The Department of Epidemiology Internship provides an opportunity for MPH students to apply the knowledge they have acquired in the classroom to professional work situations. Internships usually take place in state, county, federal, or international-level health departments, public health institutes/programs, hospitals, or within the University of Pittsburgh or international research groups.

Students are encouraged to choose an experience that will help them sharpen a skill set as well as explore a new area of research. Internship placement, goals, and responsibilities are developed in collaboration with the students' faculty advisor and preceptor to individualize and maximize the learning experience.

Special thanks to the Internship Preceptors and Research Mentors for fostering these enriching educational opportunities. An exciting result of some of these unique partnerships has been the establishment of new research collaborations.

Enjoy viewing and discussing our students' impressive work! Thank you for joining us!

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Department of Epidemiology

Epidemiology in Action!
Annual Internship Poster Session
Abstract Book
Thursday, September 27, 2018

Presenter: Brianna Adamcik
Agency: UPMC Children's Hospital of Pittsburgh, Division of Community Health
Internship Preceptor: Anne Marie Kuchera, MS, MA, RD, LPC

A Park a Day Keeps the Doctor Away: Pittsburgh Parks Rx

Background/Objective: The primary goal of Pittsburgh Parks Rx is to improve health and personal well-being through regular park use and contact with nature. The project is built on an evidence-based national initiative to encourage people to use parks, trails, and open spaces to achieve healthier lifestyles.

Methods: A Pittsburgh Parks Rx advisory team was formed, consisting of park professionals, health care providers and community and public health professionals. The advisory team provided direction and feedback on implementation of the program in primary care settings, including development of waiting and exam room materials and a prescriber toolkit. The toolkit contained resources for park prescribers including: a tip sheet for providers, a clinical implementation flowchart, and geographically-based park-specific resources used to train clinical staff. Pre – and post-pilot surveys were created to gauge prescriber knowledge and perceptions of park prescriptions. Waiting and exam room materials included: posters, brochures, stickers, magnets and maps, intended to engage the child and family in multiple areas of the clinic. A Parks Rx website and text messaging platform were created as a way to continually engage children and their families outside of the clinical setting.

Results: As of September 2018, over 50 clinical staff (physicians and office staff) were trained on Parks Rx in five clinical pilot sites using the prescriber toolkit. The sites included: UPMC St. Margaret Bloomfield Garfield Family Health Center, Children's Hospital Primary Care, Pediatric Alliance – Allegheny, Children's Community Pediatrics – GIL and Kids Plus Pediatrics. Waiting and exam room materials were distributed and displayed in each site. Pre-survey responses were collected from prescribers to be ultimately compared to post-pilot responses. A Parks Rx letter was integrated into the electronic health record at 3 of the 5 sites. A user-friendly, searchable map was developed and embedded into the Parks Rx website and Parks Rx was promoted through text message alerts two times per month.

Conclusion: While we have yet to evaluate the effectiveness of the Pittsburgh Parks Rx program, similar programs have resulted in positive outcomes. We hope to continue building upon this framework and expanding Parks Rx to additional clinical sites

Presenter: Yuan Yang
Agency: University of Pittsburgh, Graduate School of Public Health, Department of Epidemiology
Internship Preceptor: Allison L. Kuipers, PhD

The Genetic Determinants of the B-type Natriuretic Peptide

Background/Objective: BNP is a biomarker of cardiovascular disease (CVD), including heart failure, hypertension, diabetes, atrial fibrillation, and myocardial infarction. The genetic contribution to BNP levels and CVD risk is unknown. While some studies report single nucleotide polymorphisms (SNPs) that are associated with BNP levels, hypertension, and cardiovascular mortality, there is only one article that tested and showed BNP to be significantly heritable. Gaining a better understanding of the genetic regulation of the BNP levels and CVD risk could lead to improved treatment and prevention of CVD. To estimate the heritability of BNP and to test the genetic association of SNPs in the BNP gene region with BNP levels in the Long Life Family Study.

Methods: Our study included 4618 participants from the LLFS (mean age 70.5 years, 55.1% female). All analyses were conducted using the Sequential Oligogenic Linkage Analysis (SOLAR) program which uses a variance covariance method to adjust for family stricture. The full model was adjusted for age, sex, field center, body mass index, systolic blood pressure, diastolic blood pressure, diabetes, antihypertensive therapy, myocardial infarction, atrial fibrillation, and creatinine. Genotypes were ascertained by Human Omni Chip 2.5 v1 (Illumina, CA) and SNPs for this study (N=15) included those with a minor allele frequency ≥5% from the *NPPB* and *NPPA* gene regions which neighbor each other and encode for BNP and A-type natriuretic peptide.

Results: Residual heritability of BNP was 0.22 (p=6 × 10-13). Eight SNPs were significantly associated with BNP levels when tested individually. After combining these into a single model, only 2 SNPs showed independent associations: rs198389 (p=9 × 10-12) and rs5063 (p=0.016). After accounting for confounders, these SNPs explained 2.2% and 0.7% of the variance in BNP in the offspring and proband generations, respectively.

Conclusion: In this family-based sample of exceptional longevity, 22% of the variation in BNP levels was accounted for by genetic variation. We identified two common SNPs in the BNP gene region with independent effects on BNP levels.

Presenter: Lanting Yang
Agency: University of Pittsburgh School of Pharmacy
Internship Preceptor: Inmaculada Hernandez, PharmD, PhD

Real-world Direct Comparison of the Effectiveness and Safety of Apixaban, Dabigatran, Rivaroxaban, and Warfarin in Medicare Beneficiaries with Fibrillation: A Subgroup Analyses by a History of Ischemic Stroke

Background/Objective: No studies have directly compared the effectiveness and safety of direct oral anticoagulants (DOACs) and warfarin among patients with and without history of ischemic stroke and transient ischemic attack (TIA) using Medicare data. This is important since patients with atrial fibrillation (AF) and previous ischemic stroke or TIA have a particularly high risk of stroke.

Methods: Using 2012-2014 Medicare Part D data, we identified patients newly diagnosed with AF in 2013-2014 who initiated apixaban (n=2358), dabigatran (n=1415), rivaroxaban (n=5139), or warfarin (n=12,352). We categorized them according to history of stroke or TIA. Primary outcomes included ischemic stroke as a measure of effectiveness and bleeding as a measure of safety. We constructed Cox proportional hazard models that included indicator variables for treatment, a history of stroke or TIA, and the interaction between treatment and clinical history, adjusted for demographics and clinical characteristics.

Results: DOACs were more effective than warfarin for stroke prevention overall; however, the superiority of dabigatran was more pronounced in patients with a history of stroke or TIA: the hazard ratio (HR) for ischemic stroke with dabigatran compared to warfarin was 0.64(95%CI 0.48-0.85) for patients with a history of stroke or TIA, and was 0.94 (95%CI 0.75-1.16) for patients with no history of stroke or TIA (interaction p-value =0.034). Although there was no difference in the risk of stroke between apixaban and dabigatran (HR 0.94; 95%CI 0.71-1.24) or between apixaban and rivaroxaban (HR 1.01; 95%CI, 0.81-1.27) for patients with no history of stroke or TIA, the risk of ischemic stroke was lower with dabigatran (HR 0.64;95%CI 0.48-0.85) and with rivaroxaban (HR 0.70; 95%CI 0.56-0.87) in patients with a history of stroke or TIA compared to apixaban (both interaction p-values<0.05). The comparative safety of DOACs and warfarin did not differ between patients with and without a history of stroke or TIA.

Conclusion: The comparative effectiveness of DOACs differs substantially between patients with and without a history of stroke or TIA; specifically, apixaban is less effective in patients with a history of stroke or TIA. Our results reinforce the need to tailor anticoagulation to patient characteristics and support the investigation of the underlying mechanisms associated with DOACs.

Presenter: Emily Bobyock
Agency: University of Pittsburgh, Graduate School of Public Health, Department of Epidemiology, Epidemiology Data Center
Internship Preceptor: Goundappa K. Balasubramani, PhD

Influenza Vaccine Effectiveness among Outpatients: Combined Results from Five Seasons of US Flu VE Network Study 2011-2016

Background/Objective: Influenza has a large impact in the United States, with an estimated 30.9 million cases and 14.5 million influenza-related medical visits throughout 2016-2017. Influenza vaccination is recommended for all individuals >6 months old, but vaccine effectiveness (VE) varies based on factors such as age, circulating influenza strains, and high-risk conditions. VE estimates can also vary based on study design and differences in influenza status determination, making VE comparisons difficult. The objective of this study was to estimate influenza VE among outpatients who presented with acute respiratory illness (ARI) during the 2011-2015 seasons and to compare estimates between different age groups and influenza subtypes.

Methods: Data were gathered from the Pittsburgh site of the CDC's US Flu VE Network study. 6,453 subjects >6 months old were enrolled from 2011-2016 as outpatients who presented with ARI and a cough ≤7 days duration. Vaccination status was defined as receipt of >1 dose of any influenza vaccine according to medical records, immunization registries, and/or self-report. Influenza status was determined by RT-PCR. A test-negative design was used. Chi-square statistics were calculated to compare baseline characteristics by vaccination status for categorical variables, and t-tests or Wilcoxon rank-sum statistics were used for continuous variables. VE estimates were calculated using odds ratios obtained from multivariable logistic regression models. The adjusted model included age, sex, race/ethnicity, time from illness onset to enrollment, self-rated health status, any high-risk condition, and calendar time. Data was analyzed using SAS 9.4 software.

Results: Overall VE was 38% (95% CI= 30.6, 45.4). VE was highest for influenza A/H1N1 pdm09 (VE= 50.5%, 95% CI= 40.3, 59.0) and lowest for influenza A/H3N2 (VE= 18.8%, 95% CI= 4.3, 31.1). Excluding influenza A/H3N2, VE was highest in the >50 age group. VE varied by season. The 2013-2014 vaccine provided the most protection against influenza (VE= 50.6%, 95% CI= 33.8, 63.1) and 2011-2012 provided the least (VE= 30.0%, 95% CI= -25.8, 61.1).

Conclusion: Results indicate influenza vaccination reduces the risk of infection with any influenza virus. Although the level of protection varies by subtype, season, and age, this study provides support to the benefit of seasonal vaccination against influenza.

Presenter: Brady Bushover
Agency: UPMC Children's Hospital of Pittsburgh, Division of Adolescent and Young Adult Medicine
Internship Preceptor: Alison Culyba, MD, PhD, MPH

Physical Environment and Violence Perpetration among Male Youth in Pittsburgh: A Spatial Analysis

Background/Objective: Emerging research suggests environmental contexts in large urban centers may shape violence risk by impacting social interactions, but little is known about associations in mid-sized cities. This study examined associations between neighborhood-level physical environmental features and youth violence perpetration among Pittsburgh youth.

Methods: We enrolled 868 male adolescents, ages 13-19 years, through youth-serving community agencies in 20 low-resource neighborhoods in Pittsburgh, PA from August 2015 to June 2017 as part of a cluster-randomized violence prevention study. Exposure to physical environmental features, including walkability, street intersection density, bike lanes, green space quality, and alcohol and tobacco outlets, was defined by the site where participants attended programming, using kernel density and inverse distance weighting methods to ascribe individual exposure estimates. Violence perpetration was measured on baseline in-person surveys by three items: physical fighting, threatening someone with a weapon, and injuring someone with a weapon in the past nine months (any/none). Multilevel logistic regression models separately examined associations between each neighborhood environmental feature and the violence perpetration measures, accounting for individual-level confounders and clustering of participants at the neighborhood level.

Results: Mean participant age was 15.5 years. Seventy-eight percent were African American, 4% Caucasian, and 6% Hispanic. In the past 9 months, 66.4% reported being in a fight. Better neighborhood walkability was associated with significantly lower odds of fighting (adjusted odds ratio (AOR) 0.84, 95%CI 0.73-0.96). Higher density of bike lanes was also inversely associated with fighting (AOR 0.90, 95%CI 0.81-1.0). The density of alcohol and tobacco outlet retailers was inversely associated with fighting (alcohol AOR 0.98, 95%CI 0.96-0.99; tobacco AOR 0.91, 95%CI 0.87-0.96). Tobacco outlet density was also inversely associated with threatening someone with a weapon (AOR 0.96, 95%CI 0.92-0.995). Green space quality was associated with slightly increased odds of injuring someone with a weapon (AOR 1.003, 95%CI 1.001-1.005). There were no significant associations between street intersection density and violence perpetration.

Conclusion: Neighborhood environmental features promoting pedestrian transit were associated with lower odds of reporting fighting, suggesting that walkable neighborhoods in mid-sized cities may serve as a protective factor in youth violence.

Presenter: Rebecca Thompson
Agency: Allegheny County Health Department, Pittsburgh Summer Institute
Internship Preceptor: Kristen Mertz, MD, MPH

Hepatitis C Prevalence in Allegheny County

Background/Objective: *Hepatitis C is the leading cause of liver transplantation in the United States. In the last few years, hepatitis C treatments have improved drastically. Cure rates have gone up and costs have gone down. In January 2018, Pennsylvania began covering treatment of hepatitis C for all Medicaid patients regardless of liver fibrosis score. In response to these changes, Allegheny County is launching Hep C Free Allegheny, an initiative to expand treatment, testing, and education for hepatitis C. To assist with program planning and evaluation, we estimated the prevalence of hepatitis C in the county using several methods.*

Methods: *Data from National Health and Nutrition Examination Survey (NHANES) in 2003-2010 indicated that 1.3% of the general US population had antibodies to hepatitis C. However, institutionalized populations, including prisoners, nursing home residents, hospitalized individuals, and homeless individuals, which have higher prevalence of Hepatitis C than the general population, are not included in the NHANES estimate. We applied the NHANES estimate to the noninstitutionalized Allegheny County population and then accounted for these institutionalized groups. We then adjusted the estimate for underrepresentation of active drug users in the NHANES data. We also did similar calculations using state-wide prevalence estimate from HepVu, a CDC-funded project at Emory University.*

Results: *The point estimate for the number of noninstitutionalized persons in Allegheny County who were hepatitis C antibody positive is 14,900 using the NHANES prevalence estimate. After adjusting for institutionalized populations, we obtained a value of 16,200 individuals, which is a 9% increase from the original NHANES estimate. After further adjusting for active injection drug users, we obtained an estimate of 17,600 antibody positive individuals, an 18% increase from the original NHANES estimate.*

Conclusion: *Estimating the number of Allegheny County residents who have Hepatitis C is an important part of developing an intervention plan. Our estimates indicate that Hepatitis C is an important public health problem in Allegheny County, and they will serve as a baseline as the HepC Free Allegheny initiative moves forward.*

Presenter: Ashley Simenson
Agency: University of Pittsburgh, Graduate School of Public Health, Department of Behavioral and Community Health Sciences
Internship Preceptor: Suzanne M. Kinsky, PhD, MPH

Resolution of Health Disparities between Lesbian and Heterosexual Women in Pittsburgh: Results from the ESTHER Study

Background/Objective: Sexual minority women have a higher risk of heart attack, stroke, and other chronic conditions than similar heterosexual women. Data presented here are from the Epidemiologic STudy of Health Risk in Women (ESTHER) study, which was first conducted between 2003 and 2006 in order to compare the health of adult lesbian and heterosexual women in Pittsburgh, PA (mean ages 47.4 years and 47.8 years, respectively). Data from these baseline surveys established a higher rate of obesity and depression in the lesbian women compared to their heterosexual counterparts. However, it was unclear if these disparities would persist over time. The aim of this study was to describe the changes in the health of the lesbian and heterosexual participants, and to examine if the lesbian women continued to more frequently report poor health outcomes than their heterosexual counterparts.

Methods: ESTHER participants were contacted between 2015 and 2016 and asked to complete a follow-up survey. For both surveys, participants completed self-report questionnaires. Clinical measurements and blood samples were collected from all participants at baseline. In total, 479 lesbian women and 400 heterosexual women completed the baseline survey (N=879). At follow-up, 483 surveys were collected with 270 from lesbian women and 213 from heterosexual women. Only participants who completed surveys at baseline and follow-up were used for analysis.

Results: At baseline, lesbian women were more likely than heterosexual women to be depressed (p=0.02) and to be classified as obese (p=0.04). After 10 years, the lesbian and heterosexual women had statistically equal rates of obesity and depression. Nearly one-third of women in both groups, 31.0% of heterosexual women and 31.1% of lesbian women, were classified as obese (p=0.24). Additionally, 14.4% of heterosexual women were diagnosed with depression compared to 16.5% of lesbian women (p=0.53). Notably, no new disparities appeared, and the rates of lesbian and heterosexual women with each condition were not different.

Conclusion: Although there were apparent health disparities between lesbian and heterosexual women in the first survey conducted between 2003 and 2006, those gaps had closed by the time of the second survey in 2015-2016. Future studies should explore if lesbian and heterosexual women continue to have similar health outcomes, and how risk factors that differ between the two groups impact future health.

Presenter: Hannah Callahan
Agency: University of Pittsburgh, Graduate School of Public Health, Department of Epidemiology
Internship Preceptor: Catherine Haggerty, PhD, MPH

The Benefits of Music and Physical Activity-Based Therapies for Early-Stage Alzheimer's Disease: A Review

Background/Objective: Alzheimer's Disease (AD) is a rapidly progressing neurodegenerative disease that affects 50 million people worldwide. It is estimated that by 2050, there will be 1 million new cases of AD annually. There is no cure for AD; however, several treatments and interventions exist to alleviate symptoms. Currently, the NIH recommends non-drug interventions to address the psychiatric symptoms that accompany AD progression such as anxiety, depression, and irritability. This work will examine the benefits of several music-based, physical activity and dance-based, and combination therapies for people with AD.

Methods: A review of literature was conducted. Keywords "alzheimers + dance", "alzheimers + music", and "alzheimers + physical activity" were used to search PubMed and PittCat+. A total of 30 papers were reviewed for inclusion. Publications were excluded if the intervention was only used on healthy adults (N=8) or if no people specifically with AD were included in the intervention (N=12).

Results: Ten publications were chosen for analysis. Two music-based interventions demonstrated increased autobiographical memory recall in environments where recognition items were presented either being sung or with background music playing. One music-based intervention showed increased mini-mental state examination scores and improved Hospital Anxiety and Depression Scale scores after a music therapy intervention. Four physical activity-based interventions reported increased or retained brain plasticity, white-matter volume, and hippocampal volume as well as increased maintenance of cognitive functions and agility following exercise interventions. Two combination dance and music therapies showed increased positive mood and energy and decreased difficult behaviors after a dance intervention. One combination intervention reported that people with AD were more likely to participate in group activities that combined instrumental music and physical activity or dance than in music- or exercise-only group activities. Overall, studies supported a beneficial association between non-drug behavioral therapies and an improvement in cognitive and psychiatric symptoms.

Conclusion: This review showed several positive outcomes in behavioral therapies for people with Alzheimer's Disease. However, research in this area is sparse and many studies have limitations. Further research is required to confirm a true relationship between music and activity-therapies and an alleviation of the symptoms of Alzheimer's Disease.

Presenter: Siting Chen
Agency: UPMC Heart and Vascular Institute
Internship Preceptor: Andrew Althouse, PhD

The Patient Volume Change of Percutaneous Coronary Intervention and Coronary Artery Bypass Graft Procedures and Associated Landmarks

Background/Objective: During the past several decades, coronary revascularization procedures, including coronary artery bypass graft (CABG) and percutaneous coronary intervention (PCI), have been among the most common major medical procedures in United States. A small number of studies have analyzed and reported the trend of patient volume change of PCI and CABG during recent periods, but few of them have compared the trend of PCI and CABG systematically based on different variables and landmark coronary revascularization clinical trials. Since technological innovation and new published information have greatly impacted the trend of patient volume of coronary revascularization and its components during recent period of years, we plan to study the pattern of the trend influenced by landmark trials at different time points.

Methods: Data from the National Inpatient Sample (NIS) database from 1998 through 2012 were used in our study. The NIS is a large, publicly available database of inpatient hospitalizations in the United States. Our sample included all patients who underwent PCI or CABG. We identified patients who underwent PCI and CABG in NIS using the International Classification of Diseases. Descriptive statistics such as number of procedures are reported per calendar year. Chi-Square test for categorical variables and student t-test for continuous variables will be used to compare demographic and clinical characteristics of patients undergoing surgery in 1998 versus 2012. The patient volume of PCI and CABG procedures in each year will be calculated using the NIS database to study temporal trends. In our study, we also plan to analyze the trend of PCI and CABG patient volume based on age, race, gender and hospital type (hospital bed size, hospital location, hospital teaching status).

Results: As of the writing of this abstract, results are pending.

Conclusion: This study may provide important insights into the application of PCI and CABG over time in the US and the potential impact of new treatment guidelines and seminal clinical trial results on these trends.

Presenter: Erica Short
Agency: Allegheny County Health Department, Pittsburgh Summer Institute
Internship Preceptor: Kristen Mertz, MD, MPH and Lauren Brungo, MPH, RN

Animal Bite Reports: Prevention of Rabies in Allegheny County, 2017

Background/Objective: Each year in the United States there are approximately 60-70 dogs, over 250 cats, and thousands of wild animals that test positive for rabies. However, Pennsylvania has not had a human rabies case since 1984. To prevent human rabies, the Allegheny County Health Department (ACHD) investigates all reported animal bites, and staff recommend rabies vaccination (HRIG/HDCV) to victims when necessary. The aim of this project was to produce a surveillance report based on 2017 animal bite and rabies test data.

Methods: Health care providers and police departments are required by law to report animal bites. Data from reports sent to ACHD in 2017 and follow up information were entered into an Oracle database. Data were imported into Microsoft Excel and deduplicated, and some values were re-categorized or reclassified if the information was incorrectly/inconsistently reported. Analysis was completed using SAS, and figures were created in Excel. Cost information for HRIG/HDCV was obtained from the CDC website.

Results: There were a total of 1,883 mammal bites reported to ACHD in 2017, with dogs (71%) and cats (24%) involved in the majority of bites. Victims ranged from <1 to 100 years of age. In most 5-year age groups, females had more reported bites than males. Bite rate was highest among those aged 25-34 and 5-14 years. Only 4 bite incidents involved an animal that tested positive for rabies; 3 involved stray cats and 1 involved a bat. Antibiotics were prescribed for 63% of reported bites, and a tetanus shot was given for 31%. A total of 104 (6%) people completed the rabies vaccine series (HRIG/HDCV), including the 4 people who were exposed to rabies positive animals. There were 13 people who completed HRIG/HDCV unnecessarily, ultimately costing between $39,000-$91,000.

Conclusion: The bite reporting system and modern medicine have continued to prevent human rabies in Allegheny County. While no pets contracted rabies, it is still critical to communicate the importance of pet vaccination since they serve as intermediary barriers between wild animals and humans. Analysis of bite treatments indicated physicians may need to be reminded about animal bite post-exposure prophylaxis protocols to avoid unnecessary prescription of antibiotics, administration of tetanus shots, and vaccination with the expensive HRIG/HDCV series.

Presenter: Melissa Postoll
Agency: University of Pittsburgh School of Medicine, Department of Physical Medicine and Rehabilitation
Internship Preceptor: Amy Wagner, MD

A Longitudinal Characterization of Post-Traumatic Headache and Potential Treatment Target

Background/Objective: Headaches are a common adverse outcome after a traumatic brain injury (TBI) that can persist through the first year post-injury. Inflammation has been implicated in the pathophysiology of migraines and persists chronically after a TBI. Through the process of trans-signaling, the binding of interleukin(IL)-6 to its soluble receptor can lead to widespread inflammation. This process is restricted by the presence of soluble g-protein130 (sgp130). Previous studies have not examined the relationships between the IL-6 family soluble receptors and headaches in TBI patients. The aim of this study was to identify headache phenotypes and how these phenotypes are associated with other TBI outcomes. We also hypothesized that the relative levels of IL-6 family soluble receptors underlies post-traumatic headache pathophysiology.

Methods: We used monthly questionnaires to categorize headaches and to create temporal headache trajectory profiles in a prospective cohort of adults with TBI (n=79). We examined the relationship between trajectory profiles and quarterly ratios of sgp130 levels to levels of the sIL-6R (sgp130:sIL6-R), and other secondary outcomes including stress hormone, quality of life, anxiety, depression, fatigue, and disability.

Results: There were three distinct headache profiles: low, resolve, and chronic trajectory groups. We compared ratios in the symptomatic trajectory groups, and determined a cut-point for an individual to be considered at risk. Those in the resolve trajectory group had higher sgp130:sIL-6R ratios compared to those in the chronic trajectory group across all time points (p<0.05 for all comparisons). In the adjusted model, a one standard deviation increase in quarter 1 sgp130:sIL-6R protects against chronic headaches by 75.9% (p=0.006). Those in the chronic trajectory group experienced elevated levels of stress hormone, lower quality of life, and higher anxiety, depression, fatigue and disability.

Conclusion: Those in the chronic trajectory group had less inhibition of the widespread inflammation caused by IL-6 binding to sIL-6R and worse co-occurring impairments. Future studies should test the effect of a sgp130:sIL-6R targeted immunotherapy to mitigate the detrimental and long-lasting effects of PTH after TBI.

Presenter: Sarah Cohen
Agency: University of Pittsburgh Graduate School of Public Health, Department of Epidemiology
Internship Preceptor: Thomas J. Songer, PhD

An Analysis of the Effect of a Behavioral Intervention on the Quality of Life of Adolescents with Type 1 Diabetes

Background/Objective: The main study aimed to test how the FLEX behavioral intervention impacts adolescents with type 1 diabetes, assessing outcomes such as glycemic control and metabolic and psychosocial factors. The objective of this analysis was to evaluate whether this behavioral intervention improved the quality of life of the participants.

Methods: 250 adolescents aged 13-16 with type 1 diabetes were randomized into two groups, intervention and control. Those placed in the intervention group received training in problem solving in addition to normal guidance related to diabetes treatment, while the control group only received the normal treatment. Participants self-reported on various measurements of quality of life (HUI-2 and HUI-3) at baseline, six months, and eighteen months (end of the intervention). Independent two sample t-tests were used to compare the mean differences in each quality of life score at each timepoint and the mean differences in change in each factor. A mixed model was used to measure the mean differences in scores, controlling for clinical site and intervention status.

Results: The study population consisted of a total of 258 participants: 130 assigned to the FLEX intervention and 128 assigned to the control group. Participants in the intervention group reported a greater improvement in overall health scores from baseline to eighteen months as compared to the control group. The intervention group also reported better scores on emotion at six and eighteen months. The mixed model analysis revealed a difference in cognition and emotion based on clinical site, and a difference in emotion based on intervention status.

Conclusion: This analysis showed promising results of improved emotion and overall health in adolescents that took part in the behavioral intervention

Presenter: Stephanie Corey
Agency: NIH-NCI, Cancer Epidemiology in Special Populations Fellowship
Internship Preceptor: Amr Soliman, PhD

Evaluating Human Papillomavirus, Cervical, and Anal Cancer Prevention Measures in Lesbian, Gay, Bisexual, Transgender, and Queer/Questioning Individuals in Allegheny County, Pennsylvania

Background/Objective: Lesbian, Gay, Bisexual, Transgender, and Queer/Questioning (LGBTQ) individuals are at unique risk for contracting Human Papillomavirus (HPV) and developing cervical and anal cancer compared to heterosexual and cisgender counterparts. This risk is attributed to riskier sexual practices, lack of LGBTQ-specific cancer education, and delay in routine cancer screening. Limited research has evaluated if these health disparities exist in Allegheny County. The objective of this study was to determine if differences exist in HPV preventive measures among LGBTQ and non-LGBTQ individuals and to assess needs for future interventions targeting sexual and gender minorities.

Methods: A 2015-2016 Health Survey from the Allegheny County Health Department containing 9,000 individuals was analyzed to compare HPV prevention measures among LGBTQ (n=394) and non-LGBTQ (n=8472). Sexual orientation was categorized as heterosexual, gay or lesbian, bisexual, or other. Gender identity was categorized as cisgender female, cisgender male, and transgender. Preventive measures were HPV vaccine, number of HPV vaccine, ever having a pap smear, HPV test, or rectal exam. The frequencies of pap smears, HPV test, and rectal exams were assessed. Multiple linear regression models were used to assess differences in outcomes while adjusting for age, race, ethnicity, education, marital status, income, and history of hysterectomy.

Results: Transgender individuals were 89.1% less likely to have received the HPV vaccine compared to cisgender women [AOR: 0.109, 95% CI (0.013, 0.893)]. Additionally, transgender individuals were 85.7% less likely to have had a pap smear compared to cisgender women [AOR: 0.143 95% CI (0.035, 0.585)]. The 'other' women (n=24) were 74.3% less likely to have received a pap smear and 74% less likely to have received an HPV test compared to heterosexual women [AOR: 0.267 95% CI (0.088, 0.808)], [AOR: 0.26 95% CI (0.080, 0.838)]. Bisexual women were 48.2% less likely to have received an HPV test within the recommended guidelines compared to heterosexual women [AOR: 0.518 95% CI (0.297, 0.903)]. No significant differences were found when analyzing sexual minority men.

Conclusion: Differences in cancer prevention measures between LGBTQ and non-LGBTQ individuals indicate the need to identify individual and health care system barriers impacting the LGBTQ community when accessing HPV prevention interventions in Allegheny County.

Presenter: Chikako Nakama
Agency: University of Pittsburgh, Graduate School of Public Health, Department of Epidemiology
Internship Preceptor: Akira Sekikawa, MD, MPH, PhD

Relationship between Bone Mineral Density and Coronary Artery Calcification

Background/Objective: A significant association of osteoporosis with coronary heart disease (CHD) has been reported in some observational studies, especially in the elderly. However, the data appear to be scare in middle-aged population. Bone mineral density (BMD) is a well-established biomarker of osteoporosis. Likewise, coronary artery calcification (CAC) is a well-established biomarker of coronary atherosclerosis, the major underlying cause of CHD. Both BMD and CAC capture early stages of disease processes. The aims of the study were to (1) conduct a systematic review on the association of osteoporosis with CHD to examine whether there are any studies among middle-aged individuals; (2) determine protocol to read BMD using existing CT images from the ERA JUMP study of 1269 healthy men aged 40-49 years where CAC data are available; and (3) analyze the association of BMD with CAC in ERA JUMP.

Methods: Systematic review was performed with PubMed database using the following terms: osteoporosis, BMD, atherosclerosis, coronary heart disease, and CAC. Dr. Bon at Department of Medicine (expert in systems biology including the association of BMD with emphysema), Dr. Leader at Department of Radiology (expert in radio-graphical reading of BMD), Dr. Sekikawa, Department of Epidemiology (PI of ERA JUMP) and I had several meetings to determine the protocol.

Results: The systematic review found 43 articles on the topic, but no previous study has examined the association of BMD with CAC in middle-aged men. In-house software at the department of radiology was used to read BMD. A semi-circular region-of-interest was manually drawn in the central region of the T12 to L4 vertebrae to measure Hounsfield Unit values. The protocol included a test for reproducibility. As of September 2018, BMD data of about 700 participants were read.

Conclusion: The study will be the first to analyze the association of BMD with CAC in middle-aged men.

Presenter: Olivia Messina
Agency: Allegheny County Health Department, Pittsburgh Summer Institute
Internship Preceptor: Megan Tulikangas, MPP

Understanding the Tobacco Point-of-Sale Environment in Allegheny County:
A Mixed Methods Approach

Background/Objective: The tobacco retail environment, known as the point of sale (POS), is the primary channel tobacco companies use to advertise their products. Exposure to tobacco in the retail environment is associated with encouraging smoking initiation and decreases cessation, particularly for youth. This project intended to provide a youth-focused understanding of tobacco POS marketing in Allegheny County using the Standardized Tobacco Assessment for Retail Settings (STARS) surveillance tool.

Methods: This project consisted of three phases: 1) youth engagement, 2) STARS survey data collection, and 3) analysis preparation. During the youth engagement phase, a group of high school students collected qualitative and quantitative data to understand tobacco POS advertising in their communities. Quantitative data included survey data for 35 retailers in Pittsburgh collected using printed versions of the STARS survey; qualitative data included tobacco-related multimedia and interviews with stakeholders. During the survey data collection phase, Pitt Public Health students and faculty were trained to complete STARS surveys at tobacco retailers across Allegheny County using a customized mobile application. During the analysis preparation phase, I reviewed ArcGIS and SAS methodologies and met with quantitative experts to determine ideal next steps for analyzing STARS survey data.

Results: Based on the data collected, the youth identified products and marketing tactics that may appeal to children and suggested that education and community outreach would help reduce youth tobacco exposure. Pitt Public Health students and faculty collected survey data for a total of 924 stores, accounting for 75.6% of all retailers in Allegheny County. After reviewing various research methodologies, I determined that hot spot analyses should be conducted on ArcGIS Pro to understand and visualize the STARS survey data. Regression analyses could also be conducted to determine associations between retailer characteristics and demographic variables.

Conclusions: This project helped local youth understand the effects of tobacco POS advertising and prepared them to be ambassadors for youth tobacco prevention in their communities. STARS survey data will provide the Health Department with a baseline understanding of tobacco POS advertising in Allegheny County that can be used to educate communities and inform future policy action. My research of relevant methodologies will inform future analyses to further understand STARS survey data.

Presenter: Hanna Edvardsson
Agency: Allegheny County Health Department, Pittsburgh Summer Institute
Internship Preceptor: Lisa Matt, MS, RD, LDN, CLC

Women, Infants, and Children (WIC) Time Flow Study:
Improving Maternal and Child Nutrition

Background/Objective: WIC is a health and supplemental nutrition program for women, infants and children. It has impacted infant mortality, consumption of fruits, vegetables, other nutritious foods, and vaccination rates. Allegheny County is home to nine WIC clinics. Despite the differences in size and location of clinics, all appointments are allotted 15 or 30 minutes depending on appointment type or family size. However, appointments often run over the time scheduled which can result in frustration and schedule disruption for both employees and clients. The aim of my project was to provide evidence based recommendations to improve clinic flow.

Methods: An observational study was conducted with two observers at three preselected clinics (Downtown Pittsburgh, McKeesport, McKees Rocks). Observation was over a six week period to capture all hours and days of normal operation. A study form was modified to keep track of individual client appointments and the individual tasks that make up an appointment (Data Entry, Lab, Participant at Desk, and File Waiting). At the end of data collection, data sheets were digitalized to Microsoft Access and analyzed using Excel. Analyses included means and frequencies of appointment times, types, and task times.

Results: A total of 516 client appointments were observed. Downtown had the longest appointments regardless of type compared to other clinics. They also had the longest average wait time (4:13), second longest average File Waiting time (8:42), and the highest percentage (60%) of appointments with File Waiting. The Downtown office also had the largest (82.6%) Fill Rate (clients seen over clients scheduled) while McKees Rocks had the lowest (56.8%).

Conclusion: For clinic flow modification suggestions, I focused on addressing the negative uses of time, those being file waiting and wait time. Changing file distribution and increasing visibility to sign in area and File Waiting bins are realistic and impactful changes that can be made to the flow of the Downtown clinic. Impacting the flow of WIC clinics has the ability to impact health issues for women and children by increasing the number of clients served by WIC, increasing the quality of information, and making the time at the clinic feel like a worthwhile use of time to increase client retention.

Presenter: Emily Fitzpatrick
Agency: Life for a Child (LFAC) Program
Internship Preceptor: Trevor J Orchard, MBBCh, MMedSci, FACE

Improving Type 1 Diabetes Management: Considerations for a Peer-Support Network in Kigali, Rwanda

Background/Objective: As non-communicable diseases rise in low-middle income countries (LMIC), the problem of access to care and social support become significant global health concerns. In Rwanda, the collaborative work between the International Diabetes Federation's Life for a Child (LFAC) program and the Rwanda Diabetes Association (RDA) improves access to treatment and insulin for type 1 diabetic youth (T1DY). Youth (age<26) in Rwanda however still face barriers in personal diabetes management. T1DY need reliable methods for communicating problems that are prohibiting their continued treatment. In addition, T1DY need consistent social and emotional support from people who understand living with diabetes. Drawing on LFAC/RDA data and stakeholder insights, this project explores barriers youth face in diabetes management. Peer-support networks are proposed as one possible solution T1DY in Rwanda could use to meet their social, emotional and clinical needs.

Methods: In June 2018, data collected between June 2009-February 2018 from 1,541 T1DY were analyzed to generate an updated LFAC/RDA registry. Youth were categorized as RDA/Kigali as their primary clinic (n=266) or out of area (OOA) (n=1264), and 11 had no data. Stakeholder interviews with the RDA and neighboring Tanzania Diabetes Youth Association (TDYA) continue and additional data will be examined from previous LFAC/RDA surveys.

Results: As of February 2018, 167 (10.84%) use RDA/Kigali as their primary clinic and are age eligible. Among them, 24 (14.37%) were lost to follow up (LTF) and crude mortality (CM) is 4.20% (6/143; 95%CI 1.94-8.85%). Of the 829 (53.80%) age eligible OOA youth, 76 (9.12%) are LTF and CM is 9.03% (68/753; 95%CI 7.19-11.29%). The LFAC registry total of 180 includes 43 (5.19%) OOA youth who use the RDA/Kigali as their primary clinic. Stakeholder interviews suggest that barriers for diabetes management include stigma, job insecurity, transportation costs and access to medicine.

Conclusion: This preliminary analysis describes the approximate state of LTF and CM among T1DY with further evaluation pending. Previous research in Rwanda express concerns in underreporting diabetes complications and deaths which could make these measures even greater. Peer-support networks for T1DY in Rwanda could be crucial for improving follow up, continuing education on diabetes management, and providing social and emotional support.

Presenter: Sarah Martin
Agency: University of Pittsburgh, Graduate School of Public Health, Department of Epidemiology, Center for Aging and Population Health
Internship Preceptor: Deborah L. Cusick

Interactions with a Dedicated Cohort: Long-term Outcomes of Knee Osteoarthritis in the Osteoarthritis Initiative Cohort

Background/Objective: Knee osteoarthritis (OA) is a debilitating disease that affects 10% of men and 13% of women aged 60 and older diminishing their mobility and overall quality of life. The Osteoarthritis Initiative (OAI) is a longitudinal study that has followed a cohort throughout the stages of osteoarthritis for 13 years. The objective for the final four years of the OAI is to examine the long term outcomes after the clinically significant disease has been established. My goal was to gain experience and understanding in the organization involved working with this multicenter prospective cohort study.

Methods: Everyone that remained an active participant from the OAI cohort was selected for the study and divided into clinic visits and telephone interviews based on their participation in the previous years in the study. Participants were sent a letter, and then called and asked to participate. Those who refused a clinic visit were asked to participate by telephone interview. The telephone interview involved a questionnaire to assess joint pain, treatments used for OA, and overall health. If the participant was over age 75, the Telephone Interview for Cognitive Status (TICS) was included. Measurements for the clinic visit included the questionnaire, TICS if over 75, height, weight, blood pressure, pulse, grip strength, chair stands, balance tests, and the 20 meter walk test.

Results: Interviews began on June 25th, 2018. The average time for completing the telephone interview is 45 minutes. The average time for completing the clinic visit is 1 hour and 15 minutes. I completed a 56 phone interviews and 16 clinic visits. 3 participants were found to be deceased at this time in the study, and 16 refused to participate or were unable to be reached.

Conclusions: I learned that it takes a lot of time and patience trying to contact people in order to obtain the necessary data. However, I developed a deeper appreciation for working in a cohort study with participants who were happy to contribute in order to find further solutions for this debilitating disease.

Presenter: Brian Man
Agency: U.S. Food and Drug Administration
Internship Preceptor: Dongyi (Tony) Du, MD, PhD

The Safety and Probable Benefit of Enterra for Treatment of Gastroparesis in the Pediatric Population: An Updated Systematic Literature Review

Background/Objective: Enterra gastric electrical stimulator (GES) is an implantable device that stimulates smooth muscles of the stomach through mild electrical pulses in patients with chronic, intractable nausea and vomiting due to gastroparesis (GP). **Objective:** Provide a literature update on adverse events and probable benefits of Enterra for treatment of GP with GES in the pediatric population (<22 y/o).
Methods: The literature search was limited to studies with human subjects and published in English between 5/1/2017 and 4/30/2018 in PubMed and Embase, yielding 68 total citations. After excluding 4 duplicates and 11 articles published outside the date range, 53 articles were reviewed. Furthermore, 50 articles were excluded for the following reasons: conference abstracts; unrelated to safety and benefit of Enterra; non-systematic review; non-Enterra treatment; and pediatric patients not included. These exclusions left 3 articles for full epidemiological review.
Results: In the Arthur et al. paper (n=33), pre- and post-operative symptom score comparisons were made. In the 'GES only' group, mean scores improved in each of the 14 symptoms. Wakamatsu et al. (n=78), found that the percentage of patient reported symptom occurrences decreased for nausea (83% to 27%), vomiting (80% to 36%), and abdominal discomfort (37% to 20%). In the Meleine et al. study (n=21), patients implanted with GES who received the ON stimulation reported reduction in vomiting episodes (3.5 ± 0.4 to 2.3 ± 0.5). The Arthur et al. study reported the following 30-day complications: hematoma (n=1); pain at stimulator site (n=2); wound dehiscence (n=1); and post-operative diabetic ketoacidosis (n=1). In the Wakamatsu et al. study, reoperation was required for the following reasons: device replacement due to abdominal discomfort (n=13); and conversion to RYGB (n=3). Meleine and colleagues did not report any adverse events.
Conclusion: All three studies suggest benefits of Enterra regarding improved upper GI symptoms. Patients with Enterra may experience device-related adverse events consistent with previous studies and labeling. The findings of this systematic literature review should be interpreted with key limitations, e.g. inadequate number and quality of papers with adequate sample size of pediatric patients. These factors limit the ability to make definitive conclusions about the safety and probable benefits of Enterra for treatment of GP in the pediatric population.

Presenter: Jonathan Haposan
Agency: University of Pittsburgh, Graduate School of Public Health, Department of Epidemiology, Epidemiology Data Center
Internship Preceptor: Maria Mori Brooks, PhD

Short-term Predictors of Major Cardiovascular Events and Deaths in the Bypass Angioplasty Revascularization Investigation 2 Diabetes (BARI 2D) Trial

Background/Objective: My internship at the Epidemiology Data Center (EDC) was designed to demonstrate the full process of a clinical trial: design, implementation and analysis. This abstract elucidates the result of an analysis from the BARI 2D trial. The BARI 2D trial evaluated revascularization for patients with diabetes and stable heart disease. Although patients with revascularization showed a favorable long-term outcome of major cardiovascular events (MCVEs: death, myocardial infarction and stroke) over 5 years, patients who were assigned to early revascularization had a higher short-term rate of MCVE compared to those with medical therapy alone. Therefore, we sought to identify the predictors of MCVE during the critical 3-month period following revascularization.
Methods: We compared baseline characteristics and outcomes among those who underwent CABG and those who underwent percutaneous coronary intervention (PCI). We selected candidate independent variables associated with MCVE and excluded variables that contained more than 5% missing values. A multivariate logistic regression model was created using stepwise methods to identify factors associated with MCVEs. Revascularization type and glycemic treatment were forced into the model.
Results: Of the 2368 patients who had type 2 diabetes and stable ischemic heart disease in BARI 2D trial, 1178 patients underwent early revascularization (either PCI or CABG). 57 (4.84%) patients had a MCVEs by 3 months. Longer duration of diabetes, lower number of diabetes drugs, multivessel coronary disease, and normal left ventricular ejection fraction were associated with 3-month MCVE. Other predictors that marginally associated were CABG revascularization, insulin provision glycemic treatment, and history of myocardial infarction.
Conclusions: A number of variables were associated with the occurrence of MCVE within 3 months of a revascularization procedure in patients with diabetes and stable ischemic heart disease. It is important to consider factors associated with short-term events when deciding to perform revascularization.

Presenter: Alyson Harding
Agency: Allegheny County Health Department, Pittsburgh Summer Institute
Internship Preceptor: Lauren Orkis, DrPH, MPH

Assessing Community Opioid Awareness using the Community Assessment for Public Health Emergency Response (CASPER) methodology in South Pittsburgh Neighborhoods

Background/Objective: Overdose rates in Allegheny County and throughout the United States have increased in recent years. While the average number of overdose deaths in Allegheny County in 2016 was 52.9 per 100,000, areas of the county have death rates as high as 80 per 100,000. This summer, I interned with the Allegheny County Health Department (ACHD), assisting in the coordination of a door-to-door community survey about opioid overdose awareness. Goals of this project included: 1) assessing community knowledge and sharing resources, and 2) practicing the Community Assessment for Public Health Emergency Response (CASPER) methodology and deploying surge capacity volunteers.

Methods: The CASPER methodology was developed by the Center for Disease Control and Prevention as a rapid needs assessment tool for post disaster situations. Using a two-stage cluster sampling design, we selected thirty random census blocks from the South Pittsburgh neighborhoods of Southside, Mt. Washington, and Mt. Oliver. We then selected seven random housing units per census block to survey, and developed a replacement scheme. We recruited and trained volunteers, who conducted door-to-door surveys in June 2018. The survey was developed in conjunction with the Allegheny County Department of Human Services, the City of Pittsburgh, and CONNECT Communities. Depending on the surveyor's preference, data were collected via paper survey or through an electronic app called Survey123. We conducted descriptive data analyses in Microsoft Excel.

Results: Over four days, 51 volunteers approached 705 housing units to complete 100 surveys, and distributed 20 naloxone kits. The project engaged members of the Allegheny County Medical Reserve Corps, students and faculty from the University of Pittsburgh, as well as staff members from the ACHD. Of surveyed participants, 42% said that opioid overdose was a major problem in their area, 79% had heard of Narcan (Naloxone), and 97% reported they would call 911 if they saw someone overdosing. Nearly half of participants surveyed knew someone personally who has overdosed.

Conclusion: The opioid crisis is a complicated public health issue that will take the involvement and cooperation of community groups, law enforcement agencies, medical professionals, and public health practitioners to combat. This door-to-door survey allowed the ACHD to begin conversations about opioid overdose awareness with community members.

Presenter: Andrew Luskin
Agency: University of Pittsburgh School of Medicine Department of Psychiatry, Western Psychiatric Institute and Clinic
Internship Preceptor: Nadine Melhem, PhD

Neurocognitive Measures in Psychiatric Inpatients during Acute Illness

Background/Objective: Suicide is the tenth leading cause of death in the United States. Thus, identifying objective measures that predict suicidal behaviors is important. While examining decision-making, executive function, and learning and memory, previous research has found impairment in populations at risk for suicidal behavior. However, decision-making in response to stress in a population at risk for suicidal behavior has not been explored. In this study, we examine these neurocognitive measures in a sample of young adult psychiatric inpatients at the time of psychiatric hospitalization.

Methods: The sample consists of psychiatric inpatients (n=13) and healthy controls (n=8). Participants completed the Cups Gambling Task (CGT) under neutral and stressful conditions, wherein the stressor was high frequency white noise played randomly in 12 of 45 trials. Participants also completed four tasks from the CANTAB suite: Motor Screening (MOT), One Touch Stockings of Cambridge (OTS), Stop Signal Task (SST), and Spatial Working Memory task (SWM). T-tests were performed to examine differences on all outcome variables, and mixed models were performed on CGT variables. Effect size (ES) was calculated using Cohen's d for all comparisons.

Results: Inpatients chose fewer correct options on CGT for both the neutral (d=0.609, t(19)=1.17) and stressful (d=0.614, t(19)=1.37) conditions compared to controls. There were no differences in the total reward in the neutral condition (d=0.041, t(19)=0.091), however inpatients earned more in the stressful condition (d=0.458, t(19)=1.02) compared to controls. Mixed models showed that this increase was not significant with low ES (d=0.164). However, reaction time decreased between the neutral and stressful conditions (d=0.988 β=-391.84). Inpatient and control groups showed no difference in MOT 'mean error' (d=0.008, t(19)=0.986). Inpatients had greater 'mean choices to correct' (d=1.39, t(19)=3.71) compared to controls. There were no differences in SST 'Delay 50%' between patients and controls (d=0.199, t(19)=0.368). On SWM, inpatients had a greater 'strategy score' (d=1.32, t(19)=2.95) compared to controls.

Conclusion: Psychiatric inpatients at the time of acute illness showed poorer performance on behavioral tasks indicating decision making, spatial planning, and spatial working memory. Both inpatients and controls showed more impulsivity in decision-making under stressful conditions. Future studies are needed to examine these behavioral measures in a larger sample.

Presenter: Xinying Liu

Agency: University of Pittsburgh, Graduate School of Public Health, Public Health Dynamics Laboratory, Project TYCHO

Internship Preceptor: Wilbert van Panhuis, MD, PhD

Examining the Spatial Characteristics of Measles Immunization from Vaccination in California, 2013–2017

Background/Objective: Measles, mumps and rubella (MMR) vaccination is routinely performed in more than 120 countries and has resulted in a distinct decrease in measles incidence. However, recent increases in childhood vaccination exemption rates are a source of concern within the public health community, as numerous parents are choosing to exempt their children from school-entry vaccination requirements for nonmedical reasons. We analyzed how MMR immunization, measured by the percent vaccinated students entering kindergarten across space and over time in California.

Methods: Using school-entry data from the California State Department of Health, we examined the percentage of children vaccinated against measles, mumps, and rubella entering kindergarten in California from 2013 to 2017. We conduct local spatial autocorrelation and grouping analysis to determine whether MMR immunization was geographically clustered during the study period.

Results: The percent of MMR vaccinated increased from 91.8% of all kindergarteners in the school year 2013-2014 to 96.4% in the school year 2016-2017. Communities with high MMR vaccination rates were relatively clustered. The grouping analysis also showed that roughly two-thirds of all schools had a high proportion of MMR vaccinated throughout the study period.

Conclusion: We found that the overall percent MMR vaccinated students increased steadily. Regions with high vaccination coverage were relatively clustered and the region with low proportion was isolated. Thus, our results suggest that efforts aimed at increasing future percent MMR vaccinated may be more effective if they set targeted goals based on regions' spatiotemporal characteristics on vaccination.

Presenter: Earl Hord

Agency: Allegheny County Department of Human Services

Internship Preceptor: Lisa Kessler, MPH

Analyzing Homelessness Programs in Allegheny County

Background/Objective: One of the functions of the Allegheny County Department of Human Services (DHS) is to provide housing intervention for the thousands of homeless individuals that it serves in the county. DHS aims to increase housing stability by supporting different programs that meet the varied needs of individuals experiencing homelessness. However, many individuals fall through the cracks and have more difficulty than others in navigating social support services. The Office of Data Analysis, Research and Evaluation (DARE) supports the county-provided services by improving their quality and delivery. The role of my internship with DARE was to support the homelessness and housing team by creating various reports that addressed disparities within homelessness support services.

Methods: I used Toad for Oracle to pull client cohorts from the DHS database that were enrolled in county funded or associated housing programs. I analyzed trends and provided descriptive statistics for these homeless cohorts using SAS 9.4 to investigate questions that the homelessness team had regarding the services that the county provides. I also created visualizations to describe trends in homelessness in Allegheny County to lay audiences at DHS.

Results: During my time at DHS, I was able to analyze multiple cohorts and investigate problems that exist in the delivery of housing support services. I created reports to highlight differences in how people experience housing support services based on race, gender, disability, health, and other factors. I provided this information to the homelessness team to improve housing support services in Allegheny County and address where inequities exist.

Conclusion: This internship provided me with an invaluable experience that allowed me to combine my interest in data analysis with my passion for health equity. I was able to broaden my skills in SAS 9.4, and was introduced to other data analysis tools that have better equipped me for future endeavors. I developed a better understanding of the complexities of social support services and the challenges in attempting to improve them.

Presenter: Jinghui Ju
Agency: Allegheny County Health Department
Internship Preceptor: Anthony J. Sadar, BS, MS, MEd

**Hydrogen Sulfide Exceedances at Liberty Borough Monitoring Station
in Allegheny County**

Background/Objective: Hydrogen sulfide (H2S) is a flammable, colorless and malodorous gas produced by either incomplete burning of sulfur-containing fuels or generated naturally through rotting of plant life. People usually can smell H2S at low concentrations in air, ranging from 0.0005 to 0.3 parts per million (ppm). At high concentrations, a person may lose their ability to smell H2S, which may increase their exposure risk to higher H2S levels causing serious health effects. The Liberty Borough monitoring station in Allegheny County has been recording many values in excess of the odor threshold for H2S. This study examined the frequency and intensity of H2S exceedances from 2013 to 2017, and related the exceedances to various factors, such as weather conditions and relationship with other pollutants

Methods: All air pollutant data and weather conditions data were obtained from the Liberty Borough monitoring station and National Weather Service, and were recorded by hour. Data were organized and analyzed by using a combination of Excel, Stata 9.4 SE, and Google Earth. Linear regression and two sample t-tests were used for exploration of association and comparison, respectively.

Results: There were no seasonal trends but there was a daily trend in the occurrence of H2S exceedances. Most of the highest H2S readings appeared at night, from 8 pm to 10 am. Other air pollutants, SO2, benzene, and PM2.5 appeared to increase with H2S based on the graphs and linear regression models run in Stata. Pollution roses showed that most of the highest hourly H2S, SO2, benzene, and PM2.5 readings typically came from S, SSW, and SW (180 – 220 degrees). Besides, two sample t-tests showed that the average H2S concentration when a temperature inversion existed was statistically significantly higher than the average H2S concentration when a temperature inversion did not exist.

Conclusion: Wind direction and temperature inversions are strongly related to frequency and intensity of air pollutant exceedances at the Liberty Borough monitors. USS Clairton coke works is likely a major contributor H2S, SO2, benzene, and PM2.5 emissions since the plant is in the direction from which high pollutant concentrations travel.

Presenter: Keely Latham
Agency: UPMC Mercy
Internship Preceptor: Emily Magee, MPH

Changes in Contact Precautions: Effect on MRSA Conversion Rates

Background/Objective: Methicillin-resistant *Staphylococcus aureus* (MRSA) is bacteria that is resistant to numerous commonly prescribed antibiotics. Contact Precautions (CPs) are implemented within healthcare facilities to lessen the spread of MRSA. Recently, institutions have begun altering CPs in favor of horizontal interventions such as hand hygiene, bare-below-the-elbows for inpatient care, and daily chlorhexidine bathing of inpatients. The objective of this project was to determine changes in MRSA conversion rates before and after CPs were altered at UPMC Mercy, a 495-bed academic facility, in February of 2018. The review included data from 2015 to August of 2018. A secondary objective will determine incidence of bacteremia in those patients that converted.

Methods: UPMC Mercy patient data were collected through TheraDoc. Electronic medical records were accessed and used to determine converted patients, which were considered to be those who had an initial negative MRSA screen and then a later positive screen within the span of a year. This process was completed for 2015, 2016, 2017, and is still being performed for 2018. For 2015 to 2017, the number of patients screened for MRSA ranged from 2,106 to 2,218 and the number of patients who screened positive ranged from 96 to 113. Conversion rates will be determined for each year and compared. As a secondary analysis, rates of bacteremia in converters will be calculated and compared to rates in non-converter patients.

Results: Although the project is still in process, we expect to find little to no difference in MRSA rates before and after the changes in CPs. Recent similar studies have found that foregoing traditional CPs for other methods of infection control have not shown any increase in spread of MRSA infection.

Conclusion: My involvement in this project allowed me to contribute to the surveillance of MRSA within the hospital. I have gained skills related to literature review and have a better understanding of the process of extracting pertinent information from electronic medical records and applications used for hospital infection control. Results obtained from this study will be useful for healthcare systems looking to alter traditional CPs in order to avoid unfavorable consequences related to patient care, safety, and satisfaction.

Presenter: Allison Landowski
Agency: Allegheny County Health Department, Pittsburgh Summer Institute
Internship Preceptor: Lisa Matt, MS, RD, LDN, CLC

A Clinic Flow Study at the Allegheny County Health Department Women, Infants, and Children (WIC) Clinics

Background/Objective: Pennsylvania WIC is a health and supplemental nutrition program that serves low-income and high-risk women, infants and children. It was established to reduce food insecurity and improve birth outcomes and maternal health. WIC serves many clients in Allegheny County, and refining the efficiency and flow of the WIC offices may benefit the clients' and staffs' time at the clinics. The objective of this project was to create an evidence-based recommendation for 3 of 9 WIC offices in Allegheny County by implementing a clinic time-flow evaluation.

Methods: WIC clinics in Downtown Pittsburgh, McKeesport, and McKees Rocks were observed for 6 days each using a modified data collection form created by WIC staff to keep track of each client as they went through their appointment. Appointment and task types were defined and recorded for each client, and qualitative notes regarding the flow of the clinic were taken. File waiting time, or the time that a file was not actively being worked with, was also recorded. Data analyses were run in Microsoft Excel to compare average times of appointment types, wait times for clients, and task times for employees. Clinic flow maps were created to convey the efficiency of each clinic.

Results: Downtown Pittsburgh had the longest overall average appointment time (39:13), longest waiting time from client sign-in to first action on their folder (04:31) and the highest frequency of clients' files to undergo file waiting (60.0%). McKees Rocks had the smallest average number of clients (17.3 clients/day) and the highest frequency of missed appointments (45.4%). McKeesport had the lowest average wait time from sign-in (00:42) but the highest average time that a folder spent in file waiting (09:15). Based on the flow maps, McKeesport was the most efficient clinic overall.

Conclusion: Suggestions to improve the flow at each clinic include adjusting the line of sight to the sign-in sheet and the folders in file waiting and having staff hand off the folders instead of using a universal file waiting section for inactive folders. These evidence-based recommendations may improve the experience for WIC clients in the offices and maximize the efficiency of each clinic after implementation of the suggestions.

Presenter: Arshad Khalid
Agency: University of Pittsburgh School of Medicine, Department of Pediatrics, General Academic Pediatrics
Internship Preceptor: Kumaravel Rajakumar, MD, MS

The Utility of Pulsatility and Resistivity Indices in Evaluating Endothelial Dysfunction During Brachial Flow-mediated Dilation

Background/Objective: Cardiovascular disease is a leading cause of death worldwide. Rising trends in obesity and diabetes have highlighted the need to identify cardiometabolic risk factors earlier. Endothelial dysfunction is recognized as an important risk factor in the formation of atherosclerosis and subsequent diseases; several measures have sought to quantify endothelial dysfunction. Pulsatility index (PI) and resistivity index (RI) are clinically established indices used in the evaluation of kidney transplantation, cerebrovascular function, and gestational development, but have not been adequately evaluated in other vasculatures due to physiological limitations. Brachial flow-mediated dilation (FMD) is a validated tool that measures endothelial function by inducing high resistivity within the brachial artery. This provides the opportunity to measure RI and PI in a non-traditional site. This study aims to examine the relevance of the PI and RI as a measure of endothelial dysfunction in a population vulnerable for cardiometabolic risks.

Methods: This cross-sectional study examined a convenience sample of 175 subjects (10- to 18-year-old vitamin D deficient, overweight and obese children) recruited as part of an ongoing NIH-funded double-masked clinical trial. Study measures include anthropometrics [body-mass index, waist-to-height ratio, body composition (dual-energy x-ray absorptiometry)], blood pressure, serum biomarkers [non-fasting 25(OH)D, glucose, lipids, and parathyroid hormone], physical activity, and vascular indices (pulse-wave velocity, pulse-wave analysis, and traditional FMD%). Peak systolic and end diastolic velocities of the brachial artery were captured during the baseline, occlusion, and reactive hyperemia phases of the FMD. Velocity measures in the reactive hyperemia were captured at peak luminal diameter and at one-, two-, and three-minute post cuff release. Velocity measures were used to calculate the PI and RI. Associations between PI and RI and established cardiovascular indices, subject anthropometrics, and cardiometabolic biomarkers will be assessed.

Results: Data collection and analysis of this study are ongoing.

Conclusion: The implications of this study will serve to potentially identify a novel methodology for measuring endothelial dysfunction in the context of vascular research.

Presenter: Mikaela Kosich

Agency: University of Pittsburgh, Graduate School of Public Health, Department of Environmental and Occupational Health

Internship Preceptor: Aaron Barchowsky, PhD

SS-31 to Potentially Reverse Arsenic-Induced Heart Damage

Background/Objective: Arsenic is colorless, odorless, and tasteless pollutant common in drinking water. Exposure has been associated with cancers, metabolic diseases, and cardiovascular diseases. Previous work in the lab has shown increased activation of pro-autophagic transcription factor Foxo3a in the hearts of mice who have been exposed to human-relevant levels of arsenic, indicating autophagy and mitochondria dysfunction as a result of stress. We hypothesize that treatment with SS-31 will reduce the abundance of arsenic-promoted nuclear Foxo3a, indicating a reversal of this stress response and showing the potential as a treatment for arsenic exposure in order to reduce CVD risk.

Methods: Mice were exposed to arsenic for five weeks via drinking water at a concentration of 100 ppb and then injected with saline or SS-31 (1 mg/kg) for one week prior to euthanasia. Hearts were collected and nuclear protein extraction were prepared from ventricular muscle. Western analysis was used to quantify the amount of nuclear Foxo3a relative to constitutive Histone H1 expression.

Results: Arsenic exposure increases a broad stress response in the cardiac tissue that includes increased nuclear content and DNA binding of the Foxo transcription factors. Unfortunately, low protein yields in nuclear protein extractions prevented adequate analysis of the effects of SS-31 on reversing these arsenic effects. However, SS-31 was effective in reversing negative effects of arsenic on skeletal muscle regeneration in an injury model in the same mice.

Conclusion: Future work is needed to perfect the isolation of cardiac nuclear proteins to allow proper evaluation of SS-31 reversal of arsenic promoted stress responses and cardiotoxicity. Reversal of arsenic effects on skeletal muscle and regeneration by SS-31 is encouraging and may indicate success in repairing cardiac toxicities. Improving both skeletal and cardiac muscle should reduce the impact of arsenic exposures on the incidence and severity of CVD.

Presenter: Florence Kwok

Agency: Allegheny County Health Department, Pittsburgh Summer Institute

Internship Preceptor: Jennifer Fiddner, MPH, CIC

Child Death Review: Infant and Youth Mortality in Allegheny County.

Background/Objective: With careful review and understanding of the circumstances surrounding a child's death, it is possible to prevent future fatalities. Since the Public Health Child Death Review Act (Act 87) was passed in 2008, the Allegheny County Child Death Review Team (ACCDRT) was created to reduce fatalities among children aged 0-21 years within Allegheny County through multidisciplinary case reviews. The team is comprised of representatives from a number of county institutions and community partners required by Act 87. Case review data are entered in the National CDR Case Reporting System (NCDR-CRS). This review aims to discern the causes of death and associated risk factors among Allegheny County resident children to inform the development of prevention recommendations.

Methods: Case review data for 2007-2016 were extracted from NCDR-CRS and analyzed using SAS 9.4. (Birth and death certificate data were matched to vital statistics from the CDR case list. The ACCDR Report and issue briefs were developed from vital statistics for distribution among the public.

Results: From 2007 to 2016, 1,843 total child deaths occurred among Allegheny County residents as reported by ACHD vital records; missing data were present as only 72% (N=1327) of deaths were reviewed and noted to be preventable by the ACCDRT. Of the 1,843 deaths in vital records, 52% (N=960) were categorized as natural deaths. Homicide was the leading cause of unnatural deaths among youth at 16% (N=299), where 75% (N=224) were African American males and 86% (N=257) were caused by firearms. Overdose was the leading cause of unintentional deaths at 6% (N=109), where 93% (N=101) were whites and 58% of drugs involved were opiates. Motor vehicle crashes accounted for 6% (N=102) of deaths, with 56% (N=57) being aged 19-21 years. Suicides, 5% (N=93), were primarily caused by hanging (43%, N=40) and firearms (41%, N=38). Infant deaths were mainly associated with unsafe sleep practices (7%, N=132), with 40% (N=53) occurring in adult beds. Other uncommon forms of death amounted to 3% (N=55).

Conclusion: The deaths of many Allegheny County children may be preventable. A multi-faceted approach is necessary to promote interventions for at-risk youths, their families, and communities. Recommendations from the CDRT and public interventions are crucial to combatting the high number of child mortalities in Allegheny County.