Senan Ebrahim, PiN, G4

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

1. **Student Name & Contact Information**: Senan Ebrahim, G4, senan@hms.harvard.edu
2. **Project Title**: Deploying the Hikma Health System in the Tripoli Hamidy Clinic
3. **Project Location**: Tripoli & Beirut, Lebanon
4. **Project Timetable**: June 2019
5. **Summary of Experience**: I spent the first week in Beirut, conducting meetings with NGOs and potential research collaborators including Dr. Pierre Zalloua and Dr. Georges Khazen. Both of them were interested in utilizing the [Hikma Health](#) software we built for various research applications, including an upcoming study of diabetes in the Syrian refugee population of Lebanon. We will be applying to an NIH grant with Dr. Zalloua to facilitate this collaboration. I then had several meetings with leaders of the Beirut software development community, including professors and students at the American University of Beirut (AUB) and the Lebanese American University. I presented the mission and ongoing projects of Hikma Health to their group, as well as learned more about their various projects in the technology and health spaces. We are now pursuing a potential nonprofit collaboration with the AUB Entrepreneurship Center to encourage their undergraduates to join social enterprises and nonprofits like ours. We will also be involved with a collaboration with the MIT Media Lab, which supported us earlier on in our development. I then visited the Hamidy Clinic in Tripoli, where I fulfilled several key objectives of the trip: (1) I was able to meet with physicians of many specialties, as well as refugee patients with chronic diseases and discuss their technical needs; (2) I met with the Directors of the Hamidy charitable clinic and we kicked off an agreed plan for the rollout of our system in their clinic; (3) I obtained key epidemiologic data to help us modify the Hikma Health software to better suit their needs. Hikma Health and the Hamidy Clinic have decided we will be continuing our collaboration over the coming year and modifying the software to further improve patient outcomes according to their capabilities. Overall, this experience resulted in many new collaborations and partnerships that will continue well into the following months and years.
6. **Learning Achievements**: The three most important points that I learned were as follows: (1) Health data is currently collected on paper in multiple creative ways. In building the Hikma Health system, I will direct our team to integrate more technologies such as scanning with optical character recognition to more easily ingest the data that is already available. This technology will also provide an alternate paper-based workflow that is less disruptive to the clinical processes. (2) Nurses and allied health professionals play a very significant role in healthcare delivery in refugee communities. Due to understaffing of physicians, nurses, allied health professionals, and even medical students have taken on the duties that would normally be performed by physicians. The Hikma Health system must accommodate all of these users. (3) The technical capabilities of refugee clinics are highly variable. While I had previously seen rundown clinics in Jordan that essentially consisted of a chair and a table without any diagnostic or examination equipment, the Hamidy clinic had many niche diagnostic capabilities including EEG/EMG recording and ultrasound imaging. I was impressed by these

capabilities and am discussing with my team the possibility of us supporting the importation of these data into the Hikma Health product, to better serve our refugee patients.

7. **Program Strengths**: I believe my self-designed program was very beneficial to my career goals, given my personal interest in learning more about the Syrian refugee crisis and better serving that population through health technologies. I believe I did a good job dividing my time between technical meetings to plan the deploy and clinical/research meetings to better understand the use cases.

8. **Program Weaknesses**: I could have changed the order of my trip around so that I visited Hamidy first to allow that visit to inform the rest of my work. I could have also structured my time more optimally to put more emphasis on the research meetings, which gained much more traction than expected. I also might have established more warm email connections before arriving on the ground rather than cold emailing people due to the social business culture encouraging trust through warm connections. In the future, I will bear these lessons in mind and encourage others traveling on Spirit of Life projects to do the same.

9. **Impact**: This project in Lebanon has made a significant impact on my long-term career aspirations. By witnessing the care of refugee patients and talking to them about their health conditions directly, I gained a more in-depth understanding of refugee healthcare and the kinds of data that we can integrate. For my PhD work on seizure prediction and other neuroscience applications of machine learning in healthcare, I obtained a new potential data source for EEG and EMG data in a very different patient population than that seen at MGH. Additionally, when I return to my clinical training in medical school, I plan to return to Lebanon to work with refugee patients, perhaps at the Hamidy Clinic for an away rotation. Longer term, I will also likely continue to research and clinically serve in refugee settings once I complete my training as a clinician-scientist.