Proposal

Title – Comparing Antibacterial Resistance in the United States, Sweden and Syria

Program of Study – Biomedical Sciences

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Category – Applied

Abstract: Antibiotic resistance is a universal problem that is often exacerbated by external stressors (war, poverty, etc.) and the misuse of broad-spectrum antibiotics. This statistic and literature study analyzed the rates of colonization and prevalence of Methicillin-resistant Staphylococcus aureus (MRSA) in three countries (United States, Sweden and Syria) representative of three demographics. Previous records indicate that Sweden and the United States have a similar colonization rate of MRSA (2-4%) and Syria has a substantially higher rate (15-16%). Data on MRSA prevalence in Syria is scarce but the rate is also very high. When comparing prevalence in the US and Sweden and adjusting for population the US has eight times the rate as Sweden (2.6 per 10,000 compared to 0.3 per 10,000). This data correlates with the Swedish practice of prescribing some of the lowest amounts of broad-spectrum antibiotics and the highest amounts of narrow-spectrum antibiotics. Sweden also tests for antibiotic resistance and susceptibility more frequently than the US which prescribes high amounts of broad-spectrum antibiotics like fluoroquinolones and broad-spectrum penicillins, in practices similar to Syria. While correlation does not equal causation, and there are surely other factors for this difference of prevalence rates between Sweden and the US, it is nevertheless important to note that the US uses antibiotics in a strikingly similar fashion to Syria and other countries with limited resources
or medical capabilities. Further research should focus on the efficacy of antibiotic techniques in the US. and tracking colonization and prevalence rates in Sweden as unprecedented numbers of Syrian and other refugees settle there. This research project is unique in that there are not many studies that compare the effects of antibiotic prescription practices and the infection rates of MRSA. The study synthesizes important information on the topic and provides grounds for further investigation.

**Christian worldview integration:** My Christian faith has shaped my research in a very apparent way. Through the Scriptures, prayer and the words of Christian figures in my life I have found a large passion and conviction in the subjects of medicine, missions and Muslims. It is because of these interests that I have spent much time outside of class reading and researching about infectious diseases, antibiotic resistance, medical missions and the best ways to provide healthcare to the less fortunate. My desire to participate in medicine has shaped my career path, research experience and thoughts about medical practices and how to improve those techniques or technologies involved. My focus on missions has opened my eyes to a world that is less fortunate and given me a fresh perspective on how other countries or medical organizations treat diseases with limited resources. The passion I possess for reaching Muslims has kept me intently focused on the recent mass migration of people from Muslim majority countries. I am extremely curious to see if world migration patterns bring a migration of antibiotic resistant microorganisms with them and would love to participate in further research on this topic. This research project, Dr. Hubbard and my Christian worldview have also exposed me to investigating and trying to improve the testing methods for antibiotic susceptibility. If automated methods can be made cheaper and more accessible, or quicker and more holistic manual methods
for antibiotic testing can be developed, thousands of lives could be saved in the contexts of medical missions, humanitarian aid and even here in the United States.