

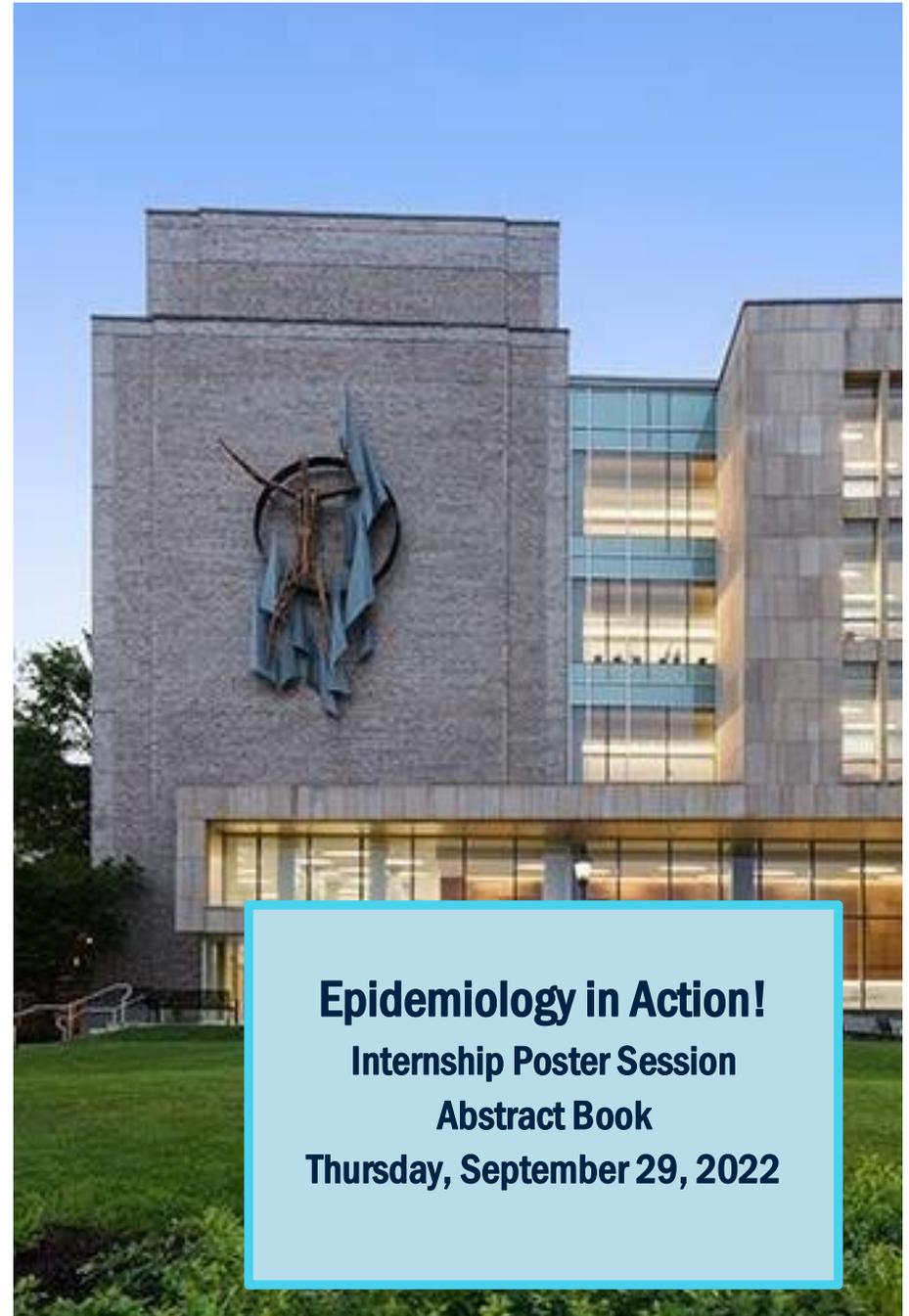
The Department of Epidemiology Internship provides an opportunity for MPH students to apply the knowledge they have acquired in the classroom to professional work situations. Internships usually take place in state, county, federal, or international-level health departments, public health institutes/programs, 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. Students develop their internship placement, goals, and responsibilities in collaboration with the students' faculty advisor and preceptor to individualize and maximize the learning experience.

Special thanks to the Internship Preceptors 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!

Pitt PublicHealth



Epidemiology in Action!
Internship Poster Session
Abstract Book
Thursday, September 29, 2022

Notes

Presenter: Geeta Acharya

Agency: CVS Health/ Aetna

Preceptor: Rinchen Lama, MPH

CVS Health/Aetna: Knee Arthroplasty Equity Evaluation

Background/Objective: Knee Arthroplasty, also known as total knee replacement, is the process of surgically replacing parts of knee joints with artificial parts. It is one of the most common orthopedic procedures performed in the United States. My internship objective was to select equity metrics, build a framework for evaluation, and conduct a proof-of-concept equity evaluation for provider questionnaire knee arthroplasty approval cases within the Aetna network. Conducting equity analysis underscores the gaps in resources and helps specific populations that may be systematically overlooked.

Methods: I used provider questionnaire knee arthroplasty data from June 30, 2020- June 30, 2021 to conduct my analysis, in which I extracted sex and zip code information for the patient demographic. I identified the county names based on zip code information to merge the dataset with CDC's County data tracker. Initial analysis of average household income for counties with highest approval was compared with counties with the lowest approval volume count. To check overall health status of case volume, I compared (through CDC's eph tracking) the counties with most approvals and counties with least approval in terms of their obesity and overweight percentage. I also conducted literature review on biases that are present in health care automation.

Results: Three metrics I recommended were age, sex, and zip codes as their importance was consistently supported by literature. Health care automation literature review illustrated that there is presence of bias within prediction models that could lead to increased spending as well as increased inequity.

Conclusion: As companies continue to automate their approval and denials, it is important that equity evaluation continues to be a part of the process to ensure that there is no bias present within their prediction models and automation codes. By establishing evidence-based metrics and building an analysis framework, an organization can routinely check their data for presence of inequity. The initial proof of concept analysis I conducted leads the way for that evaluation.

Presenter: Linda Adodoajji

*Agency: University of Pittsburgh, School of Public Health,
Department of Epidemiology*

Preceptor: Dara D Mendez, PhD, MPH

Notes

The Postpartum Mothers Mobile Study (PMOMS): COVID-19 Survey and Community-Based Dissemination through Arts and Expression

Background/Objective: While postpartum weight retention is common, Black birthing people retain 2-3 times more weight compared to white birthing people. PMOMS is a study using smartphone technology to understand factors associated with racial inequities in weight change and health during and after pregnancy. The project received additional supplemental funding to study the role of COVID-19, examine measures of structural racism, and to develop community-based dissemination strategies. For my internship, I supported the project by assisting with data collection and analysis for a COVID-19 follow-up survey. I also participated in planning and executing community-based dissemination strategies.

Methods: From May-July 2022, we administered an online follow-up survey to 185 PMOMS participants (who gave birth between January 2018 through July 2020) and asked about their experiences during the COVID-19 pandemic. We conducted descriptive analyses (using SAS v.94) of participant responses and created a one-page fact sheet to summarize variables of interest. Independent of this follow-up survey, we developed community-based dissemination strategies by partnering with community organizations and local artists and curators. With this interdisciplinary team, we created an immersive experience aimed at centering multiple, unique narratives of Black maternal health and motherhood through artistic expression.

Results: Among our study sample, there are racial disparities in COVID-19 vaccination rates, with all surveyed Black participants having a vaccination rate of 55% compared to a vaccination rate of 87% or greater for all other racial and ethnic groups. Participants reported increased employment difficulties due to childcare (51%), increased applications to social support services (17%), attitudes about masking, information sources, and increased feelings of worry (80%). The community-based dissemination activities included 1) a yoga and creative wellness event featuring mindful and artistic activities and 2) an art exhibit featuring local artists and informational material about PMOMS and local community organizations.

Conclusion: Preliminary survey results and further analysis can inform the public health community and local organizations on addressing the current physical, social, and emotional needs of birthing people in the region. Additionally, working on an interdisciplinary team to create community-based dissemination strategies provided a unique perspective on engaging with research and communities to make this work more meaningful to communities, especially communities of color.

Presenter: Natalie Ward

Agency: Prevention Point Pittsburgh

Preceptor: Aaron Arnold, MPH

Prevention Point Pittsburgh: Syringe Distribution Services in Allegheny County

Background/Objective: Syringe service programs (SSPs) are community-based programs whose services aim to reduce the transmission of HIV/AIDS, Hepatitis C and other bloodborne diseases, overdose fatalities, and accidental needle sticks in the community. Prevention Point Pittsburgh (PPP) is the only legally operating SSP in western PA. PPP serves several areas around Allegheny County by providing participants with sterile syringes and other supplies, safe needle exchanges, drug testing strips, risk reduction and overdose prevention education, and Naloxone. My internship involved hands-on experience at a PPP site and examined PPP's syringe distribution statistics and participant demographics for the first half of 2022.

Methods: At each interaction, PPP staff asked participants questions about their demographic information, the number of people for whom they were picking up supplies, and the type of requested supplies. PPP staff recorded responses and the number of supplies given, using white slips for returning participants and blue slips for new participants. PPP staff compiled the data from the slips into a spreadsheet. Data analysis and visualization were conducted in Microsoft Excel and SAS 9.4.

Results: Through June 30, 778,734 syringes were distributed during 4,644 interactions. If the rate of distribution remains constant through the remainder of 2022, PPP is on track to distribute 1,557,468 syringes this year. For comparison, PPP distributed 1,042,576 syringes in 2020 and 1,431,968 in 2021. Of these interactions, 2,364 unique individuals received syringe services with an additional 2,296 individuals receiving syringe services through secondary distribution. Of the 4,644 interactions, participants received only injection supplies at 36.8% (n=1711) of interactions, only inhalation supplies at 18.0% (n=838) of interactions, and both injection and inhalation supplies at 42.5% (n=1973) of interactions. Notably, the distribution of inhalation and injection drug use among participants varied greatly by site and race.

Conclusion: SSPs are necessary to promote and advocate for the reduction of harms, both physical and social, associated with drug use. PPP's value to the community is exemplified by the magnitude of their distribution and outreach, so more programs like PPP should be supported by local and state health department to improve the overall health of the community.

Presenter: Gabriella Alicea

Agency: Marshfield Clinic Research Institute

Preceptor: Jeffrey VanWormer, PhD

Disparities in COVID-19 Vaccine Coverage in Wisconsin Farm Children and Adolescents

Background: SARS-CoV-2 (COVID-19) infections have resulted in over 1 million deaths in the United States. Risks are severely elevated in unvaccinated individuals; thus, it is crucial to understand community patterns of COVID-19 vaccination, particularly in younger and remote populations where vaccination rates lag. Rural areas typically have lower income, less available health insurance, and other access barriers to healthcare, as well as generally higher vaccine hesitancy sentiments. In addition, more isolated farm areas generally have limited healthcare capacity to vaccinate and manage COVID-19 surges. The goal of my internship was to examine disparities in COVID-19 vaccine coverage in farm children and adolescents in north-central Wisconsin.

Methods: A cross-sectional analysis was conducted in patients of the Marshfield Clinic Health System (MCHS) in north-central Wisconsin. The sample included children/adolescents who were age-eligible for the COVID-19 vaccine for ≥ 90 days (as of May 2022), stratified by those who live vs. do not live on a farm, per linked agricultural data from state and commercial sources. Outcomes included COVID-19 vaccine initiation, series completion, and booster receipt from a regional vaccine registry. Sociodemographic and clinical covariates (e.g., age, sex, race, chronic conditions) were extracted from electronic health records. Multivariable regression was used to examine associations between farm residence and COVID-19 vaccination.

Results: There were 2,064 (5%) farm and 43,938 (95%) non-farm residents in the sample. Overall, 32% of participants initiated, and 31% completed, the COVID-19 vaccine series. Farm residence was associated with significantly lower odds of COVID-19 vaccine initiation (aOR [95% CI]=0.69 [0.62, 0.77], $p<0.001$) and series completion (aOR=0.70 [0.63, 0.78], $p<0.001$) after covariate adjustment. In the subset of individuals age ≥ 12 years (n=24,984), 12% received a COVID-19 vaccine booster. Farm residence was again associated with a significantly lower odds of COVID-19 vaccine booster receipt (aOR=0.80 [0.66, 0.97], $p=0.036$).

Conclusion: COVID-19 vaccine coverage was low in this sample of Wisconsin children and adolescents. Those who live on farms have ~25% lower levels of COVID-19 vaccine initiation, series completion, and booster receipt compared to their non-farm counterparts. Farm kids are an underserved group and may require more effective public health interventions designed to prevent COVID-19.

Presenter: Kirsten Audette

Agency: Epistemix

Preceptor: Donald S. Burke, MD

Detailed Evaluation of Influenza Vaccine Strategies with an Agent-Based Model

Background/Objective: The outcomes of an influenza season are impacted by many factors including the immunity of the population, vaccine efficacy, and staying home when symptomatic. Using the agent-based modeling platform FRED (A Framework for Reconstructing Epidemiological Dynamics) we can simulate an influenza epidemic based on the interactions of individual persons and their individual properties and behaviors. Being able to simulate an influenza season is vital in helping inform public health policy and practice. My internship project was to develop a seasonal influenza model using FRED.

Methods: I created flow-diagrams to outline the states and conditions I wanted to include in my influenza model. Using the FRED Modeling Language Guide, I learned how to translate my flow-diagrams into code. Once the conditions were built within FRED, I conducted a literature review to find appropriate values for the model variables. The transmissibility of influenza was fit using a parameter sweep with a target of age-specific influenza attack rates.

Results: The model represents multiple interacting conditions including Influenza Disease and Transmission, Vaccine Efficacy, Partial and Waning Immunity, and Staying At Home. Novel model features (1) include allowing symptoms and transmissibility to be linked or unlinked, and (2) having the vaccine efficacy represented as three separate components: infection blocking, symptom blocking, and transmission blocking.

Conclusion: This influenza agent-based model allows for an influenza season to be simulated based on specific characteristics of the population and the vaccine. For future work, I will conduct two separate experiments. The first experiment will be estimating the effects of varying the number of vaccine doses available, along with associated distribution strategies. The second experiment will be characterizing the effects of varying the three components of vaccine efficacy (against infection, transmission, and symptoms). Model outcomes will be the overall influenza attack rates, death rates, and peak number of cases. The outcomes from these simulations can help guide public policy and effective interventions.

Presenter: Josh Strauss

Agency: National Cancer Institute, Division of Cancer Epidemiology & Genetics, Clinical Genetics Branch

Preceptor: Shahinaz Gadalla, MD, PhD

Telomere Length and Clonal Chromosomal Aberrations in Peripheral Blood Samples of Patients with Severe Aplastic Anemia

Background/Objective: Severe aplastic anemia (SAA) is a rare, life-threatening bone marrow failure disorder. The standard of care for those patients involves allogeneic hematopoietic stem cell transplantation (HCT) as first-line therapy for young patients with available matched sibling donors or immunosuppression with/or without HCT for older patients or those who need alternative donors. Both short telomeres and the presence of certain cytogenetic abnormalities have been associated with disease prognosis.

Methods: All SAA patients received allogeneic HCT between 1989 to 2015; pre-HCT blood samples collected before conditioning were available at the Center for International Blood and Marrow Transplant Research (CIBMTR) biorepository. Telomere length was measured by qPCR. SNP-array data were used to calculate genetically inferred TL (gTL) and detect mosaic chromosomal alterations (mCA) across the genome. gTL was calculated via polygenic risk score based upon 120 SNP's previously associated with telomere length. Logistic regression was utilized to assess the relationship between aberration status and age-adjusted telomere length when adjusting for covariates.

Results: The analysis included 738 patients with clinically-diagnosed acquired SAA (Median age: 20.4 years (0.18-77.44)), with 56.6% male. SAA patients had shorter TL than expected for their age (Median TL percentile-for-age: 35.7 (0.00, 99.9%ile)). Large mCAs were detected in 174 patients (23.6%), with 6p copy-neutral loss of heterogeneity (CN-LOH) affecting 15.2% of the patients; XX% of the patients had aberrations affecting ≥ 2 chromosomes. Patients with aberrations had shorter measured TL than those without (adjusted OR: 1.66, 95% CI[1.14, 2.41], $p=0.008$). Yet, gTL was not associated with mCA status (OR: 1.17, 95% CI[0.83, 1.67], $p=0.37$).

Conclusion: The observed association between short TL and detected mCAs may explain the previous association between TL and risk of hematological malignancies in SAA. Studies investigating the clinical implications of chromosome 6 CN-LOH and the possible use of TL as a biomarker to guide therapeutic decisions are warranted. This may reveal additional insight into etiology, and prognosis of SAA.

Presenter: Amrit Singh

Agency: Allegheny County Health Department

Preceptor: Lauren Brungo MPH, BSN, RN

Improving Health Outcomes for Afghan Refugees with Tuberculosis in Allegheny County

Background/Objective: The Allegheny County Health Department (ACHD) provides Mantoux Tuberculin Skin Tests (TST) for screening, evaluation, and treatment for Tuberculosis (TB) patients.

Additionally, the ACHD tracks refugees from Afghanistan who test positive for TB and provides them with either Rifampin or Isoniazid therapy. While this practice has become standard, there is limited research what other interventions can be implemented to further improve TB outcomes in the Afghan refugee population in Allegheny County. This study will look at how improved language services and policy changes can help reduce the burden of TB in the Afghan refugee population.

Methods: We performed a qualitative analysis by surveying the refugees about their knowledge of TB, communication methods to their PCP's, treatment regimens, social/cultural/housing adjustments, and overall quality of health care received. Additionally, a quantitative analysis will be performed in order to better understand what causes improved health outcomes in the population. Variables such as type of treatment, duration of treatment, refugees' rating of quality of care, and access to basic food and health services will be quantified.

Results: A total of 70 refugees were surveyed. A qualitative analysis was performed and found that 88% of refugees struggled to adjust to American norms and 91.2% struggled with language barriers. Of the refugees that struggled with language barriers, 67.7% said that it negatively affected their communication with their health care providers. 94% of the refugees stated that changes in language and social barriers would improve their TB outcomes. Following the qualitative survey, a series of linear regression models will be used to assess the association between refugee care and TB outcomes.

Conclusion: Despite the more robust health care system and treatment methods in the United States as compared to Afghanistan, there is room for improvement for the refugee population. The Afghan refugee community in Allegheny County would benefit from improved language and social assistance, particularly in those who live in isolation due to having TB. Additionally, providing more treatment services for Afghan refugees with TB would help improve overall health outcomes.

Presenter: Holly Barwatt

Agency: Wolff Center at UPMC

Preceptors: Graham Snyder, MD, MS, Rebecca Glista MSN, RN, CCRN-K, CIC, and Suzanne Wagester, MSN, RN

Contamination of Ring Dosimeters and Hands Among Providers Performing Invasive Procedures: A Quality Improvement Project

Background/Objective: Ring dosimeters are radiation safety monitoring devices worn by proceduralists during invasive procedures requiring ionizing radiation. Since they are not single-use, contaminated ring dosimeters may confer a risk of hand contamination, and subsequently surgical glove contamination and procedural wound contamination, and potentially surgical site infections. No previous research has quantified the risk of contamination on the hands of those wearing ring dosimeters. My internship project was to measure the contamination risk of ring dosimeters on the hands of proceduralists who wear these rings.

Methods: This observational study will quantify contamination of providers' ring dosimeter and ring finger immediately prior to an invasive procedure, measure the reduction of bacterial contamination after pre-procedural hand hygiene and ring low-level disinfection (LLD), and compare finger contamination among ring dosimeter wearers and non-wearer controls. Using convenience sampling, ring and ring finger samples are collected using sterile saline-moistened synthetic swabs before and after LLD and hand hygiene, respectively. Specimens will be inoculated onto blood agar and MacConkey plates: growth on blood agar will be quantified (colony-forming units [CFU]) as presumptive gram-positive bacteria and tested for *Staphylococcus aureus* via latex agglutination; growth on MacConkey plates will be quantified as presumptive gram-negative bacteria. A Wilcoxon rank-sum test will be used to compare the distribution of gram-positive CFU counts on pre-and post-hand hygiene fingers between ring wearers and non-wearers and on rings of those who wear them before and after LLD.

Results: To date, I have designed the investigation and study protocol with UPMC stakeholders, including piloting the specimen collection and microbiologic methods, and have received approval from the UPMC Quality Improvement Review Committee. The study will be carried out on a minimum of 20 ring dosimeter wearers and non-wearers at the interventional radiology and cardiology departments of UPMC Presbyterian and Shadyside hospitals. Data collection has begun in September 2022 and will be completed and analyzed by December 2022.

Conclusion: Findings from this study will aid in assessing the validity of safety measures associated with current ring dosimeter-related procedures. Throughout my internship experience, I learned the importance of interdisciplinary collaboration when planning and executing a research study.

Presenter: Ruel Beresford

Agency: University of Pittsburgh, School of Public Health,
Department of Epidemiology

Preceptor: Adam J. Santanasto PhD, MPH

Determining Afro Caribbean Ancestry using Ancestry Informative Alleles

Background/Objective: The University of Pittsburgh has been collecting Tobagonian genetic information to ascertain the relationship between genetic admixture (ancestry) and health. Determining and exploring genetic ancestry was the primary focus of this project.

Methods: There were 119 Single Nucleotide Polymorphisms that are known to have different allele frequencies across different ancestry groups – called Ancestry Informative Markers. The Tobagonian genetic data (N = X Men) was converted into plink (0,1,2 based on alternate allele presence) in Excel, and a preliminary clustering was done. Afterwards the BCFTOOLS package in Unix was utilized to manipulate and extract Superpopulations (such as African, European, and South Asian) from the 1000 Genomes Project with the same Ancestry Informative Markers as the Tobagonian Population, and subsequently pull down the individuals so that they can be merged with the Tobagonians. The Superpopulation data was then clustered through a Primary Components Analysis in SAS utilizing proc factor, in R using the FACTOMINER package, and in STRUCTURE using the Ancestry inferential settings. Factor weights were applied to the Tobago data to determine genetic ancestry.

Results: In the Superpopulations, the factor analysis after varimax rotation showed that 2 Factors explained a majority of the variance in SNP allele frequency – Factor 1 (27.4%), Factor 2 (10.7%). Factor 3 (3.8%). Factor 1 differentiated between African vs. European ancestry with higher Factor 1 scores indicating more *African ancestry vs. European*. Factor 2 differentiated between East Asian vs. European ancestry. Applying the factor weights to the Tobago data revealed that this population has significant African Ancestry, followed by less prominent but still present European and South Asian Ancestry. Sub population analysis shows high levels of Ewe and Yoruba ancestry within the Tobagonian men.

Conclusion: The Afro Tobagonians unsurprisingly had primarily African ancestry, but the prominence of South Asian and European ancestry was somewhat novel. Future analyses will use the factor scores obtained in this analysis to examine the association between genetic ancestry and health outcomes.

Presenter: Sarah Helen Shepherd

Agency: University of Pittsburgh, School of Public Health,
Department of Epidemiology, Epidemiology Data Center

Preceptor: Marnie Bertolet, PhD

Best Practices for Rare Disease Clinical Trials: Case Studies from INHIBIT & SCD-CARRE Trials

Background/Objective: Rare disease clinical trials encounter novel challenges due to an incomplete knowledge of the natural history of disease, small population size, and limited funding. The INHIBIT Platform trials, including the Inhibitor Prevention trial and Inhibitor Eradication trial (INHIBIT) recruited patients with severe hemophilia A without (Prevention) and with (Eradication) a history of inhibitor formation. The Sickle Cell Disease and Cardiovascular Risk – Red cell Exchange trial (SCD-CARRE) recruited patients with sickle cell disease. In the United States, severe hemophilia A affects 1 in 5,000 males and sickle cell disease affects 1 out of every 365 Black or African American births; the small population size and patient recruitment presents a challenge for achieving adequate statistical power. The purpose of this internship was to review the current literature on best practices for rare disease clinical trials, identifying strengths and offering recommendations for improving the study design of future rare disease clinical trials.

Methods: The literature on best practices for rare disease randomized controlled trials was reviewed utilizing PUBMED. The articles focused on recruitment methods, patient involvement, and innovative trial designs to ensure researchers accurately assess the treatment effect in the trial. The clinical site coordinators, clinical center coordinators and data center personnel for INHIBIT and SCD-CARRE were interviewed to incorporate the clinical and data perspectives into the review.

Results: After critiquing the relevant literature, there were three main best practices for conducting rare disease clinical trials: developing relevant endpoints for the patient population, understanding the natural history of disease, and incorporating patient involvement in the initial trial design stage. The strengths of INHIBIT were innovative recruitment methods and utilizing a Bayesian platform design. The SCD-CARRE trial was strengthened by robust recruitment strategies and baseline covariate adaptive randomization. The primary recommendation for INHIBIT and SCD-CARRE is to include patient involvement at the beginning of trial design.

Conclusion: A patient-investigator integrated approach to rare disease clinical trial research will reduce the number of practical problems while conducting the trial. During this internship, I learned the intricacies of conducting clinical trials and the importance of communicating with patients and disease advocates throughout the trial.

Presenter: David G.L. Roach

Agency: University of Pittsburgh Department of Emergency Medicine

Preceptor: Daniel Patterson, PhD, MPH, MS, NRP

The Effect of On-Shift Napping on Indicators of Cardiovascular Health in EMS Clinicians: An Experimental Study

Background/Objective: Sleep deprivation is common in Emergency Medical Services (EMS) clinicians who perform night shifts. Sleep deprivation creates an abnormal pattern in Blood Pressure (BP); a pattern shown in previous research to be associated with increased risk of Cardiovascular Disease (CVD). For my internship project, I contributed to the analysis of BP dipping and sleep stage proportions in relation to average Systolic (SBP) and/or Diastolic (DBP) over 24 hours in an experimental study to determine if napping during night shifts restores normal BP patterns.

Methods: We used a randomized crossover study design with three conditions lasting 72 hours in duration. Twenty-four of 72 hours was in-lab to simulate a 12-hour night shift and 12-hour in-lab recovery. Two conditions included a nap at 0200 lasting 30 mins or 2 hours compared to a no-nap control. We used ambulatory devices to monitor BP. Our primary outcome was the presence of a dip in BP $\geq 10\%$ in SBP and/or DBP during the shift nap. Dips in BP of 10-20% during sleep are considered normal. We used mixed effects models and McNemar's test to compare BP dipping by condition.

Results: As of August 2022, complete data from 18 out of 29 consented participants was available. Participant demographics included mean age of 24.7 (SD 8.4) and mostly male (61.1%). All participants experienced abnormal BP dipping during the no-nap condition. Mean percentage dip in SBP and DBP for the 30-minute nap condition was 10% for SBP (SD 7.9); 12.4% for DBP (SD 9.9) and did not differ from the 2-hour nap condition (SBP 9.6% SD 7.2; DBP 15.2% SD 8.9; $p > 0.05$). Abnormal dipping during the 30-min condition was detected for 39% of participants versus 22% during the 2-hour nap condition ($p < 0.05$ comparing all 3 conditions; $p > 0.05$ comparing 30-minute to 2-hour condition). One-third of participants (33.3%) experienced abnormal BP dipping during the 30-minute nap condition yet showed normal dipping during the 2-hour condition.

Conclusion: Interim analyses show that naps during night shifts impact BP, and for many, restore BP patterns to a normal dipping state. Analyses with the final sample are needed to confirm these findings.

Presenter: Adena Bowden

Agency: Western Pennsylvania Regional Data Center, University of Pittsburgh
Center for Social and Urban Research

Preceptor: Elizabeth Monk, MS

Supporting a Local Foundation in Community Data Sharing: South Hills and Mon Valley Communities

Background/Objective: Inequality of community well-being is often exposed when indicators in one community are compared with another. Noting these differences can provide justification for targeting services and outreach, acquiring grants, and modifications to public policy. Making these differences accessible to a broader audience is key to effecting change. The Western Pennsylvania Regional Data Center (WPRDC) is a data intermediary that supports key community initiatives by making public data easier to find and use. This summer, WPRDC collaborated with the Jefferson Regional Foundation (JRF) on their project, *Surprise in the Suburbs*, which aims to identify emerging trends that may impact the service providers supported by JRF in the South Hills and Mon Valley communities. WPRDC assembled community profiles for each of the communities that JRF serves including relevant School Districts, which include economic, health, and community indicators. My role included engaging with JRF member organizations; facilitating conversations with WPRDC, JRF, and the Department of Health and Human Services (DHS); and compiling data to highlight community needs and trends.

Methods: Research was conducted to determine the best community health indicators to include, to assess the validity and reliability of data sources, and to ensure best practice in equitably presenting the data. Quantitative data including demographics, economic mobility, community health, educational levels, transportation utilization, and PA 2-1-1 and DHS service requests and utilization were collected using records from the 2020 Census, the 2020 5-Year American Community Survey, DHS, and Pennsylvania 2-1-1. This data was compiled and presented in "community profiles."

Results: Thirty-nine profiles of Allegheny County communities served by the Jefferson Health Foundation were created, with the purpose of informing policymakers, nonprofit health organizations, grant applicants, and community stakeholders about demographic changes and community health needs within each community.

Conclusion: These community profiles present information from several sources at levels of geography that are not readily available. They tell the story of increasing suburban diversity and showcase unmet community needs. By making this information accessible to a broader audience, policymakers, community members, and stakeholders can work to meet these needs and to address gaps to improve the health and wellbeing of these communities.

Presenter: Steven Cheung

Agency: Allegheny County Health Department, Pittsburgh Summer Institute

Preceptor: Kristen Mertz, MD, MPH

Allegheny County, Pennsylvania Animal Bite Report, 2021

Background/Objective: Healthcare providers are required by law to report animal bites to the Allegheny County Health Department (ACHD) due to potential transmission of rabies, a lethal viral pathogen transmitted through the saliva of infected mammals. ACHD staff investigate bite reports and advise victims regarding rabies post-exposure prophylaxis (PEP). The goal of this analysis is to assess the burden of animal bites and appropriateness of treatment for 2021.

Methods: Bite data from 2021 were exported from an Oracle database to a Microsoft Excel file. These data were then imported to SAS version 9.4 for cleaning and analysis. Tables and graphs were created in Microsoft Excel and Microsoft Word. Population age group estimates were obtained from the US Census Bureau to calculate rates per 100,000 population. Population data from 2020 were used because estimates for 2021 were not available at the time of writing this report. Data from 2013 through 2020 were obtained from past reports and used to analyze recent trends in bites.

Results: In 2021, ACHD received 2,258 unique animal bite reports. Most animal bites were attributed to dogs (75.7%) and cats (19.6%). Bats (0.8%) and rats (0.4%) were the two most common wild animals documented in the bite reports. Most bites occurred on upper extremities (58.5%). About two-thirds of bite victims received antibiotics (66.6%), and one-third received a tetanus shot (30.3%). A total of 62 victims started rabies PEP (2.7%) and 21 victims (0.9%) completed the full course of rabies PEP. Of these 21 victims, three completed the full course of PEP unnecessarily, 17 completed the full course because the biting animal could not be observed or tested, and one victim was exposed to a rabid bat. Of the 41 who did not complete the full course, 20 victims stopped the PEP appropriately and 21 stopped inappropriately. The number of reported animal bites has increased by 27% from 2013 to 2021.

Conclusion: Animal bites in Allegheny County have increased over the past decade and have led to thousands of people seeking medical care. ACHD should continue to closely follow up with bite victims regarding appropriate rabies PEP.

Presenter: Sohan Rao

Agency: UPMC Western Psychiatric Hospital

Preceptor: Janina-Marie Tatar, CIC, MBA, MT (ASCP)

Quantifying SARS-CoV-2 Infection Risks in Inpatient Psychiatric Settings: A Risk Assessment Model

Background/Objective: SARS-CoV-2 is well documented to mediate severe respiratory illness in patients with known chronic health conditions. This risk, moreover, compounds in psychiatric patients whose conditions premeditate a lack of adherence to exposure mitigation guidelines. However, these individuals require and are entitled to effective medical treatment, a lack of which poses dangers both to themselves and others around them. For my internship, we designed a quantitative model of SARS-CoV-2 infection risks to streamline admissions processes in inpatient psychiatric settings.

Methods: To construct a quantitative infection risk assessment model, key predictors needed to be characterized. A review of current models, many of which were qualitative, was carried out. Onsite visits in behavioral health settings were conducted to better understand assessment and implementation of risk mitigation measures in practice. Using these studies and experiences, a list of potential variables was constructed to frame a Cox Proportional Hazards (CPH) model. Existing data on each of these variables was compiled. The practice, efficiency, and assessment of hand hygiene was of particular interest, as it is tough to keep track of. Reviews of meta-analyses were conducted to determine the efficiency of hand hygiene at preventing acute respiratory infections. The specifications of the CPH model were then detailed.

Results: After review of the literature and discussions with Infection Prevention and Control/Infectious Disease professionals, the following data were identified/pooled: vaccination records from Pennsylvania Statewide Immunization Information System (PA-SIIS), discharge summaries from UPMC Western Psychiatric Hospital (WPH), known specifications of UPMC WPH (number of beds in each room and ventilation status, central or external unit, of each room), historical data on nosocomial infections and hygiene practices at UPMC WPH. Hygiene practices included monthly staff hand hygiene frequency and PPE worn on each unit daily. The discharge summaries provided insight into demographic variables, diagnoses, administered medications, comorbidities, and unit of admission.

Conclusion: This experience highlighted the processes and considerations needed to assess infection risks in inpatient behavioral health settings. In the future, following completion and fine tuning of the CPH model, an easy-to-use computer-based tool will be developed to streamline the risk assessment process.

Presenter: Olivia Printz

*Agency: Allegheny County Health Department Office of Family and Child Health,
Pittsburgh Summer Institute*

Preceptor: Kandis Mason, MPH, CTTS, CLC, LCCE

Family and Child Health Cultural Analysis: Identifying Health Disparities in Allegheny County

Background and Objectives: Health and racial disparities impact birth outcomes for families. In Allegheny County, there are 3.7 child deaths per 1,000 live births for White mothers compared to 10.3 child deaths for Black/African American mothers. The objective was to review data collection quality and complete the first step in understanding how home visiting outcomes compare to Allegheny County birth outcome trends through the equity plan cultural analysis.

Methods: Understanding the home visiting program and its case management software, Penelope, was the first step to evaluating data collection. Data cleaning within Penelope was performed to eliminate duplicate cases and add in missing demographic information. Data exportation for Penelope was done through Open Database Connectivity (ODBC), Access, and Excel. Answers from clients regarding breastfeeding, birth outcomes, and demographics were exported so that graphing and charting could be completed using PowerBI. Findings were then communicated to the Allegheny County Health Department Office of Family and Child Health.

Results: The analysis found that in 2020-2022 the program served mostly Black/African American families. The most common age of the primary parent was between 25 and 34 years old. The majority of families had Medicaid for insurance (74.7%). 6% of births were very low birth weights and 13.4% were low birth weights. Out of 389 pregnancies, 22 of them resulted in miscarriages (20) or fetal losses (2). 20.7% of mothers enrolled did not have a primary medical home. 11 mothers did not have prenatal doctor visits until 21 weeks of pregnancy and 9 did not until 28 weeks of pregnancy. Families residing in the zip code 15219 had the lowest intention to breastfeed. After disaggregating the data, Black/African American populations and those residing in zip codes 15136, 15219, and 15210 experienced the highest rates of adverse birth and health outcomes.

Conclusion: Completing this analysis has created a baseline for the Office of Family and Child Health to take a closer look at contributing factors and outcomes. This data cleaning and cultural analysis will aid the health department in improving data collection and guiding resources to where they are needed most.

Presenter: Matt Dempsey

Agency: Centers for Disease Control and Prevention

Preceptor: Dana Pitts, MPH

Communicating Public Health's Future: Data Modernization at the CDC

Background/Objective: The CDC's Data Modernization Initiative (DMI) is an expansive program aiming to reanimate an ailing American public health system. Its vision is to replace outdated and connect disjointed reporting systems and technology with interoperable data systems. It is also reimagining policies and processes that will enable epidemiologists to receive, analyze, and communicate crucial information faster. In short, DMI could change how public health works in America. I was in the office of the Deputy Director of Public Health Science and Surveillance (DDPHSS) where I was able to directly support this vision for public health. I had direct access to senior leaders, publications, and media products related to DMI. Here, I played a major role, with quick turnarounds, to organize, analyze, and write talking points for leadership and create public-facing communication products.

Methods: DMI is not a typical public health program, it is the confluence of innovative technologies, workforce, work processes, and policies all combining to create a more interconnected public health system. Explaining how these different areas interact is crucial to the success of the initiative and requires the help of subject matter experts and bespoke communications for diverse audiences.

Results: I worked with the communications team to support team needs, assist in the creation and organization of internal and external communication materials, and monitor public opinion surrounding DMI. Public interest and discourse around DMI was tracked using a Power BI dashboard where articles were collected and analyzed. Other activities included slide creation, notetaking, analyzing presentations, conference attendance, and more. Produced materials were incorporated in presentations, web pages, and reports and were seen by CDC leaders. I saw the inner workings of an agency in transition where I learned from experts who are addressing the evolving challenges of the future.

Conclusion: DMI's success depends on clear communication, participation from all levels of public health, and sustained funding. The project is extensive, but so are the problems facing public health. DMI's many priorities address issues in surveillance, trust, transparency, workforce, and more. However, DMI's relevance to epidemiology is clear: more and standardized data, more accessible, and available faster.

Presenter: Alexander DePaulis

Agency: National Cancer Institute, Division of Cancer Epidemiology & Genetics, Integrative Tumor Epidemiology Branch

Preceptor: Mitchell Machiela, PhD

Mosaic Chromosomal Alterations in Circulating Leukocytes and Risk of Incident Chronic Lymphocytic Leukemia

Background/Objective: Mosaic chromosomal alterations (mCAs) are somatic mutations to a chromosome that can range from a portion of a chromosome impacted to affecting the entire chromosome and detected in circulating leukocyte DNA. The risk of developing an mCA increases with age, and mCAs are associated with hematologic malignancies. Chronic lymphocytic leukemia (CLL) is a hematologic malignancy caused by mutated B cells. CLL is a common adult cancer with a lifetime risk of 1 in 175 and has a genetic component. Previous research showed that mCAs had varying and differential risks for CLL by chromosome, but little was known about the risk at specific chromosomal locations. For my internship I examined 436,761 cancer-free individuals from the UK Biobank cohort to characterize the relationship between mCAs and incident CLL risk

Methods: We ascertained cases using ICD-10 codes for CLL (C91.1). We analyzed five megabase windows along each autosomal chromosome to determine if specific locations had differential risks for progressing to CLL, using Cox proportional hazard models to determine the time until a diagnosis of CLL. We found that chromosomes 11, 12, 13, 14, and 22 had windows with differential risks for progressing to CLL. We then selected the window with the largest effect size from chromosomes 11, 12, 13, 14, and 22, using survival AUC to determine the predictive utility of the bins.

Results: We observed 423 individuals with CLL. We found that individuals with mCAs had a higher percentage of CLL than mCA-free individuals across the genome, but the distribution patterns varied by chromosome. mCAs were associated with an increased risk of CLL on chromosomes 11, 12, 13, 14, and 22 (HR < 27.9). We found the predictive utility of the chromosome windows (AUC = 0.88), and any autosomal event was (0.91).

Conclusion: mCAs had a greater frequency of CLL in the chromosome windows than controls, suggesting they may be driving most of the associations to CLL. The largest effect sizes of chromosomes 11, 12, 13, 14, and 22 were almost as predictive as any autosomal mosaic event, providing evidence the windows may account for most of the associations with CLL. Some additional COVID-19 related deaths may not have been counted for several reasons, including individuals not getting tested for COVID-19.

Presenter: Ektha Parchuri

Agency: University of Pittsburgh School of Medicine, Department of Benign Hematology, Department of Emergency Medicine

Preceptor: Charles Jonassaint, PhD, MS

Understanding the Impact of Multi-system Trauma in Patients with Sickle Cell Disease Using Vaso-occlusive Crisis Frequency Measures

Background/Objective: The impact of multi-system traumatic injury in patients with Sickle Cell Disease (SCD) is grossly understudied. Only three prior case studies have described such a relationship but failed to address prospective health outcomes--despite strong biological plausibility to support adverse effects in trauma patients with SCD. It is likely, therefore, that trauma may increase acute complications such as vaso-occlusive events (VOC) and thus pain crises in SCD. My internship with the Department of Benign Hematology examined whether exposure to a traumatic injury is associated with an increase in frequency and duration of VOC.

Methods: I conducted a retrospective chart review of 356 adult UPMC patients from 2000-2022 with SCD, abstracting data from electronic health records (EHR). A total of 62 patients were identified with a prior traumatic event (TE), defined as a sudden onset of physical injuries of any severity requiring an Emergency Department (ED) visit. Injury status was denoted as mild, moderate, and severe based on Trauma Team Activation and Intensive Care Unit (ICU) admission. Time to VOC event, frequency of VOC events pre- and post-TE, and TE and VOC hospital length of stay (LOS) were compared between injury statuses using two-sample t-tests.

Results: Earliest time to VOC event post-TE was noted in patients with mild injuries (826.3hrs), followed by patients with moderate injuries (2349.2hrs) and severe injuries (3252.6hrs). Patients with mild injuries observed a 28% increase in VOC frequency post-injury (p=0.04), followed by patients with severe injury at 20% (p=0.24), and moderate injuries at 8% (p=0.16). LOS of first VOC post-TE increased for patients with severe injuries by 472% (p=0.784), followed by patients with moderate injuries by 202% (p=0.16).

Conclusion: Our findings are the first to provide preliminary evidence for an association between multi-system traumatic injury and poor SCD outcomes, especially patients classified as having mild traumatic injuries and thus not requiring ED triage or admission. Early discharge following an injury may result in unforeseen physiologic stressors contributing to occurrence of VOC and prolonged hospital admissions. Further research is required to identify effective post-TE triage protocols and target appropriate health interventions for SCD patients suffering traumatic injuries.

Presenter: Abhijay Nadkarni

Agency: University of Pittsburgh, School of Public Health,
Department of Epidemiology, BEAM Lab
Preceptor: Andrea Rosso, PhD, MPH

Association of Brain Injury Biomarkers in Plasma with Gait Measures: The Cardiovascular Health Study

Background/Objective: Gait impairment is a major concern for older adults, as it increases fall risk, mobility decline and may have neurological contributions. We explored how plasma biomarkers of brain injury were related to gait speed changes in older adults. We also examined cross-sectional associations with quantitative gait measures in a subsample of our ancillary cohort.

Methods: Participants were from the Cardiovascular Health Study, a population-based cohort study of cardiovascular risk factors in 5888 adults ≥ 65 years old. Participants who were free from diabetes received a plasma biomarker assessment (Quanterix™) at year 9 to assess neurofilament light chain (NfL), Glial Fibrillary Acidic Protein (GFAP), Ubiquitin Carboxy terminal Hydrolase-L1 (UCH-L1) and tau levels. Our main cohort (n=1959) had biomarker data, completed a 15-foot timed walk and was followed from study years 9 (1998) to 11 (2000). Among these, a subsample (n=380) walked on a 4-meter GaitMat for quantitative gait measures (gait speed, step length, double support time, step time, step length variability and step time variability) at the Pittsburgh site in year 9. Linear mixed effects (LME) models adjusted for age, education, gender and race assessed the longitudinal association of biomarkers (year 9) with gait speed (years 9-11). Meanwhile, linear regression and Spearman's correlations quantified the cross-sectional association between biomarkers and GaitMat II measures.

Results: Our main cohort (n=1959) had a mean age of 78 (SD=4.5) years, baseline gait speed of 0.91 (0.25) m/s and was 60.8% female. Higher NfL levels were associated with lower baseline gait speed (standardized $\beta = -0.93 [-1.62, -0.24]$) and annual gait speed decline (standardized $\beta = -0.69 [-1.28, -0.10]$) after adjustment ($p < 0.05$). These results were also confirmed in the subsample, as higher NfL associated with slower gait speed cross-sectionally ($\beta = -0.0005$, 95% CI: $[-0.0008, -0.0002]$). Other gait measures were unrelated to any plasma biomarkers in cross-sectional or longitudinal analyses after adjustment.

Conclusion: NfL was most strongly related to gait speed at baseline and longitudinally, but not significantly associated with remaining gait measures, indicating that gait speed may be related to specific aspects of axonal degeneration. Our results can inform public health efforts to screen individuals vulnerable to gait impairment.

Presenter: Fatimah Dixon

Agency: Allegheny County Health Department, Pittsburgh Summer Institute
Preceptors: Hannah Hardy, PhD, MPA and Michael Kroeker

Operationalizing Theoretical Frameworks for Equity Evaluation: A Practical Application of RE-AIM and R4P

Background/Objective: In 2018, the CDC awarded the Allegheny County Health Department (ACHD) the *Racial and Ethnic Approaches to Community Health* (REACH) Grant to be utilized for the *Live Well Allegheny: Lifting Wellness for African Americans* initiative that promotes health and racial equity for Black residents by addressing several risk factors for chronic disease in six priority communities in Allegheny County. Through collaborative work with >25 community partner organizations, stakeholders, and residents, REACH formed a diverse coalition to increase access to nutritional foods, physical activities, breastfeeding support, and community-clinical linkages. Now in its fifth year, the REACH Coalition has committed to several accountability measures, including an equity audit of past/current work plans to gauge their achievement of equity and identify areas for improvement. To prepare for the audit, I conducted preliminary research on the REACH Coalition to familiarize myself with its overall aims, priority areas, existing community programs, and its internal structure with partner organizations.

Methods: I engaged with REACH partner leaders to gain insight into the coalition's existing data of CDC metrics (i.e., patient referrals and enrollment, reported in yearly performance reviews). I wrote a literature review on health and racial equity, and I found two equity frameworks, RE-AIM and R4P, that will serve as the basis of the evaluation audit by utilizing an array of diverse indicators.

Results: I divided the pre-audit materials into two assessments, each modeling the format and line of questioning of the RE-AIM and R4P frameworks. The first assessment is a self-evaluation for partner leaders to be self-reflective of their own tendencies to perpetuate biases about race, gender, and class oppression. The second assessment is an organizational-level reflective assessment for organizations to gauge equity in their work environment and during the planning and intervention stages of their programs.

Conclusion: My internship was successful in delivering a useful tool for the coalition, as well as the technical consulting and evaluator committee from the University of Pittsburgh, to be self-evaluative of equity within their programs and work towards improvement. Next steps will be to perform the equity audit utilizing the two assessments with every REACH partner organization.

Presenter: Hunter Doyle

Agency: UPMC Presbyterian-Shadyside, Infection Prevention
& Control Department

Preceptors: Graham Snyder, MD, MS and Madeline Berg, MPH, CIC

Correcting Misattribution of *Clostridioides difficile* in a Healthcare Setting: A Novel Approach

Background/Objective: NSHN guidelines define a *Clostridioides difficile* HAI as a positive specimen collected on hospital day ≥ 3 ; this definition may not accurately reflect where the acquisition of the organism or antibiotic “trigger” for development of symptomatic infection occurred. We devised a novel *C. difficile* attribution measure and compared this attribution to the NHSN attribution.

Methods: *C. difficile* events at two acute care facilities (A and B) from 7/2019-12/2021 were analyzed. The attribution metric ascribes one day of attribution to the unit where the patient was located for that day, for each of the 14 days preceding the diagnosis. We correlated the *C. difficile* NHSN HAI rate with the attribution measure, by inpatient unit-month, stratified by facility and unit types (intensive care unit [ICU] and non-ICU). Both measures were normalized as a percent of the *C. difficile* attribution for each facility, monthly. Box plots describe the distribution of monthly difference in *C. difficile* percent attribution (NHSN-defined attribution minus novel attribution measure) for each unit.

Results: During the 30-month study period, there were 727 NHSN-adjudicated *C. difficile* HAI events; the novel metric attributed 15,904 days of attribution. The correlation coefficients for non-ICU units were 0.81 (95%CI, 0.79-0.83) and 0.74 (95%CI, 0.70-0.78) and for ICU units were 0.75 (95%CI, 0.68-0.80) and 0.70 (95%CI, 0.60-0.77) at hospitals A and B, respectively. For all four stratifications (ICU/non-ICU, hospital A/B), the distribution of difference in percent attribution showed higher attribution using NHSN measure than the novel attribution metric: 43% (3/7) of ICU units and 14% (4/28) of non-ICU units in hospital A, and 20% (1/5) of ICU units and 25% (4/16) of non-ICU units in hospital B had a median difference >0 . The remainder of units had a median difference of zero; no units had a median of <0 .

Conclusion: The novel *C. difficile* attribution metric shifts attribution from acute care units to other healthcare and community settings, and correlates modestly with NHSN methodology of attribution. The attribution metric is sufficiently different that if accurate, may provide a better indicator of where to implement *C. difficile* reduction efforts.

Presenter: Aishwarya Mukundan

Agency: Allegheny County Health Department, Pittsburgh Summer Institute
Preceptor: Kell Wilkinson

Improving Language Access for those with Limited English Proficiency, Deafness, or Blindness: Allegheny County

Background/Objective: According to the US Department of Justice Civil Rights Division, Allegheny County has 25 - 50k residents with limited English proficiency (LEP). Allegheny County Health Department (ACHD) recognizes that its programs must have adequate access to language assistance material for people who are blind or deaf/hard of hearing (HH), or people with LEP and is committed to providing efficient and effective communication. Therefore, the objectives were to develop educational tools for programs on 1) ACHD’s commitment to language access; 2) data surrounding the need for language access; 3) best practices when communicating with people who are blind, deaf, or have LEP; 4) language access vendors that are available to ACHD staff; 5) visual aids for readily accessible language services.

Methods: Research methods included a review of language access commitment statements and resources from other health departments and similar agencies; research on the most commonly spoken languages by individuals with LEP in Allegheny County; compiling a list of language access vendors accessible to staff; a review of best practices for communicating with those that are blind, deaf, or with LEP.

Results: An educational slide deck was created that included 1) data exhibiting language service needs; 2) language access and commitment statements; 3) best practices for communicating with people who have LEP, blind, or deaf/HH individuals; 4) vendors accessible to staff; 5) visual aids— a poster with the phrase “I Speak (Language)” in common languages and a language line procedure card; 6) quiz and survey to test understanding and gain feedback. This 1.5-hour presentation, which was presented to 25 staff members at the ACHD’s STD clinic, will be used by other programs as a training aid. Additionally, 50 posters and approximately 700 business cards were ordered for distribution to programs.

Conclusion: Due to the high engagement of program staff with the training, positive feedback from the survey, and a high volume of visual aid orders, investment in further research surrounding language access should be implemented. In addition, future work should study diverse material for effective communication with people who are blind, deaf/HH, or have LEP.

Presenter: Mikaela Moore

Agency: Jewish Healthcare Foundation

Preceptor: Jennifer Condel

Ecosystem of Support and Resources for Black Birth Givers and Workers: Pittsburgh a Safer Childbirth City

Background/Objective: In the United States, birth givers face high maternal mortality rates of 23.8 deaths per 100,000, higher than all other industrialized countries. Black birth givers face a higher rate of 55.3 deaths per 100,000 live births. In Pittsburgh, Black birth givers are dying three times more than white birth givers during pregnancy, with most of these being deemed preventable deaths. Because of this, Pittsburgh has become “A Safer Childbirth City” (SCC) with the aims of supporting community-based organizations with high levels of maternal mortality and morbidity. The Jewish Healthcare Foundation (JHF) oversees this initiative, and my internship project was to create a visual ecosystem of SCC to better understand its scope.

Methods: After going through each organization’s website under SCC, and collaborating with the JHF team, I created a draft of a web-like graphic with each organization in SCC, and their services. At the All-Partner’s meeting at the end of my internship, seven community organizations (The Birthing Hut, MAYA Organization, Brown Mamas, Kangaroo Birthing, Elephant Song, Hello Neighbor, and Healthy Start), and senior leadership offered feedback on how to improve the layout of connections and fill in gaps that JHF might have missed.

Results: The web-like graphic had each organization with color coded dots correlating to the type of services. It highlighted that all community organizations were in the birthing space, with multiple offering Doula services. It also highlighted that there were many spaces occupied by only one organization, including anti-racism training, services for incarcerated individuals, and more. Based on the visual, I recommend continued collaboration in areas that are siloed to bring different populations to needed services.

Conclusion: Partners seemed grateful for the visual but needed some help understanding how it all works together, suggesting that the visual was not accessible for those outside of the foundation and current space. Reflections did highlight how grateful partners were for a space to work as a collaborative and appreciated the facilitation and action steps towards a common goal of reducing black birth giver mortality.

Presenter: Harika Dyer

*Agency: Western Pennsylvania Regional Data Center, University of Pittsburgh
Center for Social and Urban Research*

Preceptor: Elizabeth Monk, MS

Data Literacy to Advance Health in Allegheny County

Background/Objective: Public health research has explored relationships between health and health literacy—the capacity to understand and use basic health information. However, there is limited research on relationships between health and *data literacy*: the ability to find, understand, and argue with *any* data, not just health data. With misinformation and disinformation on the rise, the ability to think critically about data and recognize its misuse may have important health consequences. For my internship at the Western Pennsylvania Regional Data Center (WPRDC) I began to explore this issue by helping to improve the accessibility of public data, exploring community data literacy needs, and planning and facilitating data literacy workshops.

Methods: I added and organized public data in WPRDC’s Child Health Data Explorer to make it more meaningful to diverse users. The Data Explorer presents visualizations of city, county, and UPMC data related to Allegheny County communities, accompanied by contextual and source information. I also helped to adapt elements of WPRDC’s Data 101 Toolkit into a data literacy workshop for Hill District teens, and I am now helping to assess the need for a series of workshops aimed at improving data literacy among adults who work in the community.

Results: Access to the beta-version Data Explorer has already been requested by county and nonprofit users, indicating a need for easier access to public data in Allegheny County. Participants in the teen data literacy workshop indicated that they found the material beneficial, and the data literacy needs assessment among adult community members is ongoing. I hope to build on this work to explore descriptive statistics related to data literacy in Allegheny County and begin to explore its potential relationships with health literacy and with health outcomes.

Conclusion: Data literacy is gaining increasing focus among social justice advocates but remains largely unexplored as a social determinant of health. My work at WPRDC provides initial evidence of community interest in data literacy and may form the basis for future research on data literacy and health.

Presenter: Erin Fanning

Agency: Stantec ChemRisk

Preceptor: Laura Allen MS, CIH

Prostate Cancer Incidence and Mortality in Firefighters

Background/Objective: The International Agency for Research on Cancer (IARC) classifies occupational exposure as a firefighter as carcinogenic to humans. However, in a report published in 2022, IARC described that evidence in humans for prostate cancer specifically was “limited.” Firefighters are exposed to numerous chemical agents both while suppressing fires and in fire stations. The American Cancer Society cites that some of these chemical exposures may be linked to an increased risk of prostate cancer. Prostate cancer is the second most common cancer and second leading cause of cancer death in American men. During my internship, I reviewed the available literature on the potential association between firefighting exposure and prostate cancer incidence and mortality and analyzed whether there could be a causal relationship.

Methods: A literature search was conducted on August 15, 2022, in PubMed exploring the association between firefighting exposure and prostate cancer. For each relevant article, researchers summarized and tabled information on study duration, occupation, how cases or deaths were ascertained, the reference population/control group, and all effect estimates describing the relationship between firefighting exposure and prostate cancer incidence/mortality. Forest plots were created to visualize risk estimates. Bradford Hill’s criteria for causation were used to analyze a potential causal relationship between firefighting exposure and prostate cancer.

Results: One-hundred and forty-seven articles were produced from the literature search. Forty-eight articles were included in the final review after excluding those that did not provide information on the firefighting population or prostate cancer specifically. The majority (33) of included studies were cohort studies. Firefighters from thirteen countries starting employment from 1902 to 2019 were represented and followed for up to sixty-two years. Risk estimates were consistently positive, but the majority were weak and non-significant. Most prostate cancer risk estimates produced from these studies did not exceed 2.0, and the majority were less than 1.5. Only 3 of 29 overall incidence risk estimates and 1 of 19 overall mortality risk estimates exceeded 1.5. Hill’s criteria did not show evidence of a causal relationship.

Conclusion: There is no consistent epidemiological evidence of a causal association between career firefighting and the development of prostate cancer.

Presenter: Ally Maurer

Agency: UPMC Mercy

Preceptors: Mohamed Yassin, MD, PhD and Heather Dixon, MSN, RN, CPHQ, CIC

Colonization versus Infection of C. difficile: Reviewing Two-Step Testing at UPMC Mercy

Background/Objective: Clostridioides difficile (CD) is one of the most prominent hospital associated infections in the United States, with approximately half a million infections yearly. Two-step testing has become more universally used for diagnosis; however, little is known about its ability to detect colonization vs. infection. The aim of my internship project was to evaluate cycle threshold of polymerase chain reaction (PCR), toxin production, and symptoms in differentiating CD infection from colonization.

Methods: This retrospective study evaluated CD positive tests from January 2021 to April 2022 at UPMC Mercy. Electronic health records provided demographics, symptoms, and testing results. The first test was performed on TechLab’s C. DIFF QUIK CHEK COMPLETE and second on GeneXpert’s Xpert C. Diff/Epi instrument; second test included Cycle threshold (Ct) values and the cutoff was 25. Infection preventionists and myself used the EHR system to extract patient demographics, medications, and C. diff symptoms: loose stools, high white blood cell count, fever > 38 Celsius, and abdominal issues. We examined difference in proportions of toxin negative versus positive patients using a two or one-proportion z-test using Stata.

Results: Among 122 CD positive patients, 46% (n=56) were toxin positive. The 66 toxin negative patients had both tests completed; 46 individuals had a Ct value above 25. After performing two or one-proportion z-tests, it was determined there was no evidence to conclude any statistically significant differences in rates of symptoms, medications, or treatments between toxin positive and negative patients, $p \geq 0.05$ for all comparisons. Additionally, there was no evidence to conclude there are any differences in rates of these factors between those with a Ct greater than versus less than 25. However, there was evidence to support a statistically significant difference in proportion of toxin negative patients with a Ct value less than compared to greater than 25.

Conclusion: Our lack of differences indicate that testing is accurately diagnosing patients with CDI, and we were unable to differentiate colonization from infection based on study parameters. No testing is perfect, but improving the two-step method within healthcare settings will reduce overdiagnosis of disease.

Presenter: Emilee Maull

Agency: Marshall University, West Virginia Local Health Inc.

Preceptor: Deborah Koester, PhD, DNP, MSN, RN

Substance Use Disorder Recovery and Overdose Prevention in Southern West Virginia

Background/Objective: The southern region of West Virginia is particularly vulnerable to the substance use disorder epidemic. This public health problem stems from the increase in use of prescription and non-prescription illicit substances, including opioids. Known risk factors for substance use disorder include poverty, limited resources, and low socioeconomic status. In 2019, Marshall University partnered with local communities in southern West Virginia to establish the Southern West Virginia Rural Opioid Planning Consortium and develop a regional system for addiction care in Logan, McDowell, Mercer, Mingo, and Wyoming counties. My role with Marshall University was to compile substance use data in the region, create data profiles for the five counties in Southern West Virginia, and create monthly Quick Response Team (QRT) meeting PowerPoints of data from the QRT leaders to use with Consortium partners.

Methods: Multiple sources were used to compile substance use data for each of the five counties. The data were then used to create multi-county data profiles that were made for public consumption to educate about substance use disorder epidemic. Demographics, overdose and overdose death data, COVID-19 data, criminal activity, county health rankings, and community resources were all included in the county data profiles. PowerPoints were created on a monthly basis for QRT meetings among county leaders in the region to further understand and support response.

Results: The county data profiles revealed that the different indicators varied across all five counties. COVID-19 data was also included to highlight a more current health issue facing the region. McDowell county ranked the lowest for the overall health outcomes rank among all 55 counties in West Virginia, but all five counties ranked in the lower 20% for this indicator. Community resources also showed that access to care is challenging in these five counties, with Logan, McDowell, Mingo, and Wyoming counties only having one hospital per county.

Conclusion: The county data profiles created were well received by the team. The QRT meetings were productive in discussions on how to reduce substance use disorder based on the graphs and data for each county.

Presenter: Bailee Fleming

Agency: Allegheny County Health Department, Pittsburgh Summer Institute

Preceptors: Leah Lamonte, Nicholas Baldauf, and Jamie Sokol, MPH

West Nile Virus in Allegheny County, Pennsylvania in 2022: A Surveillance Report

Background/Objective: West Nile Virus (WNV) is a common vector borne virus in the US. It is endemic to Allegheny County, but it is seasonal with most human infections occurring in late summer and early fall. *Culex pipiens* and *Culex restuans* mosquitoes drive how the virus is spread through transmission from birds to humans. Asymptomatic infection is common with 80% of people experiencing no symptoms. The remaining 20% experience flu-like symptoms, with less than 1% of people developing neuroinvasive symptoms. Allegheny County had one human case in 2018, in 2021, and one more in 2022. Surveillance is done by the Allegheny County Health Department to monitor the WNV levels in the mosquito population to minimize the risk to the public. My internship aim was to conduct the field work involved with this surveillance effort.

Methods: Gravid traps are used to replicate places where female *Culex* mosquitoes lay their eggs. A motor and net are used to trap mosquitoes when they approach the water in the gravid trap. After 24 hours, the traps are collected for processing. Samples are shipped to the Department of Environmental Protection lab for testing. There are 25 locations throughout the city of Pittsburgh where traps are placed on a weekly basis. An additional 5 traps are placed on a rotating basis to cover different parts of the county.

Results: Allegheny County reported its first WNV positive sample on June 23, 2022. As of September 13, 2022, there have been 108 positives from 470 samples with an average of 50 mosquitoes per pool. The vector index, which measures the proportion of infected mosquitoes in an area, is calculated from these samples. When this is over 600, ACHD sprays pesticide in the affected areas. As of September 13, 2022, there have been 5 spraying events covering many Pittsburgh neighborhoods.

Conclusion: Mosquito WNV surveillance is important in collecting data about the prevalence of WNV in the county. The data is used to raise community awareness, encourage self-protection, and to decide where and when spray events should occur.

Presenter: Annamaria Fort

*Agency: University of Pittsburgh, School of Public Health,
Department of Epidemiology*

Preceptor: Akira Sekikawa, MD, PhD, MPH

Review of Current Knowledge and Misconceptions of Sex Differences in Arterial Stiffness

Background/Objective: Cardiovascular disease (CVD) is the leading cause of mortality in the US. There is significant evidence of arterial stiffness being a vital indicator of many CV-related diseases and even a causal mechanism. The rise in arterial stiffness has contributed to aging, but older women are twice more likely to have a rapid onset of this condition as well as more detrimental health effects. However, there is a clear disproportionate impact of arterial stiffness in women as compared to men. The purpose of this internship was to review the current literature surrounding sex differences in arterial stiffness to then develop a plan for prevention and bridging the gap of knowledge.

Methods: Targeted review of literature on arterial stiffness and sex differences with the connection to hypertension and pulsatility to better understand the current knowledge of arterial stiffness in women and possible solutions to improve clinical practices and research.

Results: The review showed key misconceptions and faults in current research, which deeply surrounds the concept of menopause and clinical practices in prevention for women. Important indicators should be hypertension and pulsatility. There is evidence for an association of hypertension and pulsatility with arterial stiffness from many studies including the University's ERA JUMP study. The pathophysiology of arterial stiffness as a marker for hypertension as well as pulsatility need to be further explored to understand these sex differences. To improve the clinical practice, there needs to be a better developed risk stratification index for middle-aged peri-menopausal women.

Conclusion: Implementation of clinical prevention programs for both peri and post-menopausal women using the tools of PWV, PP and the development for a more inclusive risk stratification system would improve health outcomes for women. I learned through this practicum vital tools for developing a risk stratification system, new data analysis methods and the complexities of casual mechanisms for CVD and arterial stiffness.

Presenter: Nancy Luosang

*Agency: UPMC Presbyterian-Shadyside, Infection Prevention
& Control Department*

Preceptors: Graham Snyder, MD, MS and Victoria Crall, MPH, CIC

Improving Compliance to a Standardized Protocol to Reduce Head and Neck Surgical Site Infections

Background/Objective: Patients undergoing head and neck reconstructive surgeries are at high risk for surgical site infections (SSI). Due to inevitable microbial burden, adherence to interventions to address this should reduce SSI risk. This project aims to analyze the effectiveness of the implementation of a four-component standardized operative wound care protocol in reducing the incidence of National Healthcare Safety Networked (NSHN) defined neck SSIs.

Methods: This is a quasi-experimental quality-improvement study; data were collected for baseline (July-December 2021) and phase 1 of intervention (June-August 2022). The intervention comprises nursing education and feedback of compliance to SSI reduction process measures to improve compliance, including emollient (Aquaphor) 2x/day, oral antiseptic (Peridex) $\geq 2x/day$, and metronidazole and cefazolin (antimicrobials) intravenous infusion pre-operatively. Compliance with protocol is the proportion of completed emollient and oral antiseptic use among all opportunities during the length of stay and the percent of doses appropriately administered pre-operatively for antimicrobials; these are assessed through medical record reviews and data visualization tools. Compliance pre- and post-intervention were compared using a two-sample test of proportions. Descriptive SSI rates are compared by events per qualifying procedure of baseline and phase 1 periods.

Results: There were 131 procedures and 963 days of opportunity in the baseline period and 52 procedures and 383 days of opportunity in the phase 1 period. Between the baseline and phase 1 period, compliance improved for emollient (59% vs 83%, $p=0.0$); did not significantly change for oral antiseptic (45% vs 48%, $p=0.3$) and cefazolin (85% vs 94%, $p=0.9$); and worsened for metronidazole (36% vs 29%, $p=0.01$). SSI rate was 13.74% and 5.77% per procedure in baseline and phase 1, respectively; the difference is not statistically significant ($p=0.13$).

Conclusion: Nursing implementation of wound care SSI prevention measures improved with education and compliance feedback; however, antibiotic prophylaxis prescribing did not show improvement. Phase 1 intervention does not encompass the full implementation of educational materials for the nurses, only standardized surgeon ordering. Results from phase 1 show promise and for phase 2, we will continue the intervention over a longer time-period to understand impact and durability.

Presenter: Jiatong (Carol) Li

Agency: University of Pittsburgh, School of Public Health,
Department of Epidemiology, ebrain Group
Preceptor: Caterina Rosano, MD, MPH

Brain Oxygen Extraction (OEF) In Elderly Population: Potential Relationship to Cardiovascular Risk Factors

Background/Objective: Cerebral oxygen extraction fraction (OEF), a key parameter of brain metabolism, can be measured by the MRI scan non-invasively using the T2-relaxation-under-spin-tagging (TRUST) sequence. Previous studies in older adults showed that OEF was inversely related to cognitive function. Several cardiovascular risk factors (CVRFs) and diseases can affect brain metabolism. Initial studies suggest that high OEF is related to hypertriglyceridemia. However, the relationship between age-related CVRFs and OEF in older adults without clinically overt cardiovascular diseases is not clear. My internship project focused on estimating the associations between CVRF and OEF.

Methods: The Monongahela-Youghiogheny Healthy Aging Team (MYHAT) study, a population-based study in southwestern Pennsylvania focusing on mild cognitive impairment of the elderly population, began in 2006-2008, with annual clinical assessments. In 2019-20, a subsample of 57 participants underwent a 3T MRI with the TRUST sequence, with concurrent assessments of cholesterol, blood pressure, diabetes, arrhythmia, and body mass index. The MRI imaging quality control was performed based on previously published research protocols. The venous oxygenation data extracted from the TRUST scan were used to compute the OEF. Multivariable linear regression models estimated the cross-sectional association between each CVRF and OEF, adjusted for population characteristics (age, sex, education, alcohol intake, and APOE4 status).

Results: A total of 57 individuals from the MYHAT study (mean age \pm standard deviation, 69.0 \pm 2.8, 21 male) underwent 3T neuroimaging with TRUST. After adjusting for age, sex, education, and APOE4 status, high cholesterol was associated with higher OEF ($\beta=0.05$, $p=0.009$); We also found high blood pressure was associated with lower OEF ($\beta= -0.03$, $p=0.07$), with a trend toward significance.

Conclusion: MRI -based oxygen extraction could be helpful to assess the impact of CVRFs on brain metabolism. Future studies should assess the opposite trends of association with high cholesterol and hypertension.

Presenter: David Frank

Agency: University of Pittsburgh School of Medicine
Preceptor: Ravy Vajravelu, MD, MSCE

Patient Factors Associated with Guideline-recommended Pharmacotherapy of Hypercholesterolemia

Background/Objective: The American Heart Association has highlighted disparities by race in cardiovascular disease risk factors, incidence, treatment, and mortality. These are thought to be due to a combination of structural inequalities and implicit bias. For my internship, we evaluated race-based health disparities using statin therapy as a model condition to isolate the effect of implicit bias.

Methods: We performed this study using data from the National Health and Nutrition Examination Survey (NHANES) from 2015-2020. We identified individuals ages 18-75 with atherosclerotic cardiovascular disease (ASCVD) or hypercholesterolemia. The outcome of interest was whether these individuals were prescribed high-dose statin therapy as recommended by 2013 and 2018 ACC/AHA blood cholesterol guidelines. The main exposure of interest was race/ethnicity. To isolate the effect of implicit bias on adherence to guideline-recommended statin therapy, we adjusted for factors related to disease severity, access to care, and ability to adhere to medical care plans using logistic regression. These factors included age, sex, race/ethnicity, insurance type, family history of ASCVD, perceived health, prescription coverage, polypharmacy, ASCVD risk and healthcare access. Analyses were performed for both primary prevention and secondary prevention of ASCVD.

Results: Out of 25,531 nationally representative NHANES participants, we identified 1,076 participants eligible for high-dose statin due to ASCVD (15.6 million US population) and 437 due to primary prevention (12.8 million US population). Black and Asian race/ethnicity were associated with lower odds of not receiving high-intensity statin therapy for primary prevention (OR 2.65, 95% CI 1.21-5.77) (OR 4.80, 95% CI 1.39-16.56). For secondary prevention, Black race/ethnicity was associated with higher odds and Asian race/ethnicity was associated with lower odds of not receiving high-intensity therapy (OR 1.58, 95% CI 1.14-2.19) (OR 0.41, 95% 0.23-0.75). Additionally, women had higher odds of not receiving high intensity therapy for secondary prevention (OR 2.71, 95% 1.84-3.99).

Conclusion: Our results demonstrate that significant disparities in delivery of guideline concordant pharmacotherapy exist for prevention of ASCVD in a nationally representative sample, even after adjusting for structural inequalities. Further progress must be made on researching and achieving pharmaco-equity, while also improving provider diversity in order to reduce implicit bias for hypercholesterolemia treatment.

Presenter: Emma Gay

*Agency: Cancer Epidemiology Education in Special Populations (CEESP)
Program, CUNY School of Medicine*

Preceptor: Brenda Diergaarde, PhD and Amir Soliman, MD, PhD

Disparities in Lung Cancer Diagnosis During the COVID-19 Pandemic in Western Pennsylvania

Background/Objective: Lung cancer is the second most common cancer and the leading cause of cancer-related death in Pennsylvania (PA). Prior to the COVID-19 pandemic, incidence rates had been decreasing by 0.8% annually. PA entered a stay-at-home order on April 1, 2020 which ended June 4, 2020. The objective of this internship project was to assess the effects of the pandemic on lung cancer diagnoses with a focus on the initial lockdown period and rural-urban disparities.

Methods: Data for all lung cancer patients diagnosed in 2019 and 2020 was obtained from the UPMC Network Cancer Registry. Patients were excluded if missing age or sex, age < 20, stage 0, and not a PA resident. The total number of cases diagnosed in each year were compared and then stratified by month of diagnosis and rural/urban residence. Descriptive and analytic statistics were performed using SAS; graphics were made using GraphPad.

Results: Patients diagnosed in 2020 did not significantly differ by age, sex, race, smoking history, or stage at diagnosis from those diagnosed in 2019. Overall, there were less lung cancer diagnoses in 2020 (n=1190) compared to 2019 (n=1316; p=0.01); the decrease was more than the expected number of 10.5 cases/year. Evaluation of the number of diagnoses per month by year showed declines during the months (April, May) corresponding to the stay-at-home order. When stratified by rural/urban residence, no decrease in total number of diagnoses was observed among rural residents but it declined among urban residents, most notably in April and May of 2020.

Conclusion: These preliminary analyses showed a noticeable drop in diagnoses during the initial lockdown period, and no increase during the second half of 2020 compared to the same period in 2019. The drop in total number of diagnoses in 2020 versus 2019 appears to be driven by a decline in diagnoses among urban residents. The rural-urban differences may be due to differing attitudes about the threat posed by COVID-19 and/or support of the stay-at-home order. Understanding the effects of the COVID-19 pandemic on cancer diagnoses and outcomes will help inform public health policy and practice for future pandemics.

Presenter: Eve Johnson

*Agency: Age-Friendly Greater Pittsburgh
Preceptor: Laura Poskin, MPSG*

An Evaluation of Age-Friendly Greater Pittsburgh's Planning Phase: September 2021-August 2022

Background/Objective: In Allegheny County, the population is aging rapidly; by 2045, Southwestern Pennsylvania will see a 75% increase in individuals older than 75. There is a growing urgency to meet the needs of older populations and connect to their communities. Age-Friendly Greater Pittsburgh (AFGP), part of the WHO's Global Network of Age Friendly Cities and Communities, strives to make the region a more inclusive and respectful place to grow old. The purpose of this internship was to conduct AFGP's yearly process evaluation to determine whether AFGP's activities are reaching their intended target populations, which activities from the initial Action Plan have and have not been carried out, and how to overcome potential barriers to implementing the Action Plan. AFGP will incorporate recommendations from this report into their future plans and continue to align their activities with their goals.

Methods: I reviewed AFGP's internal documents and had discussions with the Executive and Assistant Directors to understand the organizations' goals and major activities over the last year. I developed evaluation indicators for AFGP's activities using the RE-AIM framework. I conducted document reviews and synthesized data from AFGP's spreadsheets to quantify their reach. I also interviewed key informants from AFGP and their Work Groups to identify common themes and understand the inputs and process of each activity.

Results: I am currently writing the evaluation report covering AFGP's activities from September 2021-August 2022, highlighting the emphasis AFGP has placed on inclusive programming and intentional planning processes in the last year. Additionally, I will present my evaluation findings to AFGP's Steering Committee in December.

Conclusion: AFGP has continued to achieve its goals, expanding their program reach and developing models for partnership that provide sustainability and stability. Strengths identified through this evaluation include a strong network of supporting partners, engagement of diverse stakeholders in their planning processes, and a commitment to working with other local organizations to ensure that their plans and goals for the region align. Recommendations include a consistent use of SMARTIE goals for all activities, continued efforts to secure partnerships with city and county governments, and the development of accessible tracking tools.

Presenter: Carolyn Impagliazzo

Agency: University of Pittsburgh School of Medicine

Preceptor: Dr. Yael Schenker MD, MAS, FAAHPM

Uses of Telehealth to Expand Access to Palliative Care: A Systematic Review.

Background/Objective: Telehealth, the use of technology to deliver medical care, is an innovative way to expand access to palliative care for seriously ill individuals. We sought to (1) describe how telehealth is currently used to increase access to palliative care, (2) identify barriers and facilitators for different telehealth approaches and (3) identify gaps in supportive evidence surrounding telehealth utilization in palliative care.

Method: We conducted a systematic review to identify articles related to telehealth in palliative care. Telehealth is the use of technology to deliver various types of care to patients virtually. Any articles containing non-original research or unavailable in English were excluded. Using the review software Distiller, two researchers review each full text article to determine eligibility. Eligible articles are abstracted by two researchers, using a standardized form to identify research methods, outcomes, and overall research quality.

Results: We initially identified 9343 articles; but 8706 were excluded based on abstract review. These articles were further narrowed to 636, of which 151 were deemed eligible for abstraction. Initial analysis demonstrates that telehealth palliative care falls into one of four categories: telemedicine (full palliative care visit with specialty provider via video/phone), E-Health (use of a self-monitoring or self-reporting symptom tool), telecoaching (connecting palliative care teams to non-palliative care teams to improve care between specialties), and E-consult (providers request advice from palliative care specialists). At this time, data has not been compiled to report which studies displayed noteworthy outcomes.

Conclusion: Our literature search shows that all four types of telehealth are used to increase access to specialty palliative care. Technology literacy was the most common barrier reported while facilitators varied between assistance from research staff and study provided devices. Few studies reported the impact of telehealth on patient outcomes. Several of the telemedicine and e-health interventions showed significant results regarding QOL and symptom management. No evidence was found that reported patient outcomes in relation to telecoaching and E-consult when not combined with telemedicine. Most studies did not contain sufficient data to formally assess quality. Of those that did, less than 5 were determined poor quality.

Presenter: Kathleen Gruschow

*Agency: University of Pittsburgh, School of Public Health,
Department of Epidemiology*

Preceptor: Evelyn Talbott, DrPH, MPH

Health Effects of Hydraulic Fracturing: A Case-Control Study of Childhood Cancers

Background/Objective: Childhood cancer is the third-leading cause of death in U.S. children, yet there are very few known risk factors. There is concern that certain types of cancer rates are elevated in the Southwestern Pennsylvania childhood population. The PA Health and Environment cancer case-control study is examining residential history, family medical history, workplace exposures, and exposure to unconventional natural gas development activities and other industrial pollutants. The study region includes Allegheny county and the seven surrounding counties. My internship responsibilities were to assist in modifying study materials, aiding in recruitment efforts, and interviewing participants.

Methods: The cancer case-control study is in the recruitment and data collection phase of research. The study team and I selected the most critical information from the study and created an abbreviated questionnaire. The study team and I sent recruitment materials to 300-400 control participants each week. The recruitment materials included a letter from our study team, a letter from the Pennsylvania Secretary of Health, a brochure describing the study, and a postcard for the participants to indicate their consent status.

Results: I managed the incoming mail to the study office, which included updating participant information in an Access database and screening participants for eligibility. I have begun to clean the participant's data in order for geocoding. The creation of the short questionnaire allowed us to substantially increase the response rate of cases. I gained experience communicating audience-appropriate public health content by speaking to participants through emails and phone calls. Data analysis is forthcoming.

Conclusion: Working on the PA Health and Environment team has given me a strong interest in environmental health. We are expecting to determine risk factors associated with childhood cancer and hypothesize that cases relative to controls are more likely to live in close vicinity to environmental exposures of interest after adjustment for other risk factors. I will assist with the study until December 2022.

Presenter: Alexis Henderson

Agency: University of Pittsburgh, School of Public Health, Bridging the Gaps Pittsburgh (Youth Enrichment Services)

Preceptor: Thistle Elias, DrPH, MPA

Addressing the Effects of Trauma Among At-Risk Youth in Allegheny County

Background/Objective: Gun violence and adverse childhood events have lasting deleterious effects on families and communities. Consequently, many at-risk youths turn to unhealthy coping mechanisms, become more likely to engage in conflict, or leave their traumas unaddressed. My internship's objective was to provide the students and families Youth Enrichment Services (YES) serves with resources to address Substance Abuse, Stress/ Coping Mechanisms, and Discrimination.

Methods: Information regarding students' health needs was collected through conversations with staff and survey administration to 60 students participating in YES's summer programming. Students were aged 13-18. Survey results determined the three health issues to be included in the Teen Health Resource Poster. It asked participants to rank four health issues (Substance Abuse, Stress/ Coping Mechanisms, Discrimination, and Teen Sexual Health) from most (1) to least (4) relevant. It also asked an open-ended question, where students could list additional health concerns. The most relevant issues were determined by taking the sum of all students' responses for each issue. The issue with the overall smallest number was identified as most relevant.

Results: Responses showed that Substance Abuse (107), Stress/Coping Mechanisms (108), and Discrimination (117) were the three health issues adolescents deemed most relevant. Two participants responded to the open-ended question, expressing interest in learning about nutrition (addressed via a second intervention). The poster provides a brief description of each health issue and four corresponding resources in Allegheny County. Accessibility was assessed using Microsoft Word's reading level estimate tool, which rated the poster at a third-grade reading level. Virtual (via QR code) and physical copies of the poster were given to YES. In the virtual version, the names of each resource have links to the resource's websites embedded to facilitate access.

Conclusion: YES declared 2022 their "Year of Peace and Nonviolence." Staff members are passionate about mitigating the impact gun violence has had on YES's students and expressed the need to address associated trauma. The Teen Health Resource poster appropriately supplements YES's mission. Through connecting YES's clients to resources available in the Pittsburgh area, this poster will potentially help the many families that frequent the office heal from the traumas they have experienced.

Presenter: Stuthi Iyer

Agency: University of Pittsburgh School of Medicine, Department of Critical Care Medicine, Clinical Research Investigation and Systems Modeling of Acute Illness (CRISMA) Center

Preceptor: Christopher W. Seymour, MD, MSc

The Association Between A Prehospital Plasma Biomarker and Sepsis in Emergency Care

Background/Objective: More than 750,000 Americans are hospitalized with sepsis annually, and 20% may not survive. Emergency medical services (EMS) provide essential care for more than half of hospitalized sepsis patients, yet the diagnosis of sepsis may be delayed or missed. Plasma biomarkers provide key information about acute infection and organ dysfunction in other acute care settings, yet are understudied during prehospital care. One important sepsis biomarker is the high mobility group box protein 1 (HMGB1), which my internship project explored in the prehospital setting.

Methods: We randomly selected 20 cases meeting Sepsis-3 criteria within 24h of hospital admission and individually matched them to 20 nearest neighbor controls on (1) sex, (2) age, (3) race and (4) Elixhauser comorbidity index from the Pittsburgh Prehospital LINKing Evaluation (PIPELINE) study, which enrolled adult nontrauma, nonarrest prehospital patients at risk for sepsis who were transported by the City of Pittsburgh Bureau of EMS between August 2013 and February 2014 ($N = 345$). EMS clinical data were gathered for each patient encounter and linked to electronic health record data at UPMC hospitals. Lactate was measured at the point of care and prehospital blood samples were processed by the CRISMA Biospecimen Core upon Emergency Department arrival. Plasma HMGB1 was quantified using an express ELISA. Demographic and clinical characteristics of patients were described. Comparisons between groups were computed using R statistical software with Wilcoxon signed-rank tests for continuous data and Fisher's exact tests for categorical data.

Results: Baseline demographics, prehospital vital signs, and validated prehospital critical illness risk scores were similar between groups. Patients with Sepsis-3 had significantly higher prehospital HMGB1 [median (IQR): 6.5 (0.6–14.6) vs. 2.7 (1.2–12.9)ng/mL; $P < 0.001$] compared to nonseptic controls. They also had a longer length of hospital stay [median (IQR) 5.0 (2–19) vs. 1.5 (1–5) days; $P < 0.001$] and greater rates of ICU admissions [5 (21%) vs. 0 (0%); $P = 0.11$].

Conclusion: Prehospital HMGB1 was associated with Sepsis-3 on arrival and may contribute to early sepsis recognition as an important regulator of an early inflammatory response to an insult, including sepsis. Future work will assess the feasibility of point-of-care prehospital measurement.

Presenter: Mindy Hwang

Agency: University of Pittsburgh School of Medicine, Department of Psychiatry

Preceptor: Natacha De Genna, PhD

Neonatal Outcomes and Maternal Characteristics Associated with Prenatal Use of Tobacco and/ or Cannabis

Background/ Objective: Cannabis is the most commonly used federally illicit drug during pregnancy and there has been increasing legalization of cannabis despite the lack of updated information on its potency and risks. Prenatal cannabis use is also more common among women who smoke cigarettes during pregnancy. Several observational studies have shown significant associations between prenatal cannabis/ tobacco exposure and adverse birth outcomes; however, these findings have been inconsistent. These associations may also be confounded by maternal sociodemographic and environmental characteristics. This internship experience involved extracting and analyzing data as part of the YoungMoms Study, which looks at birth outcomes, as well as specific maternal characteristics, associated with prenatal tobacco and/ or cannabis use in young mothers.

Methods: The ongoing YoungMoms Study uses a mixed-method approach (anonymous self-reporting surveys, electronic medical record data [EMR], urine testing) to gather quantitative and qualitative data to assess prenatal cannabis and/ or tobacco exposure in pregnant adolescents and young adults. Mothers who used other illicit drugs during pregnancy were excluded from the study.

Results: At the time of preliminary data analysis, 280 participants had been recruited and 131 had delivered. Of the 118 participants included, 47% (n=55) used either cannabis or tobacco, or both during pregnancy. The average birth weight, birth weight percentile, and birth height percentile were 3083 grams versus 2936 grams, 43% versus 34%, and 60% versus 50% in the control versus the tobacco and cannabis use groups, respectively. Non-parametric tests (Kruskal-Wallis Test) showed that these differences were not statistically significant ($p > 0.05$), possibly due to the small sample size in each group.

Conclusion: The preliminary numerical analysis show that infants born to mothers in the cannabis and tobacco use group are smaller (weight and height) on average at birth compared to the control group. As more participants give birth, further data extraction and analysis will take place to assess for statistically significant differences. Survey and EMR data extraction and analysis will also need to be completed to assess maternal characteristics.

Presenter: Nicole Herdzik

Agency: TTI Health Research & Economics

Preceptor: Ashley Sier MPH, CPH

The Role of Airborne Microbiological Contaminates on Surgical Site Infections: A Systematic Literature Review

Background/Objective: Surgical site infections (SSIs) are a common hospital acquired infection. Prevention of infection in operating rooms consists of a wide array of efforts such as rigorous hand washing, antiseptic and antibiotic prophylaxis, and disinfection of the environment. Literature has noted that airborne microbiological contamination is a potential source for infection but the methodology of measuring the contamination is inconsistent. Thus, making evaluation and comparison of the literature a challenge. The objective of this internship project was to review existing literature of airborne microbiological contamination in operating rooms as a potential source of surgical site infection and/or wound contamination.

Methods: Searching PubMed using a combination of MeSH terms, with the last search on July 2, 2022, a review of existing literature measuring airborne contamination in operating rooms and SSI or wound contamination was conducted. Three reviewers independently screened for titles, abstracts, and full texts that fit the inclusion criteria. Study design, contamination type, and key points were collected from each article for further examination.

Results: A total of 475 articles were screened for the review with 33 articles used for inclusion. Articles were excluded if they did not contain airborne contamination, did not contain SSI and/or wound contamination, did not use a human population, were not original research, or were not accessible by the reviewers. The three reviewers, with oversight from a senior advisor, reviewed the articles for inclusion and drafted a manuscript. The literature showed a connection between airborne microbiological contamination and SSIs/wound contamination. Additionally, there was evidence to support that the use of ventilation systems to control for the contamination was successful.

Conclusion: The literature review can better help hospitals be aware of the risk of airborne microbiological contamination in operating rooms and make decisions about how to reduce this risk. Throughout the internship, I was able to expand my knowledge of conducting an epidemiologic study from start to finish.

Presenter: Samantha Hernandez

*Agency: Western Pennsylvania Regional Data Center, University of Pittsburgh
Center for Social and Urban Research*

Preceptors: Bob Gradeck and Mickey McGlasson, MS

Neighborhood Indicators' Relationship with Population Change Identifies Disparities in Allegheny County: A Preliminary Analysis

Background/Objective: The places where people live affect their health, security, education, and economic success; conversely, these factors also affect where people live. The geographic legacy of redlining has reinforced racial segregation in Pittsburgh with Black communities concentrated in historically disinvested areas. While demographic trends are an important indicator of disparities related to neighborhood change, examining factors that drive disparities is an essential step toward achieving health equity. Therefore, my internship sought to 1) explore the relationship between population change in Allegheny County from 2010-2020 and neighborhood indicators and 2) highlight neighborhoods and populations that are more vulnerable to neighborhood change and/or displacement.

Methods: To understand how the population has changed over time in Allegheny County, three components of change were examined: births, deaths, and migration. Using QGIS, I created choropleth maps to visualize percent population change, natural population change, and net migration at the census tract level. Using Excel, I joined structured economic and demographic data to model patterns of neighborhood change. Ultimately, I reduced the Social Determinants of Health framework to four indices that reflect 25 social, economic, environmental, and health indicators of neighborhood advantage. I then cross-tabulated each index with the rate of population change.

Results: By 2020, west Pittsburgh and the Mon Valley experienced a population decline of up to 25 percent of the 2010 population while east Pittsburgh and areas north and west of Allegheny County experienced population growth of up to 200 percent. Within Pittsburgh, Terrace Village and Larimer had the highest degree of population decline while Allegheny Center/West, Downtown, Northview Heights, Strip District, and Shadyside had the highest degree of population growth. All four indices were inversely related to population change. The housing market value analysis index, community need index, environmental justice index, and community health index identified Pittsburgh and the Mon Valley as disadvantaged communities that experienced population decline.

Conclusion: This analysis will be used to engage residents and empower them to tell their stories of neighborhood change and displacement which is fundamental for understanding increasing inequities. This can inform public health policies to address inequities and drive investment in disadvantaged neighborhoods that are experiencing population decline.

Presenter: Caroline Hoffman

*Agency: University of Pittsburgh, School of Public Health,
Department of Epidemiology*

Preceptor: Evelyn Talbott, DrPH, MPH

Recruiting Participants for a Hydraulic Fracking Childhood Cancer Case Control Study in SW PA

Background/Objective: Hydraulic fracturing started in western Pennsylvania in 2005 and has grown immensely, including over 1,000 active unconventional wells in both Washington and Greene counties. Rapid growth of unconventional natural gas development (UNGD) raises health concerns about the potential impact on children vulnerable to environmental hazards regarding long-term effects, such as cancer. At the request of Governor Wolf and the Pennsylvania Department of Health (PADOH), the PA Health and Environment Study is being conducted to investigate environmental risk factors for childhood cancers in Southwestern Pennsylvania. My internship focused on recruitment of the cohort.

Methods: Cancer registry files were obtained from the Pennsylvania Department of Health (PADOH) Cancer Registry. The cases are children aged 0-19 living in one of eight SW PA counties who were diagnosed with acute lymphoblastic leukemia, non-Hodgkins lymphoma, central nervous system tumors, or Ewing's sarcoma/bone cancers between 2010 and 2019. Birth files were obtained from the PADOH Division of Vital Records on the cases and controls. Each cancer case was matched to two cancer-free controls based on birth year, race, sex, and county of residence. Parents of the two groups of children were contacted to describe the study by mail and to determine their interest. After obtaining consent, the parents had the option of a one-time interview, online or written survey.

Results: To date, 220 cases have completed the survey, as well as 378 total controls. The answers collected captures detailed lifetime risk factor information regarding residential history, child's school history, demographics, parental occupations, parental smoking history, family health histories, and geographic proximity to environmental exposures such as industrial, oil/gas drilling, agricultural sites, and major roadways.

Conclusion: The interview data are being used to assess possible associations between environmental risk factors and childhood cancer. This is the first study of its kind to gather personal interviews and historical residency data as it relates to proximity to UNGD sites, environmental exposures, and related risk of cancer in children. It fills a dearth in the body of UNGD and health outcomes research.