



Fisher FOCUS

News from the Sherrilyn and Ken Fisher Center for Environmental Infectious Diseases

Fisher Center Discovery Program 2013 Awards

To develop excellence in clinically oriented research, the Fisher Center created the Fisher Center Discovery Program (FCDP). Goals of the FCDP include funding for clinical research related to environmental infectious diseases, resources for studies that lack traditional funding mechanisms, promotion of cross-disciplinary collaborative research, and mentoring opportunities for young investigators.

The inaugural grant cycle yielded 18 submissions, which were of exceptional quality. The difficult decision of sorting among the applications fell to the Johns Hopkins University (JHU) faculty members serving on the Fisher Center Advisory Board. After thoughtful review, the Board awarded grants to five JHU projects. Details about our awardees may be found on pages 2-3.

An event to honor the 2013 FCDP awardees was held March 28, 2013 on the main campus of the JHU School of Medicine. The event provided the opportunity for the awardees, faculty mentors and Fisher Center Advisory



L to R first row: Cindy Sears, M.D.; Trish Perl, M.D.; Megan Reller, M.D., M.P.H.; Sarah Tschudin Sutter, M.D.; Karen Carroll, M.D. Second Row: Charles Haines, M.D.; Christopher Heaney, Ph.D.; Aaron Milstone, M.D., M.H.S.; Paul Auwaerter, M.D., M.B.A.

Board members to meet one another in an informal setting.

We look forward to issuing our second "Request for Application" in the fall of 2013 and encourage our faculty colleagues to apply.

Fisher Center Mission Statement

The Sherrilyn and Ken Fisher Center for Environmental Infectious Diseases is dedicated to the clinical research of environmental pathogens which improves the diagnosis and treatment of these infections.

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A word from our Director Paul Auwaerter, M.D., M.B.A.

Clinical Director, Division of Infectious Diseases

The inaugural year of Fisher Discovery grants is underway. I am pleased to report that 18 thoughtful and innovative grants were submitted that hewed to the core mission of the center: the study of environmental infectious diseases. Topics of interest were extremely diverse, including emerging tick-borne infections, recovery of human pathogens in the Chesapeake Bay, aerosolization of manure as farm fertilizer assessing for bacterial burden, study of soil pathogen higher-order bacteria *Nocardia* spp.,

and fungus *Cryptococcus gatti*, as well as educational interventions to improve cholera outcomes in Bangladesh. With this wealth of scientifically inquisitive grants, it was indeed difficult to choose the five best applications by the reviewing committee. It is unfortunate that more of these deserving grants could not be funded; however, please take a moment to read the brief descriptions written by the five winning investigators. I think you'll agree that each touches upon an important subject that should lead to interesting findings,

additional projects and medical advances. We wish them the best of success as their projects get underway.

The arena of environmental infectious diseases remains a perpetually underfunded area in the context of clinical scientific investigations. With the start of the Fisher Center this year with the generous funding of Sherri and Ken Fisher who saw the need for such an effort, we're taking the first steps in this field that is certainly to gain in importance.

Space Renovation Underway

Renovation of the Fisher Center has begun on the second floor of the Pre-Clinical Teaching Building on the East Baltimore Campus of the Johns Hopkins University. Gone are the former anatomy labs, teaching areas and makeshift offices. Construction workers have removed walls and

have begun updating utility services. Project completion is anticipated for late-summer 2013.

Demolition of the space designated for the Fisher Center



2013 FCDP Award Recipients



Megan Reller, M.D., M.P.H.

Assistant Professor, School of Medicine, Department of Pathology, Medical Microbiology

Detection of unrecognized tick-borne febrile illness in the upper Midwest and northeast united states.

In the United States, different species of ticks can carry multiple pathogens that cause illness in humans. Tick-borne diseases in the U.S. include tick-borne rickettsial infections (such as anaplasmosis, ehrlichiosis, and Rocky Mountain Spotted Fever) as well as other infections (such as babesiosis, Lyme


disease, and tularemia). Many tick-borne illnesses have similar signs and symptoms, such as fever/chills, muscle and joint aches, and, in some cases, rash. Tick-borne rickettsial diseases continue to cause severe illness and death in otherwise healthy persons, despite the availability of inexpensive antimicrobial therapy, because they are difficult to diagnose early when therapy would be most effective.

Tick-transmitted infections are increasingly recognized in the United States when sought; additionally, new agents have been identified in new geographic areas. We suspect that

unrecognized and under-recognized tick-borne diseases likely account for a substantial proportion of febrile illness that is clinically diagnosed as human granulocytic anaplasmosis (HGA) in the upper Midwest and Northeast United States. We aim to identify tick-borne infections due to unsuspected agents in patients presenting with fever in the United States as well as to develop new diagnostic tests for multiple potential tick-borne agents, since new tests could support large clinical studies that assess the impact of early recognition and targeted treatment on clinical outcomes.

Article continued on page 3.

2013 FCDP Award Recipients, continued



Cynthia Sears, M.D.
Professor, School of Medicine, Department of Medicine, Infectious Diseases

Charles Haines, M.D.
Clinical Fellow, School of Medicine, Department of Medicine, Infectious Diseases

Does disruption of host microbiota modify colorectal cancer risk?

The number of bacteria living in and on the human body is about 10 times the total number of cells that make up our bodies. Yet we know little about how these bacteria affect our health and risk for disease. The Sears laboratory is particularly interested in the relationship between the gastrointestinal bacterial environment and colorectal cancer. Specifically Drs. Sears and Haines will be exploring the effect of antibiotic use on the risk for human colorectal cancer. It is known that antibiotics disrupt the natural gastrointestinal bacteria. It is not known if this disruption impacts the risk of colorectal cancer, and if so, the timing from antibiotic exposure to increased colorectal cancer risk. If we are able to answer these questions, we will provide important evidence supporting a role for our own gastrointestinal bacteria in colorectal cancer development. This understanding has the potential to lead to new methods of identifying individuals at increased risk for colorectal cancer, to promote new colorectal cancer prevention strategies, and to highlight the need to use antibiotics judiciously.




Aaron Milstone M.D., M.H.S.
Assistant Professor, School of Medicine, Department of Medicine, Pediatric Infectious Diseases

Development and clinical evaluation of laboratory methods to identify reduced antiseptic susceptibility in organisms causing healthcare associated infections.

Chlorhexidine is an antiseptic used to kill bacteria and prevent infections. We recently completed a large clinical trial and found that bathing critically ill children with chlorhexidine reduced potentially life-threatening bloodstream infections by 36 percent. This was the

first study of its kind in children and confirmed observations from studies in adults. As a result of our studies and others, chlorhexidine is being widely used in hospitals. As we have seen bacteria become resistant to antibiotics with frequent use, we worry that bacteria in the hospital environment may become resistant to chlorhexidine. In this study, we will develop a laboratory assay to detect and monitor for resistance to chlorhexidine in our patient care areas. Identifying emergence of chlorhexidine resistance is an important public health service.




Christopher Heaney, Ph.D.
Assistant Professor, School of Public Health, Department of Environmental Health Sciences

Evolutionary dynamics of multidrug-resistant Staphylococcus aureus (MRSA), a zoonotic pathogen of clinical significance, among industrial food animal production workers.

In the modern industrialized system of livestock production, animals are raised in close confinement and provided feeds with antibiotics to enhance growth. These practices have been shown to select for the emergence of drug-resistant bacterial pathogens of significance to human health, which along with other zoonotic pathogens are among the most globally prevalent and emerging infectious diseases. Little is known about the evolutionary dynamics and selective pressures that could drive emergence and dissemination of multidrug-resistant *S. aureus* (MRSA) from populations with exposure to the industrial livestock operation (ILO) environment to the broader community. The occupational environment inside industrial food animal production facilities may represent an important and under recognized reservoir of emerging MRSA of clinical significance in the US.

This research aims to address an important substantive question about the frequency with which ILO workers and their household member contacts carry animal versus human adaptive MRSA and whether there is a temporal relation of specific molecular characteristics – e.g., cell adhesion, immune evasion, and virulence genes – with reports of symptoms of infection

versus subclinical colonization. This study will increase the scientific evidence base and advance opportunities to develop occupational, public health, and clinical strategies to address industrial food animal production as an important potential reservoir of MRSA, an emerging zoonotic pathogen of clinical significance, in the US.



Trish Perl, M.D.
Professor, School of Medicine, Department of Medicine, Infectious Diseases

Sarah Tschudin Sutter, M.D.
Research Fellow, School of Medicine; Graduate Student, School of Public Health, Department of Epidemiology

Clostridium difficile: Impact of colonization versus transmission on development of infection.

Around 14,000 deaths per year are attributable to *Clostridium difficile* infections in US hospitals and the healthcare costs for *C. difficile* infection in the US are estimated at \$2.4-4.8 billion per year. In response to this enormous burden of disease attributable to *C. difficile*, the Center for Medicare and Medicaid Services (CMS) mandated US hospitals to reduce their *C. difficile* infection rates by 30% in the next five years. *Clostridium difficile* is a bacterium, which has been identified as the most common cause of hospital-acquired diarrhea in the developed world. Antibiotics are the most important known risk factor causing *C. difficile* infection, which results in significant morbidity and mortality among hospitalized patients.

To date, *C. difficile* infection has always been considered the result of transmission of *C. difficile* during the same hospital stay. A recent review, however, showed 52% of the patients were carriers of *C. difficile* on admission. In these cases, a key component for prevention is to avoid, to the extent possible, risks for clinical expression.

The aim of this research project is to determine if being a carrier of *C. difficile* on admission is a risk factor for consecutive *C. difficile* infection. Identifying those patients who are carriers on admission would be critical in defining risk and optimal methods of patient specific prevention methods.

Hopkins Links

Online Referral Directory

Find a Hopkins physician

www.hopkinsmedicine.org/doctors

Johns Hopkins USA

Residents from outside of Maryland

1-800-695-4872

www.hopkinsmedicine.org/usa

Johns Hopkins Medicine International

From outside the United States and

for non-English speaking residents

1-410-502-7683

www.hopkinsmedicine.org/international

Johns Hopkins Division of Infectious Diseases

www.hopkinsmedicine.org/medicine/id/

Johns Hopkins Infectious Diseases Outpatient Clinics

Green Spring Station:

410-583-2727 general information

410-583-2888 appointments

Bayview Medical Center:

410-550-0100

HIV Moore Clinic

410-955-1725

Viral Hepatitis Center

410-583-2736

Congratulations to **Roger Samuels**, 2013 IDSA Medical Scholars Program recipient. Roger is currently a student in the Johns Hopkins University, School of Medicine and the Bloomberg School of Public Health. This summer Roger will join the Fisher Center staff as a researcher on a Lyme disease project.

Presentations and Conferences

The Infectious Diseases Society of America (IDSA) joins with other partners to sponsor ID Week, October 2-6, 2013 in San Francisco, CA. Representatives of the Fisher Center will be attending the conference.

The 2nd Annual Tick Summit was held December 18, 2012 in Odenton Maryland. The Summit brought together leaders from the military, government, public health, clinical, and research arenas to exchange information and develop collaborative research opportunities regarding tick-borne diseases in the mid-Atlantic region. Katherine Feldman, DVM, MPH of the Maryland Department of Health and Mental Hygiene presented data showing Lyme disease as the third most reported notifiable disease in Maryland in 2010, higher than HIV/AIDS. **Dr. Paul Auwaerter** introduced the Fisher Center and discussed the Center's research efforts. Other Summit presenters discussed how ticks are collected for study, what tick-borne pathogens are found in particular areas of the mid-Atlantic region, what laboratory tests are used to identify pathogens, and strategies for prevention of tick-borne diseases.

Recent Publications

Clinical practice guidelines for antimicrobial prophylaxis in surgery, authored by Drs. D. Bratzler, E. Dellinger, K. Olsen, T. Perl, **P. Auwaerter**, M. Bolon, D. Fish, L. Napolitano, R. Sayter, D. Slain, J. Steinberg, AMD R. Weinstein. Published February 1, 2013 in the *American Journal of Health-System Pharmacy*

Misdiagnosis of late Lyme arthritis by inappropriate use of Borrelia burgdorferi immunoblot testing with synovial fluid, authored by Drs. Sam Barclay, Michael Melia and **Paul Auwaerter**. Published November 19, 2012 in the American Society for Microbiology's journal, *Clinical and Vaccine Immunology*.

Fisher Focus

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