

NEXUS

Physician Assistants for Global Health Newsletter

JANUARY / FEBRUARY 2015

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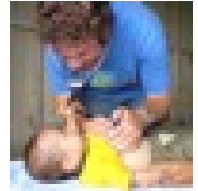
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An Inexact Science

Jacob Hauptman, PA-C, President, PAGH



Recently the World Health Organization (WHO) acknowledged that as an organization, they underestimated the Ebola outbreak which held West Africa in a tense grip during 2014 and which still continues to be a major source of concern. Although it is always important to reflect on improvements which can lead to a better, more effective response, for those of our members who have practiced medicine in low resource areas, they can understand the difficulty that the WHO as well as the other organizations faced when responding to the crisis. Whether the challenges are as complex as creating a well-functioning isolation unit or as straightforward as ensuring that the local population is effectively educated about the realities of the virus, no amount of preparation, training or planning can ensure that every single detail will be fully accounted for. The most that any organization can do is to perform the best that they can at the time and always focus on perpetually improving for the future. In the end, the WHO as well, as the other organizations who devoted their efforts to combating the epidemic, have helped ensure that as severe and tragic as the Ebola epidemic was, that it hasn't spiraled even further out of control and that it has finally begun to recede.

This mantra of serving the greater good but always trying to improve is the same for providers who are involved in global health, especially those who are volunteering abroad for the first time. For many there exists a fear that they haven't done enough to prepare or a doubt that even with their preparation that they will be able to be successful. Almost every PA who has already completed a medical mission would quickly say "don't worry, just do your best and trust in your training!" All of us have received a stringent, comprehensive program which holds clinical acumen in the highest regards. We are lucky to be part of a profession who has a mission of creating providers who are trained in almost every facet of medicine, ensuring that we have the perfect base on which to build a lifetime of medical knowledge. So if a fear of not being perfect is holding one of our members back from participating in the experience of a lifetime, set that aside and take that first step forward. Even those PAs who have dedicated their lives to relief work or medical work in underserved areas will never get it exactly right every time. The important part is that we as medical providers are always striving to be our best and helping to ensure the health of every inhabitant of our planet. 



PAGH

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Local Hands, Global Reach

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Disease of the Month: Ebola Virus

Preston Gorman, PA-S2, Baylor College of Medicine

The Ebola virus is one of the various hemorrhagic fevers originating out of Africa. It was first recognized in 1976 with outbreaks in Zaire and Sudan and since then has made sporadic appearances. More recently, a fictional account of the virus in the movie *Outbreak* (released in 1995) brought the idea of an epidemic into the public attention. Ironically, in the same year that the movie was released, a real outbreak of Ebola virus took place in the Democratic Republic of the Congo (DRC). While rare in incidence, the disease can, and often is, fatal with no current definitive cure. Though typically limited to specific geographical regions, the ease and speed of transmission of the virus, in addition to its morbidity/mortality, make it one that, if diagnosed, must be carefully contained.

Etiology/Epidemiology

The Ebolavirus genus is in the family Filoviridae and has 5 distinct species, named for their original sites of recognition: Zaire, Sudan, Cote d'Ivoire, Bundibugyo, and Reston. Of these, all but the Reston virus (exported from the Philippines) are viruses of African origin that cause severe and often fatal disease in humans. Due to their mortality and aerosol infectivity, the Ebola virus is classified as a biosafety level 4 pathogen. However, infected humans do not usually generate sufficient amounts of infectious aerosols to pose a significant respiratory infectious hazard to those around them.

The first appearance of the virus occurred in 1976 during simultaneous outbreaks in Zaire and Sudan. Interhuman spread, use of under-sterilized needles, and poor hygiene in hospitals were all found to contribute to both epidemics. After remaining relatively inactive for

approximately 20 years, the virus reappeared on the scene in a major epidemic in the DRC in 1995. Since that time, there have been multiple outbreaks of the virus of varying severity in sub-Saharan Africa, with the most recent large scale outbreak occurring in 2007 in the DRC with 264 cases and 187 deaths.

Researchers have hypothesized that the first index patient becomes infected through animal contact. The natural origin of the virus is unknown, but preliminary evidence points towards bats as the primary reservoir; gorillas and monkeys have also been known to be sentinels for virus activity. Transmission occurs through blood and bodily fluids including saliva, infected tissue, urine and feces. Caregivers (either family or medical) of an infected person are at high risk of acquiring the infection as well as those that prepare the dead for burial. Nosocomial spread is common, especially in some of the hospital care facilities in Africa where outbreaks have occurred due to the use of contaminated needles and failure to use universal precautions (gown, mask, gloves) in the hospital setting.

Almost all reported cases of the Ebola virus have come from Africa. There have been several human infections with the Reston strain of Ebola virus in the United States, but this strain has not shown itself to be pathogenic and has a benign course. At risk persons include those with a travel history to sub-Saharan Africa, persons who have recently cared for an infected patient, and animal workers who have worked with infected primates. Once infected, the outcome is usually death. The mortality rates for each of the species (except the Reston species) are very high, with the most lethal species, the Zaire ebolavirus, exhibiting a mortality rate as high as 89%. Of the 16 outbreaks

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Disease of the Month: Ebola Virus (*continued*)

Preston Gorman, PA-S2, Baylor College of Medicine

listed on the CDC website, only three of the outbreaks occurred with a mortality rate of less than 50%.

Pathophysiology

After gaining entry into human and non-human primates, the Ebola virus undergoes rapid and extensive replication in all tissues. The genetic makeup of the virus codes for a small, soluble, nonstructural secretory glycoprotein (sGP) that is produced in large quantities early in the infection. This sGP is responsible for the inhibition of neutrophil activation, thus preventing an early and effective immune response. A second, transmembrane glycoprotein is incorporated into the Ebola virions and enables it to bind to endothelial cells of all tissues, with upregulation of tissue factor and disseminated intravascular coagulation (DIC) following, secondary to the destruction of the endothelial cells. This is postulated to be the inciting mechanism behind the hemorrhagic manifestations of some, but not all, infections. In addition, viral replication is associated with widespread tissue necrosis, the most severe of which occurs in the liver. Histopathologic findings indicating an Ebola virus infection can include: councilman bodies similar to yellow fever present in the liver; interstitial pneumonitis present in the lungs; cerebral glial nodules and small infarcts present in the brain. Infection with the virus is also associated with high levels of circulating pro-inflammatory cytokines induced by the virus itself. Adding to its virility, Ebola virus shows resistance to the antiviral interferon α , although it is produced by the body in sufficient quantity. The ability of some infected individuals to mount an effective immune response while others are

unable to is not entirely understood at this time. In persons who eventually die from the infection there is little evidence of antibody response and there is extensive depletion of spleen and lymph nodes.

Clinical Manifestations

Once infected, the patient usually remains asymptomatic during the incubation period of 3 to 8 days. After this, onset of symptoms is abrupt and the patient develops severe headache, fever, myalgias, weakness, and nausea. Abdominal pain, vomiting, diarrhea, and evidence of internal bleeding of the gastrointestinal tract soon follow this. Approximately 40-50% of patients also experience bleeding from mucous membranes, skin, and puncture sites, hence the term 'hemorrhagic fever'. Some patients also experience a nonpruritic maculopapular rash, usually around the fifth to seventh day of illness, followed by desquamation. Other signs that may be present include edema of the face and neck, hepatomegaly, flushing, and pharyngitis. In the terminally ill, the patient manifests as obtunded, anuric, tachypneic, and in shock, which is soon followed by death.

Differential Diagnosis

The differential diagnosis includes malaria, Marburg hemorrhagic fever, yellow fever, dengue fever typhoid fever, and other hemorrhagic fevers.

Workup

Diagnosis is difficult due to the high infectivity and mortality of the virus. While clinical presentation and the presence of an index case give important clues, definitive diagnosis rests on the isolation of the virus in tissue culture. However this is a high-risk procedure can only be

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Disease of the Month: Ebola Virus (*continued*)

Preston Gorman, PA-S2, Baylor College of Medicine


safely performed in a few high-containment laboratories throughout the world. Thus, other confirmatory tests have been developed, most notably the IgM and IgG ELISA, which are both sensitive and specific for the Ebola virus. However these assays are also only performed in specialized laboratories.

Treatment

As of yet, there is no definitive cure for any of the strains of Ebola virus. Supportive therapy is the only treatment available, including careful monitoring to fluids and electrolytes, attention to nutrition, and comfort care. Also, medical care should include replacement of coagulation factors and heparin if DIC develops. Experimental therapies are being developed, including a DNA vaccine that expresses either envelope GP or nucleocapsid protein genes of the Ebola virus and has been demonstrated to induce protection in adult mice exposed to Ebola virus. Other experimental therapies include an inhibitor of tissue factor/factor VIIa or with activated protein C. Studies in rhesus monkeys with this treatment modality have shown improved survival.

Prevention

There are few established primary prevention measures because as of yet the identity and natural reservoir of the virus are unknown. Secondary prevention, once the index case has been identified, is difficult due to the contagious nature of the disease. Also the crude medical facilities in the third world where the virus most often appears do not provide optimal protection against the spread of infection. Despite this, steps can be taken to try to halt the spread of the deadly virus. First, health care providers must be trained

to recognize a case of Ebola virus should one appear. They also should have the capability to perform diagnostic tests to confirm the virus' presence. Most importantly, isolation and barrier techniques should be employed to further halt disease spread. Protective clothing including gowns, gloves, masks, and goggles should be worn at all times during patient contact. Lastly, infection control measures such as equipment sterilization should be implemented along with minimizing direct contact with the bodies of the deceased. 

Resources

<http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/ebola/ga.htm>

Peters CJ. Chapter 197. Ebola and Marburg Viruses. In: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J, eds. Harrison's Principles of Internal Medicine. 18th ed. New York: McGraw-Hill; 2012.
<http://www.accessmedicine.com/content.aspx?aID=9124901>. Accessed February 12, 2012.

<http://emedicine.medscape.com/article/216288-followup>

A chronological listing of outbreaks by year, country, and mortality can be found on the CDC website and this link: <http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/ebola/ebolatable.htm>.

Reprint from February 2012 edition of *Nexus*.



Battling Ebola: A View From the Front Line

Jeri Sumitani, PA-C

Original Article published on WebMD on December 3rd, 2014 and can be found at <http://blogs.webmd.com/breaking-news/2014/12/battling-ebola-a-view-from-the-front-line.html>

When the Ebola outbreak reached a critical point during the summer of 2014, I started submitting requests to volunteer in West Africa. I am a U.S.-trained physician assistant working in HIV medicine for the past two years in South Africa. I don't have any experience managing viral hemorrhagic fevers, and would never describe myself as an infectious disease "specialist." I have never been to West Africa, and don't understand the cultural context under which this disease has exploded.

What I do know is that having worked and lived in Africa and other resource-limited settings, I understand what the challenges are and perhaps more importantly, my own limitations. I know what I cannot change and when I have reached my physical and psychological limits. Besides that, the only reason I qualified for this position is because I am willing to do whatever is asked. I am no martyr and no hero. I have no intentions of saving the world from Ebola. I volunteered simply because I can.

The journey to Sierra Leone from my residence in South Africa took 48 hours, a four-country touchdown (Germany, Belgium, Senegal, and Guinea), and finally a boat ride from the airport to reach the country's capital, Freetown. In essence, I had to leave Africa to return to Africa. Previously, this trip would not have required me to leave the African continent, but due to the grounding of several flight routes since the Ebola outbreak, it now takes an epic journey of this sort to reach the land of the "Lion Mountains."

I arrived in Freetown close to midnight on November 19. This marked the beginning of my six weeks in Sierra Leone.

Day 1

Although any job begins with some kind of orientation process, this orientation carried with it an

acute sense of gravity. Not paying attention to what was being said or demonstrated could literally mean life or death. I was introduced to the team working for the UK-based King's Sierra Leone Partnership (KSLP). Many on the team have been in Freetown since before the first Ebola case was identified in Sierra Leone, despite requests from headquarters to pull out of Freetown. They support Connaught Hospital, the sole facility in Freetown to keep its doors open to Ebola and non-Ebola patients. All other facilities in the city were forced to shut down as they either lacked capacity or staff to support the volume of patients flowing through their doors. Many health care workers contracted Ebola and died, leaving a health care work force that was already stretched too thin even thinner.

Connaught operates a 16-bed Ebola isolation unit, essentially holding units for Ebola suspect patients awaiting results. Patients stay in the isolation unit until results are available; if they are found to be positive, they are then transferred to an Ebola Treatment Unit (ETU) for further management. Negative patients are given a certificate of negative results as proof, assessed for other causes of illness, and referred to the outpatient department for care and treatment if necessary. Isolation units seek to minimize exposure to others without Ebola.

My primary role was to help staff the isolation unit. I would be working next to UK-based volunteer healthcare workers as well as local nurses, cleaning staff, and district case managers who staff the unit 24 hours, seven days a week. On my first day, I practiced donning and doffing my personal protective equipment (PPE) for several hours with my mentor, a volunteer doctor from the UK who had been working in the unit for a month.

One of the most important aspects of this process is to move slowly, deliberately, and thoughtfully. Think through each step – which surfaces are contaminated? Which are clean? Should I touch that surface? That patient? With the support and advice of my mentor, I slowly perfected each technique. Having worked in respiratory

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Battling Ebola: A View From the Front Line (*continued*)

Jeri Sumitani, PA-C

and contact isolation settings previously, I figured this process would come relatively naturally. Perhaps it was the adrenaline, but I would routinely find my mind going completely blank. It was actually most foolproof to blindly follow the illustrated, step-by-step checklist posted on the wall of the decontamination room of our isolation unit. I wouldn't ever want to rely solely on my memory to save me from potential exposure.

As the final PPE training step, my mentor took me on a walk-through of the isolation unit before I would start providing patient care the next day. I was given strict instructions not to touch anything to minimize my risk of exposure. I felt surprisingly calm and safe in my PPE, like I was walking through an alternate universe in a bubble. I imagined this is how astronauts must feel when space-walking. The only difference is that this universe is a horrible reality full of suffering and anguish. It is bleak and it is grimy.

I returned to the guest house feeling relatively calm. And then the paranoia started.

I felt like everything was covered with Ebola. Every square inch of my skin, my clothing, my backpack, all were virus-infested. I quickly shed all my clothes, and made a pile of "contaminated" clothes in the farthest corner of the room. I attempted to take a shower, which was more like water torture — literally cold water dripping from the shower head. I tried to scrub the smell of chlorine off (and with it, hopefully the virtual virus crawling all over me) but it was futile. In the end, I went to bed convinced that I was starting to experience Ebola symptoms. I did not sleep very well that night.

Day 2

The next morning, I went into work ashamed of my amateurish, panic-laden evening. The lead clinician, a Spanish doctor who was recruited by the organization to oversee the Ebola response, was in the office. Perhaps having sensed my slight sleep deprivation and noticing my anxious expression, she asked me how things went. I mustered the courage to divulge my evening to her. She simply smiled an all-knowing smile. "Did you also sud-

denly develop a headache? Or feel feverish?" she asked. "And your stomach started churning? It's all part of the process, we all felt like that for the first several months of being here. Welcome to Sierra Leone!"

That afternoon was my first true shift in the isolation unit. I was more nervous that morning than I had ever been since deciding to join the response. I repeated the mantra that my long-time mentor told me just before I left: "When you see your first patient, remember your training. Remember that the virus has to obey certain rules, and remember those rules."

Even over the relatively short amount of time I spent in the isolation unit, I began to recognize Ebola patients. They exhibit a certain look that health care professionals refer to as the "Ebola stare" — a kind of empty, haunting expression of someone battling a devastating disease. I have never seen anything quite like it. Many also appear to develop a loss of coordination. Not only are they weak, but also they can no longer perform routine movements and ultimately are unable to eat and drink despite assistance. Some will ooze blood from their eyes, gums or rectum.

The young lady in bed 8 was one such patient. She was starting to show signs of altered mental status and confusion. Although the day before we had caught her aimlessly wandering the hallways of the unit, this day she was completely bedridden. During rounds that afternoon, we noted bleeding from her gums. I sat her up and tried to get her to take some fluids to help with her dehydration, but she could barely hold herself upright and lacked the coordination to swallow. As the solution dribbled down her face and onto her chest, I started to lose a little hope.

And then, as if she sensed my despair, she looked right at me in a brief moment of lucidity and said, "I like you." She died that evening.

For the remaining posts in this series, please visit WebMD by following this link:
<http://blogs.webmd.com/breaking-news/2014/12/battling-ebola-a-view-from-the-front-line.html>





Student Corner: History Without Time

Gabe Wofford, PA-S2, Wake Forest University

“Since I was born.”

“You’ve had a headache since you were born?”

“Oui.”

He wore his best clothes, including dress shoes splashed with mud from a seven mile walk to the church. I asked, through an interpreter, how he was feeling. The answer: He was in pain. Everywhere. Repeating this, he pointed to his head, neck, shoulders, abdomen, back, hips, knees, and feet. It was a common response. I hesitated before asking how long he had experienced these symptoms. It was a conversation each of our providers would repeat countless times.

The church we sat in was our clinic for nine days. Peacework Medical provided the opportunity to join their team for this visit to Ranquitte, Haiti as a clinical rotation in Global Health.

Peacework has been providing care in underserved countries since 2000 (Haiti since 2010) with a focus on health education and community partnership. Our team consisted of PAs, students, physicians, nurses, paramedics, technicians, and an acupuncturist, but in Ranquitte we all worked in primary care. We moved the pews and chairs to divide the space in an attempt at organization, but no one anticipated privacy. Patients fought for space in line, jumped in front of others, and yelled to friends through the open windows or laughed at overheard responses to interview questions. With more than 300 patients in total seen every day by our team, my primary role was to interview and provide general health screenings in tandem with one of the providers. We quickly realized unique challenges with history-taking.

While onset and duration are important to our differential, time means very little in a region where life is lived day-to-day. Foresight and planning give way to daily labor and provision of food and water. A common chief complaint was vomiting after every meal, only to be clarified to one episode of vomiting weeks ago (or a misunderstanding of reflux symptoms). Nearly everyone, man and woman, identified urinary infections ongoing for months or years. With all

complaints, any questions regarding duration received a reply to the positive, even if it contradicted the rest of the history. In discussions among the group and our interpreters, we established that some patients only want to acquire medications for the next time they are ill, as many experience recurrent infections, and a pervasive idea that duration equated to medication. In most cases, we provided education regarding hygiene and hydration, vitamins and medication (often short courses), and advised follow-up at the new clinic.

Peacework’s most recent initiative is the opening of a clinic near Ranquitte in October of this year, served by a Haitian nurse trained in independent primary care. This replaces the large teams on short visits as has been the model, with the hope individual volunteers will continue to provide additional staff at the clinic. I am encouraged by this effort to establish a more constant presence, rather than short stays where patients are only seen once a year. However, I struggle with a limited optimism. I think infections and pain will bring people to the clinic, but maintenance of truly chronic conditions such as hypertension, asthma, and others will be a challenge. Patients rarely seemed aware, even after instructions, of how and when medicines should be taken. Without deliberate contact, many patients will be lost to follow-up or noncompliance.

I had a wonderful experience in Haiti and learned an immense amount both in the practice of medicine and its applications internationally. This was my second time there and I would gladly return again, though I suspect I will continue to confront a discouraging reality. Haiti is a lovely country, both in people and landscape. Progress is certainly being made, but it is a slow process. Long-held traditions will continue to create barriers to effective care until healthcare changes occur on a national level. It has been that way since he was born.





Announcements

Welcome To Our New and Returning Fellow Members!

Tiffany Butler, Hoonani Cuadrado, Mark Caplin, Christina Murray, Billie Cartwright, Jeaninne Oliver, Preston Gorman, Casey Powell, Morgan Fulmer, April Grisetti, Rebecca Nieves, Nhumey Tropp, Kelsey Gustafson, Kristi Hembre, Molly Waite, Erika German.

Welcome To Our New and Returning Student Members!

Jennifer Trace, Kristin Graham, Mary Startos, Matthew Drause, Laura Jeanblanc, Jenna Morey, Tammy Lemoine, Rebekah Hallerman, Katie Slotter, Catalina Lehrer, Matt Kelsey, Aaron Bailey, Victoria Zappi, Caroline Carlson.

Upcoming Medical Service Trips

International Medical Relief

www.internationalmedicalrelief.org

India: Feb 12, 2015 – Feb 22, 2015	Tanzania: Feb 28, 2015 – March 8, 2015
Philippines: March 7, 2015 – March 15, 2015	Nicaragua: March 15, 2015 – March 22, 2015
India: March 22, 2015 – April 1, 2015	Indonesia: April 3, 2015 – April 11, 2015
Brazil: May 22, 2015 – May 31, 2015	Madagascar: May 30, 2015 – June 7, 2015
Ethiopia: June 11, 2015 – June 21, 2015	Cambodia: June 9, 2015 – June 21, 2015
Haiti: June 20, 2015 – June 27, 2015	Kenya: June 25, 2015 – July 5, 2015
Russia: July 23, 2015 – Aug 1, 2015	Nicaragua: Aug 1, 2015 – Aug 10, 2015
Peru: Sept 4, 2015 – Sept 13, 2015	Thailand Gulf: Sept 12, 2015 – Sept 20, 2015
Malawi: Oct 23, 2015 – Oct 31, 2015	Indonesia: Nov 20, 2015 – Nov 29, 2015

Flying Samaritans

www.flyingsamaritans.net

Frequent trips originating from California and Arizona to clinics throughout Baja California, Mexico

Seattle King County Disaster Team

www.skcdteam.org

The SKCD Team is always looking for PA volunteers for it's 4 yearly trips to Haiti. Visit www.skcdteam.org and contact any board member to discuss joining a team.

Open PAGH Positions

Newsletter Editor - *Nexus*, PAGH's bimonthly newsletter, needs a new editor. Along with collating interesting articles, conferences, service trips, updates, and more, you will be responsible for our group's primary means of communication with our members. Fresh ideas and original vision welcome! This is a great way to network and learn more about PA's practicing internationally.

Web Coordinator - If you have a talent with websites and web design then please consider joining PAGH as the Web Coordinator and creating a strong online presence for PAGH! Stephen Pasquini, PA-C has been working in the background as our web coordinator for almost 2 years now but he is leaving for international travel. Your duties will be to manage the already-built website, help keep postings on our website up to date and help expand the offerings to our members.

Please direct your interest or questions to: pasforglobalhealth@gmail.com.



Volunteer Organizations

If you are aware of any trips or organizations that are looking for **PA volunteers**, please contact pasforglobalhealth@gmail.com. Please Note: it is not our desire to promote specific organizations only to connect PAs with opportunities and encourage professional philanthropy. This information is not an endorsement of these organizations.

Africa Cancer Care Inc - International opportunities with an oncology focus. www.africacancercareinc.org

Amazon Promise - Medical trips to portions of the Amazon Basin. www.amazonpromise.org

Benjamin Wellness Center - Opportunities in Gatamaiyu, Kenya. www.benjaminwellness.org

Christian Medical and Dental Assistance - www.cmda.org

Community Coalition For Haiti - need for medical professionals for 1-2 week trips to staff a primary clinic in Jacmel, Haiti. www.cchaiti.org

Exploration Logistics - Places PAs worldwide to serve as medical support for various expeditions. Positions include oil rigs and other industrial projects, etc. www.elqfze.com

FIMRC Global Health Volunteer Program - Opportunities in El Salvador, Nicaragua, Peru, Costa Rica, India, and Uganda. www.fimrc.org

Flying Doctors of America provides medical assistance and hope to as many of the poor and needy as they are able to reach. Medical & dental teams to wherever the current need is. www.fdoamerica.org

Flying Samaritans Mexico - year-round for Baja California, Mexico. www.flyingsamaritans.net

Global Brigades - www.globalbrigades.org

Goabroad.com - Assists different professions with placement internationally. www.goabroad.com

Grounds for Health - Uses PAs in Africa, Mexico, Peru, Nicaragua. www.groundsforhealth.org

Health Horizon International - www.hhidr.org

Heal the Children - Ecuador, Haiti. Contact: jensorooni@gmail.com. www.healthchildren.us

Heart to Heart International - weekly trips to Haiti and Guatemala. www.hearttoheart.org

Holy Rosary International Medical Mission - www.hrimm.org

Hospitals of Hope - Bolivia, Haiti, and Liberia. www.hospitalsofhope.org

ICHA Outreach to fight Cardiovascular Disease - Ghana. www.ichaonline.org

International Medical Relief :Currently recruiting for a trip to Pakistan. Also trips to Asia, Africa, South & Central America, Eastern Europe. www.internationalmedicalrelief.org



Volunteer Organizations

Kenya Relief - www.kenyarelief.org

Lalmba - Lake Victoria in Kenya and in a rain-forest in Ethiopia. Goals are clinical medicine, coupled with public health, and working with local physicians. www.lalmba.org

Many Hands For Haiti - www.mh4h.org

Medical Missions Response - North Africa, Middle East, South/East Asia. www.mmronline.org

Mercy Ships - volunteer opportunities aboard "hospital ships". www.mercyships.org

Mountain Medics International - Cordillera Huayhuash, Peru. www.mountainmedics.org

Nunoa Project - two trips a year to Peru. www.nunoproject.org

NYC Medics - deployment to disaster zones and humanitarian emergencies. www.nycmedics.org

Omni Med - work focused in Uganda. www.omnimed.org

Operation Smiles: providing surgeries around the world. www.operationssmile.org

Palmetto Medical Initiative - www.palmettomedical.org

Panama Global Connections - www.panamaglobalconnections.com

Peacework Medical Projects - www.peaceworkmedical.com

Physicians for Peace - work in Central/South America, Africa, Asia. www.physiciansforpeace.org

Project HOPE - land-based and ship-based care to regions around the world. www.projecthope.org

Rotations and Courses Internationally - www.gorgas.dom.uab.edu and www.cugh.org

The Carolina Honduras Health Foundation - Limón, Honduras. Active clinic, frequent need for medical volunteers. www.carolinahonduras.org

The Damien House - Leprosy in Guayaquil, Ecuador - <http://thedamienhouse.org/aboutus.html>

Timmy Global Health - looking for volunteers year-round. www.timmyglobalhealth.org

US Doctors For Africa - utilizes PAs for Africa work. www.usdfa.org

Volunteer Kenya / ICODEI - accepting PA volunteers year-round - www.volunteerkenya.org

WellShare International - www.wellshareinternational.org

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