

GLOBAL HEALTH CENTER  
PENN STATE COLLEGE OF MEDICINE

**STUDENT SCHOLARSHIP REPORTS**

*FOR THE*

**SPIRIT OF LIFE CHARITABLE FOUNDATION**

**OCTOBER 2, 2013**

1. COLIN ANDREWS (PERU)
2. TIMOTHY IRWIN (KENYA)
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**Penn State College of Medicine Global Health Center  
Medical Student Project Report**

**Medical Student:** Colin Andrews, MS2; [candrews1@hmc.psu.edu](mailto:candrews1@hmc.psu.edu)

**Project Title:** Restaurant Sanitation in Iquitos, Peru

**Project Location:** Iquitos, Peru

**Project Timetable:** May 27, 2013 – July 10, 2013 and Spring of 2015

**Summary of the Experience:**

I spent the first 4-5 days of my travel in the capital city of Lima. The three other PSUCOM students at the Peru site toured several laboratory facilities that are run by the U.S. Navy, which have satellite facilities throughout South America. We were able to do rounds at two local hospitals and were invited to tour the National Neurological Institute, which is teamed with researchers at NIH on the cutting edge of studying prevalent parasites and diseases. We began to immerse ourselves in the history and culture of the Peruvian people and work on improving our Spanish speaking skills.

After a quick stay in Lima, we continued to our main site at Iquitos, which is the largest city in the world that cannot be accessed by road. The climate was vastly different in the Amazon and I could immediately notice the contrast in people as well. There our schedules were much more structures. Each morning we would make our way to NAMRU-6 for bacteriology lab training and to work on our respective projects. I had the opportunity to culture and identify a superfluous amount of bacterial species, including many you would probably never get to see over the course of a career in the U.S., such as *V. cholera*. Each afternoon the local Peruvians would take us out to their favorite local restaurant and we would continue to do project-specific preparation so that we would be ready to hit the ground running when our pending IRB approvals came through.

Our on the ground work consisted of a variety of activities directed towards improving the status quo of healthcare in the area and our own knowledge of the culture, language, and needs of the people. We were able to go on rounds with several doctors in the three main hospitals of the region, outlining the tripartite and desperately under-resourced healthcare system in Peru. We were also able to connect with an NGO from Illinois and do some volunteering at some of their clinics, which was a unique

opportunity for some more hands-on work in Peru. We gave fluoride treatment to children and collected basic vital and physical exam information, such as glucose readings, blood pressure measurement, heart and lung sounds, etc. These experiences put us face to face with illnesses and trying situations that we would not routinely see in the U.S., everything from exotic infections like malaria and leishmaniasis to viper snake bites.

Additionally several of us had an even more immersive opportunity to accompany physicians for their weekly rounds in Amazonian villages. We would take boat rides several hours up river and hike into the jungle to give care to those who otherwise would have access to none. It was an extremely rewarding experience and eye-opening to the magnitude of disparities that exist within different groups of people in developing countries, such as Peru.

**Learning Achievements:** *(Briefly describe the two to four most important things that you learned.)*

The first and most important thing I learned was a working proficiency of the Peruvian healthcare system. It is a tripartite system with public, private and social security hospitals and shares many of the same problems that are in the U.S. but to a much more drastic degree. I learned about why it is so hard to eradicate many of these prevalent infectious diseases when living conditions are dire and the system is directed towards treating illness after it has presented and is no longer tolerable as opposed to a more aggressive and proactive approach in identification and prophylaxis. For example, there is little motivation for uninsured families to spend money for routine care and health “maintenance” to prevent their children from becoming ill when, if they wait, the national government will pay for the treatment of malaria and dengue and a laundry list of other conditions. And it’s even harder when that money for routine care doesn’t exist.

Additionally I learned about the struggles that accompany organizing and carrying out international human use research. I learned that it takes a very special type of person to be able to adjust to working with limited resources in developing countries and that the need to expect the unexpected can’t be emphasized in these types of situation. It became immediately apparent how important communication and planning ahead for adversity really are.

**Program Strengths:** Our program strengths lie in our communication network, both as a team and with our collaborators. As a team we were able to overcome many routine

obstacles faced when traveling abroad and dealing with uncertainty swiftly and effectively, allowing us to be efficient and get the most amount of work done in a short period of time. More generally we had great communication with our large and growing network of collaborators on the ground in Peru, which helped to keep the projects on track and structured plan of action moving forward. Our contacts have been extremely beneficial in putting us in contact with special organizations who can maximize our impact and facilitating meetings with locals to streamline what would otherwise be an extremely difficult task. My teaming up with DIGESA, the local food inspection agency, to gain access to restaurant sampling for example would not have been possible without our connected friends in NAMRU-6.

**Program Shortcomings:** Our project shortcomings relate mostly to relying on external organizations for our approvals. This year was the first year we had teamed with the U.S. Navy for our IRB and protocol approval, meaning it was out of the hands of PSU affiliates. What was initially thought to be a beneficial and more timely process turned out to severely limit our time in which I was able to work on my project. In the future, we have taken measures to positively change the timetable of approvals and prevent this from happening again. Luckily, I will be returning in 2015 and am confident in the outcomes that will be achieved by my project through what I have gained from my experiences in 2013. One of the most important lessons I have learned is a first-hand account of what it means to do work abroad in terms of the hurdles of necessary approvals and the constraint of time.

**Impact:** *(How has the experience affected your career / education goals?)* This experience has had a tremendously positive impact on my medical education and solidified my interests in global health in underserved regions both domestically and abroad. I have had the opportunity to see and learn from physicians and researchers in Peru in ways that will be incorporated into my medical practice daily. On a more personal level I have had an invaluable experience in practicing Spanish and learning the basics of planning and conducting international healthcare research with aims at making a direct intervention in the future. For me, this is just the beginning of what I hope to be many international experiences that allow me to dedicate my efforts to those who need them most.

**Medical Student:** Timothy Irwin, MSII; [tirwin@hmc.psu.edu](mailto:tirwin@hmc.psu.edu)

**Project Title:** Knowledge and Perceptions of Diabetes among Community Healthcare Workers in Kenya

**Project Location:** Nyeri, Kenya

**Project Timetable:** May 13<sup>th</sup>-June 1<sup>st</sup>, 2013

**Summary of Experience:**

The beginning of my trip was a little rocky. I got stuck in traffic on my way to JFK and missed my flight, unfortunately the next available flight was in two days. After two days I arrived, well before my departure time, only to find out that my luggage would not make it to Nairobi due to a dispute between the airline and the baggage company in Brussels, Belgium. So I stuffed my backpack with the essentials and for two and a half weeks I had 3 pairs of clothes to rotate through until my luggage finally arrived in Kenya. I arrived in Nairobi and made the trek north to Nyeri by myself; which was an experience because I had never travelled alone internationally. However, I was very surprised by the amount of Kenyans that spoke English and were willing to help me along my way.

I arrived in Skuta, a little town about 5 km outside of Nyeri, where I joined two other PSU COM medical students and our advisor. We were staying at a hotel along with 30 undergraduate Penn State students who were conducting research and projects dealing with humanitarian engineering and social entrepreneurship in the area surrounding Nyeri. My project was partially connected to a project being done by a group of the undergrads; so I spent a majority of my time communicating and working with their team as well as the other medical students. Our combined project involved travelling to different rural villages, all within two hours of Nyeri, and conducting an educational session for the Community Health Workers (CHWs) in that area. The Kenyan Ministry of Health helped us coordinate the sessions with the head CHW in each region. My project, in particular, had a pre and post-test that were given to all the CHWs before and after the educational session. Along with the post-test, the CHWs filled out a survey I created in order to gain some insight on the demographics of the CHWs, their opinions about the education they receive from the government, and their perceived role in the community's healthcare. The educational session involved rudimentary lessons about diabetes, heart disease, and cancer.

Due to my travel misfortunes, I had missed the first session but because I had forwarded my information and presentation and my fellow medical students conducted the first session. For two weeks after my arrival, the group of undergrads and I went out to a different site every other day to collect data and present our educational session. The CHWs were very grateful for our session and were truly engaged in learning about the diseases we were presenting. At many of the sites the CHWs even offered us special thanks in the form of a dance or a song. On the days when we were not presenting to the CHWs, I accompanied Mike and Nelson (two other PSU COM medical students) on their journey to nearby towns to conduct interviews with locals about their perception of diabetes, high blood pressure, and cancer. We were joined by Mr. David, a local Baptist pastor, who helped translate for me and Mike. This was an extremely valuable experience because we got to walk around different towns and converse

with many different types of townspeople. In particular, we visited the Majengo, the slums, where we got a vastly different response to our interviews and even to our presence. We also spent two days in the city of Nyeri conducting interviews on the streets, in various stores, and the parks.

The undergrads left after two and a half weeks at which time we finished up Mike and Nelsons interview project as well as presented one last time to the CHWs. During the last few days in Nyeri, we travelled to different hospitals to gain some insight into their hospital healthcare system. We visited a provincial (government) hospital and a private mission hospital which had stark differences in their quality and quantity of care.

### **Learning Achievements:**

First off, I was reminded over and over again on this trip how flexibility is an international traveler's most valuable asset. From beginning to end, this trip was full of unexpected turns in which many times the only thing you could do was "go with the flow". Many times we had a CHW training session presentation scheduled at 9 am and nobody would show up until 10 am. Or we would get to a site and find there was no electricity for our power point presentation. All these things and more, reminded me of previous travels of mine where the only thing you can do is think quickly on your feet and adapt to the present conditions to ensure a successful venture.

Secondly, I learned of the poor state of the Kenyan healthcare system. The CHWs, who are government volunteers, were poorly educated and it seemed that not much effort was put into training them and making sure they correctly guide their community with everyday healthcare decisions (such as nutrition, safety, and deciding whether or not to see a physician). Furthermore, the conditions we witnessed in the hospitals were less than satisfactory, however pretty much on par for other experiences I have had in developing countries. Many of their hospital beds were being shared by two or three patients, and proper precautions to prevent infection were an afterthought. While touring the hospital we were able to talk to many Kenyan physicians as well as the provincial hospital director. The stories we heard were tough to swallow as many of them told us of colleagues who dropped out of medicine because they could not bear to come to work and watch people slowly die from lack of proper care, technology, and supplies. One of the last days we were in Kenya, a newspaper published an article stating that three years after graduation from medical school more than 1/3 of Kenyan physicians drop out of practice.

### **Program Strengths:**

The program was very self-motivated and offered a lot of freedom to the students to decide how they wanted to spend their time in Kenya. We were able to go out and really immerse ourselves in the culture instead of staying separate from it and just conducting our research. On days in which we had no research plans we were able to travel around the city of Nyeri and gain further perspective into Kenyan culture. Our advisors on the trip, Dr. Ashbaugh and Kanjan Mehta were great to work with and provided great insight and support for our projects. During my time in Kenya, the accommodations were good and I never felt unsafe.

### **Program Weakness:**

There were no glaring weaknesses to our program; however it would have been nice to gain more insight into the clinical side of Kenyan healthcare. The program is fairly new and is working on developing its connections with hospitals in the area to give the students an international clinical experience. It also would have been advantageous for us to learn a bit of Swahili before we traveled, just to ensure we could communicate at a very basic level. Most Kenyans (especially the younger population) spoke English, but it was very difficult to communicate with someone if they did not speak English; as our Swahili skills were non-existent.

**Impact:**

Much of what I experienced in Kenya solidified my passion for global health. Adding to my previous experiences internationally, this trip made me realize there is much more to do than simply taking a month off to perform surgeries or offer care in an underserved country. The process of healthcare is important to look at and public health reform may be very important for many developing countries. Furthermore, I have always known that we are well off as medical students in the U.S., but after talking to Kenyan physicians this trip made me even more grateful for my education and surroundings. Overall, whatever medical field I end up pursuing, I plan on making global health an integral part of my practice.

## Spirit of Life Scholarship

### **1. Student Name and Contact Information:**

Corinne Landis  
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### **2. Program / Project Title**

Analysis of the correlation between self-management behaviors and glycemic control in diabetic patients in M'Bour Senegal.

### **3. Program / Project Location**

M'Bour, Senegal

### **4. Program / Project Timetable**

March 2013 to May 2013 prep  
June 2013 Data collection in M'Bour Senegal  
July 2013-July 2014 Analysis of data and completion of research report

### **5. Summary of Experience**

During our stay in M'Bour Senegal we split our time between shadowing physicians and nurses in the hospital and collecting data for our research. We shadowed doctors in the emergency department, internal medicine, obstetrics, pediatrics, and surgery. We had the opportunity to see a wide variety of procedures and treatments. Through these experiences we were able to get a good idea of how practicing medicine compares to practicing medicine in the United States. We also spent the month collecting data for our research. We (the medical students) were in charge of collecting biometrics for the patients. We took their HbA1cs, blood glucose, height, weight, blood press, pulse and waist circumference. The participants of the study were also interviewed by the professor in charge of the project and her team. They asked a series of questions to gain more information about how much the participants understand about their diabetes and how well they are able to care for it. Overall we discovered that most of the participants understood the parameters of their disease but were unable to afford the medications and food to care for their disease. We also spent the month attending a series of cultural events and we also visited Gorée Island, which was the hub of the West African slave trade.

### **6. Learning Achievements**

Through this experience I gained a greater understanding of what it means to perform research internationally. Being flexible was a priority. Following the trip I am now able to compare practicing medicine in Senegal to the United States. Some of the biggest obstacles that the physicians face in Senegal include access to resources and sanitation. I also gained a greater understanding of the ramifications of living and adjusting to a new culture. This experience pushed me out of my comfort zone, teaching me a lot about my personal limitations, strengths and weaknesses.

### **7. Program Strengths**

Overall the trip was very well organized; Dr. Belue (our site lead) has a number of contacts in Senegal that facilitated the trip. Through her contacts, we had a translator, housing, cook, and

maid. The hospital was very receptive to having us shadow and work with their staff. The head of the hospital is very enthusiastic about building a lasting relationship with Penn State Hershey. The community was also very excited about our research and we had no issue recruiting patients for our study. The existing diabetes association in M'Bour is very enthusiastic about the future research and support that we can bring to the community. Our research went very smoothly since we were just added on to the existing IRB of Dr. Belue.

## **8. Program Weaknesses**

Overall I felt like we were well prepared for the trip but I felt like we could have been provided with more information about Senegal. One of the negatives of the site was the language barrier. Our experience would have been improved vastly if we were able to speak French and communicate with the staff and patients. We hope to be conversational by the time we return during our fourth year. Another issue that we had was the food. Since we had a cook we did not have a lot of control over the food that we ate. The traditional Senegalese food did not agree with some of our stomachs. During our fourth year we hope to bring our own food from the United States and buy food locally and do our own cooking.

## **9. Impact**

Although our research won't have an immediate impact on the diabetic patients of M'Bour, we hope that it will serve as a foundation to build future research projects and hopefully obtain funding for the existing diabetic association in the city.

Overall I felt like this was an invaluable experience in which I grew immensely. I have traveled internationally before but never have I lived abroad. It was definitely a different experience from being a tourist. It was challenging at first to assimilate to the culture but throughout the four weeks, I grew more comfortable with my new environment. I also gained a greater understanding of practicing medicine with limited resources. It was really hard a first to walk the halls of the hospital seeing so many patients suffering and knowing that the resources of the hospital were inferior to the care that they would receive in the United States. It opened my eyes to the privileges I have grown accustomed to. At first I was frustrated and angry by the obvious inequality between medical care in the United States compared to Senegal. As I worked with the physicians and the patient I began to see that the doctors were providing the best care that they could do with what they had.

It is one thing to read about other cultures, but to be fully submerged is completely different. Going into this trip I understood that I would be forced out of my comfort zone, for which I thought I was prepared. I generally consider myself a very understanding and accepting person, but this trip really opened my eyes to what it truly means to embrace another culture. I think that this trip will help me immensely when working with patients with different backgrounds than my own. I hope that I will be able to understand them and anticipate issues that may arise during my care for them. I think overall we as a country are moving to be more and more culturally sensitive and our recent health care changes are making a move to cover more and more people, but I do think that there is more work to be done. This experience has also convinced me that at some point in my career I would like to practice medicine internationally. I am part of the Navy HPSP program, so after I finish medical school I will return to active duty. I hope at some point to either be stationed abroad or work on humanitarian aid

missions. This experience has not only reassured my desire to be a part of international work but I think it will also prepare me to work abroad in the future.

**Penn State College of Medicine Global Health Center**  
**Medical Student Project Report for the Spirit of Life Scholarship**

**Medical Student:** Rajasree Roy, MS2; rroy1@hmc.psu.edu

**Project Title:** Prevalence of Parasite Infection Among Children in Iquitos, Peru

**Project Goal:** Compare the prevalences of *Giardia duodenalis*, *Cryptosporidium parvum* and *E. histolytica* between high and low flooding areas of Iquitos in children under 5.

**Project Location:** Iquitos, Peru (Belen Region)

**Project Timetable:** May 27 – June 22, 2013

**Summary of the Experience:**

This opportunity has been very engaging and rewarding in many ways. The “experience” was not only limited to the trip abroad, but it also encompassed our entire journey getting there and the impact it left on us. From the time we entered the Global Health Scholar’s Program at PSUCOM, we have been intricately developing our project ideas with the help and support of fellow classmates, faculty, and staff. Engaging in the approval process itself was very eye-opening and required much thought, discussion, and dedication. Supplemental classes and readings aided our global health scholarship during the first year of medical school, and a Pre-Trip week filled with many more discussions and presentations embellished our knowledge with situational awareness, safety, and ethics.

Our trip to Peru began with an introductory week in Lima, in which we visited the NAMRU-6 naval base for training, paperwork, and informative lectures. We visited local sites and the Neuroscience Institute and museum as well. The highlight of that day was meeting Dr. Hugo Garcia. This happened completely by coincidence, but this experience was very personal for me because I had worked with neurocysticercosis (NCC) last year at the NIH and we actually collaborated very closely with Dr. Garcia. Although I had never met the man, my PIs were conferencing with him every week, visiting him multiple times a year, and working with his reagents and slides for all of our collaborations. Since only a handful of people study this disease, everyone knows each other and the associated work in this small circle. It was very nice stumbling upon and finally meeting “the mystery man” through my GHSP experience.

After our week in cloudy Lima, we left for sunny Iquitos. One of our advisors at the Lima Headquarters was scheduled to bring our IRB approvals with him soon after we arrived. In Iquitos, we were warmly welcomed by the staff and faculty and introduced more to the native culture. We immediately began lab training and bought supplies in preparation for our projects. We also surveyed the areas of Belen in order to get a good grasp of our study area.

As days passed, IRB approvals were further delayed. The NAMRU IRB system was going through some changes, so there was much uncertainty. We utilized this time to maximize our training, planning, and coordination so we could hit the ground running as soon as we received word. As more days passed, we preoccupied ourselves shadowing at regional hospitals, volunteering at health clinics, and observing the malaria and dengue projects that were taking place at the naval base.

As our trip neared the end, it became clear that the IRB approvals would not come through in time. This was very frustrating and stressful as we had spent all year planning and preparing for this trip, and had a lot of hopes and support riding on our projects. The situation was not in our hands, but we tried to do the best we could given the circumstances by observing, engaging in, and learning a lot about the culture and environment we were in. Before, we were developing projects based on what we had heard or read about Iquitos. Now, having lived in our research environment for more than a month, we have greater insight and are better able to ask the right questions in order to develop a sustainable and useful intervention for the community. I have already started to think about ways to modify my protocol and survey in order to better grasp the needs of the community and paint a better picture for accurate representation.

Thus, although we faced many hurdles along the way, I appreciate my new insight I was able to attain on this trip. I can now use this knowledge and cultural competence to complete my project when I return my third year, and this would not have been possible without your support. Thank you very much for your time and consideration and I am very grateful for this opportunity.

### **Learning Achievements:**

#### 1) Patience

This experience helps towards our medical education because we will face many situations in which we won't know the verdict for a while, if ever, and many cases in which things won't go our way even though we have tried our best. Things will be out of our control and we should practice preparing our minds and emotions for these situations and how to react and act in these instances. Boy, this sure was some good practice!

#### 2) Infectious Disease Interest and Fear

The primary reason I chose this site was due to its link to Infectious Disease. Since I am greatly interested in considering this field as a Fellowship, I wanted to get as much

exposure as I could to the cases in this population. Although I had much interest, I also had much fear in approaching patients with such conditions. Would it be contagious? Should I touch that? Am I putting my loved ones at risk? In order to overcome this, I developed a SMART goal in this regard. Knowledge is surely power, and the more I found out about the diseases I encountered, the less I was scared! This site had offered many opportunities through ID rounds, patient shadowing, and project topics that helped my fear and embellished my curiosity.

### 3) Spanish

Peru reminded me a lot about India...except that everything was in Spanish. In this way, I truly felt handicapped. This was surprising because in Sierra Leone, I was able to grasp the language while there. I learned better immersed in the culture than prior preparation. However, picking up Spanish was quite difficult for me in Peru, even though I was immersed in the culture. Since the rest of my classmates were at a better speaking level, it was difficult for me to follow along during conversations. It wasn't until I invested in a dictionary and that we individually went to shadow the research groups that I starting picking up the language on my own. I guess this was when I truly had to rely upon myself for communication and survival instead of others.

### 4) Adapting

Given our circumstances, I was proud of how we adapted and tried to make the most out of the situation. Since many of my SMART goals involved contamination sources, hygiene, sanitation, and SES, I appreciated following Amy Morrison's research groups around that allowed me to observe inside peoples' homes. I was able to see the bathroom, kitchen, and hand washing areas of many homes, and these varied depending on SES and location. For example, bigger homes had more resources and designated places, while smaller and poorer homes often had a single wash area that served many purposes. By observation, I could see that SES greatly affected the sanitary situation in the household.

### **Program Strengths:**

- 1) We were fortunate for the free housing at Casa Callao
- 2) Amazing & warm relationships with the Iquitos/NAMRU staff
- 3) Great tech training under Rosa & Ricardo
- 3) Shadowing opportunities at Regional, Hospital Apoyo Iquitos, and Rounds in Lima
- 4) Shadowing opportunities with other NAMRU and Amy Morrison's projects (Dengue surveillance, Parasitology, Mazan Clinic)

**Areas for Improvement:**

Improving Transparency, Consistency & Communication between NAMRU and PSUCOM on responsibilities, timelines, deadlines, and situational awareness.

**Impact:**

The first sight of Belen made many of my classmates shudder. The setting affected me as well, but I had seen similar scenes in various parts of India and thus took the hit less hard. The sights definitely strengthened my passion and professionalism towards health advocacy. How could one sit still watching the community of Belen coming into continuous contact with fecally contaminated water? Although there were a couple of “No Litter” signs around, in a culture in which it is socially acceptable to litter anywhere, how is one to positively influence the community and teach them otherwise, for the benefit of their own health? Even though the task is big and daunting, it should not be avoided and abandoned. Future projects on improving water quality and trash collection have potential to be long-term sustainable interventions that would greatly benefit the community of Belen.

This summer helped me realize more the power of the medical profession. As soon as people learned we were medical students, they started confiding in us all sorts of things. Even though we may not have had a clue on how to help, simply listening to their worries helped relieve a lot of people. The amount of trust people put in you is simply profound and quite humbling.

Finally, my ongoing homesickness revealed to me how priorities have changed in my life. With increased responsibilities at home, I realized how differently I wish to pursue my future goals in global health. I wouldn't have known this otherwise if I had based my judgment on my previous experiences abroad.

I envision myself engaging in global health service with organizations such as Partners in Health and Doctors Without Borders. Instead of longer periods of time as I initially imagined, I imagine myself doing a couple of shorter trips every year, with a base in the States from which I can help coordinate many service trips. Working with mobile clinics like Casa de Salud was very interesting and I hope to get involved in those types of activities as well. Past experiences have introduced me to my passion and strengthened my dedication, and this trip has helped me realistically modify my future goals and reaffirm my commitment.

**Report for the Spirit of Life Charitable Foundation Scholarship for International Studies**

**Penn State College of Medicine Global Health Center  
Medical Student Project Report**

**Medical Student:** Elizabeth Wallace, MS 2; ewallace@hmc.psu.edu

**Project Title:** Diabetes Prevalence in M'bour, Senegal

**Project Location:** M'bour, Senegal, Sub-Saharan Africa

**Project Timetable:** June 1 – July 3, 2011

**Summary of the Experience:**

The first week in M'bour was spent exploring the small town and getting to know people at the small hospital. We also practiced our French during our free time so that we were able to communicate better with the locals. We explored the new culture by trying new foods, chatting with community workers, and visiting with friends and family of our contact, Fatou. Everyone was so welcoming and we felt right at home. We began our clinical work at the hospital (just a short walk down from our house) the very first week. Dr. Mor Diaw, the director of the hospital, met with us and gave us a great introduction to M'bour and the hospital. He was our main contact in M'bour for work-related issues.

We began our rotations in the emergency room where we were able to work one on one with the physicians and communicate with them about patient diagnoses and possible treatments. We saw a lot of suffering and were moved by the care that the medical staff were able to give patients in such a resource constrained area. Many people had no job, no education and no money to pay for medical care, but they were still treated in the ER. The doctors did the best they could with what was available. Next, we moved to the internal medicine unit. Here, the nurses taught us so much and allowed us to have a lot of hands-on experience. We drew blood, took vital signs and gave injections with them. We also went on rounds with the physicians in the morning and were able to practice our French with them. We saw patients with HIV and other infections and lots of post-stroke patients. We also saw a lot of diabetics. We were sad to see the lack of resources that the staff had to work with; they were always low on gloves and needles. We also spent time in the maternity ward and in pediatrics, but this was during our research weeks, so we did not spend as much time with the physicians there. We saw many surgeries our last week in Senegal – which was one of my favorite

things that we were able to do. We saw a C-section, a femur repair, a cyst drainage (11 liters!) and a uterine fibroids removal.

The last 2 weeks in Senegal, we did both clinical and research. We worked with diabetics to determine the prevalence of diabetes in M'bour. We discovered that it is very common and is not well-controlled in the majority of patients. We made a good relationship with the diabetes association in M'bour and they were a great contact for research subjects. We took body measurements from each patient (waist circumference, height, & weight), BP, blood glucose, and hemoglobin A1C. We were able to provide A1C testing for no cost at all to the patient and we also gave them a five dollar incentive for their time. We got information for 100 patients and we are hoping to finish analyzing our data sometime this year. We will use the information to determine characteristics of the diabetics in M'bour so that we can target education/future projects to those people.

We also were able to go on trips to experience the culture of Senegal. During the weekends, we went on a number of trips. We went on a boat ride to see native birds, went to the beaches of West Africa, went to a religious leader ceremony, and even went to an authentic Senegalese wedding. We learned to dance and had Senegalese outfits made. We went to the markets and chatted with countless people living in M'bour. We have a lot of fun and were able to experience every side of M'bour so that we can pass our knowledge on to future groups of students that will be going to Senegal in future summers with the Global Health Scholars Program.

**Learning Achievements:** *(Briefly describe the two to four most important things that you learned.)*

First, I learned that diabetes is a serious medical condition in M'bour, Senegal. Most patients do not have money to pay for prescription drugs, so they do not do anything for their diabetes or they visit the traditional healers and their diabetes continues to get worse until they die. There is little education about diabetes so people don't know how it works, how to treat it, and most importantly how to prevent in the first place.

Second, I learned that the hospital in M'bour has wonderful, dedicated physicians and staff, but has little resources to give patients the care they need. Dr. Mor Diaw is amazing and has gotten lots of funding to improve conditions, but not enough. The hospital is lacking proper sanitation and lacks essential things like gloves and hand sanitizer.

Third, I learned about new things about myself. I learned that I love to experience new cultures and to meet new people. I was able to reflect a lot about things and about my future career as a physician. It showed me that I would really like to do more global health medicine in the future.

**Program Strengths:** The program is designed so that we can pass projects on to future groups of students so that we can have some continuity. Many programs are not able to do this and the sustainability of what they hope to accomplish is not feasible. Because we go back 2x/year (one time with 1<sup>st</sup> year students & one time with 4<sup>th</sup> year students), we are able to keep programs/projects going and to have fresh ideas from so many students collaborating. Being able to go back to the site twice is great. We can use the first year to collect data/continue projects from other students and then we can use the 4<sup>th</sup> year to give back. We can set up an educational fair, help in the hospital, etc. In this way, we can feel like we gave back to a community that was so welcoming in the first year.

**Program Shortcomings:** There were very few shortcomings that I noted during my trip. One thing that we had trouble with was finding a good spot to do our research. The A1C kits needed to be performed at room temperature (meaning we need an air-conditioned room). We were eventually able to use Dr. Diaw's office to perform most of our research. One other problem we had was with the food. We often got sick from the food and we had trouble finding things that agreed with our stomachs. Eventually, we found yogurt and bread were our best options. I would suggest future groups bring packaged food in case they run into some of the same GI problems that we did. Otherwise, I did not notice any program shortcomings (only minor problems on the trip).

**Impact:** This trip was amazing. It was my first time abroad and I loved experiencing a new culture. I learned a lot about doing research in another country and I discovered how much Senegal needs our help. It furthered my interest in global health and made me want to do more work in Africa in the future. I'm really excited to go back in 4<sup>th</sup> year to be able to help out more in the hospital – I think that the clinical experience will be wonderful and hopefully we will be able to set up some sort of education program from diabetics in M'bour. This trip has influenced the way that I want to practice medicine. I want to help the underserved, whether it be in the U.S. or abroad. I'm not sure if that will be my fulltime job or if I will work with the underserved part-time. I'm excited to see where my future takes me!