Student Research Symposia

July 28 & 29, 2016
1:00 pm
McDonnell Pediatric Research Building
Molecular Microbiology Seminar Room 8101

Presentations by Students in the Institute for Public Health Summer Research Program

Publichealth.wustl.edu/resources/summer-research-programs
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<td>Retrospective Analysis of Pediatric Cancer and CNS Congenital Anomalies</td>
<td>Nicole Cousins, University College Dublin, Ireland</td>
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<td>Facilitators and Barriers to Healthcare and Education in Adolescents and Young Adults with Sickle Cell Disease</td>
<td>Hai Anh Pham, Brown University, Providence, RI</td>
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<td>Developing Feedback to Improve Adherence to Enhanced Recovery Pathways in Colorectal Surgical Cases</td>
<td>Sarah Kinch, Washington University in St. Louis</td>
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<td>Who Participates in a Breast Cancer Genetic Testing?</td>
<td>Laura Muller, University College Dublin, Ireland</td>
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<td>Multifactorial Components in the Engagement of African American Women in a Breast Cancer Genetic Study</td>
<td>Ailis Powderly, University College Dublin, Ireland</td>
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<td>Racial Disparities in Early-Stage Breast Cancer Patients’ Quality of Life (QOL) Over Time</td>
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<td>Protein Quality Requirements for Food Aid Recipients</td>
<td>Momoko Oyama, Washington University in St. Louis</td>
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<td>A Qualitative Community Assessment of Nutrition and Child Development in Cap-Haitien, Haiti</td>
<td>Bailey Widener, Washington University in St. Louis</td>
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<td>3:25 pm</td>
<td>Race in the City of St. Louis: Does Racialized Space Inhibit Health-Promoting Use of Public Spaces?</td>
<td>Tommy English, Saint Louis University, St. Louis, MO</td>
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<td>Neighborhood Rapid Assessment to Corroborate the Risk Factor Mapping Approach to Sex Trafficking in St. Louis</td>
<td>Anne Niyigena, William Penn University, Oskaloosa, IA</td>
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<td>3:55 pm</td>
<td>“It’s a Trade-Off”: the Perceived Health Risks and Safety of High Potency Marijuana</td>
<td>Biva Rajbhandari, Washington University in St. Louis</td>
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<td>Support of Disordered Eating Behaviors in Online Spaces: A Content Analysis of the ProED Subreddit</td>
<td>Monique McLeary, The University of North Carolina at Greensboro, Greensboro, NC</td>
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Institute for Public Health Summer Program Symposium  
Friday, July 29 - Part 2 Agenda

1:00 pm  Welcome

1:10 pm  *Childhood Undernutrition and Gut Microbiota Immaturity: Human Development Viewed from a Microbial Perspective*
Jeffrey Gordon, Washington University in St. Louis

1:40 pm  *Carbonic Anhydrases and the Neuronal Stress Response*
Lucy Sheahan, Tulane University, New Orleans, LA

1:55 pm  *Characterizing the Role of CpsA in Mycobacterial Pathogenesis*
Amir Hassan, Washington University in St. Louis

2:10 pm  *Understanding the Function of Ddi3 in the Mycobacterial Replisome*
Bolutife Fakoya, Swarthmore College, Swarthmore, PA

2:25 pm  *Deconstructing Malaria Metabolic Regulation by PfPK9 and PfHAD2 Interactions*
Marwa Mikati, Mount Holyoke College, South Hadley, MA

2:40 pm  *PathPack™ Mobile Lab Kits: Bringing Lab Medicine to the Vulnerable in Sud-Est, Haiti*
Laura Hallas, University of Texas, Austin, TX

2:55 pm  Break

3:10 pm  *The Association between Racial Discrimination and Suicidality among African American Adolescents and Young Adults*
Suraj Arshanapally, Saint Louis University, St. Louis, MO

3:25 pm  *Evaluating the Risks for Obstructive Lung Disease in HIV-infected Individuals Using Symptom-Based Scores and Spirometry*
Ageline Sahagun, University of Guam, Mangilao, GU

3:40 pm  *Barriers to Patient Contact and Follow Up: A Survey of Patients with Sexually Transmitted Infections in an Emergency Department*
Michael Conroy, Hobart and William Smith Colleges, Geneva, NY

3:55 pm  *Iganga District in Uganda HIV Treatment and Care Through the Lens of Gendered Life Experiences*
Tiffany Vuong, Loyola University Chicago, Chicago, IL

4:10 pm  *What Keeps Men out of Care? Understanding Gendered Engagement with HIV Treatment in Uganda*
Megan Hunt, Clemson University, Clemson, SC

4:25 pm  Certificate Ceremony and Closing Remarks

4:45 pm  Reception
Clockwise from top left corner: Malaria infected blood cultures resistant to an antimalarial drug (Courtesy: Marwa Mikati); Bolu cloning mutants of Ddi3 for future use in co-immunoprecipitation assays to determine Ddi3 essential amino acid residues and protein partners (Courtesy: Bolutife Fakoya); Group photo of Drs. Bierut, Ademuyiwa and the African American Breast Cancer Genetics Team at the Center for Advanced Medicine (Courtesy: Laura Muller); The steps in the experiment, including performing crosses with the flies, separating males from females under a microscope, and submerging vials of flies in a warm water bath (Courtesy: Lucy Sheahan); Some of the equations used to calculate integral components in the risks for obstructive lung disease study (Courtesy: Ageline Sahagun) and mother in Sierra Leone feeding her child a food aid product called Plumpy' sup (Courtesy: Momoko Oyama).

Clockwise from top left corner: Oil rig being set up for dabbing (Courtesy: Biva Rajbhandari); Process of quantifying colony-forming units at different time points after infecting RAW264.7 macrophages with *Mycobacterium smegmatis* (Msmeg), comparing the intracellular growth of CpsA-expressing Msmeg to vector control (Courtesy: Amir Hassan); Laura Bierut, MD and Foluso Ademuyiwa, MD with the African American Breast Cancer Genetics Team at the Center for Advanced Medicine (Courtesy: Ailis Powderly); The Sickle Cell Association, where focus groups take place (Courtesy: Hai Anh Pham); Ning Zhao sitting at her desk; HIV Treatment and Care Research in Iganga, Uganda (Courtesy: Megan Hunt).
Photos Contributed by the Students

Clockwise from top left corner: From an article in the SHEAF, University of Saskatchewan student newspaper, “You count more than calories: Eating disorders illuminated” representing the constant mental struggle associated with eating disorders (Courtesy: Monique McLeary); My six-week cubicle view with project progression - from background reading, data collection and management, and finally analysis (Courtesy: Nicole Cousins); Interview with a mother in Cap-Haïtien, Haiti (Courtesy: Bailey Widener); Highlighted and annotated papers represent the time spent studying our question - reading literature, speaking with doctors, interacting with patients, drawing upon themes and ideas that pervade throughout our research. The blue Colorectal Surgery pamphlet is a product of this research; which helps patients prepare for colorectal surgery (Courtesy: Sarah Kinch); Assessment of neighborhood characteristics in Warren County (Courtesy: Anne Niyigena); A team member performs a park audit in Tower Grove Park, tracking park usage over time, which is necessary data for the planning of future projects (Courtesy: Tommy English).

Jeffrey Gordon, MD
Dr. Robert J. Glaser Distinguished University Professor; Director, Center for Genome Sciences & Systems Biology

Dr. Gordon received his A.B. from Oberlin College and his M.D. from the University of Chicago. He joined the Washington University faculty after completing his clinical training in internal medicine and gastroenterology and doing post-doctoral research at the NIH. He was Head of the Department of Molecular Biology and Pharmacology before becoming the founding Director of a University-wide, interdisciplinary Center for Genome Sciences and Systems Biology. Students in his lab have created innovative preclinical models, and developed new experimental and computational approaches, for characterizing the assembly, dynamic operations, functional properties, and biological effects of human gut microbial communities. He has combined these models with human studies involving twins as well as members of birth cohorts living in low-, middle- and high-income countries representing diverse geographic locations and cultural traditions. His group is focused on addressing the global health challenges of obesity and childhood undernutrition through new understanding of the interactions between diets and the gut microbiome and new ways of promoting healthy development of the gut community during the first several years of postnatal life. He has been the research mentor to over 120 PhD and MD/PhD students and post-doctoral fellows. He is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, the National Academy of Medicine, and the American Philosophical Society.
William Powderly, MD
J. William Campbell Professor of Medicine
Larry J Shapiro Director, Institute for Public Health
Co-director, Division of Infectious Diseases

For more than 20 years, Dr. Powderly has been actively engaged in research to improve treatments for patients with HIV. His initial studies focused on evaluating drug cocktails to identify effective first-line treatment for HIV. He has also been involved in research to understand the long-term side effects of HIV medications, particularly metabolic problems like diabetes, lipid abnormalities, and osteoporosis. Dr. Powderly’s global health interests include findings solutions to develop human capital in resource-limited settings through shared educational and research endeavors. Dr. Powderly has served in a number of leadership roles in his field, including as vice chair of the U.S. AIDS Clinical Trials Group and chair of its scientific steering committee. He has been a member of numerous advisory groups on HIV and infectious diseases for the National Institutes of Health (NIH) and the U.S. Centers for Disease Control and Prevention. Dr. Powderly is the author of more than 300 scientific journal articles and book chapters on HIV and AIDS. He is also a fellow of the Infectious Diseases Society of America, the Royal College of Physicians of Ireland, and the American Association for the Advancement of Science.

Victoria Anwuri, MPH
Associate Director, Institute for Public Health

Ms. Anwuri is charged with implementing the strategic plan and programs of the Institute in collaboration with Institute leaders to achieve the overarching mission and vision of the Institute. She has extensive experience in public health research and programming. Prior to joining the Institute, Ms. Anwuri managed and coordinated program operations for multiple large-scale, nationally-funded health initiatives related to energetics and cancer, cancer health disparities, diabetes self-management and heart disease and stroke prevention. Recently she worked on a university/hospital research, community engagement and training initiative that was focused on collaborations with community partners to develop solutions to reduce excess cancer burden in the St. Louis region, and on a university-wide initiative to foster transdisciplinary research exchange around energetics and cancer.

Acknowledgements

We would like to thank the Institute for Public Health Summer Research Program mentors for their guidance and support of the students.

We are very grateful to the staff at the Institute for Public Health, the Clinical Research Training Center and the Division of Biology and Biomedical Sciences for there tremendous logistical support.

From top to bottom: Participants having dinner together at Favazza’s and gardening in a Beyond Housing community garden (Courtesy: Alissa Ontiberos).
and general health (each $p < .05$); Black patients experienced little improvement or decline in these subscales, while White patients reported increases in each subscale but general health, which was flat but higher than for Black patients. A three-way (time*race*stage) interaction was observed for EWB. Black DCIS patients’ EWB improved by 6-month follow-up, then declined, and Black EIBC patients’ EWB steadily declined compared with White DCIS and EIBC patients, whose EWB improved by 2-year follow-up. Controls’ EWB changed minimally over time. **Conclusion:** Clinically important differences by race were observed in QOL change of patients. Reasons for these disparities in QOL outcomes require further investigation.

**Ericka Hayes, MD**
Associate Professor, Division of Pediatric Infectious Diseases, Washington University and Saint Louis Children’s Hospital
A native of Mississippi, Dr. Hayes completed a B.S. in Chemical Engineering as well as her M.D. at Washington University. She completed her pediatrics residency training at the University of California, San Francisco. She returned to WU School of Medicine for fellowship training in pediatric infectious diseases. In 2005, she joined the Department of Pediatrics as faculty and the Washington University Pediatric HIV program, which she currently serves as medical director. Dr. Hayes’s past research projects have focused on metabolic complications and drug dosing of HIV medicines in severely malnourished children; implementation and optimization of universal HIV testing programs for adolescents and young adults and sexually transmitted infection diagnosis and treatment in youth. She also serves Saint Louis Children’s Hospital as medical director of Infection Prevention. Dr. Hayes’s other passion is medical education and she is the co-coursemaster of the second year pediatrics course at the School of Medicine and is the co-chair of the pediatric infectious diseases education committee.

**Jacaranda van Rheenen, PhD**
Manager, Global Health Center, Institute for Public Health
Dr. van Rheenen, is manager of the Global Health Center at the Institute for Public Health at Washington University. She is the organizational lead on the Center’s initiatives, including the annual global health and infectious disease conference, visiting speaker series, the summer research program, global health advisory committees and the research and educational activities. Prior to Washington University she worked for five years at St. Jude Children’s Research Hospital in Memphis, TN, recruiting postdoctoral fellows. A native of the Netherlands, she earned a master’s of science degree in agricultural and environmental sciences at Wageningen University in the Netherlands, and a doctorate in plant ecology from Utrecht University in the Netherlands. Her doctorate research was in the Bolivian Amazon rainforest studying the role of seed trees and seedling regeneration for species maintenance in logged-over forests. Dr. van Rheenen’s international background has given her a great appreciation for the importance of global health.

From left to right: Suraj Arshanapally analyzing the Missouri Family Study database on psychiatric and substance abuse disorders (Courtesy: Suraj Arshanapally) and Entrance to the Barnes Jewish Hospital Emergency Department at Washington University (Courtesy: Michael Conroy).
Racial discrimination (RD) has been identified as a social risk factor for suicidality. This study aimed to determine the strength of association between RD and suicidality in AA adolescents and young adults.

Data are from a high-risk alcoholism family study including 806 AA youth (Mean age = 17.9 years). A semi-structured interview assessed psychiatric problems and disorders, including RD – defined as endorsement ≥ one of the following domains: school, getting a job, at work, on the streets, or from the police – and suicidality – defined as lifetime endorsement of suicidal ideation, having a plan, and/or attempting suicide. A series of logistic regression models examined the association between RD and suicidality while considering individual and familial covariates. The base model includes sociodemographic information and individual discrimination. Model 2 includes individual risk characteristics. Model 3 includes maternal risk characteristics.

Fifteen percent of the sample endorsed suicidality and 45% endorsed experiencing ≥ one domain of RD. In the base model and Model 2, RD was significantly associated with increased odds of suicidality. However, in Model 3, the association between RD and suicidality lost significance, although there was a trend.

RD was significantly associated with elevated odds of suicidality in 2 of 3 models, but lost significance when maternal characteristics were introduced. Findings suggest that RD is significantly associated with suicidality in AA youth and suggest maternal characteristics – including maternal RD – as a possible contributor to this association. Future research into other forms of discrimination, inter-generational contributions to suicidality, and longitudinal effects of RD are warranted.

Racial Disparities in Early-Stage Breast Cancer Patients’ Quality of Life (QOL) Over Time

Background: Racial disparities in breast cancer (BC) patients’ diagnosis, treatment, and survival are well known. But no longitudinal studies have examined racial disparities in QOL change in early-stage BC patients (ductal carcinoma in situ [DCIS] and early-invasive breast cancer [EIBC]) compared with same-aged women without a BC history (controls).

Methods: Four telephone interviews were conducted over two years with participants from Siteman Cancer Center and Saint Louis University School of Medicine. Using repeated-measures analysis of covariance, we examined QOL changes in the eight RAND 36-item Health Survey subscales, by race (White, Black) and diagnostic group (DCIS, EIBC, controls) controlling for significant QOL covariates at enrollment. Higher scores indicate better QOL.

Results: Of 1096 participants, 990 were included in the analysis (78.6% White, 22.4% Black; 17.1% DCIS, 33.7% EIBC, 49.2% controls). Significant time*race interactions were observed for role limitations due to emotional problems, emotional well-being (EWB), vitality,
Iganga District HIV Treatment and Care Through the Lens of Gendered Life Experiences

Uganda is known as a model country for HIV response. While antiretroviral therapy (ART) has improved people’s quality of life since the 2005 government scale-up, the percentage of clients who fall out of care remains significantly high, hindering the possible benefits of ART, particularly among men. To understand the gender disparity with engagement with HIV care, this study examined the relationship between a person’s involvement with antiretroviral care systems and his or her everyday life, future goals, and local gender expectations in Iganga District of Eastern Uganda.

Methodology: Data was collected using a mixed qualitative and quantitative methodology, including 135 patient surveys (106 women, 29 men) in nine district’s health facilities to understand the unique experiences of the clients utilizing ART and determine factors that may contribute to the males’ inadequate retention to care; exploratory visits to 13 ART clinics in rural and town regions in Iganga District to collect providers’ perspectives on the lack of male attendance in the ART clinic; participatory research activities in clinic- and community-based support groups to examine the role of external support system in regards to HIV care retention; and in-depth individual interviews with three men and three women who are on ART treatment to gain a greater insight on the lives of people living with HIV.

Conclusion: While increased availability of ART has extended lives in Uganda, this study reveals that there is a conflict between HIV care delivery and client’s gendered lifeways, experiences, and goals. Gender-specific psychosocial support groups as well as the encouragement of male participation in antenatal care could be implemented as ways to draw men into the system of HIV testing and treatment.

Bailey Widener, MPH/MSOT Student; Lora Iannotti, PhD, Brown School, Washington University

A Qualitative Community Assessment of Nutrition and Child Development in Cap-Haïtien, Haiti

Introduction & Background: Although there is a great deal of literature supporting the association between undernutrition and poor child development, few interventions have aimed to

Michael Conroy, Undergraduate Student; ¹Anne Trolard MPH, ¹Ben Cooper MPH, and ²Hilary Reno MD PhD, ¹Institute of Public Health and ²Department of Medicine, Division of Infectious Diseases, Washington University

Barriers to Patient Contact and Follow up: A survey of Patients with Sexually Transmitted Infections in an Urban Academic Emergency Department

Background: No rapid diagnostic testing is available for the sexually transmitted infections Chlamydia trachomatis (Ct) and Neisseria gonorrhoeae (GC). Therefore, some patients have to return for follow up after receiving positive test results. Follow up is particularly difficult in emergency departments (EDs) with unorganized call back systems. Assessing the current status of follow up in an urban ED and surveying patients for attitudes towards ED use will highlight potential areas for improvement. Methods: A retrospective analysis of patients that tested positive for Ct/GC in an urban ED between March 1 and June 27, 2016 was conducted. Chi-square tests were carried out comparing the demographics of patients with and without active phone numbers in their medical records. Structured interviews were conducted on a subset of subjects. Results: During the period of interest, 159 patients tested positive for Ct/GC, or both. Twenty-nine (18.2%) of these patients were not contacted and remained untreated. Nearly half (49.5%) of potential interview participants were unreachable because recorded phone numbers were disconnected, inaccurate, or outdated. These patients did not differ significantly on the basis of age, race or gender. Survey respondents (n=11) reported using the ED as their most frequent source of healthcare (90.9%) and all (100%) reported convenience as a reason for choosing the ED for care. Conclusions: Almost 20% of patients with Ct/GC failed to receive treatment in the ED due to lack of follow up. The large proportion of patients who leave unreliable phone numbers remains a barrier to follow up.
Retrospective Analysis of Pediatric Cancer and CNS Congenital Anomalies

Introduction: Congenital anomalies and pediatric cancer both contribute to pediatric hospitalizations and significant disease burden and have been recognized as global priorities by the World Health Organization. Unlike many adult malignancies, pediatric cases demonstrate fewer somatic mutations and are more often associated with germline mutations. Previous research demonstrates an association between non-chromosomal congenital abnormalities and cancer, suggesting a common disease aetiology. This study examined the association between neurological congenital anomalies and pediatric cancer, and it is hypothesized that the prevalence of CNS anomalies will be higher among patients with a neurologic tumor compared to those diagnosed with another cancer subtype. Methods: Electronic medical records of 854 pediatric oncology patients at St. Louis Children’s Hospital (SLCH) from January 1, 2004 to October 14, 2010 were accessed. They were evaluated for a congenital anomaly diagnosis and verified using ICD-9 hospitalization codes. Bivariate analysis was used to examine differences between patients with neurological anomalies and those without, and those with CNS tumors. Results: 10.8% of pediatric oncology patients were identified with a congenital anomaly. There was a significant correlation between diagnosis of congenital anomaly and CNS tumors cases (p=0.04), as well as males diagnosed with a neurological congenital anomaly and CNS tumors (p=0.03). Conclusions: This study demonstrates further evidence of an association between congenital abnormalities and pediatric cancer. It additionally identifies a previously unrecognized relationship between males diagnosed with a neurological anomaly and CNS tumors. Future research will focus on identifying the mechanisms of early childhood cancers and gender differences.

Carbonic Anhydrases and the Neuronal Stress Response

Stress can offset physiological homeostasis, leading to adverse outcomes and disease. In the nervous system, under stress, increased neuronal activity can cause shifts in pH inside neurons and in the environment surrounding. Carbonic anhydrases (CAH) represent a family of proteins that catalyze the hydration of carbon dioxide via the production of bicarbonate and protons, thereby playing a major role in buffering intra- and extra-cellular pH. Disruptions of their function in humans and animals, including the genetically tractable model, Drosophila melanogaster, can lead to neuronal stress and disease. To examine the role of CAH in neuronal stress response, the expression of 6 different family members of the enzyme was silenced by using UAS/GAL4-based RNA interference. One hundred flies from each group expressing RNAi for a different CAH gene were subjected to heat, which induces neuronal stress. The amount of time the flies were able to remain active before having a seizure was used as an indicator of their resistance to stress. The average time it took for the flies in each group to seize remained relatively constant for each of the RNAi lines. Thus, the data did not give sufficient statistically significant evidence to accept the hypothesis that expression of the genes tested has an effect on neuronal stress response. However, RNAi knockdown of the gene CG3940 produced few progeny that lacked functional wings and died shortly after eclosion, indicating that this specific CAH is required in neuronal tissues during Drosophila development. The statistically insignificant data could be due to technical problems with the RNAi approach to gene knockdown, which is prone to false negatives due to incomplete penetrance of its effects on target genes. Nevertheless, the experiment is an attempt to answer the daunting question of how mechanisms to maintain homeostasis in the brain prevent neuronal stress and disease.

Conclusion: This study underlines the importance of long-term study in the smoking, HIV-infected population in order obtain a better understanding of the specific risk factors that contribute to the rise in chronic respiratory co-morbidities. Furthermore, emphasis is placed in addressing smoking cessation in standard HIV care.
Evaluating the Risks for Obstructive Lung Disease in HIV-infected Individuals Using Symptom-based Scores and Spirometry

Purpose: Respiratory symptoms have always been extremely common in people living with HIV (PLWH). Due to improved treatment, aging of the population and a decrease in infectious complications, chronic respiratory co-morbidities has become more prevalent among PLWH. Certain risk factors, such as smoking, contribute to this observed rise. This project aims to analyze symptom-based scores against pulmonary function tests and imaging in order to evaluate HIV, obstructive lung disease and risk factor associations.

Methods: Current smokers, HIV-positive and HIV-negative participants, over age 30 and with at least a 15 pack-year smoking history were enrolled in this study. Pulmonary function tests were performed to assess for obstructive defect. St. George’s Respiratory questionnaires (SGRQ) were administered and served as the primary source for symptom-based data. Basic demographic data as well as HIV disease specific information, including CD4 count and HIV viral load were collected. Results: This study included 75 HIV-infected patients and 38 HIV-negative controls. HIV-infected patients had lower tobacco exposure than HIV-negative patients (27.1 versus 46.4 pack-years.) and were younger (49.1 ± 8.0 vs 56.1 ± 7.0). Lower FEV1/FVC ratios in the HIV-negative population points to higher instances of obstruction. However, symptom-based scores did not vary (26.9±20.7 vs 28±25.4, p>0.05), suggesting symptomatology may be a

Race in the City of St. Louis: Does Racialized Space Inhibit Health-Promoting use of Public Spaces?

Introduction: White space has been described as space that is dominated by Whites and is unwelcoming or even inaccessible to non-Whites. It has also been described as space where Blacks may fear harm because of their lack of belonging and the value assigned to their lives by society. The St. Louis region has a history of Black and White racial tension, and it possesses many of the features that are described as creating White spaces—discriminatory housing policies, segregation, and unequal police surveillance. The purpose of this study is to better understand and define White Space in St. Louis City and how it affects Blacks’ use of public spaces. This study examines how Blacks and Whites in St. Louis City perceive and experience racialized spaces. Methods: Individuals who lived, worked, prayed, or played in St. Louis City were recruited through convenience sampling to participate in semi-structured qualitative interviews. A total of 50 race-matched interviews were conducted with 25 participants who self-identified as Black and 25 as White. Interviews were audio recorded, transcribed, coded, and analyzed using a grounded theory approach. Results: Interviews with 25 Blacks were completed and responses suggested a need to gain perspectives from White residents, as such interviews with Whites are currently in progress (13 completed to date). Preliminary results suggest that both Blacks and Whites can identify White space in the St. Louis Region and often identify the same spaces as White space. Blacks have discussed common experiences in White Spaces such as internal and external surveillance, code switching, and a lack of belonging. Conclusions: The definitions of White space and predominate themes from qualitative analysis will inform the development of quantitative survey items, which will assess how Blacks’ respond behaviorally and psychologically to White spaces.
Bolutife Fakoya, Undergraduate Student; Katherine Mann and Christina Stallings, PhD, Washington University

**Understanding the Function of Ddi3 in the Mycobacterial Replisome Through Site Directed Mutagenesis and Cellular Growth Assays**

Tuberculosis, caused by *Mycobacterium tuberculosis*, affects 1/3rd of the world’s population and killed 1.5 million people in 2014. Attempts to curb tuberculosis pathogenicity are stymied by *M. tuberculosis*’ waxy cell envelope that renders it difficult to affect biochemically, and its evolution of multi-drug resistance. However Ddi3, a novel protein implicated in *M. tuberculosis* stress response, has been shown to be likely essential for successful M. tuberculosis DNA replication and thus serves as a potential target for effective antituberculosis therapies. Through site-directed mutagenesis we generated Ddi3 mutants with single amino acid substitutions in conserved regions of the protein. We assayed the growth patterns of *M. smegmatis*, a non-pathogenic model for *M. tuberculosis*, that expresses mutant Ddi3 to determine residues important for Ddi3 functionality. Furthermore, to determine if Ddi3’s function is conserved across prokaryotes, we transformed *Escherichia coli* with both wildtype and mutant Ddi3 versions and monitored changes in growth and cell morphology. As a W113A mutant Ddi3 phenocopies a Ddi3 deletion mutant in *M. smegmatis*, other mutants in the same conserved amino acid region of Ddi3 were cloned but not yet assayed for effects on the growth of *M. smegmatis*. Furthermore, data show that overexpression of Ddi3 in E.coli alters cellular morphology and overall population density. Our preliminary data show a fundamental role for Ddi3 in the mycobacterial replisome and proffer possibilities of a species-specific target for tuberculosis therapies. Future studies aim to identify Ddi3-protein interactions with as well as further characterize its role in the mycobacterial replisome.

Laura Hallas, Undergraduate Student; Sarah Brown, PhD, DABCC, FACB, Washington University

**PathPack™ Mobile Lab Kits: Bringing Lab Medicine to the Vulnerable in Sud-Est, Haiti**

**Introduction:** Diagnostic testing is a critical component of healthcare delivery: it informs individual patient care, improves health equity and furthers global health goals.

Biva Rajbhandari, MPH/MSW Student; Patricia Cavazos-Rehg, PhD, Department of Psychiatry, Washington University

**“It’s a Trade-Off”: The Perceived Health Risks and Safety of High Potency Marijuana**

**Introduction:** Inhaling high potency marijuana, commonly referred to as dabbing, is becoming a common method of marijuana use. Currently, research on health impacts of dabbing is limited therefore we focused first at assessing consumers’ perception of the safety and health risks of dabbing in both short and long term. **Methods:** We analyzed 20 interviews from marijuana users who posted or watched YouTube videos on dabbing. Participants were screened and interviewed from April to September 2015. Interviews were transcribed verbatim and then coded for content. **Results:** Out of 20 participants more than half (55%) were 18 to 24 years old and many (65%) identified as White. A majority of participants (80%) resided...
Facilitators and Barriers to Essential Healthcare and Educational Attainment in Adolescents and Young Adults with Sickle Cell Disease: A Qualitative Approach

Introduction: Sickle cell disease (SCD) is a chronic disease currently affecting over 70,000 people in the US, primarily African Americans. Having reliable access to healthcare is critical to SCD patients, especially during adolescent and young adult (AYA) years, with the transition from pediatric to adult healthcare. AYAs with SCD are also burdened with possible neurocognitive deficits and frequent medical leaves, which directly affect their academic success. This study aims to identify factors that promote or hinder essential healthcare and educational attainment in AYAs with SCD through qualitative analysis of patient, caregiver, and healthcare provider perspectives. Methods: We conduct focus groups with AYA sickle cell patients and their caregivers, and with sickle cell healthcare providers. Focus groups are audio-recorded, transcribed, de-identified, and coded into themes using principles from grounded theory. Results: Five main themes emerged from early analysis: healthcare access (lack of specialized care, long wait for appointments and medications), transition needs (autonomy development, care coordination and planning, disease management), provider interactions (stigma, establishing trust between patients and providers), disease education (for patients and caregiver, for providers, for educators, for friends and colleagues), and academic accommodations (provider support, structured assistance at school). Conclusions: The study is ongoing, but initial evidence promises great potential in using a multi-perspective qualitative method to inform healthcare and educational optimizations for youths with SCD.

Ailis Powderly, Medical Student; Laura Muller and Laura Beirut, MD, Department of Psychiatry, Washington University

Multifactorial Components in the Engagement of African American Women in a Breast Cancer Genetic Study

Introduction: Having knowledge of an individual’s genetic status can guide both prevention and treatment

Amir Hassan, Undergraduate Student; Jennifer Philips, MD, PhD, Department of Medicine, Division of Infectious Diseases, Washington University

Characterizing the Role of CpsA in Mycobacterial Pathogenesis

*Mycobacterium tuberculosis* (Mtb) infects one-third of the world’s population and causes an estimated 1.7 million deaths per year, more than from any other single bacterial pathogen. Mtb is able to alter cellular trafficking and survive in macrophages, which are important host immune cells that normally engulf and destroy bacteria. The Philips laboratory found that a previously uncharacterized Mtb protein, CpsA, allows Mtb to avoid degradation by macrophages by altering delivery of the bacteria to lysosomes, thereby contributing to virulence. The primary aim that I have been investigating is to determine the extent that Mtb CpsA promotes enhanced intracellular survival to *Mycobacterium smegmatis* (Msmeg), a rapidly-growing, non-pathogenic mycobacterium that does not contain CpsA naturally. After transforming Msmeg with *cpsA*, I infected RAW264.7
Macrophages, lysed the macrophages at different time points, and plated intracellular bacteria, comparing the intracellular growth of CpsA-expressing Msmeg to vector control. Preliminary results demonstrate that, when introduced into Msmeg, CpsA confers enhanced intracellular survival to Msmeg, such that 5-fold more bacteria were found 72 hours after infection. In addition, to determine whether the interactions with NDP52 and TAX1BP1 are important in virulence, I generated various mutant constructs of CpsA and, through a Yeast Two-Hybrid System, will investigate which parts of the CpsA protein are required for the interaction with TAX1BP1 and NDP52 as well as which are required for virulence. Overall, we hope that by studying the molecular mechanisms by which Mtb CpsA sabotages cellular functions, we can better understand both the host immunity and Mtb pathogenesis.

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What keeps Men out of Care? Understanding Gendered Engagement with HIV Treatment in Uganda

Since the Ugandan government scale-up of antiretrovirals (ARV) in 2005, treatment of HIV has been a focus within the central-eastern region of Iganga, an area with the highest rates of fertility and poverty in the country. According to district data, of the estimated 30,000 with HIV approximately 21,900 people are accessing ARVs. Of those actively enrolled in care, around 70% are female and 30% are male. Though social factors may increase women’s infection risk (such as polygamy and gender based violence), there is an inexplicably large gendered disparity in access to HIV care that does not correlate with men's typical greater access to resources. Through 135 surveys of ART patients (on adherence, disclosure, treatment, and life goals), 13 clinician-officer interviews, and 5 community participatory activities, we examined gender and other social dynamics that influence males’ disproportionately lower engagement with HIV care and higher rate of dropping out of care. Preliminary analysis reveals that medical emphasis on women and children, the lack of privacy at the ARV clinics, and notions of masculinity are major factors in discouraging men’s accessing HIV care. While women are drawn into care through antenatal testing, men must actively seek out testing and treatment, which is difficult due to male mobility. Once in care, the publicity of clinics discourages men from staying in care, because men fear to have their status disclosed to current or potential partners. Programs

Result: 23 out of 34 items of the checklist presented a moderate to perfect interrater agreement (.40<= Kappa<=1.00) and the rest of items showed a poor agreement between the two raters. We expect to find considerable differences in aggregate items of the checklist between case and control census tracts within St. Louis City and Warren County. Implication: Even when objective outcome data are unavailable to test predictive utility of risk factors, indirect observational study such as rapid assessment can be used to corroborate usefulness of our theory-driven risk factor approaches.

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Estimation of the Protein Quality Requirements for Food Aid Recipients During Four Physiologic States and a Review of Food Aid Products and Protein Quality in the Treatment of Moderate Acute Malnutrition

Introduction: The current method for determining the protein quality for food aid products uses the reference amino acid (AA) pattern of a healthy child in the protein digestibility-corrected AA score or the digestible indispensable AA score. Protein and AA requirements vary with physiological state, therefore using the specific requirements of the recipient is necessary when evaluating the protein quality of food aid products.

Objective: Develop reference AA patterns for 1-3 year olds in four different physiologic states. Determine protein quality of common food aid products using the AA pattern for a malnourished child. Evaluate the relationship between protein quality and effectiveness in treating moderate acute malnutrition (MAM).

Methods: AA requirements for 1-3 year olds in the four physiologic states were estimated. Studies from Suri et al that measured growth during treatment of MAM using fortified blended foods (FBF) and ready to use foods (RUF) were reviewed. Food aid products were evaluated for protein quality with the use of the AA pattern for malnourished 1-3 year olds and compared with recovery and average weight gain for the different treatment foods.

Results: Percent recovery and average weight gain were correlated with protein quality of the food. Average weight gain was greater when treated with foods with dairy than without.

Conclusion: It is necessary to use the appropriate reference AA pattern when evaluating protein quality, especially for food aid products. As the protein quality of food aid products increases, particularly through the addition of dairy, the more effective they are in treating MAM.
participation. We will assess participation by zip code to visually depict the areas of the city best represented in the study. **Results:** We observed a 44% participation rate among women under 40 years of age, while participation rates were 33% in women ages 41-60, 64% in women ages 61-75%, and 17% in women over age 75. Women who were referred by their doctor were 38% more likely to participate than those who were referred by a non-physician source. **Conclusions:** As genetic testing enters medical care, it is crucial to understand potential factors that limit participation in testing. Greater understanding of age-specific variation in receptiveness to genetic testing is warranted. If linking referrals to clinical care generates higher participation, we would encourage oncologists to recommend genetic testing to patients, and emphasize the need for testing to take place during the medical consultation.

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**Neighborhood Rapid Assessment to Corroborate the Risk Factor Mapping Approach to Sex Trafficking in the St. Louis Metropolitan Statistical Area (STLMSA)**

**Background.** There has been a pervasive misconception that human trafficking involves exclusively citizen of foreign nationals or immigrants from other counties. However, more has been known about domestic trafficking involving US Citizens. Currently, domestic sex trafficking is more prevalently reported than labor trafficking. However, little is documented about the exact magnitude and heightened risk areas which produces conditions conducive to local sex trafficking. This study is based on the previous effort on STLMSA sex trafficking risk factor mapping.

**Methods:** Potential risks factors of sex trafficking had been collected and mapped based on three perspectives (SES deprivation, weak educational institution, and sex trafficking venue concentration) that are postulated to contribute to trafficking in persons. We chose Warren County and St. Louis City for rapid assessment pilot phase. Within each area, a two-stage sampling method entailed a nested case-control design based on available sex trafficking risk scores at the census tract level for these areas. We created a checklist of neighborhood characteristics suitable for this study, based on previous neighborhood observations tools. Two raters blinded to risk status independently assessed the neighborhoods and inter-rater agreement was examined. We will create composite scores from the checklist items and test significance using Chi-square test of significance.

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**Developing Feedback to Improve Adherence to Enhanced Recovery Pathways in Colorectal Surgical Cases**

Enhanced Recovery Pathways (ERPs), perioperative care strategies composed of evidence-based practices, have been proven to improve the quality of patient care and recovery after surgery. Such interventions have benefitted post-operative patient recovery, including a 2.5-day average reduction in length of hospital stay and a 50% decline in morbidity. Despite such benefits, ERPs are implemented in fewer than one-third of surgeries in the U.S. and, even when the value is realized, adherence is low, especially during the post-operative period. Studies show, however, a 5% increase in adherence to ERPs when hospital staff is provided feedback. Therefore, we collected post-operative data from colorectal surgical staff that are implementing ERPs at BJH in order to identify areas for improvement. By sharing our analyses with staff, we seek to incentivize adherence to ERPs.

**Methods.** Nurses and surgical staff at BJH recorded “Daily Patient Goals” that reflect ERP adherence for each patient’s post-operative recovery period. These records were analyzed using the RedCap database to understand adherence to ERP-related patient activity, such as ambulation, each day following surgery. Analyses will be shared with hospital staff, and debriefing will be performed.

**Results.** Preliminary findings suggest widespread discrepancies in key data capture for critical measures of adherence, such as distance ambulated by patient. A strong association between day of week and adherence to ERPs has been found. Findings show an especially marked decrease in adherence on the weekend.

**Conclusion.** Feedback reports can be implemented to improve adherence to ERPs, especially those focused on weekend activities. A better understanding of patient needs could provide a future solution.
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Support of Disordered Eating Behaviors in Online Spaces: A Content Analysis of the ProED Subreddit

Introduction: Anorexia and other eating disorders are often stigmatized in society and in face-to-face interactions, making the Internet a source of information and solace for many who suffer from these conditions, especially younger adults who may favor online interactions. This study examines the content of the pro-eating disorder (ProED) community on Reddit, designed for individuals who are engaging in eating disorder-related behaviors and do not want engage in traditional in-person recovery programs. We hypothesize that individuals in this ProED subreddit are seeking support and encouragement for their disordered eating behaviors. Methods: Moderators of the ProED subreddit post themed discussion threads every week: Monday=stats update; Tuesday=self-care and beauty; Wednesday=small achievements/way to go Wednesday; Thursday=emotional support; Friday=selfies + progress pics. All the comments and their accompanying replies were collected from each weekday post starting May 16 and ending July 8 (N=40, N = number of posts). The direct replies to the original moderator post (comments) and their responses (replies) were qualitatively coded for themes by a team of four coders. Primary comments were coded for expression of eating disorder behaviors, seeking advice/support, and other prominent themes. Replies were coded for the type of support or advice given, and whether the advice could potentially be harmful. Results: Preliminary findings support the use of this ProED subreddit as a support network that positively reinforces harmful eating disorder behaviors. These findings support our hypothesis that individuals in the ProED subreddit are seeking support and encouragement for their disordered eating behaviors. Conclusion: Our findings underscore the significance of clinical and public health concerns of pro-eating disorder support spaces online.

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Who Participates in a Breast Cancer Genetic Testing?

Introduction: Precision medicine has the potential to revolutionize medical care. To extend our knowledge about underlying genetic risk and identify potential barriers to genetic testing, African American women diagnosed with breast cancer were contacted by phone to invite them to undergo free genetic testing to test for known variants increasing risk to breast cancer development. We aim to determine who elects to participate and to decipher the characteristics of women who are more receptive to genetic testing. Variables analyzed will include age, referral source, zip code and reasons for refusal. Methods: We will analyze data from a recruitment call log to determine participant reachability and common reasons for refusal. We will test to uncover whether age and referral sources influence

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Deconstructing Malaria Metabolic Regulation by PfPFK9 and PfHAD2 Interactions

Malaria continues to pose a global health threat, with approximately half a million deaths reported worldwide yearly. The malaria parasite, Plasmodium falciparum, synthesizes isoprenoids through the methylerythritol phosphate (MEP) pathway. Since isoprenoids are essential biomolecules for parasite growth and survival, the MEP pathway has been crucial to novel drug development, especially in response to emergent drug resistance. In this project, we aim to understand the regulation of the MEP pathway through the relationship between the purine monophosphatase (PfHAD2) and phosphofructokinase-9 (PfPFK9). The antimalarial drug fosmidomycin (FSM), which inhibits the enzyme deoxyxylulose 5-phosphate reductoisomerase (DXR) of the MEP pathway, was used to select for FSM-resistant parasites with PfHAD2 loss-of-function mutations. From previous work, we hypothesize that PfHAD2 is a negative regulator of the MEP pathway whose loss confers a fitness defect. Growth selects for suppressor mutations in PfPFK9 that restore FSM sensitivity and improve parasite fitness. We hypothesize that these PfPFK9 mutations alter enzyme catalysis and/or regulation. In this study, we employ a suppressor screen to better understand residues necessary for PfPFK9 activity and regulation. We use phenotypic variations in FSM response to select for sensitive strains and perform sequencing analysis to detect novel PfPFK9 polymorphisms. Currently, we have noted phenotypic changes in some strains, which need to be validated by sequencing. These findings will help increase our understanding of the regulatory activity of PfHAD2 and overall MEP pathway modulation.

PfPFK9 and PfHAD2 Interactions

We will test to uncover whether age and referral sources influence