. I stop and watch him closely for 15 seconds. No breaths. I continue to watch for a full minute, staring at his limp body. No breaths. I pick up his wrist. No pulse. He is dead. Two minutes ago this 25 year old man was walking and talking, now he is dead. I have never seen anything like this.

Ambulance rides are killing people. Unlike the standard ambulance you think of, complete with paramedics delivering lifesaving care, these ambulances are nothing more than transport vehicles. Contact tracers tell the drivers to go pick up patients in remote villages, sometimes several hours from the ETC. Patients are told to get in the back of the ambulance, no matter how sick or weak. Ambulance drivers are told not to open the windows to make sure no bodily fluids come out. Air conditioning may or may not be working or turned on. These mobile ovens transport between one and six patients, some with active vomiting and diarrhea, over the worst pot hole riddled dirt roads you can ever imagine. Outside temperatures are around 90 degrees Fahrenheit. Patients who might not have Ebola are thrown into a washing machine with very wet Ebola patients, and hope to emerge virus free. Once the ambulance arrives, patients sit in the back of the ambulance at the ETC gates and await sprayers and health care workers to get dressed in full PPE and come open the door. Many are much sicker by the time they arrive from when they left their village. After later telling my story about Komba, PIH staff who have been here for several weeks tell me of two other patients who stepped out of the ambulance, seized, and died.

I go into Ward 4, where some antibiotic injections need to be given. There is a 28 year old female who has been altered for several days. It is not likely that she has Ebola, but seemingly has suffered some kind of brain damage from an infection or stroke or other event. We do not have access to the studies we need to figure out what is truly wrong with her. We examine her and she seems unable to move her left side, completely paralyzed. She will not answer questions, and seems to have altered vision as well. I have an injection of Ceftriaxone antibiotic to put into her thigh muscle, as she has pulled out her IV,

and a nurse holds down her right side as I prepare the injection from the left. As I poke into her thigh, her entire body jerks into motion and her left arm comes alive and grabs my syringe and needle. Clearly not paralyzed and now with great strength, she wrestles with me until I am finally able to pull the needle away from her hand. My heart races, and my head spins.

I walk over to Ward 7. Jiah is where I left him in his cardboard box. Smiling. Healthy. Life.

From ward to ward, I roam and assist other teams and help get new patients situated. At this point Bill and Mariatu and the Cubans and Mohammed have left the Red Zone to doff. I am not sure how long I have been inside, but the sun is getting low. Dave, a 58 year old family medicine doctor like myself, is admitting several children and I go to help him. He has been inside for quite a while as well, and we have to make decisions about who we will try to give an IV, despite the fact that all the children need them. We do not have enough time for all of them, and some will go all night without IV fluids. We pick a seven year old girl who looks the most dehydrated. Dave has worked in a clinic for years in the US and has not started an IV in decades, but bravely steps forward to help this girl. The IV is placed, but she moves and the catheter comes out. Frustrated, we move to her other arm and I hold it as Dave tries once again. The sun is setting and the lighting is terrible. The needle is adjusted but no blood flows, and Dave removes it from the catheter. While trying to put the needle back into the catheter, he squints behind his glasses and fogged face shield and misses the target but does not realize it. "Careful!" I shout, and he barely escapes a needle stick as he stops his hand from moving forward. "We need to get out," I say.

We head over to the doffing area, disappointed that we could not do more for the four children just admitted. They had family members die at home from Ebola, some lost their parents, and they all likely will have positive blood tests in a few days. They need aggressive rehydration and nursing care overnight, the simple things that would keep them alive in the United States. But we have to walk away before we hurt ourselves. I have been inside for over three and a half hours. I can feel that my heart rate is over 100 beats per minute as my blood volume has decreased by the amount of sweat saturating my scrubs. The 25 year old British military medic who taught us how to don and doff our PPE had to be flown back to England due to kidney stones he developed after repeated episodes of dehydration from staying inside the Red Zone too long. We are taught in our medical education to do everything we can for our patients, but here, that is just not possible.

It is after 7pm once I leave the Red Zone and take a shower, and I find a driver to take me back to tent city. I walk into my tent to find my five colleagues, all exhausted from the long day. We head over to the mess hall to have dinner and talk about improvements we want to make to the ETC, which is the standard topic of our dinner conversation. Each new cohort of PIH staff brings fresh energy and ideas and slowly, week by week, improvements are made in the care we are able to provide. I quietly eat my pork chop and scalloped potatoes and listen to Kim's idea for improving our documentation and our clinical care.

"We will have binders in the break room where we can keep simple documentation to help us keep track of what each patient needs the next time we go inside the Red Zone." I nod and marvel at her energy level and dedication, having stayed up late the night before preparing her documentation template. Kim is a 40 something year old ER nurse and former paramedic with a 12 year old daughter and husband back in New Mexico. She felt the moral imperative to use the skills she had acquired throughout her career to volunteer to treat Ebola patients, quit her job, and applied with PIH. She starts

more IVs every day than any other staff member, and has been selected to be the new clinical lead at Maforki. She has signed an extension with PIH to stay in Sierra Leone for six months, instead of only six weeks. What an example to set for her 12 year old daughter.

Musa hunches over his bowl of rice and fish, giggling. He was born in Sierra Leone, moved to the US in his twenties, and works as an outpatient Behavioral Health nurse in Philadelphia. Every night we hear him talking on the phone to his wife and four young kids that he left behind to come help his native people. He has developed an entire social support program for our Ebola patients, from delivering updates to family members in their native language to helping reintegrate survivors into their communities. While we were in Freetown, he welcomed us into the second home that his family has built there and provided us with a feast. I watched him hand out money easily to old acquaintances as he walked though his childhood neighborhood. One of the most generous people I have ever had the pleasure to know, he has also agreed to extend his deployment in Sierra Leone to six months to continue his work.

Robyn sits next to Kim and talks about the small items she wants to buy in the market to take into the Red Zone for her patients tomorrow. Back in Portland she is the single mother of a 14 year girl. She told her Emergency Department where she works as a nurse that she was going to Sierra Leone to fight Ebola, and if they said no she would quit. Her passport came in time for her very first trip outside of the United States, and now here she is. Every day she works with the Sierra Leonean nurses to make them feel involved in this largely American run operation. She encourages and trains them and keeps them safe in the Red Zone, as many are only nursing students who signed up to work in the ETC when their classes were canceled. Her daughter brags about her to her friends at school.

Ray sips his coffee and tells us about the trials of his day in the ETC. Freshly trained as a nurse practitioner, he left his wife behind in New York to use his 30+ years of experience as a paramedic and ER nurse to treat Ebola. From India to Malawi to Eastern Europe to Sierra Leone, Ray has made a habit of bringing skills and dry wit to third world countries to train local health care workers and provide medical care. Twenty five years older than me, Ray brings as much energy or more to each day, and cannot be held back by the PPE perspiration records he routinely sets. I can always count on him to drink a Carlsberg with me at the end of a long day.

Quy, a Vietnamese infectious disease doctor from Minnesota via Washington and Kenya, is now talking quickly about his plans to bring more safety to the ETC by reorganizing the way we put suspect patients into the wards. A tireless worker, Quy is notorious for getting up in the middle of the night and typing into his laptop, emailing lab directors and arranging meetings. His energy cannot be matched, and he brings life out of those around him with his traveling boombox and suitcases full of things forgot by others. He Skypes at night with his fiancé, currently working in Kenya, a truly global couple working to change the world. He too has been asked by PIH to continue to lend his expertise for a six month deployment, and he too has accepted.

After dinner we retire back to our cots, and I can overhear my friends Skyping and WhatsApping with their friends and family back home. The WIFI connection is good enough to allow video chatting back to the United States from what was just an open field in Sierra Leone a few weeks ago. When WIFI is not available, there is now 3G data services available from endless cell phone towers rising across the country. Nearly every Sierra Leonean has a cheap cell phone, and as they make a little bit of money they buy “credit” for their phones to purchase minutes and 3G data megabytes. Phone credit is a kind of

currency now, and workers are even paid sometimes in the easily transferable credit. The technology advancement since I was last in Sub Saharan Africa seven years ago is striking, and putting the world into the hands of these poor people. They are no longer insulated and marginalized from the world at large.

From inside their mud hut homes, Sierra Leoneans are managing their Facebook profiles and sending emails. They are laughing at the same puppy memes that you are. They observe our culture and our way of life. They know how different a first world hospital looks from the Port Loko District Hospital. They know that Americans do not die from Ebola. They know that the United States has 100 times more doctors per citizen than Sierra Leone. Africans have entered our globalized world, and our excess, as well as their plight, is more on display and accessible than ever before.

I am reminded of a philosophical dilemma posed by the professor of my freshman year Intro to Philosophy class, Professor William Ramsey. He posed this moral question originally from Peter Singer: If you were to walk past a child drowning in a shallow pond on your way to class, would you feel a moral obligation to help the child at the expense of only some muddy clothes and a missed class? Most everyone easily answered yes. He then expanded the question to address the millions of people around the world that are on the brink of death from various causes, that could be saved with only minimal sacrifice and cost – does the same individual moral imperative apply to each of their lives? The class went quiet, most of us internally acknowledging that we did not feel the same imperative, but not understanding why.

People dying on the other side of the world have a hard time appealing to an American's sense of moral obligation. The look on their dying face, like the look on the drowning child's face, that can appeal to the basic human emotion of empathy is not on display before us. Until now.

Maybe Ebola patient selfies posted to Facebook from inside the walls of an ETC will appeal to our sense of moral imperative. Maybe WhatsApp texts from nurses about to put on their inadequate PPE will make us feel their fear. Maybe the social media silence of sprayers with no phone credit because they have not been paid for their heroic work will be alarming to us, their first world Instagram friends. The people on this planet are connected not only by a device now in each of their pockets, but have always been connected by a common desire to protect and preserve one another. It has never been so easy to see. And it does not require suiting up in PPE.

The disease of Ebola is not a Sierra Leone problem, not a West Africa problem, not an American problem, but a human problem. And as I fall asleep tonight, in a tent with five of the most inspirational humans I have ever met, I think about what a privilege it is to be here fighting this disease with them.