

Peace Through Health Care in Somaliland

Gabe Butterfield, class year 2012 and Michael Gonzales, class year 2012
Reed College

Objective

The objective of our project is to provide critical and region specific health information to doctors at the Edna Adan hospital in Hargeisa, Somaliland. This information will improve the health care of children and adults in Somaliland. We will conduct tests to determine the level of antibiotic resistance present in the hospital, giving doctors the information they need to more effectively treat their patients. We will also test locally sourced antibiotics that are suspected by doctors in the hospital to be counterfeit in order to determine which of the drugs being given out are curing patients' diseases and which are not. These objectives were identified by Dr. Thiel, a doctor at the hospital who has guided the development of the project, as the most important information to improving treatment in the hospital and saving the lives of children and adults.

Background

Somaliland is an independently functioning but not yet U.N.-recognized country northwest of Somalia, in which internationally-certified elections have been held.(1,2). The state department has issued travel warnings about Somalia and Somaliland, but also has acknowledged that Somaliland, particularly Hargeisa, is more stable. We will monitor the situation, and may be able to alter the project slightly to allow lab work to be done in neighboring Djibouti if necessary. Somaliland was involved in a brutal civil war from 1982 until 1991 which led to the disappearance of the infrastructure needed to provide health care. Significant progress has been made, but the state of health care is still among the worst in Africa.

The long-term lack of adequate health care has led to a wide array of deeply-ingrained problems in the administration of health care and, in turn, to many unnecessary deaths, particularly of children. To address some of these problems, we asked Dr. Thiel of Edna Adan Hospital to articulate for us the most pressing needs for the hospital; this project is the result of that conversation. The Edna Adan Hospital is the main hospital in the capital city of Hargeisa, and has made significant progress in improving health care in the region after the civil war. It started as a childrens' and maternity hospital and still retains a focus on the needs of mothers and children.

Diarrheal diseases are the leading cause of death in African children under five years old. (3) The lack of effective diagnoses compounds an already serious problem in the developing world: bacterial resistance to antibiotics caused by overuse and misuse. This leads to a situation wherein the doctors do not know whether or not they are giving out drugs that help cure their patients' diseases; they could be worsening the resistance problem by giving out ineffective antibiotics.

Project Description

We hope to address the current diagnostic testing problems for two common diarrheal pathogens, shigella and salmonella. Our first task is to carry out effective testing for both of these pathogens. For this purpose we will take stool cultures from patients suspected to be suffering from diseases caused by either of these pathogens and test them using the wellcolex test, a test that has been shown to give highly accurate results with a low rate of false positives in independent evaluations.(4) These tests will tell us not only whether salmonella or shigella are present, but also the specific strain. This information is critical, since different strains can cause very different symptoms and possess different levels of antibiotic resistance. Most notably, an infection with

Salmonella typhi causes typhoid fever and leads to much longer lasting complications than other strains of salmonella. A comparison of these results with the results obtained by the local method, the widal test, will give Dr. Thiel and the other doctors at the hospital useful information for the treatment of patients.

When this testing is complete, we will possess confirmed cultures of both shigella and salmonella species on which to perform the rest of our work. To determine the level of antibiotic resistance and the efficacy of local antibiotics, we will determine the minimum concentration of antibiotics necessary to inhibit the growth of each of these bacteria using commonly prescribed antibiotics, both from U.S. suppliers and from local stocks. This will allow us to determine the level of resistance to each antibiotic in the pathogens present, and the quality of antibiotics being purchased from local suppliers. We will do this by subculturing each sample of these pathogens into a series of test tubes containing selenite broth as well as increasing concentrations of antibiotics. The tube containing the lowest concentration of antibiotics in which the bacteria are unable to grow is termed the minimum inhibitory concentration, and is a standard measure of an antibiotic's efficacy. This will be done for each antibiotic, both those purchased from U.S. suppliers and those from local suppliers. This information will allow Dr. Thiel to determine which antibiotics are worth administering and to which antibiotics the resistances render the antibiotics ineffective. Since in the case of most diseases, there are several possible antibiotics that can be given, knowing which antibiotics are most effective will lead to a greater probability of successfully curing disease in children and adults.

Expected Outcomes

Doctors in the hospital will be able to more effectively tailor their prescriptions to the particular bacteria and corresponding resistances present in the region. This knowledge will greatly increase the efficacy of antibiotic treatments for these diseases.

Knowledge of which pharmacies are selling quality antibiotics will prevent doctors from giving out antibiotics that are useless and potentially dangerous. Knowledge of which antibiotics are working and which are not will prevent many unnecessary deaths, particularly of children.

By improving health care in Somaliland, we give strength to a fragile state of peace, and to the fragile democracy that is working to maintain that peace.

Because our project proposes to leave behind knowledge rather than physical infrastructure, it will continue to improve health care, save lives, and promote peace and stability long after we have returned to the U.S.

Sources

1. International Republican Institute, Parliamentary Election Assessment Report Somaliland September 29, 2005.
2. Life as an election observer, The Economist, July 7th, 2010.
3. Robert E Black, Simon Cousens, Hope L Johnson, Joy E Lawn, Igor Rudan, Diego G Bassani, Prabhat Jha, Harry Campbell, Christa Fischer Walker, Richard Cibulskis, Thomas Eisele, Li Liu, Colin Mathers, Global, regional, and national causes of child mortality in 2008: a systematic analysis Lancet. 06/2010; 375(9730):1969-87.
4. P Rohner, S Dharan and R Auckenthaler, Evaluation of the Wellcolex Colour Salmonella Test for detection of Salmonella spp. in enrichment broths. J. Clin. Microbiol. December 1992 vol. 30 no. 12 3274-3276.