2013–2014 Assignment Opportunities

Third- and Fourth-Year Medical and Veterinary Student Projects

- Feasibility, Acceptability, and Costs of Rectal Artesunate for Pre-Referral Treatment of Children with Severe Malaria at the Community Level: Assessment of a Pilot Roll-Out — Malawi
- Guatemala Child Health Improvement Partnership (G-CHIP) — Guatemala
- Knowledge, Attitude and Practice (KAP) Surveys, Rabies Exposure Risk Assessment and Implementation of Preventive Approaches within Population at Higher Risk of Exposures to Bats or Other Rabies Reservoirs; Pathogen Discovery Focused on Bats, Lyssaviruses and other Emerging Zoonotic Pathogens at the Human-Animal Interface; Development and Implementation of Pilot Projects for Canine Rabies Elimination — Guatemala or India
- Monitoring and Evaluation of a Large-Scale Urban Water Infrastructure Project — Zambia
- Pilot Intervention Trial of Ceramic Water Filters to Reduce The Burden of Cryptosporidium In Household Drinking Water — Rural Kenya
- Population-Based Surveillance for Emerging Infectious Diseases, Kibera Informal Housing Settlement (Nairobi)

Fourth-Year Medical and Veterinary Student Projects

- Population-Based Surveillance — Rural Thailand

Third- and Fourth-Year Medical Student Projects

- Seroprevalence of Hepatitis B among Children — Haiti

Fourth-Year Medical Student Projects

- Injection Safety Practices — Egypt

Third- and Fourth-Year Veterinary Student Projects

- Antimicrobial Resistance in the Broiler Production Chain — Thailand

The CDC-Hubert Global Health Fellowship is made possible by the joint efforts of the CDC Foundation and CDC with an endowment established by the O.C. Hubert Charitable Trust; additional support is provided by an educational grant from External Medical Affairs, Pfizer Inc.
Project title: Feasibility, Acceptability, and Costs of Rectal Artesunate for Pre-Referral Treatment of Children with Severe Malaria at the Community Level: Assessment of a Pilot Roll-Out

Fellow requested (select all that apply):
Year: ☒ Third year ☒ Fourth year Type: ☒ Medical student ☒ Veterinary student
Location (country): Malawi Project duration: 12 weeks
Project availability: September 2013 – June 2014

Project supervisor(s):
Don Mathanga, MBBS, PhD, Director, Malaria Alert Centre
Kimberly Lindblade, PhD, MPH, Chief, Strategic and Applied Sciences Unit, Malaria Branch, CDC
Laura Steinhardt, PhD, MPH, Epidemiologist, Strategic and Applied Sciences Unit, Malaria Branch, CDC

Languages: English

Skills:
- Good communication skills
- Creativity in resolving problems and trouble-shooting in the field setting
- Attention to detail and willingness to learn data management skills
- Ability to supervise others and to work closely with people of diverse backgrounds
- Experience in or interest in learning quantitative and qualitative research skills

Project description:
Rectal artesunate is recommended by WHO for pre-referral treatment of children with severe malaria in communities prior to arrival at health facilities where they can receive parenteral treatment. Severe malaria can quickly become fatal, and administration of rectal artesunate to children with signs of severe malaria can improve their survival outcomes if delays occur in reaching a health facility with appropriate treatment for severe malaria. However, few countries have implemented rectal artesunate on a large scale, and questions remain about caregiver completion of referrals and acceptability of the drug within communities.

The National Malaria Control Program in Malawi has decided to roll out rectal artesunate for delivery by community health workers providing treatment to children under five years in hard-to-reach areas. To inform the national roll out, CDC, in collaboration with the World Health Organization, is supporting a pilot roll-out and evaluation of rectal artesunate in one district of Malawi. Depending on the timing of the Fellow's stay in Malawi, there are potential opportunities for involvement in other malaria projects being carried out by the Malaria Alert Centre, with technical assistance from CDC, including an ongoing cohort study to assess the effectiveness of insecticide-treated bednets in an area with high documented insecticide resistance, an upcoming study (in 2014) to assess the use of cell phone technology to improve health worker case management of malaria, and potentially an in vivo drug efficacy study.

Objectives:
To determine the feasibility, acceptability, and cost of having community health workers administer rectal artesunate in the community to children with signs of severe malaria, as a pre-referral treatment prior to receiving parenteral treatment at a health facility. Specific objectives include:

- Assess rates of referral completing among children who received rectal artesunate in the community
- Determine the appropriateness of use of rectal artesunate among community health workers
- Assess the acceptability of the intervention by community members, community-based health workers and health facility-based health workers
- Determine the costs and cost-effectiveness of the intervention
Project title: Feasibility, Acceptability, and Costs of Rectal Artesunate for Pre-Referral Treatment of Children with Severe Malaria at the Community Level: Assessment of a Pilot Roll-Out

Project design:
The pilot roll-out and evaluation will employ a non-randomized pre-post design in one district of Malawi. Data collection instruments will include the following:

- Pre- and post-household survey to assess rates of care-seeking for children with fever and for children with signs of severe malaria
- Qualitative interviews with community members, community health workers, and health facility-based health workers
- Review of CHW registers to assess utilization rates for febrile children and for children with signs of severe malaria and appropriate treatment of children with fever/signs of severe malaria
- Structured interviews with caregivers of children treated by community health workers with rectal artesunate to assess referral completion rates and barriers to completing referrals
- Pre- and post-review of tertiary/referral facility records to assess rates of admission and sources of referral for children with signs of severe malaria

Student responsibilities:
The Hubert Fellow will be based in Malawi for the duration of the fellowship. He/she will interact very closely with Malaria Alert Centre staff, who will be implementing the pilot study. The Fellow will assist in baseline data collection before the pilot roll-out of rectal artesunate and will help ensure that all data collection follows standard operating procedures. He/she will help ensure appropriate data management for the study. The Fellow will spend time both in Blantyre, where Malaria Alert Centre is based, as well as in Phalombe, 1.5 hours from Blantyre, where the study will be carried out. He/she will closely supervise data collection in the field, at health facilities and in households and with community members. The Fellow will receive direct supervision in Malawi from Don Mathanga, the director of Malaria Alert Centre. Dr. Mathanga is a medical doctor who received his PhD in Epidemiology from the University of Michigan; he has overseen numerous research studies on malaria, and has authored many peer-reviewed publications on his malaria research. In addition, the Fellow will receive supervisory support (both in Malawi and from Atlanta) from CDC Malaria Branch staff, including Kimberly Lindblade and Laura Steinhardt.
Project title: Guatemala Child Health Improvement Partnership (G-CHIP)

Fellow requested:
Year: ☒ Third year ☒ Fourth year Type: ☒ Medical student ☒ Veterinary student

Location (country): Guatemala Project duration: 8 weeks

Project availability: September 2013 – June 2014

Project supervisors:
Sharon Roy, MD, MPH, Medical Epidemiologist, Waterborne Diseases Prevention Branch
Eric Mintz, MD, MPH, Team Lead, Waterborne Diseases Prevention Branch

Languages: English and Spanish

Skills:
Experience with basic computer programs helpful, especially those programs similar to Microsoft Excel and Microsoft Access® (familiarity with statistical software like SAS would also be helpful, but is not required).

Project description:
This multi-year project involving a consortium of organizations seeks to improve the health of neglected persons in Guatemala by achieving freedom from chronic, water-related illnesses, specifically by eliminating death and severe morbidity due to diarrhea and intestinal parasites in children younger than five years of age. A pilot project is being developed in a small focused area in the department of Quetzaltenango to establish the “proof of concept” for a package of high impact, cost-effective, scalable interventions implemented by a consortium of organizations, with an emphasis on health education, water/sanitation/hygiene, nutrition, and medical treatment. Initial baseline data collection using a cross-sectional survey design will be conducted by CDC in late 2013 / early 2014. The overarching vision for this project is to eventually create a nation-wide plan to achieve key milestones in targeted areas of every Guatemalan department by the end of 2020.

Objectives:
The aim of baseline data collection is to assess the health and environmental status of communities participating in the pilot study, specifically to:

- Determine the prevalence of diarrhea, intestinal parasites, malnutrition through household interviews of parents/guardians of children 5 years of age and younger, stool testing of participating children for enteric pathogens, blood testing for nutritional markers, and anthropomorphic measurements.
- Determine household water, sanitation and hygiene (WASH) status through household interviews and direct observation.
- Determine community WASH status related to the status of municipal WASH resources using key informant interviews and direct observation of infrastructure.
- Determine knowledge, attitudes, and practices (KAP) regarding health seeking behavior using household surveys and key informant interviews.
- Determine KAP regarding WASH behaviors, barriers to improved WASH, and WASH preferences using household surveys and key informant interviews.
### Project title:
Guatemala Child Health Improvement Partnership (G-CHIP)

### Project design:
The study design will be a cross-sectional survey of randomly selected households in participating communities. Parents/guardians of household children 5 years of age and younger will be interviewed. Participating children will have stool and blood testing and have anthropomorphic measurements taken. Community key informants will be interviewed and community water and sanitation services will be assessed.

### Student responsibilities:
The student will assist with implementation of the study protocol, monitoring data collection in the community, and will be involved with ensuring data quality is met. The student will also be involved in data management and creating and disseminating summary reports on data collected. This highly motivated student should be flexible, and willing to work as part of a team.
Project title: Knowledge, Attitude and Practice (KAP) Surveys, Rabies Exposure Risk Assessment and Implementation of Preventive Approaches within Population at Higher Risk of Exposures to Bats or Other Rabies Reservoirs; Pathogen Discovery Focused on Bats, Lyssaviruses and other Emerging Zoonotic Pathogens at the Human-Animal Interface; Development and Implementation of Pilot Projects for Canine Rabies Elimination

Fellow requested:
Year: ☒ Third year ☒ Fourth year Type: ☒ Medical student ☒ Veterinary student

Location (country): Guatemala or India Project duration: 1–2 weeks in CDC lab (Atlanta); 4–6 weeks in the field

Project availability: September 2013 – June 2014

Project supervisors:
Sergio Recuenco, MD, DrPH
Amy Gilbert, PhD
Richard Franka, DVM, PhD
Inger Damon, MD

Languages: Spanish would be an asset, but it is not required for Guatemala

Skills:
- Previous experience with animal capture, biological sample collection (e.g., blood draw, swabbing), inoculation, and necropsy
- Basic computer skills for data entry
- Familiarity with public health investigations via questionnaires and household surveys will be helpful, including use of GPS and PDA devices, but is not required
- Basic biosafety training for work with pathogens of biosafety level 2–3 is needed, including medical clearance and respiratory training for use of fit-tested N95 masks and Powered Air Purifying Respirator (PAPR); rabies pre-exposure vaccine series is an asset, but not required for all projects
- Flexibility, self-motivation and understanding of teamwork (cooperation with others, team spirit) as well as the ability to work under rather austere field conditions in developing countries are prerequisites for perspective candidates
Project title: Knowledge, Attitude and Practice (KAP) Surveys, Rabies Exposure Risk Assessment and Implementation of Preventive Approaches within Population at Higher Risk of Exposures to Bats or Other Rabies Reservoirs; Pathogen Discovery Focused on Bats, Lyssaviruses and other Emerging Zoonotic Pathogens at the Human-Animal Interface; Development and Implementation of Pilot Projects for Canine Rabies Elimination

Project description:

Guatemala: Field expedition will focus on identifying emerging zoonoses with bats as hosts or vectors that constitute an immediate or prospective threat to human health in several high risk areas (hot-spots). The general strategic approach for developing bat sample schema will be based on geographic risk assessment and proximity to human populations. In addition, KAP surveys will be done and blood specimens collected from humans from the same areas where bat specimens are collected to assess transmission of bat-associated pathogens to humans, rabies epidemiology and public health risks. Evaluation of local laboratory capacity and potential for improvement of rabies prevention and control will be part of the mission. An essential component of the study is to collect data regarding ecologic and other risk factors associated with pathogen transmission. These data will be assessed in order to develop and validate models for emerging diseases. Other potential projects may include rabies vaccine seroconversion studies in domestic animals and livestock.

India: Project will focus on the evaluation and development of laboratory capacity in selected regions and evaluation of appropriate risk assessment practices as related to rabies post-exposure prophylaxis. In addition, estimation of disease burden through analyses of data from selected hospitals and Ministry of Health will be done. Estimations of local dog population, their vaccination coverage and design and implementation of program for canine rabies control and canine population management will be conducted.

Objectives:

- Collect biological samples for further analysis focused on detection of zoonotic pathogens associated with chiroptera.
- Collect information on rabies prevalence in various host species.
- Assess dog population demographics.
- Collect available information on human rabies (incidence of exposures, impact in different demographic groups and geographic regions; sources of the exposure; deviation in postexposure prophylaxis), if available.
- Evaluate capacity of laboratories performing rabies diagnosis, provide additional training if needed.
- Evaluate the availability and accessibility of rabies biologics for veterinary and public health use, evaluate national rabies control and prevention programs.

Project design:

Guatemala: A set of model districts (hot-spots) will be selected based on the suggestions of local collaborators, to ensure accessibility and representation of different socio-economic layers of the country. Data on human rabies cases, exposure rates, and availability of post-exposure prophylaxis will be collected from the local public health officials and hospitals. Data on dog population and the proportion of stray dogs, as well as vaccination coverage of the dogs, will be estimated based on official records and investigation of a representative set of households. Animal rabies data will be retrieved from the reference veterinary diagnostic laboratory. A sampling of bats will be performed from available roosts and various tissues, oral and fecal swabs, and serum will be collected. The collected information will be entered into a database, mapped, and further used for modeling purposes.

India: A reference laboratory will be selected to implement project of sustainable rabies control and prevention based on laboratory diagnosis of suspect animals and appropriate risk assessment in exposed patients. Training in standard laboratory detection methods will be performed. Estimation of local dog population and demographics studies will be conducted. Part of the trip may involve design and assistance with dog vaccination and evaluation of population management practice.
### Project title:
Knowledge, Attitude and Practice (KAP) Surveys, Rabies Exposure Risk Assessment and Implementation of Preventive Approaches within Population at Higher Risk of Exposures to Bats or Other Rabies Reservoirs; Pathogen Discovery Focused on Bats, Lyssaviruses and other Emerging Zoonotic Pathogens at the Human-Animal Interface; Development and Implementation of Pilot Projects for Canine Rabies Elimination

### Student responsibilities:
- Student will assist in capture and sampling of mammals (with the focus on Chiroptera) in selected zoonotic hot-spots and further assist in processing of captured animals
- As a part of epidemiologic survey, student will interact with representatives of local health agencies as well as local communities while involved in collection of data such as household surveys focused on the evaluation of knowledge and perception of rabies, associated risk and vectors, as well as knowledge of appropriate prophylaxis
- Student will be also expected to perform database entry and limited statistical analysis
**Project title:** Monitoring and Evaluation of a Large-Scale Urban Water Infrastructure Project

**Fellow requested:**
- ☑ Third year
- ☑ Fourth year
- ☑ Medical student
- ☑ Veterinary student

**Location (country):** Lusaka, Zambia

**Project availability:** September 2013 – June 2014

**Project supervisors:**
- Joan Brunkard, PhD, Epidemiologist, Waterborne Disease Prevention Branch
- Rob Quick, MD, MPH, Medical Epidemiologist, Waterborne Disease Prevention Branch
- Eric Mintz, MD, MPH, Team Lead, Waterborne Disease Prevention Branch

**Languages:** English

**Skills:**
- Experience with basic computer programs such as Microsoft Excel (familiarity with SAS or other statistical software programs would be helpful, but is not required). Ability to work as part of a multi-disciplinary, multi-cultural team is essential.

**Project description:**
The Millennium Challenge Corporation (MCC), an innovative foreign assistance program designed to reduce poverty by promoting sustainable economic growth, is funding a large-scale ($350,000,000) urban water infrastructure project in the capital city of Lusaka, Zambia to increase population access to potable water, sanitation, and flood protection. CDC will conduct monitoring and evaluation activities associated with the multi-year project, with a specific focus on evaluating its impact on health outcomes (e.g., diarrheal disease incidence) as well as economic expenditures (both direct and indirect), behavior change, and flood risk reduction.

**Objectives:**
- Measure health impact of interventions (including water supply, sanitation, and drainage improvements)
- Assess change in household income, household expenditures on water, and indirect costs (e.g., time spent collecting water, missed work associated with diarrheal illness, time spent caring for an ill child) pre- and post-intervention
- Assess changes in access to, and use of, water and sanitation infrastructure
- Assess exposure to, and changes in, flooding over time
- Evaluate water treatment, hygiene, and sanitation behaviors over time

**Project design:**
A baseline survey in the fall of 2013 and semiannual household visits (one in the rainy season, one in the dry season) will be conducted in a large probability-based sample of Lusaka residents (sample size potentially as high as 20,000 households). Depending on timing, the fellow would assist with data collection during the baseline or first rainy season community survey. Data collected will include indicators on access to water, water sources, cost of water (if any), water treatment (if any), sanitation, exposure to drainage problems, and reported episodes of diarrhea, respiratory, and skin diseases in the previous week. Additional data will be collected on use and cost of health services; observations of water source, water storage, hand-washing, and sanitation; and testing of source and stored water for *E. coli* in a sub-sample of households.
Project title: Monitoring and Evaluation of a Large-Scale Urban Water Infrastructure Project

Student responsibilities:

| The student will work with a team of U.S. and Zambia collaborators to conduct the baseline or first rainy season population survey to assess diarrheal illness, household expenditures on WASH, and other indicators described in the project design. Specific duties will include monitoring data collection in the field, ensuring data are complete and data quality is adequate, assisting the team with data management, and creating and disseminating summary reports on data collected. The student should have excellent interpersonal skills, be willing to be independent, flexible, and work well as part of a multi-disciplinary, multi-cultural team. |
**Project title:** Pilot Intervention Trial of Ceramic Water Filters to Reduce The Burden of *Cryptosporidium* In Household Drinking Water in Rural Kenya

**Fellow requested:**
**Year:** ☒ Third year ☒ Fourth year  
**Type:** ☒ Medical student ☒ Veterinary student

**Location (country):** Kenya  
**Project duration:** 8 weeks

**Project availability:** September 2013 – June 2014

**Project supervisors:**
Ciara O’Reilly, PhD, Epidemiologist, Waterborne Diseases Prevention Branch  
Eric Mintz, MD, MPH, Team Lead, Waterborne Diseases Prevention Branch

**Languages:** English

**Skills:**
Experience with basic computer programs helpful, especially those programs similar to Microsoft Excel and Microsoft Access® (familiarity with statistical software like SAS would also be helpful, but is not required).

**Project description:**
Diarrhea is a major cause of illness among children in Africa. *Cryptosporidium* is a protozoan waterborne diarrheal pathogen resistant to chlorine. Ceramic filters are effective at improving drinking water quality, including removal of protozoa. In a recent preliminary analysis of >22,000 children <5 years enrolled in the Global Enterics Multi-Center Study (GEMS) case-control study of moderate-to-severe diarrhea, *Cryptosporidium* was identified as the second most common pathogen (after rotavirus) causing diarrhea in infants across all four participating African sites. We propose to pilot the first *Cryptosporidium* specific intervention trial of household ceramic water filters to reduce the burden of cryptosporidiosis acquired through drinking water in rural Kenya. This trial, if successful would have the potential to influence household water treatment policy and protect the health of large vulnerable populations.

**Objectives:**
The aim of the study is to examine the efficacy of ceramic water filters to reduce the burden of waterborne diarrheal illness among infants in selected villages in the study area in Kenya.

**SPECIFIC OBJECTIVES:**
- Determine if the use of ceramic water filters to store and treat drinking water reduces waterborne diarrhea prevalence by comparing the longitudinal diarrhea prevalence among infants in households who receive ceramic water filters with that of infants in households who do not receive them.
- Determine the seroincidence of *Cryptosporidium* infection in infants and young children by examining antibody response among consenting participants in selected households.
- Evaluate the efficacy of ceramic water filters for removal and inactivation of waterborne microbes in the laboratory using water samples seeded with *Cryptosporidium*, and bacterial and viral indicators of fecal contamination.
- Determine the efficacy of ceramic water filters for *Cryptosporidium* removal from household drinking water under field conditions by distributing ceramic water filters to households with infants in the study area in Kenya and testing source and filtered drinking water for water quality indicators, and *Cryptosporidium*.
- Assess user acceptability of ceramic water filters as an intervention to reduce diarrhea prevalence in infants and young children.
<table>
<thead>
<tr>
<th>Project title:</th>
<th><strong>Pilot Intervention Trial of Ceramic Water Filters to Reduce The Burden of Cryptosporidium in Household Drinking Water in Rural Kenya</strong></th>
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<tbody>
<tr>
<td>Project design:</td>
<td>The study design will be a randomized, controlled intervention trial of ceramic water filters to reduce the burden of waterborne diarrheal disease, including <em>Cryptosporidium</em>, in infants in rural Kenya.</td>
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<tr>
<td>Student responsibilities:</td>
<td>The student will assist with implementation of the study protocol, monitoring data collection in the community, and will be involved with ensuring data quality is met. The student will also be involved in data management and creating and disseminating summary reports on data collected. This highly motivated student should be independent, flexible, and to work as part of a team.</td>
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**Project title:** Population-Based Surveillance for Emerging Infectious Diseases, Kibera Informal Housing Settlement (Nairobi)

**Fellow requested:**
- Year: ☒ Third year ☐ Fourth year
- Type: ☒ Medical student ☐ Veterinary student

**Location (country):** Kenya
**Project duration:** 8 weeks

**Project availability:** Will schedule fellow when mentor is available. Unable to predict travel schedule for this time period.

**Project supervisor:**
- Dr. Joel Montgomery, PhD, MS, Director, Global Disease Detection-Kenya and the International Emerging Infectious Program (IEIP), CDC-Kenya

**Languages:** English

**Skills:**
- Experience with basic computer programs helpful, especially those programs similar to Epi Info™ and Microsoft Access® (familiarity with statistical software like SAS would also be helpful, but is not required)

**Project description:**
- The incidence of important infectious disease syndromes, such as pneumonia, diarrhea, fever and jaundice, is currently being described in Kibera, which is one of the largest contiguous slums in Africa. Additional information is needed and will be crucial in helping to develop targeted intervention and prevention studies.

**Objectives:**
- To define the burden of these infectious disease syndromes in Kibera, leading to introduction of intervention and prevention strategies that may decrease their burden.

**Project design:**
- **Household visits.** Enrolled households located in two villages of Kibera are visited every two weeks to identify individuals who meet the case definition of the syndromes in which we are tracking. All family members in each enrolled household are administered a questionnaire using a smartphone. Anyone who is sick is encouraged to visit the field clinic linked to the program for additional clinical information and sample collection.

- **Clinic visit.** Enrolled participants living in the two villages in Kibera are encouraged to visit the program field clinic for their illnesses. Clinic staff will provide free medical care, treatment or refer them for further follow up as needed for their illness. After receiving medical care, a short questionnaire will be conducted by Kibera clinic staff. Besides the routine laboratory tests done at the clinic, additional specimens will be taken to accurately diagnose illness. CDC will cover cost of consultation, laboratory testing and medications.

- Persons who access the clinic but reside outside the study area will not have costs covered by CDC and will have to pay regular prices as determined by clinic management. However, these people can be seen by clinical staff paid for by CDC through the KEMRI cooperative agreement.
**Project title:** Population-Based Surveillance for Emerging Infectious Diseases, Kibera Informal Housing Settlement (Nairobi)

**Student responsibilities:**

| The student will work on a special project within the population-based surveillance area. Possibilities include developing protocols for collecting epidemiologic data (e.g., cell-phone, household-based), evaluating the accuracy of symptom reporting on biweekly home visits, evaluating the clinical spectrum of illness for people coming into the clinic, and implementing soil-transmitted helminth infection treatment. In addition, the student may have the opportunity to participate in several intervention trials including pharmaceutical (e.g., vaccine clinical trials) and non-pharmaceutical (e.g., WASH projects, nutritional supplementation). The student’s activities will be field-based in an urban slum. In addition, the student will have the potential to interact with the various Global Disease Detection programs in Kenya. The student should be independent, flexible, and self-motivated. |
Project title: Population-Based Surveillance in Rural Thailand

Fellow requested:
Year: ☑ Fourth year Type: ☑ Medical student ☑ Veterinary student

Location (country): Bangkok, Thailand Project duration: 10–12 weeks
Project availability: September – November 2013 and January – June 2014

Project supervisors:
Toni Whistler, PhD, Chief, Laboratory Section, International Emerging Infections Program, Thailand
Julia Rhodes, PhD, Senior Epidemiologist, International Emerging Infections Program, Thailand

Languages: English. Thai would be a bonus.

Skills:
Epidemiology, data analysis, and writing. Experience in clinical infectious diseases or infectious disease epidemiology would be helpful.

Project description:
The International Emerging Infections Program (IEIP), part of the Thailand Ministry of Public Health (MOPH) – U.S. CDC Collaboration (TUC) and CDC’s Global Disease Detection Program, conducts active, population-based surveillance for community-acquired pneumonia (CAP) requiring hospitalization in two rural Thai provinces, Sa Kaeo and Nakhon Phanom. Nasopharyngeal specimens are collected from a subset of pneumonia patients and tested for a panel of viral and bacterial respiratory pathogens by PCR. In 2005, a laboratory capacity-building project added bloodstream infection surveillance capabilities to both provinces, allowing identification of non-viral causes of pneumonia and sepsis through an automated blood culture system. This system has increased our knowledge of the burden and causes of CAP in Thailand and highlighted the need for more detailed understanding of the epidemiology of specific pathogens. IEIP is one of seven sites world-wide that has just begun the Pneumonia Etiology Research for Child Health (PERCH) project that aims to improve the evidence-base for pneumonia prevention and treatment in children less than 5 years of age in developing countries. This study uses the Fast-track Diagnostics Respiratory Pathogens-33 Kit for molecular identification of pathogens in nasopharyngeal swabs and induced sputum specimens. We also use the surveillance and laboratory infrastructure to evaluate new diagnostic approaches to important public health pathogens, including a study to evaluate novel diagnostic approaches for Streptococcus pneumoniae, which launched in 2010. Other smaller studies have used Taqman Array Cards as the format for multiplexed molecular determinations of pathogens in the collected respiratory specimens. Finally, the surveillance system allows in-depth investigations of new diseases, such as pandemic influenza A (H1N1), as well as evaluation of potential interventions, such as vaccines.
Project title: Population-Based Surveillance in Rural Thailand

Objectives:

Depending on the timing of the fellow’s arrival and professional interests, at least one of the following projects would be available for consideration:

1. Molecular technologies are becoming more widely used for the detection of respiratory pathogens, in part due to their greater sensitivity and ability to detect slow growing pathogens or those difficult to culture. This has evolved to include multiplex PCR technology that allows for the detection of a large number of viral and bacterial pathogens from a single specimen. We have recently introduced two different multiplex technologies into our surveillance projects. The fellow would be involved in the evaluation of the clinical potential of these real-time PCR technologies. Initial basic descriptive analysis will involve a) examining the distribution of respiratory pathogens in a small subset of hospitalized cases of community acquired pneumonia in Thailand; b) monitoring the trends of coinfections of respiratory pathogens (bacterial and viral) among hospitalized patients; c) describing the prevalence of *Streptococcus pneumoniae* and *Haemophilus influenzae* type B carriage.

2. We expect the work of our current Hubert Fellow on antimicrobial susceptibility patterns will identify new research questions which the 2014 fellow could address. This project examines the antimicrobial susceptibility patterns of bacterial isolates obtained from bloodstream infections over a 7 year period in Sa Kao and Nakhon Phanom, Thailand. This proposal is to analyze an existing dataset describing the clinical, laboratory, and epidemiological characteristics of bacterial pathogens and their associated antimicrobial sensitivities, and changes over time. This could be expanded to examine a) the organisms that grew from persons reporting pre-culture antibiotic use, or those testing positive for antimicrobial serum activity, and b) correlation of changes over time in antimicrobial susceptibility with changes in pre-culture antibiotic use. Current pathogens of interest include *E. coli*, *Cryptococcus*, *Mycobacteria*, and non-typhoidal Salmonella.

Additional overall project objectives include:
- Develop a project summary and presentation to facilitate data sharing with CDC partners in the MOPH
- Develop an understanding of the key attributes of a good surveillance system and how surveillance data are used for public health action.
- Draft a manuscript for publication in a peer-reviewed journal.

Project design:

The primary data for this project is collected through IEIP’s active, population-based surveillance systems. Blood specimens from patients are sent to the laboratory for identification of bacterial and fungal pathogens using hemoculture, and pre-culture antibiotic usage is collected through self-report and by antimicrobial serum disc testing. Antimicrobial susceptibility testing is performed on all major pathogens isolated from the hemoculture system. Two different projects currently use multiplex PCR technology for pathogen identification: a) PERCH tests nasopharyngeal and induced sputum specimens from children <5 years using the Fast-track Diagnostics Respiratory-33 Kit that identifies 21 viral and 12 bacterial pathogens; and b) CAP uses the TAC system on nasopharyngeal swabs to test for the rapid simultaneous detection of 21 pathogens – 10 viral and 11 bacterial.
Project title: Population-Based Surveillance in Rural Thailand

Student responsibilities:
The student will be primarily responsible for analyzing the relevant data to meet project objectives and for developing clear summaries that can be shared with IEIP staff and Ministry of Public Health partners. S/he will meet regularly with mentors to develop a sound analysis plan and timeline. Before analyzing the data, the student will need to understand the surveillance system. To facilitate this they will start by reviewing our surveillance procedures. This includes understanding case ascertainment, data collection and entry, and specimen collection. The Fellow will interact with members of our surveillance teams to understand all aspects of the system. This includes discussions with surveillance officers, epidemiologists, information technology, and laboratory personnel. S/he will come away with an appreciation of the importance of integrated epidemiologic and laboratory surveillance systems. The student will also assist with and oversee collection of supplemental data for the specific analyses. They will gain experience in Thailand on clinical, laboratory, and epidemiological research, as well as exposure to the management of infectious disease in an international public health setting. An understanding of surveillance systems, study design, data collection, clinical laboratory analysis, and the challenges in coordinating a project with language and/or cultural barriers will be some of the expected knowledge areas the student will leave with. Candidates should be in excellent health, have a strong work ethic, be culturally astute, and not be averse to a tropical climate. For more information on the program, interested persons are referred to our website at http://www.cdc.gov/ncidod/global/ieip/index.htm.
Project title: Seroprevalence of Hepatitis B among Children

Fellow requested:
Year: ☑ Third year ☑ Fourth year ☐ Type: ☑ Medical student ☐ Veterinary student

Location (country): Haiti
Project duration: 6–12 weeks

Project supervisor:
Rania A. Tohme, MD, MPH, Medical Epidemiologist, Global Immunization Division

Languages: English, French (required), Creole (helpful but not required)

Skills:
Well-organized; Able to work independently with MS office: word, excel, power point; Familiarity with a statistical software package such as SAS and electronic data collection would be helpful but is not required; Good communication and ability to work in a team; Able to work in challenging environments.

Project description:
Hepatitis B vaccine was introduced to the childhood vaccination schedule in Haiti in October 2012. The vaccine is provided at 6, 10 and 14 weeks of age and is currently given as part of a combined pentavalent vaccine including diphtheria, pertussis, tetanus, Hib and hepatitis B. However, there are no baseline data on the prevalence of hepatitis B infection among children prior to vaccine introduction in Haiti.

Objectives:
Establish baseline prevalence of hepatitis B infection among children in Haiti prior to the introduction of hepatitis B vaccination. Results would allow the country to document the impact of vaccination on the burden of hepatitis B in children a few years later.

Project design:
A nationally-representative sample will be selected using a community based, probability proportional to size cluster methodology. Haiti will be stratified into two geographic regions: 1) Ouest department including metropolitan Port-au-Prince and 2) all other departments. This will ensure that results will be available for the highly populated and urbanized Ouest department (including metropolitan Port-au-Prince) as well as the entire country.

Serum specimens will be collected from 1200 children aged 5–10 years old. Information on basic demographic, socio-economic, vaccination history, and exposure to hepatitis B risk factors will also be collected from the parents and children. Data collection will be done using smartphones and information will be transmitted electronically on a daily basis.

Student responsibilities (Include an explanation of how the fellow will interact with the community):
The student will assist in monitoring data collection through:
1. Going on site visits to ensure that survey teams are following the established protocol for sampling, interviewing, and specimen collection. Student is expected to visit households in the community to monitor data collection in the field and report any problems to the principal investigator
2. Compiling household interview data log sheets and entering them in an excel document to calculate response and refusal rates
3. Assisting in addressing any problems with electronic data collection

If the student is able/interested to learn/work with SAS, the student might also be involved in data management and analysis by running SAS codes to cross-check and clean the data on a daily basis.
**Project title:** Injection Safety Practices

**Fellow requested:**
- **Year:** ☑ Fourth year  
- **Type:** ☑ Medical student  

**Location (country):** Egypt (Cairo)  
**Project duration:** 8 Weeks

**Project availability:** January – June 2014

**Project supervisor(s) (name, degrees, title, e-mail):**
Francisco Averhoff, MD, MPH, Associate Director for Global Health

**Languages:** English, Arabic (preferred/ideal but not mandatory)

**Skills:**
- Basic computer skills including use of Microsoft Office and ability to use statistical software (Epi-Info, SAS, or SPSS)

**Project description:**
The Division of Viral Hepatitis (DVH), CDC is collaborating with the World Health Organization and the Pasteur Institute to provide technical assistance to the Ministry of Health and Population (MOH) in Egypt in the prevention and control of viral hepatitis. The technical assistance activities include implementation and/or evaluation of activities and programs highlighted in the Egypt Viral Hepatitis Control Action Plan and will include assessing injection safety practices in Egyptian hospitals.

**Objectives:**
- Egypt has the highest rate of hepatitis C virus globally and over 150,000 new infections annually, most infections are transmitted in the health care setting. The objective of this project is to implement a comprehensive control strategy for viral hepatitis in the health care setting in order to lower the overall rate of viral hepatitis in Egypt and control disease transmission.

**Project design:**
- Survey of injection safety will be conducted in a sample (n = 20) of hospitals in one rural province in Egypt

**Student responsibilities (Include an explanation of how the fellow will interact with the community):**
- The student will assist in:
  - Developing and piloting the survey instrument
  - Administering the survey to Health Care Workers (HCWs)
  - Entering and analyzing the data
  - Drafting a report/manuscript

The student will have oversight by CDC Staff in the field. Student will work closely with Egypt Ministry of Health (MOH) staff and Ain Shams University students and staff. The student will spend few hours daily in MOH Hospitals in the rural province interviewing hospital HCWs with a structured survey instrument. In the evening the student will enter data collected into database. When data collection is complete, student will clean and analyze the data, and draft a report under CDC supervision.
### Project Title: Antimicrobial Resistance in the Broiler Production Chain

**Fellow requested:**

- **Year:** ☑ Third year  ☑ Fourth year
- **Type:** ☐ Medical student  ☑ Veterinary student

**Location (country):** Thailand  
**Project duration:** 10–12 Weeks

**Project availability:** January – June 2014

**Project supervisor:** Pawin Padungtod, DVM PhD, Veterinary Medical Officer, International Emerging Infection Program (Thailand)

**Languages:** English

**Skills:** Poultry production and handling. Basic bacteriological and statistical techniques are advantages.

**Project Description:**

This study will be conducted in Livestock region 1 of Thailand, which covers Bangkok and nine surrounding provinces. Samples will be collected from integrate broiler operations and independent enterprises and tested for the presence of *Salmonella* spp., *E. coli*, their antimicrobial resistance profile and genetic relationship among bacteria isolated from various stages of the production chain.

**Objectives:**

To determine the incidence, molecular characteristics, transfer mechanism and genetic relatedness of antimicrobial resistance in *Salmonella* spp. and *E. coli* in the broiler production chain.

**Project design:**

A prospective study design will be used to determine the incidence (occurrence) of bacterial contamination and antimicrobial resistance along the production chain. The same batch of chicks will be followed from the hatchery to broiler farm, processing plant/slaughterhouse and outlets where consumer has access to the product. These outlets include fresh markets, supermarkets and products ready for export.

**Student responsibilities:**

The student will work as part of a research team, which includes academic researchers, regulatory veterinarians and laboratory technicians to collect samples from live poultry, slaughtered poultry and poultry products; perform various laboratory procedures to identify and characterize the bacteria; conduct statistical analysis of the data and prepare progress report and presentation.

The student will have the opportunity to see firsthand how broiler is produced from hatching until place on shelf for consumers. This is an excellent opportunity for the student to gain insight into poultry production industry, food safety and antimicrobial resistance in a developing country.