

P. falciparum sporozoite in a mosquito midgut



# Infectious Diseases

Washington University in St. Louis  
SCHOOL OF MEDICINE

DIVISION NEWSLETTER September 30, 2016 • Volume 11, Issue 3

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## Calendar Highlights

**Thursday, Dec. 15, 2016 - ID Society of St. Louis**  
 Virus Versus Host: Mechanisms of Post-infectious Cognitive Dysfunction After Flavivirus Infection of the Central Nervous System  
 Robyn Klein, MD, PhD  
 Engineers' Club of St. Louis  
 Reception 6:00 pm Presentation 7:00 pm  
[Event Details](#)

We are interested in your achievements, clinical and/or research activities, and other personal news since leaving Washington University School of Medicine. Please contact Dr. Gerald Medoff at [gmedoff@wustl.edu](mailto:gmedoff@wustl.edu) with any information you would like to share.  
 ID Division Newsletters

## Immediate Breast Reconstruction Following Mastectomy Association with SSI's

Margaret Olsen, PhD



Margaret Olsen, PhD, MPH  
Professor of Medicine

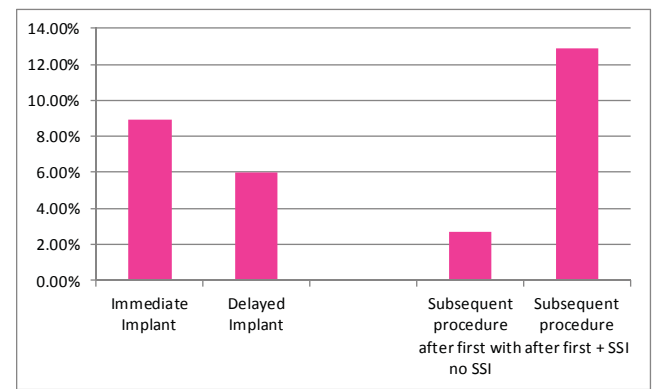
**M**y primary area of interest is in infectious disease epidemiology, with special focus on risk factors and outcomes of surgical site infection (SSI). I am especially interested in SSIs after mastectomy with immediate breast reconstruction, which is associated with surprisingly high rates of infection (10% or more).

In the past several years we have used private insurer claims data to study the epidemiology of SSIs and noninfectious wound complications in non-elderly women after mastectomy. We used claims data because of access to a large population of women and the ability to identify complications across the spectrum of care (outpatient and inpatient). This was a big advantage in comparison to using BJC data, where we often lose patients to follow-up if they present to outside hospitals or private physicians for care after surgery.

The claims data required development of complex algorithms to extract accurate information because of errors in use of ICD-9-CM diagnosis and procedure codes. For example, one of the errors we found was use of a diagnosis code for "infected seroma" to code an uninfected seroma. Because of potential inaccuracies we invested a great deal of time and effort to develop clinically logical algorithms for surgeries and outcomes, incorporating supplemental evidence (e.g., incorporating codes for anesthesia and pathology at the time of mastectomy into our algorithm) and excluding ambiguous diagnosis codes. We found that the incidence of SSI was about 10% after mastectomy with immediate implant or autologous flap reconstruction compared to 5% for mastectomy only, similar to what we found in previous studies at Bares Jewish Hospital (BJH). Noninfectious wound complication rates were similar for mastectomy only and mastectomy plus implant reconstruction (6% and 10%, respectively), but were even higher after mastectomy with flap reconstruction.

We also published an SSI risk prediction model that can be used by surgeons  
*continued page 2*

### Why does this Matter?



## FEATURED COLLEAGUE



**Toshibumi Taniguchi, MD, PhD  
with daughter, Sarah**

Five years have passed since I left St. Louis. Upon completion of my ID fellowship in 2011, I returned to my country, Japan, and joined one of the immunology labs at the Chiba University Graduate School of Medicine, as a PhD student. I worked on the development of Follicular Helper T cells. After graduation, I joined the Division of Infectious Diseases at the Chiba University Hospital as an Assistant Professor and shifted my work toward clinical infectious diseases.

Chiba is about 25 miles east of Tokyo. It is a suburb of Tokyo, so most people commute to Tokyo by train. From the residential area, beaches and mountains are easily accessible within an hour of driving. Narita international Airport is located about 20 miles north of Chiba, so those who have visited Japan may have heard the name, Chiba.

Here at Chiba University Hospital, I have many clinical duties. In addition to HIV clinic and general ID consultations, I lead the infection control team, transplant infectious diseases team (mainly for lung/heart and liver transplantation) and organize the travel medicine clinic. Infectious Diseases as a fellowship program is not well established in Japan, and my current challenge is to recruit ID trainees so that I can pass along the clinical infectious diseases pearls I learned at Wash U.

The Center for Global Health Care is another place I work at Chiba University. In collaboration with 5 other national universities, I participated in a project to develop an infection control SOP after a natural disaster with the Ministry of Health at Myanmar (Burma).

Inspired by my most wonderful mentors in HIV

## SSI's continued

during a pre-operative visit to discuss a woman's individual risk of SSI and whether to have immediate reconstruction or wait and have reconstruction performed at a later date. This is an important issue, since breast reconstruction is an elective procedure, and does not have to be done immediately after mastectomy. In fact there may be benefits to delayed reconstruction in some women.

We just completed a comparison of the complication rates after immediate vs. delayed breast reconstruction, and found significantly higher SSI and higher noninfectious wound complication rates after immediate compared to delayed implant reconstruction. We also found that women who had an SSI after their immediate implant reconstruction had almost 5-fold increased risk of SSI after a secondary implant surgery (e.g., insertion of a new implant to replace the previous infected implant). Interestingly, the management of the initial infected implant did not impact the SSI rates after the secondary implant procedures. These results are important since they can be used to counsel high-risk women and discuss the pros and cons of immediate reconstructions vs. surgery at a later time. The impact of wound complications on subsequent procedures is also an important issue to discuss, since from our results it appears that complications after immediate reconstruction have downstream effects resulting in poorer outcomes after secondary procedures.

My goal with this work is to further refine the risk prediction model and develop a decision support tool that can be used by surgeons to facilitate discussion about a woman's individual risk factors for SSI and what is most appropriate for her regarding the timing of breast reconstruction and SSI preventive measures.

*Dr. Olsen is a professor of medicine in the Infectious Diseases Division at Washington University School of Medicine.*

## Tosh Taniguchi continued

such as Turner Overton, Nur Önen, Diana Nurutdinova and Jessica Grubb, my research interest still lies in HIV. In collaboration with 16 other HIV clinics in Japan, we have completed a prospective study involving about 700 patients called "J-HAND". As you could imagine from its name, it is a study about HIV-associated neurocognitive disorder in Japanese patients.

Another project I have accomplished recently was setting the standards for clinical practice guideline



publication in Japan, in collaboration with Ministry of Health, Labour and Welfare. Although GRADE is considered the standard in guideline development, many Japanese guidelines are developed based on a

Japanese original protocol called Minds. In order to follow the international standard, I had the chance to work on this issue. Japan will follow GRADE system for guideline development from 2016. GRADE center will be established as well, hopefully functioning as the EBM center for Asia.

After getting married 2 years ago, I have a new family member. Taking care of my daughter Sarah, gives me a lot of happiness. Thanks to my wife Naoko, I am able to work full time with minimal sleep deprivation. I hope I can visit St. Louis again with my family.

# awards & announcements

| RECENT AWARDS               |   |  |
|-----------------------------|---|--|
| PRINCIPAL INVESTIGATOR(S)   | AWARD   | PROJECT TITLE  |
| Hilary Babcock, MD          | Centers for Disease Control and Prevention (CDC)                    | Contract award for Washington University to be a qualified applicant in the CDC's Safe Healthcare Epidemiology Prevention Research Development (SHEPheRD) program. |
| David Warren, MD            | CDC Epidemiology Prevention Research Development (SHEPheRD) Program | Domain 1, Healthcare-Associated Infection and Other Adverse Healthcare Event Prevention Research Protocol Development and Implementation                           |
| Erik Dubberke, MD           | CDC Epidemiology Prevention Research Development (SHEPheRD) Program | Domain 6, Advanced Molecular Epidemiology and Microbial Community Analysis   |
| William G. Powderly, MD     | CDC Epidemiology Prevention Research Development (SHEPheRD) Program | Domain 7, International HAI and Other Adverse Healthcare Event Prevention Research   |
| Jacco Boon, PhD             | Longer Life Foundation Grant  | Identification of human genetic variants for high risk of severe influenza   |
| Daniel E. Goldberg, MD, PhD | National Institutes of Allergy and Infectious Diseases (NIAID)      | T32 Training Grant   |
| Jeffrey Henderson, MD, PhD  | CDC   | Intestinal Metabolomic Factors affecting <i>Clostridium difficile</i> Colonization and Infection   |
| Jeffrey Henderson, MD, PhD  | NIH, NIDDK  | Metabolomic Mechanisms of Nutritional Immunity in the Urinary Tract  |
| Steven Liang, MD            | Barnes-Jewish Hospital Foundation                                   | Hospital avoidance strategies for treatment of acute bacterial skin and skin structure infections  |
| Jennie H. Kwon, DO, MSCI    | CDC   | Prospective Study Characterizing Fecal Microbiome Disruptions during and after receipt of Antimicrobials   |
| Jennie H. Kwon, DO, MSCI    | CDC   | Prospective Study Characterizing Fecal Microbiome Disruptions During and After Receipt of Antimicrobials in Healthy Adults   |
| Hilary Reno, MD             | Barnes-Jewish Hospital Foundation                                   | Improving Management of Patients with Sexually Transmitted Infections in the Emergency Dept.   |

## special recognition

Ramakrishna Rao, PhD, an associate professor of medicine at Washington University School of Medicine in St. Louis, recently received the 2016 Anne Maurer-Cecchini Award, an honor that recognizes outstanding epidemiological or clinical research on neglected tropical diseases. Rao, of the Division of Infectious Diseases, was recognized for a project that focused on lymphatic filariasis in Sri Lanka. The illness is caused by parasitic worms and spread by mosquitoes and is a major cause of disability in the developing world.



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# welcome new faculty

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## **Megan Tierney Baldrige, MD, PhD, Assistant Professor of Medicine**

Dr. Megan Baldrige grew up in Houston, Texas, but blames her Pittsburgh origins for her lack of a Texan accent. In Houston, she attended Rice University, where she studied Biochemistry and Cell Biology, and fell in love with research while studying plant auxins in *Arabidopsis thaliana* in the lab of Bonnie Bartel as an undergraduate. She subsequently entered the MD/PhD program at Baylor College of Medicine, which in addition to providing great training, also served an unintentional match-making function by introducing Megan to her classmate-turned-husband, Dustin. During her time in graduate school in the Molecular and Human Genetics department, she explored the effects of *Mycobacterium avium* infection on hematopoietic stem cells in mouse models in the lab of Margaret (Peggy) Goodell. She continues related collaborations today by studying interactions between the microbiome, antibiotic treatment and hematopoiesis.

After completing medical school, Megan elected to put her full focus on research by pursuing a postdoctoral position in the lab of Skip Virgin at Wash U. During her time in Skip's lab, she studied the effects of the microbiome on both the immune system and on enteric virus infection, using mouse norovirus as a model system. She completed her postdoc earlier this year, and has been delighted to start her own lab in a combined position in the Division of Infectious Diseases and the Center for Genome Sciences & Systems Biology. Her laboratory focuses on the interplay between the bacterial microbiome, the mucosal innate

immune system including type III interferon signaling, and viral and bacterial pathogens. She maintains a continued emphasis on norovirus pathogenesis, and is developing methods to assess viral evolution in immunocompetent and immunocompromised hosts. She is also working to understand the signaling pathways and antiviral effects of type III interferons, with the goal of identifying therapeutic targets for norovirus and other mucosal pathogens.

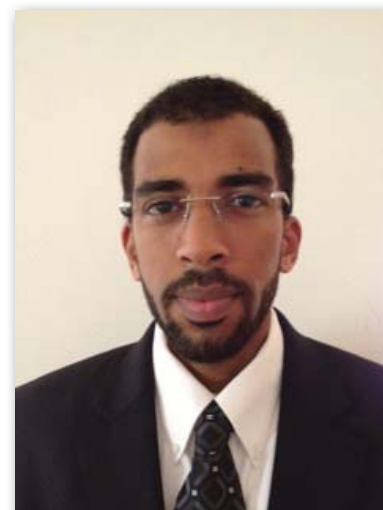
While not in the lab, Megan enjoys traveling, brewing and tasting craft beer, and extremely leisurely biking.

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## **Yasir Hamad, MD, Instructor of Medicine**

Born in Indiana and raised in Sudan where my family moved soon after my birth, I spent my early years of life there. I attended medical school at Juba University then returned back to the US for additional training. I did my residency at Harbor Hospital in Baltimore where my work with indigenous populations exposed me to a plethora of infectious disease problems and incited my interest in the field.

After working a few years as a hospitalist, I joined the infectious disease fellowship at the University of Pittsburgh Medical Center. In my second year of training I took the transplant track with extensive exposure to patients with solid organ transplants. I had developed interest in atypical mycobacterial infections in lung transplant patients, and I studied the outcome of *Mycobacterium abscessus* infection in lung transplant candidates and recipients. As I was interviewing for jobs, I found in the infectious disease division at Washington University, the breadth and depth I need to further my clinical skills. The division leadership seemed to be very supportive for faculty development. With the larger transplant program here I am looking forward to further advance my knowledge and build my experience in treating infections in this population. I was also attracted to St. Louis since I found it to be a family friendly city with lots of activities and places to visit for my kids with whom I spend most of my spare time.



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## **Larissa B. Thackray, PhD, Assistant Professor of Medicine**

I was born and raised near Toronto, Ontario in Canada, and moved to Indianapolis, Indiana for high school. I went to Cornell University in Ithaca, New York for my undergraduate degree in Biology.

My interest in infectious diseases began during my two years of Peace Corps service in Kenya. I obtained my graduate degree at the University of Colorado Health Sciences Center in Denver, Colorado studying coronaviruses with Dr. Kathryn Holmes. I came to St. Louis in 2003 for postdoctoral research on noroviruses in the laboratory of Dr. Skip Virgin in the Department of Pathology and Immunology at Washington University School of Medicine.



# welcome 2016 fellows



## **Abdullah Aljorayid, MD**

I am from Saudi Arabia, graduated from Qassim University. I did one year of research at Case Western Reserve University. I was working on a multi-year study of flu vaccine responses in older population. I completed my residency at University Hospitals Case Medical Center in Cleveland. I am married to my wonderful wife who is working toward her master's degree in

computer science. We have an 18 month old daughter.

### **Why did you chose an ID fellowship?**

Many aspects of infectious diseases attracted me to pursue ID as a career. It started with studying microbiology and immunology in basic science classes, and continued during my residency where I decided with certainty that this is my next step. I chose Wash U because I believe the university offers all the resources to help me with my journey, wherever my career takes me.



## **Juan Calix, MD, PhD**

I was born in New Orleans, LA, where I lived the first ten years of my life. I then moved in 1992 to my family's homeland El Salvador, where I resided until I graduated from high school. I returned to the U.S. to complete my undergrad at Loyola University New Orleans. I took a year off before medical school to work in Hurricane Katrina/Rita relief efforts in Baton Rouge. I then obtained my

M.D. and Ph.D. in microbiology from the University of Alabama at Birmingham. I was fortunate to have a successful doctorate career, having been rewarded an F31 grant from the NIAID, the UAB Samuel B. Barker Award for Excellence in Graduate Studies and multiple travel awards to present my research at the national and international level. Most importantly, while at UAB I met my wife who also obtained her PhD in Microbiology. We got married during our doctorate years.

### **Why did you chose an ID fellowship?**

My career goal is academic medicine with a strong emphasis on basic and translational research. For my medical residency, I applied to accelerated residency programs (e.g., Physician Scientist Training

Programs) with strong internal medicine training and ample opportunities for research in host-microbe interaction and the impact of microbial surface on virulence. Prior to moving, my wife and I attempted to start a family, and we were blessed with triplet boys. BJC and WashU are a perfect fit for my research interests and career goals; St. Louis is a wonderful, affordable city, and a great place to raise a family. All my programs have been very supportive, from accommodating the birth of our triplets during my intern year to facilitating the transition back to research at the end of my medical training. I can sincerely say I have no regrets of coming here.



## **Carlos Mejia, MD**

I'm originally from Guatemala city, where I studied medicine and graduated from San Carlos University. I did my Internal Medicine training at La Paz University Hospital in Madrid, Spain.

### **Why did you chose an ID fellowship?**

I choose WUSM because of its busy and high quality ID training program. I'm interested in HIV medicine and emerging infectious diseases -specially tuberculosis- within the frame of a Global Health perspective.



## **Jane O'Halloran, MD, PhD,**

I am originally from Ireland and did my medical degree at the National University of Ireland, Galway. I then completed my basic specialist training in Medicine before embarking on a five year higher specialist training program in infectious diseases and general internal medicine.

Additionally, I recently completed my doctoral studies on mechanisms contributing to increased cardiovascular diseases in HIV infection

### **Why did you chose an ID fellowship?**

I chose to do an ID fellowship at WashU as it offered me the opportunity to further my ID education at an internationally renowned

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# fellows' corner

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welcome fellows continued

institution where I would have clinical exposure to a varied case-mix, and have the chance to continue my interest in translational research in HIV.

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## **Krunal Raval, MD**

I am originally from Ahmedabad in India. I received my medical school training from Pramukh Swami Medical College (PSMC) at Karamsad, India. I completed my internal medicine residency at St. Luke's Hospital in Chesterfield, MO. During my residency, I was awarded "best intern of the year" and was elected as chief resident. I won a Poster as well as a Research Presentation competition during my residency.

I am married to my wonderful wife, Dhvani, and we have a one year old daughter, Ruhi. My families have always been strength and inspiration during all my endeavors.

### **Why did you chose an ID fellowship?**

My interest in infectious diseases started with my fascinatin in Microbiology and my exposure to tropical ID during my early medical school years. My interest in history and its connection with infections made it even more fascinating for me. The best thing about ID is that we are not restricted to any organ system and it suits my curious detective mind.

I'm interested in pursuing a critical care fellowship after my ID fellowship – considering my appeal for both fields as well as significant overlap. My research interest includes invasive fungal infection mostly in intensive care setting. I am also interested in pursuing research on critical illness and HIV patients.

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## **Knowlton Incentive Award for Excellence**

Brett Jagger, MD, PhD and Jason Burnham, MD, 2<sup>nd</sup> year fellows, each received a Knowlton Incentive Award for Excellence from the Barnes Jewish Foundation on October 17.

The Knowlton Incentive for Excellence Award program recognizes resident physicians who have demonstrated the ability to balance exceptional, compassionate care with a commitment to being leaders in the science of internal medicine. These residents embody the Knowlton Spirit. Since 1985, nearly 160 select physicians have received this prestigious award and have carried the Knowlton Spirit with them throughout their medical careers.

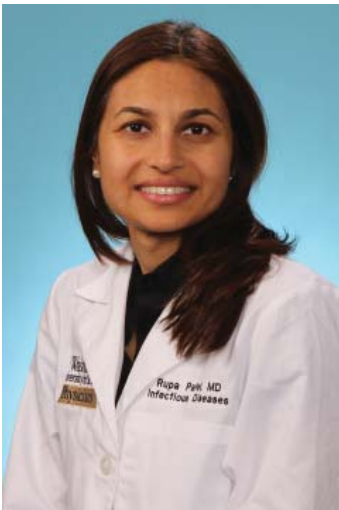


*Jason Burnham, MD, Bill Powderly, MD, co-director of the ID division, and Brett Jagger, MD, PhD*

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## **ID WEEK 2016**

Congratulations to **Jason Burnham, MD**, 2<sup>nd</sup> year fellow in training for receiving an IDWEEK Trainee Travel Grant to help defray the costs of attending the IDSA 2016 Conference. Merilda Blanco Guzman, MD, Lemuel Non, MD, Anupam Pande, MD and Andre Spec, MD, all Instructors in Medicine, also received Travel Grants.



## Rupa Patel, MD, MPH, DTM&H, Named Clinical Advisor to PrEP Implementation Grant

Dr. Rupa Patel, Director of the PrEP Program at the WUSTL ID Clinic, has been named the HIV pre-exposure prophylaxis (PrEP) Clinical Services Advisor to JHPIEGO, a non-profit organization affiliated with Johns Hopkins University, for the BRIDGE to SCALE grant awarded by the Bill and Melinda Gates Foundation.

BRIDGE to SCALE is one of the largest PrEP implementation grants awarded by the foundation outside of prior PrEP clinical trials and demonstration projects. The goal of the grant is to demonstrate scale up of PrEP services in a low-resource setting. The 4-year grant has an anticipated PrEP user target of 20,000 people and PrEP awareness target of 50,000 people in Kenya among 3 key populations 1) men who have sex with men (MSM) (estimated HIV prevalence 18%), 2) female sex workers (estimated HIV prevalence 30%), and 3) adolescent girls and young women 15 - 24 years (estimated HIV prevalence > 7%).

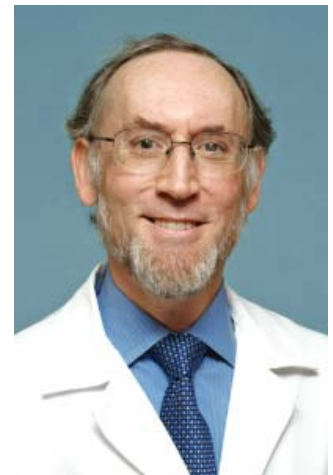
Dr. Rupa's technical role will include creating clinic protocols, provider training, devising adherence and program evaluation metrics along the PrEP care cascade, and assisting in demand generation programs geared towards MSM using social applications.

JHPIEGO has been recognized for achievements in scaling up voluntary medical male circumcision (VMMC) services, in partnership with local governments, for HIV prevention in 12 countries across sub-Saharan Africa. VMMC reduces female-to-male HIV transmission by 70%. They performed a total of 2 million VMMC, one million in the last 2 years, which represents 15% of the World Health Organization-estimated 11.7 million VMMCs performed worldwide since 2008. Mathematical modeling estimates that JHPIEGO potentially averted 50,000 new HIV infections through 2025.

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## Daniel E. Goldberg, MD, PhD announces T32 Training Grant Award

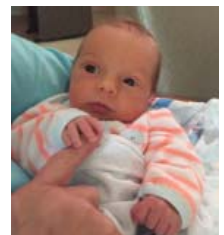
The ID division has been awarded a \$4.2 M T32 training grant from NIAID. The Training Program, which has had NIH support for the past 35 years, integrates faculty from five departments: Medicine, Pediatrics, Molecular Microbiology, Immunology & Pathology and OB/GYN. The program provides training to MD, PhD and MD/PhD postdoctoral fellows, and to PhD and MD/PhD students, in disciplines related to pathogenesis and host defense in infectious diseases. The research performed is medically relevant and in some cases translational.



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## congratulations...

**Mike Durkin, MD**, Instructor in Medicine and his wife, Dr. Julie Rupel, celebrated the birth of their first child, a girl, at 8:03 p.m. on August 10, 2016. Isla, (pronounced EYE-la), weighed in at 5lbs 7oz.



**Jennie H. Kwon, DO, MSCI** graduated with a Masters of Science in Clinical Investigation from Washington University in August 2016.

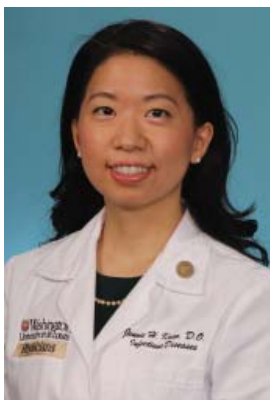
Additionally **Dr. Kwon** recently received a National Institutes of Health: National Center for Advancing Translational Sciences loan repayment award. The NIH Loan Repayment Programs (LRPs) are a set of programs established by Congress and designed to recruit and retain highly qualified health professionals into biomedical or biobehavioral research careers.



## Michael S. Diamond, MD, PhD, among lead team of investigators at the newly named Bursky Center

Washington University School of Medicine in St. Louis has received a \$10 million gift from Andrew M. and Jane M. Bursky that will advance cutting-edge work at the newly named Andrew M. and Jane M. Bursky Center for Human Immunology and Immunotherapy Programs.

Michael S. Diamond, MD, PhD, Robert D. Schreiber and Wayne M. Yokoyama, MD, lead a team of investigators working to develop new immune-based therapies for cancer, infectious disease, autoimmunity and immunodeficiency in the new center.



## Jennie H. Kwon, DO, MSCI and Jeff Henderson, MD, PhD among principal investigators of \$2 million award

Four research teams at Washington University School of Medicine in St. Louis have been collectively awarded nearly \$2 million for research aimed at combating the growing threat of antibiotic resistance. The funding focuses on finding new approaches to fight drug-resistant germs, including research to understand how “friendly” microbes that live in and on the human body could be used to prevent infections caused by drug-resistant organisms.

Henderson is principal investigator of a \$498,427 grant included in the \$2 million total. He will lead a group of clinicians, chemists and mathematicians to identify

how diet, metabolism and intestinal microbes interact to protect against gastrointestinal infections with a nasty bacteria called *Clostridium difficile*. Such infections can occur after prolonged antibiotic use and can cause severe diarrhea, fever, intestinal pain and, in some cases, death.



Jennie H. Kwon, DO, instructor of medicine, is the principal investigator of a \$449,417 award to understand the extent and duration of microbiome disruptions observed during and after usual courses of antibiotics used to treat community-acquired pneumonia.



## Hilary Reno, MD, PhD and Kimberly Gray, EdD, MSN - Medical Consultants to the CDC

Hilary Reno, MD, PhD and Kimberly Gray, EdD, MSN, were selected to serve as medical consultants to the Division of STD Prevention at the CDC. These positions are fifty percent appointments for one year.



### The ID Division has a new website!

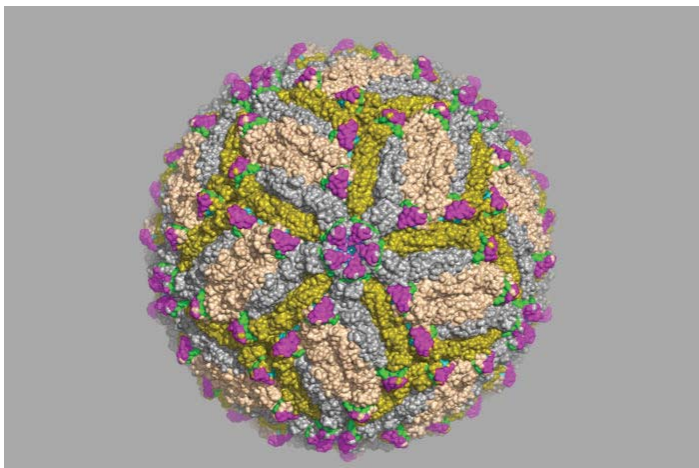
Please be sure to visit <https://infectiousdiseases.wustl.edu>



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# antibodies identified that thwart Zika virus

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*Scientists at Washington University School of Medicine in St. Louis have identified antibodies capable of protecting against Zika virus infection, and located the precise spot on the Zika virus that the antibodies recognize. The work is a significant step toward developing a vaccine, better diagnostic tests and possibly new antibody-based therapies. Shown is an image of Zika virus captured via cryo-electron microscope.*

Scientists at Washington University School of Medicine in St. Louis have identified antibodies capable of protecting against Zika virus infection, a significant step toward developing a vaccine, better diagnostic tests and possibly new antibody-based therapies. The work, in mice, helps clarify recent research that also identified protective Zika antibodies but lacked important details on how the antibodies interact with the virus.

In a study published July 27 in *Cell*, the researchers identified the precise spot on the virus that the antibodies recognized, information that could be used to develop a vaccine against Zika. The antibodies bound exclusively to Zika and not to related viruses, which means they are specific enough to be used in diagnostic tests.

“Importantly, some of our antibodies are able to neutralize African, Asian and American strains of Zika virus to about the same degree,” said David Fremont, PhD, a professor of pathology and immunology and a co-senior author on the paper. A vaccine designed to elicit similar antibodies might be able to protect people from Zika strains worldwide.

Fremont, co-senior author Michael Diamond, MD, PhD, and colleagues identified six antibodies that bound strongly to Zika virus and used a technique called X-ray crystallography to zero in on the binding site. They locked the virus and the antibodies into place together – or crystallized them – and visualized the adjacent structures by bouncing X-rays off them. The two most protective antibodies bound to the same region of the viral envelope protein that covers the surface of the virus.

“We think that this piece of the viral envelope protein alone would be able to elicit a protective immune response to Zika,” Fremont said, referring to the possibility of making a vaccine from an engineered viral protein rather than the whole virus.

Vaccines made from live, weakened viruses are common and effective, but can’t be given to pregnant women. Pregnancy suppresses a woman’s immune system, so a weak virus that safely immunizes most people could make pregnant women ill. In the case of Zika – where viral infection of pregnant women can cause devastating birth defects or miscarriage – a live-virus vaccine would be unusable, but a protein-based vaccine could be a lifesaver. Despite having recently developed a mouse model of Zika infection during pregnancy, the researchers have not yet tested whether vaccinating mothers with a portion of the Zika envelope protein could protect a fetus from infection.

“The mouse is just not an ideal model for those kind of experiments,” said Diamond, the Herbert S. Gasser Professor of Medicine. In pregnant women, maternal antibodies are transported efficiently across the placenta to protect the fetus. The same is not true in mice, which obtain their mothers’ antibodies mostly after birth. Diamond said that studies to determine whether vaccinating pregnant women against Zika could protect their fetuses likely would need to be done in primates.

The study’s findings are in agreement with a paper published July 14 in *Science* that identified the same general section of the viral envelope protein as a key site for antibody binding. However, the previous paper lacked the detailed description of how the antibodies interact with the virus, information that could aid in designing a Zika vaccine.

The antibodies described in this study, which reliably distinguished Zika from closely related viruses, also could be incorporated into a diagnostic test. Zika currently is diagnosed primarily by detecting the viral genome, which requires high levels of the virus in the blood and only identifies people who have been infected within a week of being tested. A complementary test would measure the amount of Zika-specific antibodies in people’s blood, which could identify people infected months or years prior. Developing such a test has been hampered by a lack of Zika-specific tools.

“You really want to know not just how many people have virus in their blood right now but also how many people have been infected over time,” Diamond said.

Added Fremont, “This is particularly important for pregnant women who want to know whether they were infected with Zika earlier in their

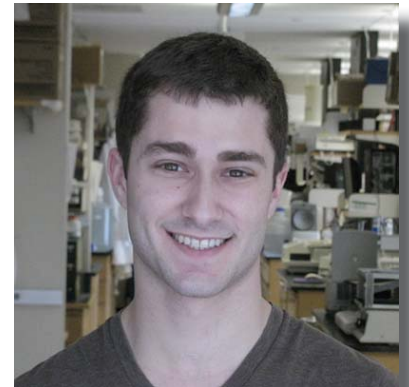
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# Victoria J. Fraser, MD Fellowship Award

The **Victoria J. Fraser, M.D. Fellowship for Graduate Studies in Infectious Diseases** was established with a generous donation by the *Terry and Kathy Bader Family Foundation* and Harry and Barbara Schukar. This donation was made in honor of Dr. Victoria J. Fraser to establish a fellowship that can be used for pre-doctoral trainees in the Infectious Diseases Division who are pursuing additional research.

**Alexander Polino, BA**, pre-doctoral trainee in Dr. Daniel Golberg's laboratory, Infectious Diseases Division, recently received the Victoria J. Fraser, M.D. Fellowship Award. Using a recently developed genetic technique, the award will assist Alex in his effort to identify targets for future drug development against the malaria causing parasite, *Plasmodium falciparum*.

Alex grew up outside Buffalo, NY with an interest in science. He pursued a degree in Biological Sciences from Cornell University in preparation for medical school. However, courses in bacterial pathogenesis and medical parasitology ignited his interest in microbiological research which led him off the medical track. He pursued his interests with two years in the lab of Dr. John Parker studying mammalian orthoreovirus evasion of cell innate immune factors. This experience convinced him that he should apply to graduate schools and was drawn to Washington University by the "breadth of infectious disease research, the collaborative environment, and of course, the St. Louis-style pizza at Imo's". Alex joined Dr. Daniel Goldberg's lab to do his PhD work using new reverse-genetics tools to probe the mechanisms by which the parasite *Plasmodium falciparum* infects human red blood cells and causes disease. Says Polino, "So far, I have had a great time learning and growing here in the Goldberg lab, and I look forward to much more of that in the years to come".



Alex Polino, BA

#### Abstract of Alex Polino's research plans:

"Malaria kills nearly 500,000 people per year, the vast majority of whom are children under the age of 5 years. The symptoms of malaria are caused by infection of red blood cells by the parasite *Plasmodium falciparum*. Once inside the red blood cell, the parasite sends out hundreds of proteins which radically modify the host red blood cell, transforming it into an environment in which the parasite can thrive. This ability to export proteins that remodel the host red blood cell is crucial for parasite survival. As such, our lab is interested in determining how the parasite exports its proteins into the host cell. Most export-destined proteins made in the parasite carry a small export-signal. This signal is recognized by a parasite enzyme called Plasmepsin V, which cleaves the signal, sending the protein out to the host cell.

While we know that Plasmepsin V plays this critical role in protein export, how it accomplishes this task is not known. In the six months since I joined the lab, I have used a recently-developed genetic technique to show that Plasmepsin V is essential for parasite survival. Now, using this tool, I am determining which parts of the Plasmepsin V enzyme are required for parasite survival, as well as how each piece of the enzyme functions. Since Plasmepsin V is required for parasite survival, it is a promising target for the development of new antimalarial drugs. This work could help to inform that development by indicating which parts of the enzyme might serve as good targets for future drug development."

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#### Zika virus continued

pregnancy. The current tests won't tell us that." The antibodies – which protected mice from a lethal dose of Zika in this study – also potentially could be used to treat high-risk patients, such as people with other medical conditions and pregnant women.

"Cost would be an issue, if we're going to treat a woman for the duration of her pregnancy," Diamond said. "But in theory, an antibody prophylaxis could protect against infection of the fetus." Since the antibodies in this study were obtained from mice, they would need to be modified to be more like human antibodies, before they could be used in people.

The researchers also found a particularly worrisome pattern: Low levels of anti-Zika antibodies – too low to protect against disease – helped the related dengue virus infect cells in a petri dish. People with dengue virus tend to get sicker the second time they are infected, because low levels of antibodies left over from the first infection help the virus invade. Dengue and Zika are both circulating in tropical parts of the Americas, including Brazil. It is possible that people who get infected with dengue after Zika – or after immunization with a Zika vaccine – would develop more severe dengue disease.

"One has to be careful extrapolating from experiments with cells in a lab to what happens to real people," Diamond said. "Will Zika immunity really exacerbate dengue virus pathogenesis? All we know now is that it's possible in the laboratory."

*Adapted from the Washington University News Hub... by Tamara Bhandari*

## \$8M dollar grant aids effort to eliminate elephantiasis



*A woman in India suffers severe swelling in her legs due to elephantiasis, a tropical disease. (Photo: Caitlin Worrell/Centers for Disease Control and Prevention)*

Washington University School of Medicine in St. Louis has received a two-year, \$8 million grant from the Bill & Melinda Gates Foundation to evaluate an investigational treatment regimen for lymphatic filariasis, a neglected tropical disease.

More than 1 billion people in 73 countries in tropical and subtropical regions live at risk of lymphatic filariasis, which is a major cause of disability. Without effective treatment, the infection can lead to massive swelling and deformity of the legs, known as elephantiasis.

The new grant supports a team led by Gary Weil, MD, a professor of medicine and of molecular microbiology. Weil has studied lymphatic filariasis — which is caused by parasitic worms and spread by mosquitoes — for decades. His earlier research led to a new diagnostic test for the disease. Weil also has been instrumental in evaluating drug treatments to end transmission of lymphatic filariasis.

Efforts to eliminate lymphatic filariasis have focused on massive treatment programs that involve administering medications to people living in areas where the disease is endemic, as a means of curing current infections and preventing new ones.

The World Health Organization (WHO) coordinates the Global Program to Eliminate Lymphatic Filariasis, which treats some 500 million people each year with a single oral dose of one of the approved two-drug regimens. People in regions with lymphatic filariasis typically require treatment annually for five to seven years to reduce infection rates to levels that no longer support transmission of the disease by mosquitoes.

The grant will fund multicenter studies of an investigational triple-drug treatment – ivermectin, diethylcarbamazine and albendazole, also known as IDA. The community-based studies will enroll more than 30,000 people.

Recent clinical trials have shown that the three-drug regimen is more effective than the currently used two-drug regimens of diethylcarbamazine plus albendazole, or ivermectin plus albendazole. However, more information is needed on the safety and effectiveness before it can be approved for widespread use by WHO and other public-health entities.

“People in the global filariasis community are very excited about the potential of IDA treatment, and we will do our best to complete the studies carefully and quickly,” Weil said. “This new treatment not only appears to be more effective at clearing the infection, but it also may only need to be given once while the two-drug treatments need to be repeated for many years.”

“If our studies confirm the safety and effectiveness of the triple-drug regimen, the treatment could be a game changer in accelerating the global program to eliminate lymphatic filariasis in the developing world,” Weil added.

The new grant will fund field studies in Haiti, Papua New Guinea, Indonesia and Ivory Coast, and will partially fund parallel studies in Fiji and India. Washington University will oversee the studies and collaborate with scientists at Case Western Reserve University and elsewhere to carry out the work.

“While we have made great strides in many countries, lymphatic filariasis remains pervasive in many impoverished countries in Africa and Asia, where it causes incredible suffering and disability,” Weil said. “A one-time treatment strategy has the potential to have a transformative impact on our efforts to eliminate the disease and could go a long way toward reaching our goal of eliminating lymphatic filariasis by 2020.”

*Originally published by the School of Medicine By Kristina Sauerwein • October 12, 2016*

In 1997 the Centers for Disease Control and Prevention (CDC) Division of Healthcare Quality Promotion began the Prevention Epicenter program. This unique research program uses academic leaders in healthcare epidemiology to conduct innovative research designed to fill gaps in public health knowledge.

Now, nearly 20 years later the Washington University and BJC Epicenter for Prevention of Healthcare Associated Infections has once again been funded to continue its work as one of the CDC's Prevention Epicenters. Washington University in St. Louis is one of only two Epicenters that have been competitively and continuously funded since the inception of the program.

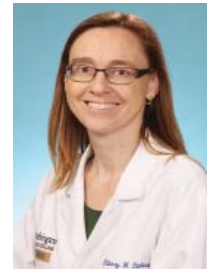
The 2016-2020 Prevention Epicenter Program at Washington University includes a multitude of projects conducted by a diverse scientific group of experts. This current cycle of funding will support 5 core projects conducted within the WU and BJC network and 3 multicenter projects that will be conducted throughout the national Prevention Epicenter network.

The 5 core projects are focused on developing and testing novel strategies to: document and improve outpatient antibiotic prescribing practices, reduce surgical site infections (SSIs), identify changes in Antibiotic Resistance (AR) and gut microbiome following fecal microbiome transplant (FMT), and identify novel biomarkers to more rapidly diagnose urinary tract infections and avoid unnecessary antibiotics in asymptomatic bacteriuria.



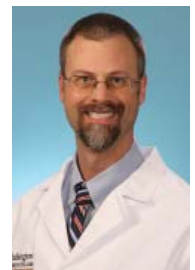
1. Michael Durkin, MD and Kevin Hsueh, MD lead a core project that will determine antibiotic prescribing practices among dentists in the US utilizing Express Scripts Inc., a large pharmacy benefits manager database.

2. Hilary Babcock, MD leads a core project focused on reducing surgical site infection (SSI) after colorectal surgery utilizing an enhanced recovery bundle looking at the implementation and expansion of a comprehensive care package.



3. Margie Olsen, PhD leads a core project enhancing an existing mastectomy SSI risk prediction model for individual women using clinical information from the electronic health record (EHR), integrating the enhanced mastectomy risk prediction model into the EHR for use by surgeons to communicate individualized SSI risk to women undergoing mastectomy.

4. Erik Dubberke, MD will lead the fourth core project determining the impact of fecal microbiome transplant (FMT) administered for recurrent Clostridium difficile infection (CDI) on intestinal multidrug resistant organism (MDRO) colonization from specimens collected for a double blinded, dose response, randomized controlled trial.



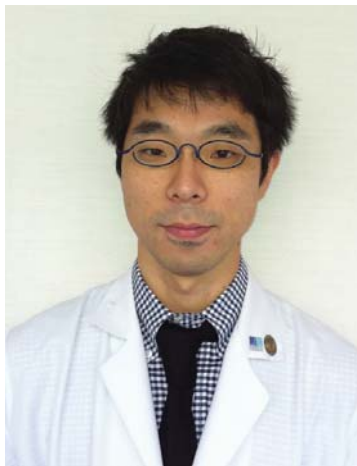
5. Jeffrey Henderson, MD will lead the fifth core project which will identify metabolomic biomarkers of high risk bacteriuria in hospitalized patients utilizing novel diagnostic methods.

*continued*

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# alumnus highlight

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## **The Society for Healthcare Epidemiology of America (SHEA) “Member Spotlights” 2016 Recognize Hitoshi Honda MD, PhD, ID fellow 2007-2010**

Hitoshi Honda MD, PhD is an infectious diseases consultant and a hospital epidemiologist at the Tokyo Metropolitan Tama Medical Center, Tokyo, Japan.

He received his MD and PhD from the Kitasato University School of Medicine, Japan in 2000. He completed the internal medicine residency at University of Hawaii in 2007 and then completed an infectious diseases fellowship and healthcare epidemiology fellowship under the tutelage of Drs. David Warren and Victoria Fraser at Washington University in St. Louis, MO.

After completing his fellowship in 2010, Dr. Honda moved back to his native country of Japan to help initiate an infectious disease consultation service while also working to advance infection control and hospital epidemiology. His clinical research has focused on the epidemiology and prevention of healthcare-associated infections. He is also interested in antimicrobial stewardship and behavioral modification among healthcare workers, as exemplified in influenza vaccination protocol and hand hygiene practice.

One of Dr. Honda’s goals is to develop collaborative relationship in the area of healthcare epidemiology between Japan, the United States, and other Asian countries. He helped organize a joint workshop for antimicrobial stewardship in Japan, endorsed by both SHEA and the Japanese Society for Infection Prevention and Control (JSIPC) in February 2016.

He received the SHEA Jonathan Freeman Scholarship in 2010, and was selected to be the SHEA International Ambassador in 2012. He also received the SHEA International Award at IDWeek 2013. He currently serves as a member of the SHEA External Affairs Committee.

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## **prevention epicenter program** continued

In addition to these 5 core projects, the Washington University Prevention Epicenter will also lead 3 multicenter studies.

1. David Warren, MD leads a 2-year multicenter project studying patterns of utilization and effect of pre- and post-operative antibiotics in common surgeries. His study will be conducted here at WU and at the Duke University and the University of Pennsylvania Epicenters.
2. Margie Olsen, PhD leads a 3-year multicenter project studying the microbiology of surgical site infection after breast reconstructive surgery. Her study will be conducted here at WU and at the Duke University, University of Pennsylvania, and the Chicago (Rush University) Epicenters.
3. Erik Dubberke, MD and Jennie Kwon, MD lead a 4-year multicenter project studying predictors of recurrent multidrug resistant urinary tract infection and the impact of fecal microbiome transplant on recurrence. Their study will be conducted here at WU and at the Duke University, University of Pennsylvania, and the Chicago (Rush University) Epicenters.



In addition to these WUSM lead studies the WU Epicenter will be participating in 10 multicenter projects lead by the CDC’s other existing Prevention Epicenters, Cook County Health & Hospital and Rush University Medical Center, Duke University, Harvard Pilgrem Health Care and University of California, Irvine and University of Pennsylvania.

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# IDWeek 2016 presenters & posters

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## ***IDWeek Oral Presentations***

### **Philip J. Budge, MD, PhD**

Premeeting Workshop: PW1. Vincent T. Andriole ID Board Review Course; W3. Parasitic Diseases

### **Erik R. Dubberke, MD, MSPH, FIDSA, FSHEA**

PW2. Premeeting Workshop: Best Practices for Antimicrobial Stewardship Programs; W16. The Role of the Stewardship Team in the Management of Clostridium difficile Infections

### **Victoria J. Fraser, MD**

187. Session: Meet-the-Professor Session: Be the CEO of Your Own Career; 1702. Advancing Career Success With Mentors and Career Development Plans

### **Jeffrey P. Henderson, M.D., Ph.D.**

263. Host/Microbe Metabolic Factors Shape Infectious Disease Pathogenesis; 2363: Bacterial and host metabolites in urinary tract infection pathogenesis

## ***IDWeek Poster Presentations***

### **Merilda Blanco-Guzman, MD**

Opening Reception and "Posters in the Park" – SHEA section  
Epidemiology of Initial and Recurrent Episodes of Infection in Left Ventricular Assist Device (VAD) Recipients

150. HAI: Surgical Site Infections, 1470: Epidemiology of Initial and Recurrent Episodes of Infection in Left Ventricular Assist Device (VAD) Recipients

### **Jason Burnham, MD - 2nd year fellow**

137. Clinical Infectious Diseases: CNS Infection  
1186: Recovery of Propionibacterium spp. in Cultures from the Central Nervous System – Clinical and Laboratory Criteria to Distinguish Infection from Contamination

### **Erik R. Dubberke, MD, MSPH, FIDSA, FSHEA**

Poster Abstract Session: Microbiome: GI; 2228: Impact of amoxicillin/clavulanate and autologous fecal microbiota transplantation on the fecal microbiome and resistome

### **Gerome Escota, MD**

234. HIV and Aging; 2125: Presentation title: Aging Attenuates the Association Between Coronary Artery Calcification and Bone Loss Among HIV-infected Persons

### **Jennie H. Kwon DO, MSCI**

HAI: Environment and Device Cleaning, 274: Assessment of Multidrug-Resistant Organism and Viral Pathogen Transmission from the Rooms of Hospitalized Patients to Healthcare Workers and to the Hospital Environment Utilizing Surrogate Markers

HAI: Environment and Device Cleaning; 387: Healthcare Worker Self-Contamination During Standard and Ebola Virus Disease Personal Protective Equipment Doffing,

2086: Effect of an Electronic Hard-Stop Intervention to Prevent Repeat Clostridium difficile Toxin Testing on Test Utilization and Clinical Outcomes

## ***Oral Abstract Presentations***

### **Andrej Spec, MD**

43. Epidemiology and Outcomes in Mycology  
122. Cryptococcus Infection Network in non-HIV Cohort (CINCH) study: Initial Report of Treatment and Outcomes

### **David Warren, MD, MPH**

178. Studies that will Impact your Practice  
1681. Location, location, location: A change in urine testing order sets on culturing practices at an academic medical center emergency department

## ***Interactive Panelist***

### **Hilary Reno, MD, PhD**

196: STIs in the HIV Care Setting: An interactive Case Based Approach

### **Stephen Liang, MD**

55. HAI: Multi Drug Resistant Gram Negatives  
315. A Qualitative Study of Infection Prevention Perceptions, Beliefs, and Practices in the Emergency Department

### **Lemuel Non, MD**

135. Clinical Infectious Diseases: Bacteremia and Endocarditis  
1121: The occurrence of infective endocarditis with Staphylococcus lugdunensis bacteremia: A retrospective cohort study and systematic review

### **Lemuel Non, MD (Jimmy Ma, MD)**

237. HIV/HCV Coinfection and Liver Disease; 2145: The Care Cascade of Hepatitis C Management with Direct-Acting Antiviral in HIV-Infected Individuals

### **Margie Olsen, PhD, MPH**

144: HAI: Epidemiologic Methods; 1362: Development of a Single Model to Predict Surgical Site Infection and Non-Infectious Wound Complications after Mastectomy with Immediate Reconstruction

## ***150: HAI: Surgical Site Infections***

1458: The Incidence of Surgical Site Infection after Planned Laparoscopic Inpatient vs. Ambulatory Cholecystectomy: A Matched Propensity Score Analysis

### **Andrej Spec, MD**

43. Epidemiology and Outcomes in Mycology

240. HIV: Other Opportunistic Conditions  
2174. AIDS-defining Illnesses at Initial Diagnosis of HIV in a Large Guatemalan Cohort  
Session: Poster Abstract Session

65. HIV Testing and Diagnosis

521. Early HIV diagnosis in Guatemala; an elusive opportunity

62. Mycology - There's a Fungus Among Us: Epidemiology  
1611. Infectious Disease Consult Is a Strong Predictor of Reduced Mortality in Cryptococcosis Mycology - There's a Fungus Among Us: Epidemiology

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Our mission is to provide outstanding clinical care, conduct ground-breaking research, and train the next generation of leaders in academic medicine and infectious diseases. Dr. Gerald Medoff has been among the most influential leaders in the School of Medicine in the past half century, and the contributions of Dr. Medoff to the field of medicine are clearly reflected in the quality of the School and in the extraordinary individuals he has mentored. It is therefore only appropriate that we honor him by creating a fund that will provide support for young trainees and junior faculty in the Division, helping them transition their independent careers. Additionally, we rely heavily on outside donations to continue to recruit, train, and retain high quality staff to support the research, education, and clinical mission of the division.



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Emeritus Professor of Medicine

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