Department of Environmental & Global Health

College of Public Health & Health Professions

Summer 2012

ISSUE 03

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Created by: Christa Roberts

EGH to Offer Two New One Health Degree Programs

The University of Florida is one of the few US universities with all the necessary disciplines on one campus to pursue One Health training. Given this advantage, the Department of Environmental and Global Health is expanding its degree portfolio by adding two new One Health programs. We received official approval for our One Health PhD program earlier this year and expect to have approval for a new One Health Master's program in June.

One Health thinking seeks to include human, animal, and environmental experts in problem solving. It is particularly helpful in tackling zoonotic disease and food safety problems. Internationally applauded, the One Health approach is strongly endorsed by human medicine, public health, veterinary medicine, the CDC, and various other national and international institutions and organizations. To view our One Health video, please visit: http://egh.phhp.ufl.edu/academic-programs/. Continued on page 2...

UF UNIVERSITY of FLORIDA

NEW! One Health PhD Program Approved for Summer 2012

The new PhD in Public Health with a One Health concentration requires a minimum of 90 post-baccalaureate credit hours. These credits will include core public health coursework (15 credits); quantitative methods and statistics (12 credits); professional issues (7 credits); concentration area (35 credits); supervised research (3 credits); supervised teaching (3 credits); and dissertation research (15 credits).

The One Health concentration is a research-oriented health degree that emphasizes working across public health, veterinary health, and environmental health disciplines to tackle difficult health problems. This program is designed to bridge the gap between various areas of animal, plant, and human health to improve the well being of all species.

Students are now enrolling for Fall 2012. For more information, please visit: http://egh.phhp.ufl.edu/academic-programs/.

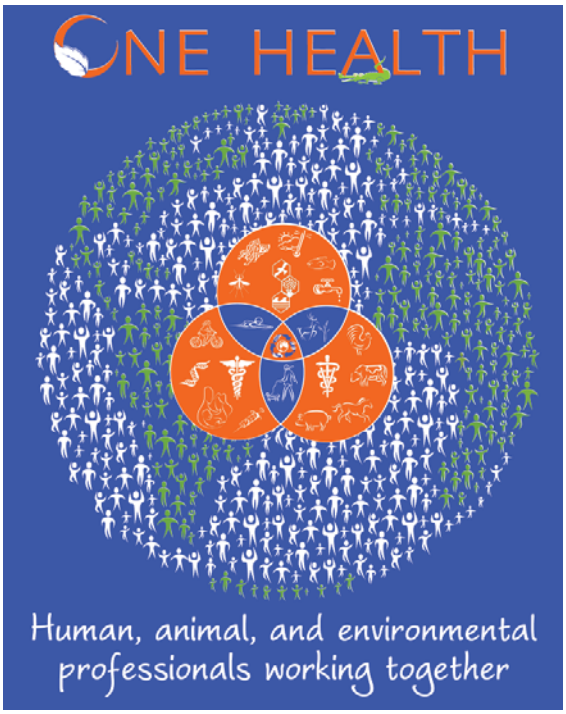
One Health MHS Program to Receive Final Review in Summer 2012

The One Health MHS curriculum addresses a diverse range of health issues but has a strong focus upon infectious diseases. Courses and other educational experiences are carefully structured to enable students to develop competence in very specific health skills. The program offers particular depth in how infectious diseases are transmitted at the human-animal interface; how the environment impacts such disease transmission; and how we can predict and mitigate new and current disease threats. An emphasis is placed upon agricultural industries, biosecurity, entomology, zoonotic diseases, animal health, food production, pathogen detection and identification, and environmental controls. Through elective courses, students may draw upon the extensive expertise of University of Florida faculty from diverse disciplines to gain special training in a specific field of interest.

As this is the first degree program of its kind in the United States, we expect much demand and relatively high salaries for students with this training. It is also important to note that out-of-state students in this program will receive a considerable reduction in out-of-state tuition costs.

The One Health MHS program is under consideration for approval by the UF Board of Trustees during their June 2012 meeting. If approved, graduate students could begin training in August 2012. For more information, please visit: http://egh.phhp.ufl.edu/academic-programs/.

Proposed MHS One Health Curricula	
Introduction to Biostatistical Methods	3
Principles of Epidemiology in Public Health	3
Environmental Health Concepts in Public Health	3
Introduction to Public Health*	3*
Occupational & Environmental Health among Agriculture Workers	3
Water Quality & Human Health	3
An Introduction to Entomology, Zoonotic Diseases, and Food Safety	3
Environmental Infectious Diseases: A Molecular Approach	3
Seminar Environmental & Global Health: Critical Thinking & Teaching	1
EGH Journal Club	0†
Electives in Area of Specialization	12
Occupational Health Field Research Experience	3
Total credit hours:	40



*Course offered online at no charge and may be taken prior to matriculation; †Students must participate in journal club during one term but they will not receive academic credit on their transcript.

Faculty at a Glance

Name	Title	Primary Research
Afsar Ali, PhD	Research Associate Professor	Epidemiology and ecology of Vibrio cholerae
Dana Focks, PhD	Research Professor	Bio-control and computer simulation models designed to control Aedes aegypti
Gregory Gray, MD, MPH FIDSA	Professor and Chair	Zoonotic and respiratory pathogens
Gary Heil, PhD	Research Assistant Professor	Virology and diagnostics
Andrew Kane, PhD	Associate Professor and Associate Chair	Aquatic pathology and toxicology
John Lednicky, PhD	Associate Professor	Microbiology and bioaerosol research
Bernard Okech, PhD	Research Assistant Professor	Antimalarial drug resistance; malaria transmission, leptospirosis
Edsel Redden, MS	Associate in EGH International Development	Agriculture and community development
Richard Rheingans, PhD	Associate Professor	Water quality and sanitation; vaccine policy
Stephen Roberts, PhD	Joint Professor	Toxicology and risk assessment
Tara Sabo-Attwood, PhD	Associate Professor	Mechanisms of particle-induced pulmonary injury

EGH to Welcome New Associate Professor, Dr. Song Liang

Dr. Song Liang joins the Department of Environmental and Global Health as an Associate Professor beginning July 1, 2012. Dr. Liang's research interests include environmental epidemiology, risk assessment, and dynamic modeling of water-associated and zoonotic infectious diseases (WZIDs). His research programs are unified by underlying interests in understanding environmental impacts on the transmission of WZIDs, assessing human health risk, quantifying disease burden, and evaluating environment-oriented intervention and surveillance strategies. He is also interested in socio-environmental determinants underlying emerging and re-emerging environmentally-mediated infectious diseases. EGH faculty and staff look forward to future collaboration with Dr. Liang.

Longitudinal Studies of Cholera and Other Diarrheal Diseases in Haiti

Afsar Ali, PhD
Research Associate Professor

Haiti is one of the poorest countries on the planet. The majority of Haiti's people lack access to clean drinking water, adequate sanitation, and hygiene; all of which produce a large number of cases and deaths from diarrheal diseases. On October 21, 2010, Haiti witnessed, for the first time in 60 years, a major cholera outbreak that still continues. The total number of cholera cases reported is over 500,000 with an estimated 7,000 deaths. With funding from USAID and DoD-GEIS, we have recently built a state-of-the-art infectious disease laboratory in Gressier to study cholera and other enteric pathogens.

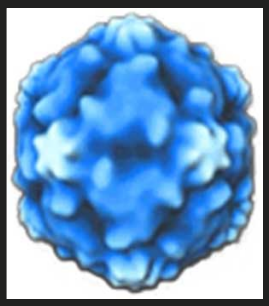
Introduction of cholera in a non-immune population in Haiti provides us a unique opportunity to study (i) the transmission dynamics of cholera, (ii) ecology and epidemiology of *Vibrio cholerae*, the causative agent of cholera, and (iii) the evolution and adaptation of *V. cholerae* in the newly-found aquatic niche. To achieve our goals, we have set up a cohort study that will include about 2,000 school-aged children and their household members from 4 selected schools closed to the laboratory. Stool samples from children exhibiting diarrhea and their household members (both symptomatic and asymptomatic cases) will be collected and processed in the laboratory for the detection of possible *V. cholerae* strains. In addition to school-based cohort study, we have selected 16 environmental sites that we will survey monthly for the isolation of *V. cholerae*. The funding for this study is provided by the National Institute of Health (NIH/ NIAID). At the end of this study, we will be able to understand the transmission dynamics of cholera in Haiti. We will also gain insight in mutational frequency and/or evolutionary dynamics of *V. cholerae* in human vs. aquatic reservoirs, and understand the pathogen's mode of persistence in Haiti's aquatic reservoirs. Knowledge gained from this study will be used to develop appropriate intervention strategies to combat cholera in Haiti and at the global level.

In addition to cholera, we have begun to examine the prevalence of diarrhea caused by other enteric pathogens, including Salmonella, Shigella, Campylobacter, *Escherichia coli*, Norovirus and parasites from additional funding awarded to us by DoD-GEIS. The major objectives of this study are to develop baseline data on predominant enteric pathogens causing diarrhea, and to determine if the incidence of a singular diarrheal pathogen follows a spatial and temporal patterns. To achieve our goal, we will use the same specimens collected for the cholera study and develop an integrated system for surveillance of enteric pathogens.

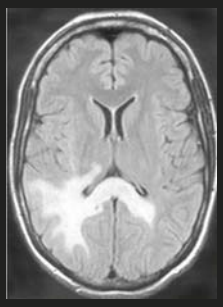
Lednicky Laboratory Updates

John Lednicky, PhD
Associate Professor

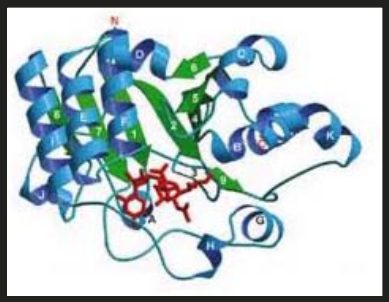
The BSL2 laboratory is now functional, and some of our projects were recently showcased at the EPI Research Day. Our primary work centers on the transmission of respiratory pathogens. Apart from inhalation exposure studies, we are evaluating the efficacy of various air samplers at collecting air-borne pathogens. Recent developments include the detection of airborne rhinovirus C in office air. Rhinovirus C was discovered relatively recently, but is difficult to study because it cannot be propagated *in-vitro* using standard virology methods. It has been associated with both mild and severe respiratory illnesses. We obtained the genetic sequence of the virus we detected, and it appears to be significantly different from other rhinovirus C strains that have been described to-date. A reverse-genetics system of this virus is being devised for additional studies; if successful, we will have a novel model system for generating a virus that ordinarily cannot be grown *in-vitro*. Progress has been made with additional respiratory pathogens. We successfully used our viral forensics methods to obtain the complete genome of a Human Parainfluenza 4B virus; our GenBank entry is time-stamped as the 3rd submission and adds significant insights on the genetics of this virus. Once our studies are close to completion, we will also describe the detection of another airborne virus from office workers.



Computer-rendition of a Rhinovirus



A human brain infected with JCV



Sialyl-transferase (SIAT)

Apart from work related to aerobiology, we continue to develop methods to optimize virus isolation and/or detection in tissue culture cells. Technician Julia Loeb and intern Maya Luetke are learning the art and science of tissue culture and the engineering of tissue culture cells for virus research. Recent accomplishments include the development of cell lines that over-express signaling lymphocyte activation molecule (SLAM), a cell-surface virus receptor for canine distemper virus (CDV). Our SLAM-expressing cell lines were function tested and proven superior for the detection of wild-type CDV strains that cause systemic disease. Other cell lines which we have developed express influenza virus alpha 2,3 receptors (useful for H5N1 and various influenza virus subtypes that affect animals) or alpha 2,6 receptors (for human influenza viruses). The alpha 2,3- and alpha 2,6-cell lines were engineered by introducing appropriate human sialyl-transferase (SIAT) genes into the cells; the SIAT enzymes are expressed using a hybrid promoter/enhancer that is more active than standard CMV promoters in mammalian cells. In laboratory tests, influenza virus detection was faster in the SIAT cells, and virus yields higher, highlighting the utility of the cells for clinical diagnostics as well as basic research.

Finally, we continue with our virus discovery and characterization studies. For example, we have determined that once infected, humans likely are persistently infected with the same JC virus for life. This is a virus we all carry and take to our grave without signs of clinical disease. However, whereas we persistently shed JCV in small quantities in our urine as we age, the virus is not entirely benign. JCV has a “Jekyll and Hyde” opportunistic pathogen feature: it causes a fatal disease called progressive multifocal leukoencephalopathy (PML), a fatal demyelinating disease of the central nervous system that occurs in some immunocompromised humans. JC virus is a type of polyomavirus. We are finessing methods for detecting and cloning polyomaviruses, and will soon reveal an important new variant of a human polyomavirus that has only recently been reported.

Malaria Research in Haiti

Bernard Okech, PhD
Research Associate Professor

Malaria infects close to 30,000 people in Haiti every year. However, there is a general lack of detailed knowledge about malaria in Haiti and about anti-malarial drug resistance. Forty years ago, a nationwide effort to control malaria infection using pyrimethamine (PYR) in combination with chloroquine (CQ) led to the first report of PYR resistance. CQ was effective at that time and is still widely used today for the treatment of malaria in Haiti. However, with Haiti's increasing number of cases of malaria and the need to eliminate malaria, additional data on the status of anti-malarial drug resistance in Haiti is required. These data could be useful in shaping future treatment guidelines in the country. The Haitian Ministry of Health does not have the capacity to conduct routine surveillance for anti-malarial resistance, however it has recently agreed to readdress surveillance activities for drug resistance in Haiti. My research is based at two clinics, one in Port au Prince and the other in Leogane's Hospital Sainte Croix. Additional samples from the Ministry of Health come from all over Haiti.

The goals of this malaria research, in partnership with the Haiti Ministry of Health, is to determine the prevalence of anti-malarial drug resistance markers for chloroquine (PfCRT, PfMDR 1), sulfadoxine (PfDHPS) pyrimethamine (PfDHFR) and artesunate (PfATPase6). Resistance to these anti-malarial medicines is conferred by single-nucleotide polymorphisms (SNPs) in respective genes. We analyzed the amino acid mutations in the respective drug resistance markers and we are beginning to find markers for drug resistance for CQ and PYR. We have found a prevalence rate of 32% mutations for CQ resistance markers and 27% for PYR resistance in our analysis. We have also identified new *PfCRT* haplotypes in Haiti. Our research will provide surveillance and monitoring data for the Ministry of Health and other stake holders in Haiti.

Allemande Left, Right to Good Health

Andy Kane, PhD
Associate Professor

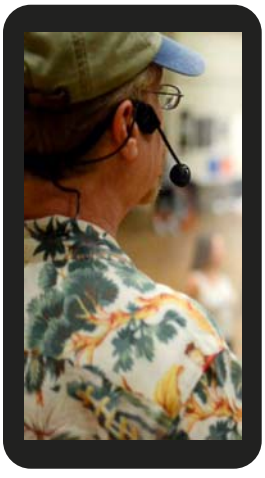
What does environmental pathobiology have to do with square dancing? There's a link, somewhere. I've always loved music. Music with a beat and a groove. Back in my college days I stumbled upon a square and contra dance while walking along the downtown mall in Ithaca, NY. There was great music and lots of folks having a great time dancing to it. I tried it. And then tried it again some weeks later, when serendipity had me alongside the music and dancing again. Now, some thirty years later, I am still dancing to "in-the-groove" old-time music, and I facilitate the fun factor by calling dances, too.

It's a balance, gents turn by the left, and partner swing. Participants at the Tallahassee dance this month party to the music of the Avant Gardners with Andy Kane calling. *Photo: Dave Pokorney*

It won't come as a surprise that aerobic exercise is good for many parts of our well-being, including cardiovascular fitness, managing weight and cholesterol levels, and enhancing mental stamina. For me, regular exercise helps me to be better focused with my job and my family, and provides more energy throughout the day.

Dancing is one form of exercise that has a serious additional benefit: it's fun. That means that you can do more of it, perhaps with greater frequency, and not feel like it's work. And the fun factor helps to balance the other stressors that sometimes abound in daily life. Apparently I am not alone in loving dance as a form of fun exercise. The US Surgeon General, Dr. Regina Benjamin, advocates dance with zeal and great enthusiasm. "I want exercise to be fun; don't want it to be work," said Benjamin in a recent NY Times interview. "I love to dance, and whenever I'm at places with music, I will dance. That exercise is medicine. It's better than most pills."

First Lady, Michele Obama's *LET'S MOVE* campaign also targets physical activity (including dance and healthy eating) to fight childhood obesity and "raising a healthier generation of kids." Again, the emphasis is on fun.



Square and contra dancing is one of our nation's few homebred dances. It embraces a sense of community through a common goal of having fun, and putting dance to music. The dance structure is not complicated - in fact it's easily mastered, and provides a means for your body to find synergy with great music. It's a traditional and great way for families to have fun together, for kids enjoy music and build social skills, and for folks of all generations to interact and groove to the music.

When he's not dancing, Andy Kane is an Associate Professor of environmental and global health, focusing on environmental pathology and toxicology. He directs the Emerging Pathogens Institute's Aquatic Pathobiology Laboratories. Dr. Kane can be found dancing and calling around Gainesville, Tallahassee, Tampa, St. Petersburg, Orlando, and other places with good music. For a listing of events, visit http://www.contradancelinks.com/schedule_FL.html.

Initiation of the Immune Response in the Lung by Nanoparticles and Viruses

Pallab Sanpui, PhD
Post Doctoral Associate, Dr. Sabo-Attwood Laboratory

Despite recent advances in the manipulation of nanoscale materials and successful application of these engineered nanoparticles (ENPs) in various fields, we lack sound knowledge on the biotoxicity associated with ENP exposures. This has led to concerns regarding adverse health effects of ENPs. Because inhalation is the primary exposure route to ENPs, it is critical to understand how ENPs may impact the lungs. In Dr. Sabo-Attwood's group, my research focuses on the characterization of mechanisms controlling the immune response of lung cells exposed to single-walled carbon nanotubes (SWNTs). We have a particular interest in SWNTs as they are widely used and superficially resemble asbestos which may affect long-term health. Recently, we have concentrated on toll-like receptors (TLRs) as they are an early line of defense against foreign invaders in human body. We will also investigate the effect of ENP exposure on the susceptibility of respiratory infections caused by other infectious agents like influenza A virus (IAV). This part of the work will be carried out in close collaboration with Dr. John Lednicky's laboratory team.

Pallab Sanpui completed his doctoral research work in the field of nano-biotechnology at the Indian Institute of Technology in Guwahati, India.

Severe Acute Respiratory Infection (SARI) & Community Acquired Pneumonia (CAP) Surveillance Study in Republic of Georgia

Whitney Krueger, PhD
Research Coordinator, Global Pathogens Laboratory

Giorgi Chakhunashvili (left) and Ana Kasradze (center), two former EGH Certificate in Emerging Infectious Disease Research trainees, now lead study efforts at NCDC in Georgia.

EGH is collaborating with the National Center for Disease Control and Public Health (NCDC) in Tbilisi, Georgia in the first multi-pathogen surveillance study of community-acquired pneumonia (CAP) and severe acute respiratory infections (SARI) ever to be conducted in the Country of Georgia. CAP and SARI are two of the most prevalent infectious disease problems addressed by clinicians, and are an important cause of mortality and morbidity worldwide. Improving the care of adult patients with CAP has been the focus of many different organizations, and several have developed guidelines for the management of CAP. Such efforts at improvement in care are warranted, but despite advances in antimicrobial therapy, rates of mortality due to pneumonia have not decreased significantly since penicillin became routinely available.

The purpose of this study is to identify the main etiological agents causing SARI & CAP in outpatient and hospitalized patients in the Country of Georgia. *Continued on next page...*

...continued from p.9

Aims of this study are to assess the effectiveness of current antimicrobial treatments and develop recommendations for improved antibiotic and antiviral treatment. The Country of Georgia has a limited capacity to screen SARI and CAP patients for etiology of their illness. However, NCDC possesses key equipment and qualified staff to perform pathogen identification, and the US Department of Defense's US-Country of Georgia Central Public Health Research Laboratory (CPHRL) is contributing in the fulfillment of project activities. The collaboration between UF, NCDC, and CPHRL will increase diagnostic capacities in Georgia through training and technology transfers. Implementation of diagnostic methods will not only provide data regarding responsible respiratory microorganisms but also may reduce antibiotic prescription rates and improve treatment of patients with proper antibiotics.

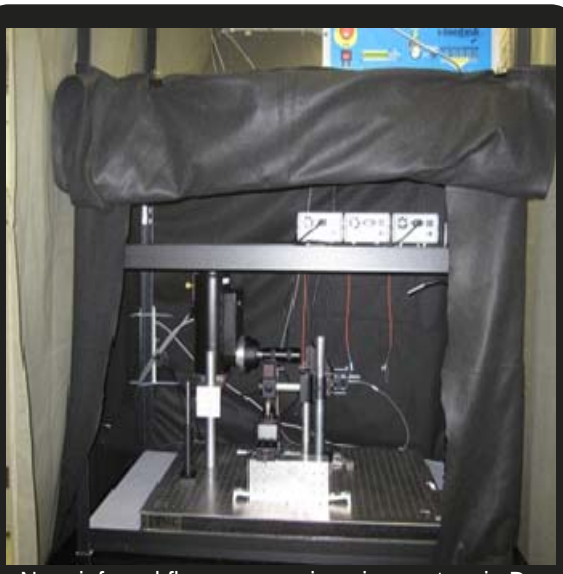
Tracking Nanomaterial Distribution in Fish Using Near Infrared Fluorescence

Joseph Bisesi, PhD
Post Doctoral Associate, Dr. Sabo-Attwood Laboratory

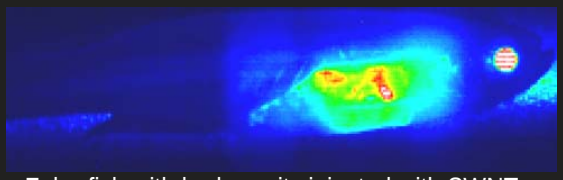
One line of research in Dr. Tara Sabo-Attwood's lab is focused on the fate and physiological effects of nanomaterials in biological systems. Within this framework, my research is focused on single walled carbon nanotubes (SWNTs), which have unique physical/chemical properties that have led to their increased use in manufacturing. The inevitable release of these particles into our aquatic environment has led us to question the risk they may pose to aquatic organisms. To address this concern, we plan to examine the fate and potential effects of SWNTs in fish during waterborne and dietary exposures.

Since SWNTs are primarily composed of carbon, detection in carbon based organisms has been particularly difficult. But SWNTs with specific chiralities have been shown to fluoresce in the near infrared (NIR) spectrum. Because biological tissue exhibits low auto fluorescence and high transparency in the NIR, the fluorescent properties of SWNTs can be used for in vivo detection and imaging. To take advantage of these unique properties, an instrument was custom built in Dr. Sabo-Attwood's lab that utilizes powerful NIR lasers for deep tissue excitation of SWNTs coupled with a NIR emission detection array. I have been optimizing the system for detection in fish and will soon begin experiments to determine fate of SWNTs in various exposure scenarios.

Joseph H. Bisesi received his PhD from Clemson University, where he conducted research on the effects of pharmaceutical contaminants on brain chemistry and predation behavior in fish.



Near infrared fluorescence imaging system in Dr. Sabo-Attwood's lab

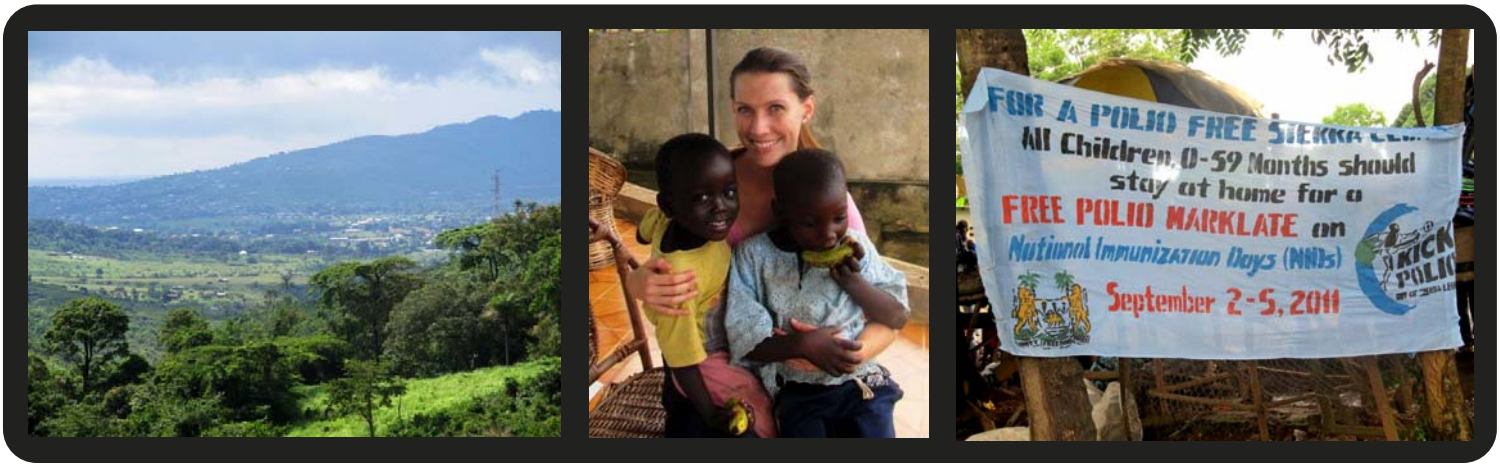


Zebrafish with body cavity injected with SWNTs. The eye of the fish is auto fluorescent and is typically covered during experiments.

Many Countries Still at Risk for Wild Polio

Amber Barnes, MPH
PhD-EGH Student

During the summer of 2011, I volunteered in Sierra Leone as a STOP team member with the World Health Organization and the Centers for Disease Control and Prevention. STOP, or Stop Transmission of Polio, is part of the Global Polio Eradication Initiative. Following the success of the Smallpox Warriors of the 1970s, STOP team members are trained by the CDC and sent to over 60 countries to find and eliminate the remaining pockets of wild polio virus. STOP team members work with the WHO to plan, conduct, and monitor national immunization campaigns, perform acute flaccid paralysis surveillance, ensure community mobilization is accomplished through partnering with village chiefs and non-governmental organizations, promote routine immunizations, lead case investigations, and help to manage and respond to outbreaks.



Based out of the WHO country office in Freetown, Sierra Leone, I worked with the Ministry of Health and Sanitation alongside immunization partner UNICEF for the National Immunization Days campaigns. I trained the national and district supervisors, independent monitors, and vaccination teams on how to conduct the country-wide vaccination campaigns. Also, I assisted vaccination teams with administering the oral polio vaccine to children using a house-to-house strategy. By implementing the RED, or Reaching Every District Approach, outreach efforts are used to immunize hard-to-reach populations located in extremely difficult terrain.

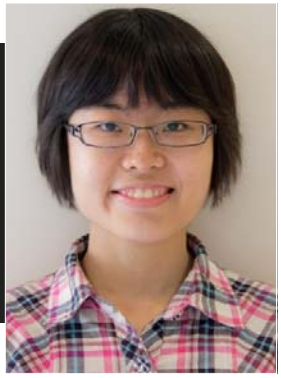
Sierra Leone is a mountainous country located along the coast of West Africa. Following a brutal civil war that ended just ten years ago, the country has some of the poorest health indicators in the world. The average life expectancy for an individual born in Sierra Leone is 47 years old. One in six women is at risk of death due to childbirth or childbirth complications and one in five children will not reach their 5th birthday. Recently the Government of Sierra Leone initiated a free health care plan for children under 5 and pregnant and lactating mothers. A key component to increasing the health and wellbeing of children within the country is to enhance both routine and outreach immunization services within each of the thirteen health districts. The STOP program and team members strive to improve immunization coverage within these most vulnerable populations.

Besides serving as an in-country consultant for polio eradication, I investigated a pertussis outbreak in a rural village affecting over one hundred individuals. I also assisted in the development of the country's new multi-year policy for the Expanded Programme on Immunization, the creation of a new national influenza sentinel surveillance initiative, the formulation of a new cold chain plan for the country to ensure the integrity of vaccine distribution and performance, and the revision of the priority disease reporting and investigation guidelines for the Integrated Disease Surveillance and Response program.

Amber obtained her BA in Communication from Western Illinois University and her MPH degree from the University of North Florida. Following her graduate degree, she worked with the Florida Department of Health's Bureau of Epidemiology as an Epidemic Intelligence Service fellow. She plans to continue her work in global health and hopes to return to Sierra Leone during her graduate studies at UF to conduct research on Lassa fever.

Finding Hope for Children with Leukemia in China

Su Yi
MPH-EH Student



I recently served a one-year internship as a nurse in a Chinese hospital. During my time in the Department of Pediatrics, I met children who were only one or two years old with acute leukemia. Their parents were anxiously waiting for some news of possible cures for their children. For children under the age of ten in China, the incidence of leukemia is 2.28/100,000.[1] Another set of data states that there are 4 million leukemia patients in China, of which half are children.[2] As these measures of morbidity are high, in China there seems to be growing concern about Chinese children developing leukemia. Several risk factors for childhood leukemia have been identified. They include: exposure to environmental hazards such as contaminated food and environmental chemical toxins such as those contained in the furniture.[3] As for treatment, the main cure protocol for the leukemia is bone marrow transplantation. However, the Marrow Donor Program in China collects only about 83,000 samples from donors each year, while the demand for bone marrow treatment greatly exceeds this supply.

As a public health worker, what we worry about is the increasing number of children who are developing leukemia. What can be done to prevent or reduce this morbidity? Certainly reducing childhood exposures to known environmental risk factors (e.g. high dose radiation, benzene, tobacco smoke[4]) is important. However, we really do not know well which exposures put children at greatest risk. As a result, more focus has been placed on leukemia treatment efficiency. As bone marrow donors are few in China, I researched the problem. I found that, in Taiwan, the number of bone marrow donors is three times higher than it is in China.[5] I also found out the reasons for this difference are largely cultural. Chinese traditions teach that it is harmful to donate bone marrow and this perspective is rooted deeply in many peoples' minds.

As a Chinese public health worker, I can deal with this problem by encouraging Chinese people to donate bone marrow and convincing them that they will remain healthy in doing so. Moreover, I can target my interventions by conducting surveys to measure the concerns about donating bone marrow, address those concerns, and explain the high moral value of making such a donation. There are also ethical issues in China to explore. It is reported that 20% of Chinese bone marrow donors afterwards regret making the donation to leukemia patients and restrict bone marrow use.[6] At present there is no legislative guidance regarding bone marrow donation, so medical professionals often face difficult decisions in employing bone marrow therapy. A potential solution to these problems is to import bone marrow from other countries. Through standardized tissue typing and screening, a large worldwide network of donated bone marrow specimens could be organized to help more patients. Special bone marrow specimens could be imported to partially satisfy the great need in China. This may be a be a practical solution for the lack of bone marrow donors. Government and charity foundations have the capability to help children pay for bone marrow and bone marrow transfers. In conclusion, I feel sincere compassion for Chinese children with leukemia and hope to use my University of Florida public health training to help them.

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3. 2010. Appendix: Leukemia Diagnosis in Resource-Poor Countries, 377-382.
4. Dario Campana. (2008) Role of minimal residual disease evaluation in leukemia therapy. Current Hematologic Malignancy Reports 3:3,155-160
5. Shang-Ju Wu, Shang-Yi Huang, Chien-Ting Lin, Yu-Jr Lin, Chee-Jen Chang, and Hwei-Fang Tien
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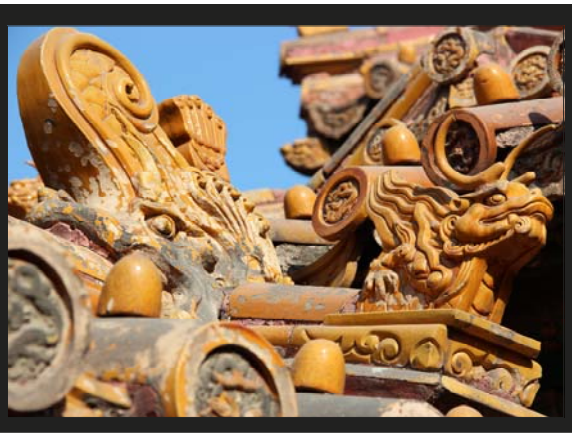
6. Shiyan Daily Newspaper, 2011-10-19

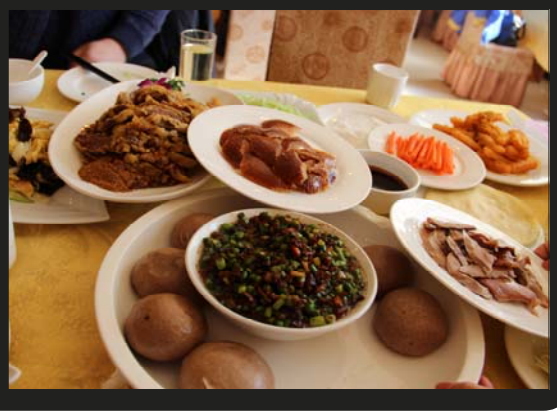
CNIC Internship in Beijing

Ben Anderson
MPH-EH Student

In the spring of 2012, I had the extraordinary opportunity to conduct my MPH internship at the Chinese National Influenza Center (CNIC), located in Beijing, China. CNIC is one of six World Health Organization Collaborating Centers for influenza, collectively providing data to the Global Influenza Surveillance and Response System (GISRS) which is used to better understand and track the global transmission of influenza viruses. The data provided by CNIC is generated from a sentinel surveillance system established throughout China utilizing over 500 collection sites with the support of more than 400 network laboratories. The data from this system is used by CNIC to describe the epidemiology of influenza transmission each year, as well as to identify outbreaks. Furthermore, CNIC conducts routine antigenic and genetic testing to track virus types and subtypes, as well as test for antiviral resistance. Impressively, nearly half of all the reference influenza strains used in annual vaccine development are supplied by CNIC.

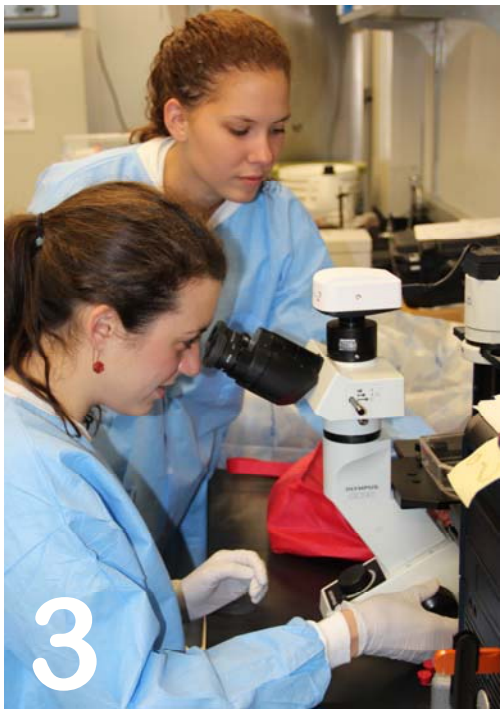
My internship lasted for 5 weeks and involved working closely with the Epidemiology and Management section of CNIC. While in China, I was charged with the task of writing a thorough operational description of the surveillance network and performing a simplified evaluation of the system in order to identify potential areas of improvement. The experience culminated in a final presentation where I was able to address the members of CNIC and report on my findings which were well-received. My time in China was both challenging and extremely rewarding as I was introduced to a phenomenal culture inside and outside the laboratory. This culture coupled with the high-quality research and epidemiology that is conducted at CNIC, led to a thoroughly remarkable internship experience.





Photos

1. Dr. Andy Kane collects water samples in Haiti
2. PhD-EGH Student, Yaser Alsahafi and Dr. John Lednicky at the EGH Student Reception
3. Technicians, Julia Loeb and Maya Luetke, at work in Dr. Lednicky's laboratory
4. EGH New Student Orientation
5. Dr. Richard Rheingans on a research trip in Bangladesh
6. Dr. Gary Heil leads a tour for EGH graduate students at the Emerging Pathogens Institute
7. International participants of the 2011-2012 Certificate in Emerging Infectious Disease Research program



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