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**Public Health Forum**

**Spring 2020**

**Friday May 8, 2020**

**Presented Virtually via Zoom**

11:30 AM – 12:00 PM MPH Public Health Forum Opening Session

 <https://ucdenver.zoom.us/j/97426769739>

12:00 PM – 3:45 PM MPH Oral Presentations – see schedule

The Capstone projects presented are the culminating experiences of students in the Master of Public Health program at the Colorado School of Public Health.

**Please note, presentation times may vary slightly due to unforeseen scheduling changes.**

**The Colorado School of Public Health**

**MPH Capstone Experience**

**Goal**:

The goal of the Capstone experience for Master of Public Health (MPH) students is to connect all aspects of the curriculum, including seminars, lectures, course work, independent studies, projects and direct experiences to establish an understanding, appreciation and working knowledge of public health practice and, specifically, how their chosen areas of concentration enhance public health practice in Colorado, the nation and the world.

**Objectives:**

1. To develop products that can be added to the student’s portfolio, documenting her/his reasoning, decision-making, analytical and authorship skills as they relate to linking important public health projects to the MPH learning objectives and competencies.
2. To provide a collaborative environment for students from all concentrations to review and discuss the core competencies of the MPH curriculum in relationship to their practice related experiences.
3. To provide an independent but guided opportunity for the student to practice and document the role that her/his specific concentration skills play in public health practice.
4. To develop awareness of personal strengths and competencies as a public health professional.

1. To improve skills related to presenting project results in oral and written formats.

**Spring 2020 MPH Capstone Faculty**

Lisa McKenzie, PhD, MPH

Madiha F. Abdel-Maksoud, MD, PhD, MSPH

Dawn Comstock, PhD

Thomas Jaenisch, MD, PhD

Angela Sauaia, MD, PhD

Teresa Sharp, PhD

Sarah Stotz, PhD, MS

Patti Valverde, PhD, MPH

Kayla Williamson, MS

Teaching Assistant: Carl LoFaro, MSW

**The Colorado School of Public Health extends its upmost appreciation to all these preceptors who gave their time and expertise to advise our students on their Capstone Projects:**

|  |  |
| --- | --- |
| Jennifer Adams, MD | University of Colorado School of Medicine; Denver Health |
| Nisha Alden, MPH | Colorado Department of Public Health and Environment |
| Ben Allshouse | Colorado School of Public Health |
| Monica Amador | The GrowHaus |
| Casara Andre, DVM, cVMA | Veterinary Cannabis Education and Consulting |
| Brian Dauenhauer, PhD | UNC Active Schools Institute (ASI |
| Penelope Bennett, PhD, CNM, MPH | Colorado School of Public Health  |
| Mary Bessesen, MD | Department of Veterans Affairs – Eastern Colorado Health Care System (VA ECHCS)  |
| Virginia Borges, MD | School of Medicine - Medical Oncology |
| Sara Brandspigel, MPH | Program for Injury Prevention, Education, and Research (PIPER) |
| Deb Bristol, MURP | Brighton Housing Authority |
| Jaime Butler-Dawson, PhD | Center for Health, Work & Environment |
| Marcy Campbell | Boulder County Public Health |
| Thomas Campbell, MD | UC Health |
| Simon Capewell, MD, DSc | University of Liverpool, Liverpool Department of Public Health and Policy  |
| Elizabeth Carlton, PhD, MPH | Colorado School of Public Health |
| Jessica Cataldi  | University of Colorado Cancer Center |
| Scotti Church, MD | Veterans Community Living Center at Fitzsimmons (Colorado State Veterans Home) |
| Cindy Copeland, MS | Boulder County Public Health |
| JK Costello, MD, MPH | Steadman Group, LLC |
| James Crooks, PhD, MS | National Jewish Health; Colorado School of Public Health- Department of Epidemiology |
| Kelli Curl, MPH | Larimer County Department of Health and Environment (LCDHE) |
| Chris Czaja, MD, MPH | CDPHE |
| Miranda Dally, MS | Center for Health, Work & Environment |
| Stephen Daniels, MD, PhD  | Colorado Childrens Hospital; University of Colorado School of Medicine |
| Lisa Diaz, MPH | Denver Department of Transportation and Infrastructure |
| Agathe Dorel | Denver Department of Public Health and Environment |
| Megan Duffy, MPH | Colorado Department of Public Health and Environment |
| Chris Estes, MPH | Center for Disease Analysis Foundation |
| Charlotte Farewell, PhD, MPH  | Colorado School of Public Health; Rocky Mountain Prevention Research Center |
| Tillman Farley, MD | Multiple Outpatient Care Center Locations  |
| John Fluke, PhD  | The Kempe Center for the Prevention and Treatment of Child Abuse and Neglect |
| Victoria Francis | International Rescue Committee  |
| Reese Garcia, MPH | Fight Colorectal Cancer |
| Gary Grunwald, PhD | Colorado School of Public Health |
| Karen M. Hampanda, PhD, MPH | Center for Global Health |
| Christy Hockett, PhD | Colorado School of Public Health, LEAD Center |
| Fernando Holguin, MD, MPH | Colorado School of Public Health - Latino Research and Policy Center |
| Jason Hoppe, DO, FACEP | UCHealth |
| Lindsay Houston, MPH | The Steadman Group |
| Cori Howard, MHC | Central Colorado Area Health Education Center  |
| K. Joseph Hurt | University of Colorado School of Medicine Department of Obstetrics and Gynecology |
| Christymarie Jackson, MPH | Denver Public Health |
| Kathy James, PhD | Colorado School of Public Health - Environmental and Occupational Health |
| Ethan Jamison, MPH | Colorado Department of Public Health and Environment |
| Helen Johnston, MPH | Colorado Department of Public Health and Environment |
| Marissa Kaesemeyer, MHA | Pediatric Care Network |
| Dr. Mark Katz | Consultant for the World Health Organization |
| Breanna Kawasaki, MPH | Colorado Department of Public Health and Environment |
| Lori Kennedy, MPH | Colorado Department of Public Health and Environment |
| Angela Keniston, MSPH | UCHealth University of Colorado Hospital, Division of Hospital Medicine |
| Greg Kinney, PhD | Colorado School of Public Health; National Jewish Health |
| Jennifer Kiser, PharmD, PhD | University of Colorado-AMC, Skaggs School of Pharmacy and Pharmaceutical Sciences |
| Christopher Kleck, MD | UC Health |
| Alex Kloehn | Lutheran Family Services and United Way |
| Lyndsay Krisher, MPH | Center for Health, Work & Environment |
| Mariah La Rue, MS | Colorado Department of Public Health and Environment |
| Molly Lamb, PhD | Colorado School of Public Health  |
| Sarah Lampe, MPH | Trailhead Institute |
| Caroline Ledbetter, MPH  | Colorado School of Public Health |
| Jenn Leiferman, PhD | Colorado School of Publich Health - Population Mental Health and Wellbeing Program |
| Sarah Macrander | Colorado Community Health Network (CCHN) |
| Kari Mader, MD MPH | DAWN Clinic; University of Colorado Department of Family Medicine |
| Lisa McKenzie, PhD, MPH  | Colorado School of Public Health |
| Rachel Mesia | Stanford Cancer Institute |
| Jessica Mestas  | UCHealth |
| Christie Mettenbrink, MSPH | Denver Public Health |
| Stacy Miller, PhD, RD, CLC  | Colorado Department of Public Health and Environment |
| Wendy Moschetti | LiveWell Colorado |
| Mikhaela Mullins | Denver Urban Gardens |
| Lee Newman, MD, MA | Center for Health, Work & Environment |
| Jamie Nordhagen, MS, RN | UCHealth |
| Jill Norris, PhD, MPH | Colorado School of Public Health |
| Douglas Novins, MD | Center for American Indian and Alaska Native Health  |
| Katie O'Connor, MPH | Children's Hospital Colorado |
| Graham Ogle, MD | Life For A Child, University of Colorado Anschutz- Barbara Davis Center for Diabetes |
| Rebecca Orsi, PhD, MS | The Kempe Center for the Prevention and Treatment of Child Abuse and Neglect |
| Sonali Patel, MD, PhD | Colorado Childrens Hospital; University of Colorado School of Medicine |
| Emily Payne, MSPH  | Boulder County Public Health |
| Wei Perng, MPH, PhD | Colorado School of Public Health |
| Scott Primack, DO | Colorado Rehabilitation and Physical Medicine / Comprehensive Outcomes Measurement Technologies |
| Sierra Quintana, MPH | Center for American Indian and Alaska Native Health |
| Daniel Ramos | One Colorado |
| Sara Reese | Swedish Medical Center |
| John Rice, PhD, MSPH | Colorado School of Public Health- Department of Biostatistics, ACCORDS |
| Terri Richardson, MD | Colorado Black Health Collaborative  |
| Amelia Ritchhart  | Lutheran Family Services and United Way |
| Fernando Riosmena | University of Colorado Boulder |
| Cordelia Rosenberg, PhD, RN | JFK Partners |
| Carly Rossi |  St. Anthony’s Hospital (Centura Health) |
| Elizabeth Rumbel, MA | Denver Public Health |
| Jessica Sanchez | Colorado Community Health Network (CCHN) |
| Lizbeth Schoon | City and County of Denver |
| Dayna Scott | Broomfield Fellowship in Serving Humanity (FISH) |
| Kimber Simmons, MD, MS  | Life For A Child, University of Colorado Anschutz- Barbara Davis Center for Diabetes |
| Christine Spina, MSPH | Adult and Child Consortium for Health Outcomes Research and Delivery Science (ACCORDS) |
| Erin Starzyk, PHD | Colorado Department of Public Health and Environment |
| James Stith | UCHealth |
| Darcy Thompson, MD, MPH/MSPH | Adult and Child Consortium for Health Outcomes Research and Delivery Science (ACCORDS) |
| Collin Tomb | Boulder County Public Health |
| Jessica Tracy, RN | Town of Dedham Health Department |
| Kevin Trice, MD | Baptist Health Madisonville |
| Patrick Van Horne | Boulder Office of Emergency Management |
| Cathreine Velopulos, MD, MHS | University of Colorado, Department of Surgery  |
| Michael Vente  | Colorado Department of Higher Education  |
| Sharry Vere, MD | Centura Health |
| Laura Verbert | Chaska |
| Kieu Vu, MSPH | Colorado Department of Public Health and Environment |
| Jessica Wallace | Denver Health |

Thank you

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| **TIME** | **Zoom Room 1 – Facilitators: Thomas Jaenisch & Teresa Sharp****Zoom Meeting ID:** <https://ucdenver.zoom.us/j/986206852> |
| **12:00 PM** | **Kyria Brown – MPH & MSW***Perception of Social Support and Maternal Mental Health* |
| **12:15 PM** | **Cassidy Christopher – MPH & MSW***Evaluating the Experiences and Policy Needs of Licensed Clinical Social Workers at Colorado Federally Qualified Health Centers* |
| **12:30 PM** | **Liza Elkin – MPH & MSW***Assessing Smoking Cessation Interventions at St. Anthony Hospital’s Comprehensive Stroke Center for Guideline Compliance* |
| **12:45 PM** | **Kimberlee Balsamo – CHE** *Promoting Children’s Physical Activity by Gathering and Distributing Community Physical Activity Resources* |
| **1:00 PM** | **Lauren Davis – CHE** *Integration of Uniformed Police Officers into the City and County of Denver (CCD) Citywide Wellness Program* |
| **1:15 PM** | **Charlette Flanders – CHE** *Stanford Cancer Institute Health Needs Assessment:* *Evaluating the Cancer Burden in the California Greater Bay Area* |
| **1:30 PM** | **Brianna Robles – CHE***Larimer County Sexual Health Assessment* |
| **1:45 PM** | *Break* |
| **2:00 PM** | **Leslie Walker – CHE** *Educational Material for Community Members Working with the Greeley Refugee Population* |
| **2:15 PM** | **Allison Moore – MPH & MD** *US Incarcerated Population: Exploring Factors Leading to Violent Death* |
| **2:30 PM** | **Mackenzie Garcia – MPH & MD***Developing a Public & Population Health Curriculum for Medical Students* |
| **2:45 PM** | **Rebecca Guigli – CBHS** *Taking Care of Our Own: Identifying Program Recommendations Aimed at Decreasing Household Food Insecurity Among Team Members at Children’s Hospital Colorado* |
| **3:00 PM** | **Timothy Kelly – MPH & MD***Firearm Storage Maps: A Pragmatic Approach to Reduce Firearm Suicide During Times of Risk* |
| **3:15 PM** | **Stephanie Leonard – MPH & MURP***Cross-Sector Database Framework to Align Health and Housing in Brighton, Colorado* |
| **3:30 PM** |  |

**BIOS**= Biostatistics, **CBHS**= Community & Behavioral Health, **CHE**= Community Health Education (UNC), **EHOH**= Environmental Health and Occupational Health, **EPID**= Epidemiology, **HSMP**= Health Systems Management & Policy, **LPH**=Leadership in Public Health, **MCH**=Maternal & Child Health

**See next page for more presentations!**

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| **TIME** | **Zoom Room 2 – Facilitators: Sarah Stotz & Carl LoFaro****Zoom Meeting ID:** <https://ucdenver.zoom.us/j/901681240> |
| **12:00 PM** | **Jason Wright, PharmD – LPH** *HIV Pre-exposure Prophylaxis (PrEP) Program Expansion Evaluation* |
| **12:15 PM** | **Caitlin Chapman – LPH** *Expanding Breastfeeding Best Practices in the Child Care Setting through a Train the Trainer Pilot Program in Colorado* |
| **12:30 PM** | **Michael Lott-Manier - LPH***Direct Democracy and Suicide in Colorado: Exploring the Interaction of Civic Engagement and Public Health* |
| **12:45 PM** | **Lisa Mettler, MD – LPH** *Development and Implementation of a Medicare Annual Wellness Visit Workflow Improvement Project- a Look at Processes, Challenges, and Future Directions* |
| **1:00 PM** | **Kathryn Razavi-Shearer – LPH** *Modeling NAFLD Disease Burden in Singapore 2019-2030* |
| **1:15 PM** | **Ibukun Akinboyewa, MD – LPH** *Rates of Trial of Labor After Cesarean Section Versus Repeat Cesarean Section Amongst Women in a Rural Southern Community: A Retrospective Analysis* |
| **1:30 PM** | **Bruce J. Lanser, MD – LPH***Analysis of Anaphylaxis Events in Colorado Public Schools, 2015-2019* |
| **1:45 PM** | *Break* |
| **2:00 PM** | **Kathy Lehenbauer, MD – LPH***Improving Student-Run Free Clinic Community Partnerships:* *An Evaluation of the Inaugural Year of a Community Board* |
| **2:15 PM** | **Marina Woolums – LPH** *Understanding barriers and opportunities to improve adoption of genomic biomarker testing for colorectal cancer at the national level* |
| **2:30 PM** | **Catherine Kradel – CBHS** *Measuring the Impact of Positive Youth Development in Urban Garden Education:* *The GrowHaus Evaluation Toolkit* |
| **2:45 PM** | **Veronika Hanna – CBHS** *Examining Naloxone Accessibility Within Public Pharmacies in Colorado* |
| **3:00 PM** | **Juan Martinez, MD – LPH** *Determine Correlations of Increased Female Suicide Rate in the United States: An analysis of the increased rate of suicide among females in western states and potential correlations with demographic factors* |
| **3:15 PM** |  |
| **3:30 PM** |  |

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| **TIME** | **Zoom Room 3 – Facilitator: Patricia Valverde****Zoom Meeting ID:** <https://ucdenver.zoom.us/j/517327613> |
| **12:00 PM** | **Sarah DeLong - CBHS***Evaluation of Refugees’ Understanding of the United States Health Insurance System* |
| **12:15 PM** | **Ryan Tsipis – CBHS** *Water Tariff Analysis Across All Water For People Country Programs* |
| **12:30 PM** | **Kyla** **Muñoz – CBHS** *Development of a Database for Colorado’s Medical Marijuana Registry Data for Tableau Dashboard Visualization* |
| **12:45 PM** | **Rebecca Rodriguez Salazar – CBHS** *Understanding Factors Influencing Screen Use in Low-income Mexican-American Families: A Secondary Analysis* |
| **1:00 PM** | **Rhiannon Streight – CBHS***Evaluating a School-based Garden Program to Improve Quality, Increase Parent Engagement and Investigate Mental Health Impact: The Healthy Seedlings Experience* |
| **1:15 PM** | **Laura Hill – CBHS** *Process Evaluation of a Wellness Coaching Program within Internal Medicine, UCHealth* |
| **1:30 PM** | **Katherine Myers – CBHS** *Evaluating a Comprehensive Sexuality Education Program in Cusco, Peru* |
| **1:45 PM** | *Break* |
| **2:00 PM** | **Lauren Winchell – CBHS** *Understanding Motivators and Barriers for Participation in Farm to Early Care & Education among Colorado Providers* |
| **2:15 PM** | **Michelle Kleitsch – MCH** *Impact of Indoor Air Pollution and Allergens on Asthma in Low Income Children Living in the East Colfax Corridor* |
| **2:30 PM** | **Nalleli Ramirez-Salinas – MCH** *Recommendations for the Implementation of Breastfeeding Friendly Accommodations at Outdoor Public Events in the City and County of Denver* |
| **2:45 PM** | **Marcella Fasano, MA – MCH***“I Know How to Handle Him”:**A Qualitative Analysis on Navigating Pregnancy, HIV, and Gender Power Dynamics for Women in Zambia* |
| **3:00 PM** | **Obinna Diala, MBBS – MCH** *Learning about Barriers Individuals with Dual Diagnosis experience in accessing Colorado Crisis System* |
| **3:15 PM** | **Rachel Lacy – CBHS***Development of an Evaluation Plan for a Prenatal Wellness Program* |
| **3:30 PM** | **Micah Cornett – MPH & MD***Association Between Illicit Drug Use and E-cigarette Use Among High School Students in Colorado* |

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| **TIME** | **Zoom Room 4 – Facilitator: Lisa McKenzie****Zoom Meeting ID:** <https://ucdenver.zoom.us/j/326569099> |
| **12:00 PM** | **Jonathan Bihl – EHOH** *Relationship Between Occupational Status and Cardiovascular Disease in the San Luis Valley* |
| **12:15 PM** | **Caitlin Brown – EHOH** *A Hospital-Based Study of Noninfectious Outcomes Related to Foley Catheter Insertion in Emergency Department Patients* |
| **12:30 PM** | **Kendra DeHerrerra – EHOH** *Bacterial Load Quantification of the Sanitized Hands of Medical Professionals with Various Nail Characteristics in an Outpatient Care Setting* |
| **12:45 PM** | **Carolyn Ho – MPH & MD***Difficult Communication Encounters in Obstetrics: A Training Program for Medical Professionals* |
| **1:00 PM** | **Ariella Foss – EHOH** *Anxiety Rates Among Residents Living Near Unconventional Oil and Gas Sites in Colorado* |
| **1:15 PM** | **Farrah Zeort – EHOH** *Examining Underlying Health Status in Guatemalan Sugarcane Workers and its Impacts on Productivity and Attrition During the Harvest Season: 2018-2019* |
| **1:30 PM** | **Kathy Pang – EHOH***Elementary School Absenteeism and Ground-Level Ozone in Colorado* |
| **1:45 PM** | *Break* |
| **2:00 PM** | **Connor Celentano – EHOH***Oil and Gas Development’s Air Quality Impacts and Resulting Health Effects: A Systematic Review* |
| **2:15 PM** | **Kirk Hohsfield – EHOH & EPID***Effect of Wet-Bulb Globe Temperature and Baseline eGFR on the Rate of Dehydration Injury in Guatemalan Sugarcane Cutters* |
| **2:30 PM** | **Christine Prissel – EHOH & EPID***Climate Changes Everything: The Importance of Accounting for Precipitation in Studies of Sanitation and Diarrhea* |
| **2:45 PM** | **Kate Cochran – EHOH** *Evaluation of the Spatiotemporal Relationships Between Oil & Gas Development and Suicide in Colorado: 2008-2018* |
| **3:00 PM** | **Emily Culbertson – EHOH** *A Review of Colorado’s Changing Climate and Health* |
| **3:15 PM** | **Erin Girard – EHOH** *Spatial Analysis of the Relationship between Climatic Conditions and Chronic Kidney Disease of Unknown Origin (CKDu) in Guatemalan Sugarcane Farmers* |
| **3:30 PM** |  |

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| **TIME** | **Zoom Room 5 – Facilitator:**  **Angela Sauaia****Zoom Meeting ID:** <https://ucdenver.zoom.us/j/991920473> |
| **12:00 PM** | **Mariah Salerno – HSMP** *The ‘Nanny State’ Perspective: Implications for Public Health Advocacy*  |
| **12:15 PM** | **Cynthia Jimenez – HSMP** *Surveying Colorado Community Health Centers on Their Uptake and Utilization of Social Determinants of Health Screening Tools* |
| **12:30 PM** | **Katherine Waters – HSMP** *Non-Medical Exemption Policies in Child Care Centers: An Analysis of Colorado Practice Compared to National and Global Contexts* |
| **12:45 PM** | **Allison Baker – HSMP** *Improving Care Coordination in Complex, Long Length-of-Stay Patients* |
| **1:00 PM** | **Casey Connolly – HSMP** *Environmental Scan of the Current Substance Use Disorder Treatment Landscape in Jefferson County, Colorado* |
| **1:15 PM** | **Ilona Dewald – HSMP** *How to Ensure Quality in the Integration of a Behavioral Health Department in Primary Care Clinics* |
| **1:30 PM** | **Johanna Gelderman – HSMP***Pediatric Care Network Asthma Program: Key Data Elements of a Technical Solution to Track and Manage Asthma Care* |
| **1:45 PM** | *Break* |
| **2:00 PM** | **Thora Holm – HSMP***Discovery Interviews: Ensures Smooth Implementation for a Smart Cities Web-based Key Performance Indicator Dashboard at Denver’s Department of Public Health and Environment* |
| **2:15 PM** | **Jeremy Lee – HSMP** *Succession Planning to Meet the Future Leadership Needs of Denver Public Health* |
| **2:30 PM** | **Kimberly Phu – HSMP** *Developing a Process Evaluation Plan for a Community Pilot Program* |
| **2:45 PM** | **Kathleen Risk – HSMP** *Policy Analysis and Recommendation on Injury Prevention in School Zones for the City and County of Denver* |
| **3:00 PM** | **BreAnna Teeters – HSMP***A Case Study: Evaluating the Colorado Black Health Collaborative’s Health Ministry Toolkit and the Standing of Faith Based Organizations in Public Health Using Organizational Theory* |
| **3:15 PM** | **Sara Kitchen – HSMP** *Idaho’s Maternal Mortality Review Committee: A Toolkit for Development and Implementation* |
| **3:30 PM** | **Victoria Vela – HSMP***Boulder County Hospital Supply Chain Assessment* |

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| **TIME** | **Zoom Room 6 – Facilitator: Kayla Williamson****Zoom Meeting ID:** <https://ucdenver.zoom.us/j/111449163> |
| **12:00 PM** | **Jessica Stubblefield – EPID***Understanding Characteristics of Child Maltreatment Reporting and Foster Care Placement in the U.S. from 2005 to 2017* |
| **12:15 PM** | **Rachel Steinberg – EPID** *Spatial Analysis of the Relationship Between Youth Type 2 Diabetes Incidence and the Built Environment in a Rural American Indian Community* |
| **12:30 PM** | **Jessica Lopeman – EPID** *Predictors of Mortality in Clostridium difficile Infections* |
| **12:45 PM** | **Mina Moghaddami – EPID** *Risk and Protective Factors for Intimate Partner Violence Among LGBTQ High School Youth in Colorado* |
| **1:00 PM** | **Amanda Ireton – EPID** *DNA Methylation Mediates the Relationship Between Family History of Type 1 Diabetes and Type 1 Diabetes Risk* |
| **1:15 PM** | **Kylie Kline – EPID** *Long-term Heavy Cannabis Use and its effects on Respiratory Health* |
| **1:30 PM** | **Robert Suss – EPID & BIOS***Evaluating the Role of Physical Activity on Mood Disorder Symptom Development in Pre-Adolescents* |
| **1:45 PM** | *Break* |
| **2:00 PM** | **Kathleen Angell – EPID & BIOS***Perinatal Determinants of a Positive Health Index in Early Adolescence* |
| **2:15 PM** | **Hannah Marinoff – EPID & BIOS***Factors Associated with Quality of Life in Kaposi Sarcoma Patients in Zimbabwe* |
| **2:30 PM** | **Sophia Centi – BIOS** *Investigating the Effects of Psychosocial Status on Recovery Time in Injured Adults* |
| **2:45 PM** | **Anna Metzger – BIOS** *The Quality of Daily Volume Status Measures in Patients Hospitalized for Heart Failure and Its Association with Patient Outcomes* |
| **3:00 PM** | **Ryan Coyle – BIOS** *Evaluating the Correlation between Adherence Measures in Drug Users with Hepatitis C taking Ledipasvir/Sofosbuvir* |
| **3:15 PM** | **Ann Giesenhagen – HSMP & BIOS***Health Disparities in Opioid Prescribing Patterns and Subsequent Long-Term Use: A Retrospective Cross-Sectional Analysis of UCHealth Emergency Departments* |
| **3:30 PM** | **Rachel Weber – BIOS***SAFE Act Passage and Incidence of Gun Violence in New York City* |

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| **TIME** | **Zoom Room 7 – Facilitator: Madiha Abdel-Maksoud****Zoom Meeting ID:** <https://ucdenver.zoom.us/j/658032485> |
| **12:00 PM** | **Ariel Alonso – EPID***Depression Among Mexican Americans: A Comparison Between the 1982-1984 Hispanic Health and Nutrition Examination Survey and the 2015-2018 National Health and Nutrition Examination Survey* |
| **12:15 PM** | **Mary Boyd – EPID** *Comparisons on the Demographics of the Estimated Undiagnosed HIV Population in Colorado*  |
| **12:30 PM** | **Erin Coleman – EPID** *Outcomes with Cannabis Treatment in Canine and Feline Patients who Sought Cannabis Harm Reduction Consultations Conducted by Veterinary Cannabis Education and Consulting from 2017-2019* |
| **12:45 PM** | **Nolan Green - EPID***Gonococcal Antimicrobial Reduced Susceptibility Trends in Denver, 2017-2019* |
| **1:00 PM** | **Lisa Kisling Thompson – EPID***What Clinical and Behavioral Factors Impact Clinical Weight Loss? An Analysis of One Colorado Weight Loss Clinic* |
| **1:15 PM** | **Maeve Lawlor - EPID** *A Comparison of Inspection Records Between Food Establishments in Two Massachusetts Towns with Differing Food Safety Regulations* |
| **1:30 PM** | **Sophie Luckett-Cole - EPID***The Effects of Inter-Parent Relationship Quality on Parental Mental Health and Child Behavior Outcomes* |
| **1:45 PM** | *Break* |
| **2:00 PM** | **Sarah McLafferty – EPID** *Co-Infections Among Patients Experiencing Homelessness Hospitalized with Influenza in Colorado* |
| **2:15 PM** | **Betsy** **Feighner Miller, DVM – EPID** *Risk Factors for Carbapenemase-Producing Enterobacteriaceae in Denver, Colorado: 2013-2018* |
| **2:30 PM** | **Shannon O’Brien, MD – EPID** *The Effect of Socioeconomic Status on HPV-Related Oropharyngeal Cancer Stage at Diagnosis: An Analysis of Colorado Cases.* |
| **2:45 PM** | **Kaitlyn Probst – EPID** *Missed Opportunities: Following Syphilis Diagnoses to HIV Diagnosis in Coloradans* |
| **3:00 PM** | **Patrick Ryan, MD – EPID***Augmenting Predictive Models for Hospital Readmissions with Social Determinants of Health* |
| **3:15 PM** | **Taryn Robertson – EPID** *The Continuous Improvement Care Coordination Learning Series* |
| **3:30 PM** | **Leslie Baldwin – EPID** *Epidemiology of Invasive Group B Streptococcal Infections and Prediction of Requirement of Intensive Care for Adults in the Denver Metropolitan Area: 2014-2018* |

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| **TIME** | **Zoom Room 8 – Facilitator: Dawn Comstock****Zoom Meeting ID:** <https://ucdenver.zoom.us/j/242075042> |
| **12:00 PM** | **Kimberly Tolchinsky – HSMP** *Hunger Free Campus Checklist: Program Recommendations to Address Student Food Insecurity at Colorado Higher Education Institutions* |
| **12:15 PM** | **Kelly Zavaleta – HSMP** *Evaluating Pediatric Provider Communication Strategies and Self-Efficacy Regarding Routine Childhood Vaccinations* |
| **12:30 PM** | **Leila Diab – HSMP** *An Analysis of Public Health Improvement and Strategic Planning in Colorado* |
| **12:45 PM** | **Ben Dellos – HSMP** *Cost-effectiveness Analysis of Facial Feminization Surgery* |
| **1:00 PM** | **Christopher McMahon – HSMP** *Streamlining the Process for Multiple Sclerosis Infusion Orders at University of Colorado Hospital* |
| **1:15 PM** | **Jessica Serbus – HSMP** *Utilizing the Independent Sector in Outbreak Response: An Assessment of Immunize Colorado’s Hepatitis A Vaccination Outreach Campaign* |
| **1:30 PM** | **Nnamdi Nwafo – HSMP** *Perspective of Veterans on Factors Affecting Transition to Home Following Discharge from Colorado State Veterans Home* |
| **1:45 PM** | *Break* |
| **2:00 PM** | **Tamara Akers – HSMP** *Grant Proposal for Implementing the Health Resources and Services Administration (HRSA) 2020 Rural Communities Opioid Response Program (RCORP) in Western Colorado* |
| **2:15 PM** | **Bradley Reeves – EPID** *Coflex Utilization for Treatment of Lumbar Spinal Stenosis: A Retrospective Cohort Study* |
| **2:30 PM** | **Desiree Esselman – EPID** *Survival of Ovarian Cancer Patients by Weight Status in Colorado* |
| **2:45 PM** | **Erin Youngkin – EPID** *Clinical Presentation at Onset of Diabetes Does Not Predict Diabetes Treatment* |
| **3:00 PM** | **Puja Shah – EPID** *Examining Differences in Timely Follow-up Between Refugee and Non-Refugee Children With Elevated Blood Lead Levels* |
| **3:15 PM** | **Hannah Parris – EPID** *Recurrence after Neoadjuvant Chemotherapy in Young Women with Postpartum Breast Cancer* |
| **3:30 PM** | **W. Jon Windsor, MLS – EPID** *An Evaluation of Clinical Trajectories for Respiratory Pathogens in the Pediatric Population* |

**BIOS**= Biostatistics, **CBHS**= Community & Behavioral Health, **CHE**= Community Health Education (UNC), **EHOH**= Environmental Health and Occupational Health, **EPID**= Epidemiology, **HSMP**= Health Systems Management & Policy, **LPH**=Leadership in Public Health, **MCH**=Maternal & Child Health

**Grant Proposal for Implementing the** **Health Resources and Services Administration (HRSA) 2020 Rural Communities Opioid Response Program (RCORP) in Western Colorado**

Tamara Akers

Preceptor: JK Costello, MD, MPH

Site: The Steadman Group

**Background:** Western Colorado is disproportionately affected by the increase in opioid use disorders (OUD) and overdose deaths. This disparity is caused by a gap in OUD prevention, treatment, and recovery services in this region. To remediate this pressing public health problem, St. Mary’s Hospital created The Western Colorado Consortium for Opioid Prevention Enhancement, Recovery, and Addiction Treatment Engagement (WeCo2Operate or the Consortium). The purpose of this project is to complete a grant proposal to submit to the HRSA RCORP Implementation grant for WeCo2Operate.

**Methods:** WeCo2Operate was awarded the HRSA RCORP-Planning grant in 2019. The Implementation grant proposal synthesized, updated, and integrated RCORP-Planning grant experience and activities. Activities used include outcomes from targeted workgroups and strategic plans from consortium members. Updated background information and data on SUD prevalence in the service area were included in the proposal. All information was used to write the grant narrative, work plan, and budget.

**Results:** The result for this project is a grant proposal submitted to HRSA with four specific goals that address treatment, recovery, and prevention.

**Conclusions:** When awarded this grant, WeCo2Operate will strengthen and expand SUD/OUD services and will reduce morbidity and mortality in high risk rural communities. The consortium will enhance rural residents’ ability to access treatment and move towards recovery through RCORP core prevention, treatment, and recovery activities.

**Rates of Trial of Labor After Cesarean Section Versus Repeat Cesarean Section Amongst Women in a Rural Southern Community: A Retrospective Analysis**

Ibukun Julia Akinboyewa, MD

Preceptor: Kevin Trice, MD

Site: Baptist Health Madisonville

**Background:** The attempt of a vaginal delivery after a previous cesarean section, known as trial of labor after cesarean section (TOLAC), is accompanied by deterring risks that have driven pregnant women to undergo repeat cesarean section for subsequent deliveries. Our objective is to examine rates of TOLAC vs. repeat cesarean section in a rural hospital, in hopes of encouraging rural physicians to recommend eligible pregnant patients for TOLAC instead of repeat cesarean section.

**Methods:** We performed a chart review of all accessible delivery encounters that were coded “VBAC” or “Repeat Cesarean” at Baptist Health Madisonville from 2009 to 2018. We looked at encounters undergoing TOLAC, successful vaginal birth after cesarean (VBAC), and repeat cesarean sections, both elective and indicated.

**Results:** Of the 369 total accessible delivery encounters, 67 (18%) were admitted for TOLAC. Out of these TOLAC encounters, 50 (74.6%) achieved VBAC. Major complications with TOLAC included postpartum hemorrhage (PPH) and uterine rupture. Complications with repeat cesarean included PPH, incidental cystotomy, and urine rupture; the incidence of each was less than 1%.

**Conclusions:** This retrospective analysis demonstrated that the rates of TOLAC were significantly less than rates of repeat cesarean section at our hospital. TOLAC had a success rate comparable to the national average of 60-80%. Given the benefits of vaginal delivery and the demonstrated success rate of TOLAC in this study, rural physicians should encourage their pregnant patients to undergo TOLAC in non-emergent situations, when no contraindications are present.

**Depression Among Mexican Americans: A Comparison Between the 1982-1984 Hispanic Health and Nutrition Examination Survey and the 2015-2018 National Health and Nutrition Examination Survey**

Ariel Alonso

Preceptor: Fernando Riosmena, PhD

Site: CU Boulder

**Background:** Prevalence of depressive symptoms has been studied extensively among non-Latino Whites, but research for depression among Latinos is limited. We examined the largest group of Latinos, Mexican Americans, over the last four decades to determine the change of depression over time. The study highlights the differences in depression severity among Mexican Americans.

**Methods:** A cross-sectional analysis that examined depression among Mexican Americans, both males and females, >18 years old (n = 4,497) using depression data from the 1982-1984 Hispanic Health and Nutrition Examination Survey (HHANES) and the 2015-2018 National Health and Nutrition Examination Survey (NHANES) cycles. A multivariable logistic regression analysis explored the association of depression between HHANES and NHANES while controlling for age, gender, nativity, and education.

**Results:** The prevalence of depression for Mexican Americans in NHANES was significantly higher than Mexican Americans in HHANES (P <.0001). Mexican Americans in NHANES have 2.88 times the prevalence of depression compared to Mexican Americans in HHANES (95% CI = 2.47, 3.35). After adjusting for age, gender, nativity, and education in the analysis, Mexican Americans in NHANES had 3.23 times the prevalence of depression compared to Mexican Americans in HHANES (95% CI = 2.73, 3.83).

**Conclusions:** The study found that Mexican Americans report having higher prevalence of depression in 2015-2018 as compared to 1982-1984. The significant difference found between HHANES and NHANES highlights the importance of addressing depression among Latinos despite inconsistencies in the literature. Interventions designed to lessen the burden of depression among Mexican Americans should be taken into consideration.

**Perinatal Determinants of a Positive Health Index in Early Adolescence**

Kathleen Angell

Preceptor: Wei Perng, MPH, PhD

Site: University of Colorado - Anschutz Medical Campus

**Background:** The perinatal period is a sensitive time for the programming of future disease risk. Little is known of perinatal determinants of positive aspects of health. Data from the Project Viva pre-birth cohort was leveraged to: (1) create an index representative of positive health during early adolescence; (2) identify perinatal determinants of this index.

**Methods:** Principal components analysis was used to create a positive health representative using four domains of health (biological, functional, behavioral, and experiential) based on data collected from participants, ages 11-16 years. Multivariable linear regression models were used to identify modifiable, semi-modifiable, and non-modifiable perinatal determinants of this score.

**Results:** Mean age of the participants was 13.1±0.8 years; 50.8% were male. No significant associations were observed excluding maternal gestational diabetes mellitus (GDM) with an unexpected increase in health score (P = 0.0405), and maternal race/ethnicity with an expected decrease (P = 0.0330). While the estimate for GDM was attenuated to the null after accounting for child lifestyle characteristics, the estimate for race/ethnicity persisted (P = 0.0124 adjusting for maternal age, child’s age, sex, activity level and pubertal status).

**Conclusions:** Our results are largely null. One explanation for this may be that Project Viva was not initiated to assess positive health, thus, data collection instruments may not be appropriate or sensitive enough to assess positive aspects of health. As the participants age, we anticipate health trajectories to diverge, making it more feasible to detect differences in positive health with respect to perinatal characteristics.

**Improving Care Coordination in Complex, Long Length-of-Stay Patients**

Allison Baker

Preceptor: Jamie Nordhagen, MS, RN, NEA-BC

Site: UCHealth- MDSS/HMS 7 Unit

**Background:** Patients with complex social or behavioral needs without acute healthcare needs are difficult to discharge and care for in an inpatient setting. The purpose of this project is to create a new care delivery model for this patient population that provides faster discharge and better transition back into society.

**Methods:** We conducted literature reviews to gain insight on how other hospitals have approached LOSO patients and the best route of care, along with how to implement this change with the staff. Measures for length of stay, bed availability, and costs were taken for the current care delivery model in order to project changes with the new care delivery model. A business plan was used to consolidate all information and draft the timeline of changes.

**Results:** Costs associated with implementation are projected to pay off through additional bed availability within the first year. Length of stay in the patient population could decrease by 0 to 33 days. Two additional patients will be able to be placed on the service.

**Conclusions:** The implementation of the new care delivery model will benefit both the patient population and the hospital based on costs, quality of care, and quality of life. Quality of care and life will increase for both patients and staff. Increased bed availability on acute care units will allow for better care of patients with acute care needs.

**Epidemiology of Invasive Group B *Streptococcal* Infections and Prediction of Requirement of Intensive Care for Adults in the Denver Metropolitan Area: 2014-2018**

Leslie Baldwin

Preceptor: Breanna Kawasaki, MPH; Nisha Alden, MPH

Site: Colorado Department of Public Health and Environment

**Background:** Group B *Streptococcus* (GBS) can cause serious infections known as GBS disease which is a leading cause of death among infants and adults. The objective is to understand the trends of invasive GBS disease in the Denver metropolitan area and identify risk factors that predict admittance into intensive care.

**Methods:** Invasive GBS cases were collected by Active Bacterial Core surveillance at the Colorado Department of Public Health and Environment. Cases were residents of the 5-county Denver metropolitan area and had GBS isolates from a normally sterile body site between 2014 and 2018. All cases were characterized by demographic characteristics, clinical syndromes, and underlying conditions. Incidence was calculated each year using the Colorado State Demographers population data. Predictors for intensive care admittance in adults 18 years or older were identified with logistic regression.

**Results:** There were 1102 cases of invasive GBS disease reported between 2014 and 2018 (59% male; median age, 59 years; age range, 0-99 years). The most common underlying conditions were diabetes (47%) and obesity (23%). Overall GBS incidence did not change in the 5-year period (P=0.43). Of adult patients 18 years or older, those with heart failure were 2.27 times more likely to be admitted into intensive care (P= <0.0001), and those with chronic obstructive pulmonary disease were 1.72 times more likely (P= 0.0146).

**Conclusions:** Invasive GBS disease continues to be a public health concern and warrants continued surveillance. Some underlying conditions may predict intensive care admittance such as heart failure and chronic obstructive pulmonary disease.

**Promoting Children’s Physical Activity by Gathering and Distributing Community Physical Activity Resources**

Kimberlee Balsamo

Preceptor: Brian Dauenhauer, PhD

Site: UNC Active Schools Institute (ASI)

**Background:** School and life outcomes are better for active children. In schools today, many children are not in an environment where physical activity can be nurtured. Children’s physical activity (PA) promotes concentration and helps to relieve life and school stressors. Barriers to children’s PA include lack of knowledge about opportunities near their homes and schools, as well as the financial burden imposed through many PA programs. By identifying nearby PA opportunities in the community, and working to mitigate associated financial barriers, children will have opportunities to be more physically active outside of school.

**Methods:** Google Maps and in-person assessments were used to map and evaluate community PA resources within 3 miles of two Greeley, Colorado elementary schools, Madison and Centennial. Program costs and available financial assistance options were identified through community organization collaborations. This information is compiled into digital Community PA Resource Manuals, and distributed to each school to provide families with accessible PA opportunities.

**Outcomes:** Children and parents affiliated with the project schools now have better access to information on community PA opportunities, cost, and available financial assistance programs, through the resource manuals.

**Public Health Significance:** Providing information on PA programs and resources as well as available financial assistance will help decrease economic barriers and enable children to increase PA. If increases in PA are noted, future efforts by the ASI will incorporate the assessment of the impact of PA on children’s school performance.

**Relationship Between Occupational Status and Cardiovascular Disease in the San Luis Valley**

Jonathan Bihl

Preceptor: Kathy James, PhD

Site: University of Colorado

**Background:** Stress related to employment may lead to an increased risk of cardiovascular disease (CVD). The purpose of this study is to determine the association between self-reported occupational status, industry, and job title and CVD among workers in the San Luis Valley.

**Methods:** We used the San Luis Valley Diabetes Study (SLVDS): a population-based prospective cohort study investigating the risk factors for cardiometabolic outcomes in 1,406 individuals between 1984 and 1998. Using a logistic regression model, we separately modeled self-reported data on occupation, occupational stress and quality of life with clinically measured CVD biomarkers, (blood pressure, angina, claudication and peripheral arterial disease) while adjusting for known CVD risk factors.

**Results:** We found that individuals who reported being currently employed had a lower risk of developing CVD ten years after the initial visit when compared to those who were not working (OR=0.79; 95% CI: 0.60,1.05) and of those employed, individuals in jobs that required less or no college education (OR=1.681; 95% CI: 1.151,2.456) or were more labor intensive (OR=1.636; 95% CI 1.119, 2.392) had a higher risk of developing CVD.

**Conclusions:** This study found that those who are employed may have a lower risk of developing CVD. It also shows that those who are employed in occupations that require less or no college education and are more labor intensive may be at higher risk of developing CVD. This data sheds light on the impact that occupation has on people’s health in the San Luis Valley and in other low socioeconomic areas.

**Comparisons on the Demographics of the Estimated Undiagnosed HIV Population in Colorado**

Mary Boyd

Preceptor: Erin Starzyk, PhD

Site: Colorado Department of Public Health and Environment (CDPHE)

**Background:** The undiagnosed HIV population is the leading contributor to the ongoing transmission of HIV, which is a significant public health issue. The objective of this research is to generate annual estimates of the undiagnosed and diagnosed HIV population within Colorado, describe the demographics of the population and their associations to being undiagnosed.

**Methods:** A cross-sectional study was preformed based on a cohort produced from an adopted program, which used various methods on the current HIV data within the CDPHE system to estimate the diagnosed and undiagnosed HIV population in Colorado between 2008-2017. HIV cases under the age of 13 were excluded. From those estimates, multiple logistic regressions were conducted to determine which demographics of the population were most likely to be undiagnosed.

**Results:** After running multiple logistic regressions, it was determined that heterosexuals are 1.42 (95% CI: 1.2, 1.6) times as likely to be undiagnosed than homosexuals and Hispanics are 2.65 (95% CI: 2.4, 2.9) times as likely to be undiagnosed than whites. In addition, the youngest population are 32.87 (95% CI: 25.4, 42.6) times as likely to be undiagnosed than the oldest population and males are 1.28 (95% CI: 1.1, 1.5) times as likely to be undiagnosed than females.

**Conclusions:** This analysis provided insight on both the differences within the undiagnosed HIV population in Colorado across the demographic variables, and which of those populations require greater outreach and services. Additional analysis will be necessary to understand how these demographic variables would affect the outcome when introduced together.

**A Hospital-Based Study of Noninfectious Outcomes Related to Foley Catheter Insertion in Emergency Department Patients**

Caitlin Brown

Preceptor: Sara Reese, PhD, MPH, CIC

Site: Swedish Medical Center

**Background:** Foley catheter usage may be overutilized in many healthcare settings, particularly emergency departments (ED). Inappropriate catheterizations can lead to adverse infectious and noninfectious outcomes. Our objective is to determine whether patients in ED vs. Critical Care settings have elevated risk of developing noninfectious outcomes from catheterization, and to supplement an evidence base for policy development.

**Methods**: Within a case-control study framework and using ICD-10 codes for selected noninfectious outcomes (bladder spasms, hematuria, urethral stricture, cystitis, suprapubic tenderness), data was retrieved from a medical records database on 2774 patients who had received a Foley catheter within a two-year timeframe; 31 cases who received an ED catheter developed an outcome within thirty days. With ED catheterization as the exposure of interest, a logistic regression analysis was performed using age and gender as covariates on all outcomes.

**Results**: An overall logistic regression adjusted for age and gender gave odds ratios of 1.39, 95% CI [0.66, 2.93] for gender (female) and 2.77 [1.22, 6.31] for age (>65 years). A sub analysis for the outcome hematuria gave odds ratios of 1.34, 95% CI [0.51,3.54] for gender and 3.26 [1.05-10.1] for age.

**Conclusions**: Our results suggest an elevated risk of developing adverse noninfectious outcomes for elderly and/or female patients who are catheterized in the ED. Future policy addressing ED Foley catheter use in this vulnerable population should focus on initiatives aimed at staff education and reduction of reliance on catheters for bladder management in older patients.

**Perception of Social Support and Maternal Mental Health**

Kyria Brown

Preceptor: Jennifer Greenfield, PhD

Site: University of Denver

**Background:** Societal expectations require that mothers devote a significant amount of emotional and physical effort to be the primary caregiver for their child, even to the detriment of their own mental health and wellbeing. The objective is to ascertain the relationship of the perception of trust concerning others caregiving, not the act of others caregiving, has an impact on maternal mental health.

**Methods:** Using Fragile Families and Childhood Wellbeing Study data from waves 2, 3, and 4 (approximately child’s first, third, and fifth birthdays), we identified variables that asked about trust and mental health. We ran paired T-tests, logistical regressions, and correlation tests to ascertain the relationship and longitudinal changes.

**Results:** Paired T-tests showed significant change for nearly every variable, especially between years 1 and 5. The focal child’s health was the only variable that did not change significantly. Overall, maternal mental health improved between years 1 and 5. Maternal trust of the father decreased slightly, while maternal trust of ”others” increased. A small positive correlation between trusting others (including the father of the child) to care for child and maternal anxiety and depression was found.

**Conclusions:** Social support can help mitigate the negative effects of intensive mothering on maternal mental health, but social support systems need to be varied. Interventions inclusive of building maternal trust and support systems may help a mother cope with mental health issues better and improve the health of the mother/child dyad.

**Oil and Gas Development’s Air Quality Impacts and Resulting Health Effects: A Systematic Review**

Connor Celentano

Preceptor: Cindy Copeland

Site: Boulder County Public Health

**Background:** The rapid expansion of unconventional oil and gas (UNOG) development has led to populations being exposed to environmental stressors, such as air pollutants, more frequently. The goal of this review is to determine the state of scientific literature regarding UNOG-attributable air pollution and the resulting health effects.

**Methods:** I conducted a systematic review using PubMed and Web of Science. Search terms included oil and natural gas, oil and gas development, air quality, air pollution, and health. To be included in the qualitative synthesis, publications must have been written in English, been primary literature, investigated UNOG-attributable air pollutants or used an appropriate proxy exposure, investigated human health effects, and been published in 2017 or later.

**Results:** Of 129 unique articles identified, 13 met the criteria for qualitative synthesis. The included publications employed various study designs, focused on several geographic regions, and examined seven different outcome categories. Nine studies utilized proxy exposure classifications and the remaining four used direct methods such as modeled inhalation exposures. Each outcome category had a study with significant findings. Of three risk assessments, one reported a cancer risk estimate that exceeded the EPA’s acceptable threshold. Of the remaining ten studies, nine reported significant relationships.

**Conclusion:** There is consistent evidence that UNOG development adversely impacts human health. However, the relationship between UNOG-attributable air quality impacts and human health remains partly unclear due to the frequent use of indirect exposure classification methods. Future research should focus on employing direct exposure classification methods to better describe this relationship.

**Investigating the Effects of Psychosocial Status on Recovery Time in Injured Adults**

Sophia Centi

Preceptor: Scott Primack, DO

Site: Comprehensive Outcomes Management Technology (COMT)

**Background:** It has been seen that psychosocial factors such as distress, anxiety, depression, and unreasonable expectations can be related to poor outcomes and extended recovery times in musculoskeletal diagnoses. The objective was to determine if there is a significant difference in recovery time between the different psychosocial classification groups (normal and at risk [N/R] versus distressed depressive and distressed somatic [DD/DS]), and how other factors contribute to this potential relationship.

**Methods:** Analyses were performed separately on six different injuries: ankle/foot, knee, hand/wrist, elbow, shoulder, and spine. Accelerated failure time models were fit to model the multiplicative effect of psychosocial group on interval-censored length of stay, controlling for other factors such as age, gender, language, and clinic type. Similar models were used to model the effect of native spoken language (English or Spanish) on interval-censored length of stay. Backwards selection methods were used to determine the covariates included in the final models.

**Results:** Every injury type showed statistically significant longer recovery times for the DD/DS subjects compared to the N/R subjects (all p < 0.05). When looking at language stratified by psychosocial status, there was a significant difference in recovery time in the N/R group for shoulder and knee injuries (p < 0.05).

**Conclusions:** The significantly longer recovery times in DD/DS subjects compared to N/R subjects show the need for new treatment plants, mental therapy referrals, and overall, more guidance on working with emotionally distressed patients. A subject’s native language does not greatly influence their recovery time.

**Expanding Breastfeeding Best Practices in the Child Care Setting through a Train the Trainer Pilot Program in Colorado**

Caitlin Chapman

Preceptor: Stacy Miller, PhD, RD, CLC

Site: Colorado Department of Public Health and Environment

**Background:** Despite the health benefits associated with breastfeeding, many Colorado families do not meet recommendations for breastfeeding duration and disparities exist based on race, maternal age, ethnicity, and income. Breastfeeding support in the child care setting is associated with improved duration and dismantling inequities. However, child care provider education on breastfeeding is inconsistent across Colorado. The objective was to develop a statewide, online ‘Train the Trainer’ module, to prepare community members to act as advisors to child care providers in using best practices when caring for breastfed infants.

**Methods:** An existing, statewide Advisory Committee collaborated to develop this training module. This Committee was composed of 28 individuals representing state and local public health agencies, early childhood councils, child care providers, and non-profit organizations. The Committee compiled multiple, existing curricula from their respective organizations and collectively drafted the outline of the training. Following a detailed review, the outline was converted into a narrated module.

**Results:** A Colorado-specific, ‘Train the Trainer’ module was created to train individuals in guiding child care programs in their local communities on implementing breastfeeding supportive policies and practices. The module includes a narrated slide deck for CO.TRAIN, participant evaluation questions, and supplementary documents.

**Conclusions:** Existing curricula were combined, adapted, and edited to create a new training module, utilizing expertise from the Committee, that reflect current best practices. The Committee provided valuable feedback and direction throughout the process. The intention is that this training module will integrate into a statewide Breastfeeding Friendly Child Care recognition program.

**Evaluating the Experiences and Policy Needs of Licensed Clinical Social Workers at Colorado Federally Qualified Health Centers**

Cassidy Christopher

Preceptor: Sarah Macrander, MPH

Site: Colorado Community Health Network

**Background:** As more statewide and national attention is brought to substance use, suicide, and other mental health issues, Licensed Clinical Social Workers (LCSWs) at Federally Qualified hold a unique and critical role in addressing the behavioral health needs of underserved Coloradans, acting as behavioral health providers for vulnerable communities across the state. This project was conducted through Colorado Community Health Network (CCHN), the Primary Care Association for Colorado’s FQHCs, with the aim to better understand the practice experiences of LCSWs at FQHCs and identify challenges or needs that may be addressed through CCHN’s policy work.

**Methods:**  Qualitative key informant interviews were conducted with five LCSWs working in Colorado FQHCs.

**Results:**  These interviews informed several findings about current policy needs of LCSWs: (1) The out-of-state licensure transfer process creates barriers to practicing social work in Colorado, (2) there are insufficient continuing education opportunities for health care social workers in Colorado, and (3) there should be a better educational/internship pipeline in place to encourage recruitment of LCSWs at FQHCs. All interviewees stressed a great need for continued support for LCSWs, with many emphasizing the unique skills and values of social workers in the team-based care environment.

**Conclusions:** The results of this project can inform the policy priorities and quality improvement CCHN in years to come. By supporting the needs of LCSWs at FQHCs, CCHN and its FQHCs can improve patient care and health outcomes for the vulnerable populations served by FQHCs and work to achieve health equity.

**Evaluation of the Spatiotemporal Relationships Between Oil & Gas Development and Suicide in Colorado: 2008-2018**

Kate Cochran

Preceptors: Lisa McKenzie, PhD, MPH & Ben Allshouse, PhD

Site: Colorado School of Public Health, Department of Environmental & Occupational Health

**Background:** A multitude of risk factors contribute to Colorado’s high suicide rate. Unconventional oil and gas (O&G) technologies (e.g. hydraulic fracturing) increase several suicide risk factors, therefore it is conceivable that proximity to O&G development may increase risk for suicide. Our objective is to evaluate spatiotemporal relationships between O&G development and suicide in Colorado.

**Methods:** This case-series study examined 4,665 suicide decedents in three Colorado basins (2008-2018) using data from the Colorado Violent Death Reporting System (CoVDRS) and Colorado Oil & Gas Information System (COGIS). We calculated intensity-adjusted inverse distance weighting (IA-IDW) to estimate O&G well activity within 5 miles of each decedents’ residence. We compared age-adjusted standardized suicide rates for O&G basins and those living within 5 miles of an active well to Colorado rates.

**Results:** Within the three O&G basins, 49.2% of suicide decedents lived within 5 miles of an O&G site. The percentage of firearm deaths for those living within 5 miles of a well site were by 3% higher (95% CI 0-5; *P*=0.07) than those living greater than 5 miles. 56% of suicides occurred in areas with low O&G activity; however, percentages in each exposure group varied by basin. We observed no relationship between proximity to O&G activity and suicide based on age-adjusted standardized suicide rates.

**Conclusions:** There may be a relationship between the method of suicide and O&G activity. Because suicide risk is multifactorial, future research should explore environmental exposures that may affect mental health. Suicide prevention efforts should address unique characteristics of each region.

**Outcomes with Cannabis Treatment in Canine and Feline Patients who Sought Cannabis Harm Reduction Consultations Conducted by Veterinary Cannabis Education and Consulting from 2017-2019**

Erin Coleman

Preceptor: Dr. Casara Andre DVM, cVMA

Site: Veterinary Cannabis Education and Consulting

**Background:** Research in cannabis derived medications for animals is limited in comparison to human research. Studies have shown positive results with cannabis treatment in canines for pain, anxiety, and seizures, but less is known about cannabis treatment for felines. This study investigated the short-term therapeutic effects and potential adverse events associated with cannabis treatment in canines and felines.

**Methods:** Retrospective cohort medical review of cannabis harm reduction consultations from 2017-2019. Subjects were included if initial and follow up consultations were completed and subject began treatment. Twenty felines and 82 canines were identified. Therapeutic effects and adverse events in response to cannabis treatment was analyzed using Fisher’s exact test and dichotomous logistic regression.

**Results:** Twelve felines (60%) reported symptom improvement and classified as responders (canines: n=57,70%). Twelve (60%) felines reported adverse events potentially related to cannabis treatment (canines: n=43, 52%). The most common adverse event in felines, n= 9 (45%) was dislike (canines: sedation n=14, 17%). Adverse event rate did not vary by cannabis type for felines or canines. There was no significant difference in responder rate by cannabis type for felines. Canines, however, were 3.9 times more likely to be classified as a responder if the product used was cannabidiol alone versus cannabidiol and tetrahydrocannabinol (OR 3.9; 95% CI: 0.67 to 0.94).

**Conclusions:** Canines and felines report symptom improvement after cannabis treatment. The most common adverse event reported was dislike (felines) and sedation (canines). Canines were more likely to report symptom improvement if using cannabidiol alone versus cannabidiol and tetrahydrocannabinol.

**Environmental Scan of the Current Substance Use Disorder Treatment Landscape in Jefferson County, Colorado**

Casey Connolly

Preceptor: Dr. JK Costello, MD, MPH

Site: The Steadman Group & Jefferson County Public Health

**Background:** Jefferson County has been hit hard by the substance use disorder (SUD) epidemic with 285 opioid related Emergency Department visits, 298 hospitalizations, and 106 opioid-related deaths. Jefferson County faces limited resources, treatment facilities, and providers to address the growing number of people with SUD. The purpose of this environmental scan is to improve understanding of the SUD treatment landscape in Jefferson County and recommend innovative solutions.

**Methods:** We conducted an internet search using Colorado’s Licensing and Designation Database and Electronic Records System and Substance Abuse and Mental Health Services Administration’s Buprenorphine Practitioner Locator to determine treatment resource density in Jefferson County. A survey was developed to be distributed via substance use task force list serve but was delayed due to COVID-19.

**Results:** The internet search yielded a SUD treatment resource matrix that depicts the current treatment options in Jefferson County. These included 11 SUD counseling programs, 7 Office Based Opioid Treatment programs, 4 residential treatment programs, 2 medically monitored detoxes, 5 sober living facilities, and one syringe access program. Resources are clustered in areas with higher populations, resulting in a geographic disparity in SUD treatment access between rural and urban communities.

**Conclusions:** The lack of and distribution of SUD treatment resources demonstrates a geographic disparity for access in Jefferson County. Future work should focus on increasing access to services by reducing geographic and socioeconomic barriers to treatment, creating one central online resource for people to easily navigate treatment resources, and increasing awareness and use of Naloxone for overdose prevention.

**Association Between Illicit Drug Use and E-cigarette Use Among High School Students in Colorado**

Micah Cornett

Preceptor: Patricia Valverde, PhD, MPH

Site: Latino Research and Policy Center

**Background**: The recent increase in rate of adolescent e-cigarette use is a serious public health concern. The greatest increases in e-cigarette use is among Latino populations compared to other ethnic/racial groups in the US. The purpose of this study is to investigate the association of illicit drug use and e-cigarette use among both Latino and non-Latino high school students in Colorado.

**Methods**: The data was provided by the 2017 Health Kids Colorado Survey (HKCS) and included responses from 44,739 high school students across the state of Colorado. Total lifetime illicit drug use and number of different illicit drugs ever used were compared with past 30-day e-cigarette use (none, light, heavy) using Multinomial Logistic Regression. Options included Cocaine, Meth, Heroin, Ecstasy, Prescription Pain Pills, and Sniffing Glue.

**Results**: For all high school students, there was a greater association between illicit drug ever-use and both light (non-Latino [relative risk ratio (RRR), 3.14; 95% confidence interval (CI), 2.66 to 3.71], Latino [2.91;2.21 to 3.85]) and heavy (non-Latino [9.36;7.76 to 11.30], Latino [5.63;3.91 to 8.12]) e-cigarette use compared to those who did not indicate any illicit drug use. Among those who indicated having ever-used illicit drugs, greater use (>10) had a greater relative risk ratio of heavy e-cigarette use compared to those who indicated less use (<1-9), (non-Latino [13.62; 10.21 to 18.17], and Latino [9.77; 6.67 to 14.32]) compared to (non-Latino [7.97; 6.27 to 10.13], and Latino [4.36; 2.69 to 7.06]). Additionally, having tried 3 different types of illicit drugs showed a greater association with heavy e-cigarette use compared to only 1 type of illicit drug tried (non-Latino [77.41; 32.22 to 185.97], and Latino [23.78; 9.63 to 58.63]) vs. (non-Latino [5.34; 4.25 to 6.73], and Latino [3.43; 2.23 to 5.29]).

**Conclusions**: These findings suggest that greater illicit drug use in both frequency and variety is associated with a greater risk for e-cigarette use, especially heavy use, among adolescents in Colorado. Intervention efforts for reducing e-cigarette use among adolescents may benefit by concurrently addressing illicit drug use.

**Evaluating the Correlation between Adherence Measures in Drug Users with Hepatitis C taking Ledipasvir/Sofosbuvir**

Ryan P. Coyle

Preceptor: Jennifer Kiser, PharmD/PhD

Site: University of Colorado-AMC, Skaggs School of Pharmacy and Pharmaceutical Sciences

**Background:** Hepatitis C Virus (HCV) infection affects more than 3.5 million Americans, and approximately half of these persons are drug users. Despite these high rates, there has been a reluctance to treat HCV-infected drug users because of concerns regarding adherence and reinfection. The objective of the current study is to evaluate the relationship between measures of adherence in HCV-infected drug users taking ledipasvir/sofosbuvir (LDV/SOF).

**Methods:** HCV-infected drug users with and without HIV coinfection were prospectively recruited and enrolled. Participants were randomized to one of two groups of observed therapy: directly-observed therapy (DOT) or Wisepill-observed therapy (WOT). Pearson correlation was used to evaluate the relationship between self-reported LDV/SOF adherence and DOT or WOT recorded adherence at weeks 2, 4, 8, and 12.

**Results:** A total of 60 participants were enrolled in the study. Pearson correlation showed a significant correlation between self-reported and DOT adherence at week 2 (*r*=0.64, *P*=0.0003), week 4 (*r*=0.76, *P*<0.0001), week 8 (*r*=0.77, *P*<0.0001), and week 12 (*r*=0.74, *P*<0.0001). There was not a significant correlation between self-reported and WOT adherence at week 2 (*r*=0.20, *P*=0.29) or week 4 (*r*=0.21, *P*=0.27), but was significant at week 8 (*r*=0.44, *P*=0.01) and week 12 (*r*=0.37, *P*=0.047).

**Conclusions:** This study showed a correlation between self-reported and DOT adherence at weeks 2, 4, 8, and 12, and a correlation between self-reported and WOT adherence at weeks 8 and 12. The stronger correlations between self-reported and DOT adherence indicate more accurate self-reporting among those on DOT compared to WOT.

**A Review of Colorado’s Changing Climate and Health**

Emily Culbertson

Preceptor: Collin Tomb

Site: Boulder County Public Health

**Background:** Atmospheric and oceanic temperatures have been increasing over the past three decades and are expected to continue increasing over the coming years. Rising temperatures are anticipated to result in more extreme heat days, increased frequency in extreme events, and reduced quality in air and water. The purpose of this project is to evaluate how future climate projections will impact the health of Coloradans.

**Methods:** This literature review was specific to Colorado and examined all ages, occupations, and population backgrounds. PubMed and Web of Science were used to find articles. The search selected for peer-reviewed journal articles that have been published in English between 2014-2019. A variety of search terms were utilized following a pattern of location + health topic + climate change. A total of 1,693 articles were retrieved and 36 of these articles were reviewed.

**Results:** Atmospheric temperature, incidence of wildfires and flooding events are all projected to increase. Water quality and quantity as well as air quality are both projected to decline. This will result in an increase in heat-related deaths/year, increased premature mortality and hospital admissions due to wildfire smoke and increased acute gastrointestinal illness.

**Conclusions:** Climate change will have multiple impacts on the health and environment of Coloradans. The health of vulnerable populations will be impacted more severely but adaptation measures can be put in place to reduce the projected harm on human health.

**Integration of Uniformed Police Officers into the City and County of Denver (CCD) Citywide Wellness Program**

Lauren Davis

Preceptor: Lizbeth Schoon

Site: City and County of Denver

**Background:** The City and County of Denver (CCD) executes a corporate wellness program to city and county agency employees. In 2020, CCD will incorporate the Denver Police Department (DPD) into the city-wide program to bring more preventive health awareness and wellness programming to the DPD agency personnel.

**Methods:** In order to best execute this integration, quantitative and qualitative data were collected to develop a tailored implementation and communication plan based on agency personnel feedback. Quantitative data were analyzed using SPSS and qualitative data were analyzed via using theming and grounded theory. The output of the analyses were utilized to develop wellness and communication considerations based on the needs and desires communicated by the DPD personnel.

**Results:** Project results indicate that DPD personnel are prepared to engage with programs to enhance their health and wellbeing. The data analyses led to the development of seven considerations for wellness programming and seven separate considerations to address communicating effectively with DPD personnel.

**Conclusions:** Data collected from the Denver police agency verified that personnel are ready to engage with personal health and wellness programing. Thus, by creating a tailored approach to integrating the DPD agency with the CCD citywide wellness program it can lead to being positively accepted and adopted by DPD personnel. Thus, achieving the goal of DPD personnel being more engaged with personal health. Public health significance of this project is through gathering feedback from the police officer community, it results in the development of tailored interventions to improve individual’s health & wellbeing.

**Bacterial Load Quantification of the Sanitized Hands of Medical Professionals with Various Nail Characteristics in an Outpatient Care Setting**

Kendra DeHerrera

Preceptor: Tillman Farley, MD

Sites: Federally Qualified Health Centers in the Mountain West

**Background**: To prevent the spread of healthcare-associated infections, it is important to understand whether nail characteristics (such as nail polish, chipped nails, etc.) affect bacterial presence after hand hygiene efforts. The purpose of this study is to evaluate the influence of nail characteristics on bacterial growth in a cohort of medical professionals in an outpatient clinic.

**Methods**: A cross-sectional study of 132 medical professionals with direct patient contact was conducted in 2020. Individuals were asked to sanitize their hands with gel hand sanitizer and all ten fingers were swabbed once dried. The amount of gram-negative rods, *Staphylococcus aureus,* andtotal bacterial growth were quantified then analyzed. Categories of analysis include nail polish presence and degree of nail chipping; Wilcoxon Rank Sum and the Cochran-Armitage test were utilized for analysis.

**Results**: On average, individuals with nail polish have 70.4 Colony Forming Units (CFU) less of total bacteria than those without nail polish, but 4 CFU more of *Staphylococcus aureus;* both differences are not statistically significant. Cochran-Armitage results indicate that of those with nail polish, individuals with chipped nails have significantly less bacteria than those with unchipped nails. We observed no relationship between the degree of chipping on participants without nail polish and bacterial growth.

**Conclusions**: These results indicate nail polish presence alone does not affect the *Staphylococcus aureus*, gram-negative rod, or total bacterial load on the sanitized hands of medical professionals. Further studies on the effect of chipped nails and nail polish type should be conducted.

**Cost-effectiveness Analysis of Facial Feminization Surgery**

Ben Dellos

Preceptor: Daniel Ramos

Site: One Colorado

**Background:** Facial feminization surgery is an effective treatment for transgender patients experiencing gender dysphoria yet is not covered by Medicaid in Colorado. The objective of this study is to provide a cost-effectiveness analysis of facial feminization surgery that can inform Colorado policymakers on whether to expand the state’s current transgender health benefit.

**Methods:** A Markov model was developed to track a hypothetical cohort of transgender patients across health states over 5- and 10-year time horizons. Patients either received full facial feminization surgery or the current health benefit with no coverage for facial feminization surgery. Health states were assigned costs and utility weights for life years and were discounted at 3%. Cost-effectiveness was assessed using an incremental cost-effectiveness ratio (ICER) and a threshold of $150,000/quality-adjusted life year (QALY).

**Results:** Patients that received facial feminization surgery experienced more QALYs and incurred greater costs than compared to patients that received no health benefit over the 5- and 10-year time horizons. Both the 5-year ICER ($130,801/QALY) and the 10-year ICER ($88,575/QALY) were below the $150,000/QALY cost-effectiveness threshold. Results from a probabilistic analysis demonstrated that facial feminization surgery was cost-effective in over 80% of simulations.

**Conclusions:** The gains in QALYs outweigh the costs associated with providing facial feminization surgery. Extending the transgender health benefit in Colorado to include facial feminization surgery would be economically beneficial for the State of Colorado and lead to improved health outcomes for transgender Coloradans.

**Evaluation of Refugees’ Understanding of the United States Health Insurance System**

Sarah DeLong

Preceptor: Victoria Francis

Site: International Rescue Committee

**Background:** Refugees encounter many barriers when navigating healthcare in the US and understanding how to access and utilize health insurance. The goal for this project is to evaluate what is effective and what can be improved in the IRC’s Health Insurance Literacy Program for refugees who have recently settled in Denver, Colorado.

**Methods:** The data that was collected and analyzed was mixed method survey data. The evaluation used a pre/post survey design with data collected at three different points, before the health insurance literacy course, after the course is completed, as well as a survey given 3-6 months after refugees have completed the course. The questions ask refugees to define important terms about health insurance literacy and their attitude towards insurance

**Results:** The pre-survey data shows that most refugees did not understand many of the aspects of the U.S. healthcare system, as it was a very different system than their home country. The survey given immediately after showed that understanding was increased but some concepts will still not be fully understood. In the follow up survey, given months later many did not remember the concepts taught during the courses.

**Conclusions:** This evaluation showed the information is not retained long term after completing the class. Many of the questions asked after the course could be answered but participants were unable to answer the same question at the later follow-up. For future studies, I would recommend having resources available for review and offering review courses for refugees after the original course.

**How to Ensure Quality in the Integration of a Behavioral Health Department in Primary Care Clinics**

Ilona Dewald

Preceptor: Jessica Mestas, BA

Site: UCHealth

**Background**: UCHealth has initiated a pilot project of integrating a behavioral health department in their primary care clinics. This entails that each primary care clinic will have a licensed therapist on site to meet with patients who need mental/behavioral health help. The objective of this project was to ensure the integration upholds quality standards and give recommendations on how to improve quality.

**Methods**: Interviews were created through previous quality research interviews. Interviews were then conducted with all the major people who are part of this integration pilot (managers, administers, doctors, therapists). Interviews were transcribed and analyzed with R, a statistical analysis software. Common words were grouped together and put into related categories (category of words relating to time, category of words related to patient care, so on).

**Results**: It was found that the most common theme of the interviews was time/time management. From there, an online quality search was conducted looking specifically at the major theme and its relationship to quality.

**Conclusions**: To ensure quality moving forward with the integration process, the recommendation was that UCHealth prepares to hire more than one therapist per clinic, and there should be appropriate space for each therapist. More so, to ensure quality, UCHealth should put components in place that will allow for systematic follow-ups, treatment adjustment in a timely manner, and timely communication and care coordination.

**An Analysis of Public Health Improvement and Strategic Planning in Colorado**

Leila Diab

Preceptor: Sarah Lampe, MPH

Site: Trailhead Institute

**Background:** Planning is important to guiding decision-making and direction of public health organizations. There is no current documentation of planning practices, themes, and gaps in Colorado. This project will analyze and compare health improvement and strategic plans of local, regional, and non-governmental public health organizations in Colorado.

**Methods:** Strategic plans and public health improvement plans were obtained and analyzed from 11 public health entities in Colorado. The documents were analyzed in Microsoft Excel. After analysis, we followed up with certain agencies to clarify findings, obtain missing information, and gain insight into the planning process. We then performed a thematic analysis using the RADaR technique to identify common themes. These themes were visualized using Tableau.

**Results:** All documents assessed were created within the last 5 years and contained goals or objectives. Many of the public health departments offered similar programming with notable alignment with expressed goals and objectives. Non-governmental organizations offer more specific and distinguished programs. Themes identified were health equity, behavioral health, chronic disease prevention, access, community partnerships, workforce strengthening, and funding and economic development.

**Conclusions:** This analysis demonstrates a snapshot of themes in public health planning in Colorado. It demonstrates areas of strength and focus and can reveal information about gaps in service. It also shows pursuits outside of statutory services and where resources are allocated. This information can be used to begin discussion for best practices and guide future decision making and planning.

**Assessing Smoking Cessation Interventions at St. Anthony Hospital’s Comprehensive Stroke Center for Guideline Compliance**

Liza Elkin

Preceptor: Carly Rossi, LCSW

Site: St. Anthony Hospital

**Background:** Smoking is a significant risk factor for stroke. St. Anthony’s Hospital provides the highest level of stroke care as it is certified biannually but the Joint Commission as a Comprehensive Stroke Center. The purpose of this project was to compare the current smoking cessation intervention practices of medical providers working with stroke patients at St. Anthony’s Hospital to the new guidelines for such interventions with this population.

**Methods:** Thorough review of anticipated guidelines provided basis for creation of a survey assessing smoking cessation practices at St. Anthony’s Hospital. The survey was comprised of 8 questions, and was distributed to core members of the stroke team and a small number of nurses. Data was entered, cleaned, coded, and tested for associations using SPSS. Survey data was compared to anticipated guidelines.

**Results:** The COVID-19 pandemic limited the sample size substantially (n=10), therefore tests of association did not show significant relationships between the variables. New guidelines dictate that high-intensity behavioral interventions for smoking cessation should begin in the inpatient setting and include more than 1-month of follow-up post-discharge. Survey results indicate that providers are in compliance with the guideline on the inpatient side, however, they are only providing follow-up within the first month of discharge.

**Conclusions:** Results suggest that the implementation of a smoking cessation intervention beyond 1-month of discharge from St. Anthony’s Hospital may be recommended for future program guideline compliance. Further quality improvement efforts should assess documentation to ensure that practices are described adequately which will be crucial for recertification.

**Survival of Ovarian Cancer Patients by Weight Status in Colorado**

Desiree Esselman

Preceptor: Kieu Vu, MSPH

Site: Colorado Department of Public Health and Environment

**Background:** Ovarian cancer is the 5th leading cause of cancer death among women in the United States. Obesity is a known risk factor for ovarian cancer, as high amounts of low-level inflammation, often common for those in the overweight or obese category, can cause cell damage and lead to the development of cancer. This study will aim to understand survival and mortality rates among women diagnosed with ovarian cancer in Colorado between 2000-2016 by using weight status, determined by BMI, for comparisons.

**Methods:** This retrospective cohort study included 1532 women diagnosed with ovarian cancer in Colorado between 2000 and 2016. A Cox proportional hazard model, adjusted for covariates of interest, was used to understand the relationship between BMI and cancer survival times.

**Results:** Overall, BMI was not associated with differing survival times amongst women with ovarian cancer. The covariates of interest proved to be better predictors of survival time. Women that were current or former smokers had an increased risk of mortality (HR = 1.4, p =0.0029 and HR = 1.3, p = 0.0083, respectively). Non-Hispanic Black women had increased risk of mortality (HR = 2.9, p <0.001) as did women diagnosed post-menopause (HR = 2.2, p <0.0001). Those with late stage diagnosis also had much higher risk of mortality.

**Conclusions:** Though BMI did not seem to have a significant impact on survival, cigarette use, age and stage of diagnosis and women’s race/ethnicity were significantly related to survival time for women with ovarian cancer.

**“I Know How to Handle Him”:**

**A Qualitative Analysis on Navigating Pregnancy, HIV, and Gender Power Dynamics for Women in Zambia**

Marcella A. Fasano, MA

Preceptor: Karen M. Hampanda, PhD, MPH

Site: Center for Global Health

**Background:** Even with consistent dedication to improving health outcomes, Zambia continues to have a high burden of Human Immunodeficiency Virus (HIV), with women disproportionately impacted. Men often serve as gatekeepers to healthcare for women in Zambia, and these gender power dynamics have a significant impact on women’s ability to access HIV treatment and to prevent mother-to-child HIV transmission (PMTCT). This project asks how women who are pregnant and living with HIV in Zambia perceive and navigate gender power dynamics in order to meet health goals.

**Methods:** Semi-structured interviews of 30 women who were pregnant and living with HIV were completed in Lusaka, Zambia. Codes, categories, and a primary theme emerged using interpretive phenomenological analysis guided by feminist standpoint theory. A peer critique was performed, and structure resonance used, to bolster the credibility of the findings.

**Results:** The primary theme, *social avenues of resiliency,* conveys how women enact power through particular methods (e.g. asking church elders to mediate a relationship conflict) to navigate a social structure which places them in inferior positions. Zambian women seemingly had more power in their relationships when facilitating the use of healthcare (e.g. HIV treatment) that also impacted the health of their pregnancy or family.

**Conclusions:** In environments where Zambian women are socially disempowered, certain methods can be utilized to navigate the gender hierarchy and enact power. Understanding how these methods are used to meet health needs is highly valuable when seeking to create effective HIV and PMTCT interventions for women in Zambia.

**Stanford Cancer Institute Health Needs Assessment:**

**Evaluating the Cancer Burden in the California Greater Bay Area**

Charlette Flanders

Preceptor: Rachel Mesia

Site: Stanford Cancer Institute

**Background:** Stanford Cancer Institute (SCI), is one of 51 National Cancer Institute-Designated Comprehensive Cancer Centers. The SCI has a 10-county catchment area in which the Community Outreach and Engagement (COE) Program has a crucial role in fostering efforts to reduce cancer burden through community partnerships, programs, and research. A health needs assessment was developed to assess two counties in their catchment area to develop a comprehensive understanding of the health disparities affecting communities.

**Methods:** SCI COE evaluated qualitative and quantitative data to identify unique health trends in two counties within the catchment area: San Mateo and Contra Costa. Primary qualitative data were gathered from phone-based and in-person key informant interviews from local health organizations. Secondary quantitative data were extracted from existing county demographics, health behaviors, and cancer incidence and mortality.

**Results:** American Native and Alaska Indians have the highest cancer incidence and mortality rates compared to other racial/ethnic groups, but there are concerning heath data gaps among these sub-populations. Key informants expressed that the social determinates of health (SDH) are a more significant concern for communities than cancer.

**Conclusion:** The intersectionality of the SDH and health disparities can contribute to increased risk for racial/ethnic minorities to develop certain cancers. SCI’s next steps are to identify methods to minimize health data gaps for underserved communities, strengthen community partnerships, and develop culturally inclusive community-based health programs in an effort to reduce the cancer burden in health disparate communities.

**Anxiety Rates Among Residents Living Near Unconventional Oil and Gas Sites in Colorado**

Ariella Foss

Preceptor: Lisa McKenzie, PhD, MPH

Site: Colorado School of Public Health

**Background:** Unconventional oil and gas development (UOGD) continues to grow in Colorado, along with the number of residents living close to UOGD sites. Our objective was to determine what impact living within one mile of an UOGD site while it is being developed had on rates of anxiety among Colorado residents.

**Methods:** This was a retrospective cohort study. Health insurance claims, provided by the Colorado All Payer Claims Database, were obtained for residents with an anxiety condition. Each resident’s address was geocoded and matched to the locations of UOGD sites, available from the Colorado Oil and Gas Information System.Using an interrupted time series approach, claims for each individual were counted before, during, and after the development phase of a site. Rate ratios, obtained from running a piecewise negative binomial regression, determined whether counts for health insurance claims changed over time, with type of insurance, sex, and age as covariates.

**Results**: Among 5,267 patients, anxiety claims increased by 1.16 times (1.00–1.34) during the development phase and 1.34 times (1.13–1.57) in the post-development phase. After stratifying by covariates in the model, anxiety was found to be highest among men, Medicare and Medicaid recipients, and patients aged 50 and older.

**Conclusions:** Anxiety rates increased during the development phase and increased even more in the post-development phase. Understanding how UOGD impacts anxiety will help to inform regulations and policymaking that might better protect the mental health and overall well-being of Colorado residents living close to these sites.

**Developing a Public & Population Health Curriculum for Medical Students**

Mackenzie Garcia

Preceptor: Jennifer Adams, MD

Site: Denver Health, University of Colorado School of Medicine

**Background:** It is critical that public health concepts be incorporated into medical education1,2. The University of Colorado School of Medicine is undergoing curriculum reform which includes development of tracks that will emphasize public and population health. The purpose of this Capstone Project was to develop a pilot public/population health curriculum for the Denver Health Longitudinal Integrated Clerkship.

**Methods:** This project included a needs assessment, curriculum development, and creation of a pre/post survey for curricular assessment. For the needs assessment, a survey of key informants (public health/medicine faculty, Denver Health clinicians involved in public health, and students) assessed prioritization of established public health competencies3, additional priority topics, and curricular deficiencies. Scores for each competency were averaged and qualitative responses were coded. Curricular development involved grouping codes by competency, creating new competencies, developing learning goals based on codes, and creating session plans and assignments. A pre/post survey was developed based on learning goals.

**Results:** 61 informants completed the survey (50.0% response rate). Competencies with the highest average scores were related to social determinants of health (mean 4.72, SD 0.52), interpreting evidence (mean 4.48, SD 0.72), and prevention (mean 4.41, SD 0.75). The most prevalent codes related to social determinants of health and understanding evidence. New competencies focused on interprofessionalism. A pilot curriculum with 23 content modules was developed.

**Conclusions:** This project highlighted the need for teaching public health content to future physicians. The curriculum will be implemented in 2020-21 and updated based on the pre/post survey and student feedback.

**Pediatric Care Network Asthma Program: Key Data Elements of a Technical Solution to Track and Manage Asthma Care**

Johanna Gelderman

Preceptor: Marissa Kaesemeyer, MHA

Site: Pediatric Care Network, Children’s Hospital Colorado

**Background:** Asthma is the leading chronic disease in children and is often poorly managed, leading to poor health outcomes and increased health care costs. Our objective was to identify and assess new approaches for the Pediatric Care Network (PCN) to track and manage core data inputs and outcome metrics in their current asthma program in a more efficient and affordable manner for primary care practices and the PCN. Phase 1 of this project was to identify a core data set to determine minimum functionality of a new technical solution.

**Methods:** We conducted a literature review to identify what clinical and operational components in a primary care setting improve key asthma-related outcomes. Key databases were searched to find relevant peer-reviewed publications, using search terms pediatric, asthma, utilization, outcomes, and primary care. In addition, we convened a multi-disciplinary team of 11 content experts with clinical, quality improvement, and technology backgrounds to review data components and make a recommendation.

**Results:** The literature review included 32 peer-reviewed publications. The multi-disciplinary team met three times between October 2019-Feburary 2020. The multi-disciplinary team agreed upon guiding statements for this project, which aligned with literature review results. In addition, the multi-disciplinary team narrowed data collection requirements from twenty-six elements to six elements. This core data set was consistent with literature review results.

**Conclusions:** The PCN will consider six core data elements when assessing options for a new technical data management solution. This is based on the multi-disciplinary team’s recommendation and reinforced by literature review results.

**Health Disparities in Opioid Prescribing Patterns and Subsequent Long-Term Use: A Retrospective Cross-Sectional Analysis of UCHealth Emergency Departments**

Ann M. Giesenhagen

Preceptor: Caroline Ledbetter, MPH

Primary Investigator: Jason Hoppe, DO, FACEP

Site: University Hospital

**Background**: Opioid prescribing at emergency departments (ED) has been climbing where acute back pain is the third most common reason for ED visits in the United States. Research is limited regarding racial/ethnic biases and opioid prescription, but underlying biases may reveal further associations and risk of current opioid prescribing. We investigated opioid prescribing for back pain at different UCHealth EDs to determine variability between races.

**Methods**: We conducted a retrospective cross-sectional analysis of patients who were prescribed an opioid for complaint of back pain from October 1, 2013 through September 30, 2015 at 13 unique UCHealth EDs. Basic demographic statistics were gathered. Logistic regression with a random effect for ED site was used to test the likelihood of prescribing opioids and patients filling prescriptions when adjusting for race.

**Results**: A total of 18,257 patients with back pain were included in the study. Of these patients 62.5% were non-Hispanic white (NHW); 18.4%, 13.7%, 5.4% were Hispanic, Non-Hispanic Black, and other race/ethnicity, respectively. Compared to NHW, the minority patients were less likely to receive an opioid prescription (OR=0.856; CI [0.799, 0.918]). Additionally, there was no significant likelihood of minority patients filling their prescriptions after their visit compared to NHW (OR=1.000; CI [0.028, 36.154]).

**Conclusions**: There are racial disparities in opioid prescribing patterns for back pain are present as we see that those in the minority are less likely to be prescribed an opioid prescription. Additional research of the racial impact and opioid prescribing and filling is necessary to inform policy and practices.

**Spatial Analysis of the Relationship between Climatic Conditions and Chronic Kidney Disease of Unknown Origin (CKDu) in Guatemalan Sugarcane Farmers**

Erin Girard

Preceptor: Jaime Butler-Dawson, PhD

Site: Center for Health, Work & Environment (CHWE), Colorado School of Public Health

**Background:** CKDu is one of the leading causes of kidney related death amongst farmers and heat stress may be a contributing factor. Previous research observed that Guatemalan farmers originating from lowlands experienced worse kidney function, however climate of their municipality had not been examined. This analysis explores the relationship between climatic conditions and kidney function in Guatemala.

**Methods:** Utilizing health and demographic data from pre-employment screenings for applicants at a sugarcane company and climate data, we examined the relationships between estimated glomerular filtration rate (eGFR), an indicator for kidney function, and mean and maximum temperatures of applicants’ municipalities. Additional variables considered in multivariable regression models include age, gender, number of previous harvests, and origin (highland vs lowland). Hot-spot analysis was conducted in ArcGIS to identify clustering of reduced eGFR.

**Results:** Applicants from lowlands are twice as likely to have reduced kidney function (eGFR <90 ml/min/1.73 m2), and lowland municipalities are on average 10 degrees hotter than highland municipalities. Multivariable logistic regression found that every degree increase in average temperature increases the odds of having reduced eGFR by 1.03. Age, number of previous harvests, and female gender are also risk factors for reduced eGFR. However, when models only include highland applicants, increasing temperature is a protective factor.

**Conclusions:** We demonstrated that reduced kidney function is a community health risk that may be exacerbated by occupational exposure. Further study is needed to explore the differing interaction of temperature and eGFR in highland and lowland communities, such as potential acclimatization within highland workers.

**Gonococcal Antimicrobial Reduced Susceptibility Trends in Denver, 2017-2019**

Nolan Green

Preceptor: Christie Mettenbrink, MSPH

Site: Denver Public Health

**Background:** Gonococcal antimicrobial resistance has become a growing concern, as it can lead to higher cases of untreated gonorrhea which can cause epididymitis and infertility in men. The purpose of this project is to assess whether a variety of factors can act as predictors of gonococcal antimicrobial resistance.

**Methods:** A retrospective cohort design was used to analyze data collected at the Denver Health STD Clinic from 2017- 2019. 1,541 males who had a culture collected at the clinic were included. A minimum inhibitory concentration of 1 µg/mL or higher for Ciprofloxacin was used as the outcome variable of interest. A multivariable logistic regression was used to identify predictors of antimicrobial resistance.

**Results:** After adjusting for age, race/ethnicity, and sexual orientation, men who reported having sex with more than five male partners had 1.62 (1.15, 2.28) higher odds of having Ciprofloxacin-resistant gonorrhea when compared to men who reported having one to four male partners in the past three months. After stratifying the model by sexual orientation, men who were 25-29 years old had 1.55 (1.00, 2.41) higher odds and men who were 40-49 years old had 1.93 (1.08, 3.45) higher odds of having Ciprofloxacin-resistant Gonorrhea when compared to men who had sex with men and who were 30-39 years old.

**Conclusions:** Our results indicate that males at the Denver Health STD Clinic have different clinical and demographic characteristics that may indicate Ciprofloxacin resistance. These findings are important in understanding what factors may act as potential predictors of gonococcal antimicrobial resistance.

**Taking Care of Our Own: Identifying Program Recommendations Aimed at Decreasing Household Food Insecurity Among Team Members at Children’s Hospital Colorado**

Rebecca Guigli

Preceptor: Katie O’Connor, MPH

Site: Children’s Hospital Colorado

**Background:** Based on a needs assessment conducted at Children’s Hospital Colorado, there are a sufficient amount of team members who are experiencing food insecurity in Food Services, Environmental Services, and Security departments, particularly among team members with children. The purpose of this study was to identify program recommendations aimed at decreasing household food insecurity among team members at Children’s Hospital Colorado.

**Methods:** In phase one, we conducted a literature review to assess health problems and negative quality of life outcomes related to food insecurity, and behavioral and environmental factors that contribute to food insecurity. Then, we conducted a community capacity assessment through semi-structured key informant interviews to identify current programs and partnerships at Children’s Hospital Colorado, and conducted a rapid qualitative analysis to developed possible program recommendations. In phase two, we conducted unstructured informational interviews to outline essential implementation requirements and formulate basic cost projections for each recommendation.

**Results:** Given all the information and feedback obtained during both phases, four program recommendations were developed with subsequent basic cost projections. (1) Expansion of cafeteria voucher program costing approximately $X. (2) Produce truck through partnership with Any Street Grocery costing approximately $X. (3) Mobile food pantry through established Healthy Roots Clinic contract with Food Bank of the Rockies costing approximately $X. (4) Mini-market at concierges desk costing approximately $X.

**Conclusions:** Children’s Hospital Colorado currently has the need and capacity to implement a food assistance program to help combat household food insecurity among those team members, and their children, who are in need.

**Examining Naloxone Accessibility Within Public Pharmacies in Colorado**

Veronika Hanna

Preceptor: Cori Howard, MHC

Site: Central Colorado Area Health Education Center

**Background:** Naloxone is a lifesaving drug that can reverse opioid overdose. In 2015, Senate Bill 15-053 passed in Colorado, creating a standing order for naloxone. The standing order made naloxone available at pharmacies and harm reduction centers without a prescription if the organizations had the proper certificate from the state. Our objective is to understand the impact how accessible naloxone is within Colorado.

**Methods:** This project utilized data collected from the Community Opioid Response Program directed by the Central Colorado Area Health Education Center in 2019. AmeriCorps members conducted phone interviews with all the public pharmacies in Colorado. The project used a cross-sectional study design to collect data about the barriers that a shopper would experience when accessing naloxone. Data collected by CDPHE was used to analyze the relationship between access to naloxone and death within the state.

**Results:** Out of the 64 counties in Colorado only 33 counties had the standing order (51%).

About 86% retail companies had naloxone available, while 59% of health systems had naloxone available. About 80% of public pharmacies in Colorado had naloxone and about 74% of pharmacies had the standing order with naloxone. Overdose mortality rates and naloxone access a surprisingly do not have a strong correlation.

**Conclusions:** These results show that pharmacies have a lack of understanding regarding the naloxone standing order. More education for pharmacies and consumers is necessary in order for better access to the drug. Access to naloxone is very important in rural regions to prevent overdose deaths in Colorado.

**Process Evaluation of a Wellness Coaching Program within Internal Medicine, UCHealth**

Laura Hill

Preceptor: Jenn Leiferman, PHD

Site: UCHealth, Internal Medicine

**Background:** The Wellness Coaching Program (WCP) is a free program for patients at the University of Colorado Department of Medicine and is designed to help patients change a health behavior in order to prevent and/or manage chronic disease. This program gives MPH students the opportunity to practice their motivational interviewing skills to promote behavior change. The study aimed to conduct a process evaluation of the entire program.

**Methods:** Amixed-methods study was conducted from September 2019-March 2020. Satisfaction surveys were distributed to 23 patients (who completed the program) and 7 coaches. These surveys were open ended questions for a deductive thematic analysis. Additionally, behavior change progression, completion of the program, and five referral types were all collected through a visit intake form for descriptive statistical analysis. Lastly, a deductive thematic analysis was conducted on coaches’ reflexive paper and bi-weekly meetings.

**Results:**  Patients stated they were “very satisfied” with the program and “very likely” to sustain/maintain their behavior change. Most preferred behavior physical activity, patient outreach had the most success for a patient to sign up and show up to the first visit. Coaches rated the overall program a 7.2 – with patient recruitment being the main issue.

**Conclusion:** Patient recruitment is the main concern within the program. Strategies should be developed to stimulate providers buy-ins/referrals. WCP should develop partnerships with the wellness center on campus, grocery stores, and the dietician within internal medicine. These partnerships could develop incentives for the patients to decrease the likelihood of dropouts.

**Difficult Communication Encounters in Obstetrics: A Training Program for Medical Professionals**

Carolyn Ho

Preceptor: K. Joseph Hurt, MD, PhD

Site: University of Colorado School of Medicine

**Background:** Recently, the importance of communication skills within medical education has become increasingly emphasized although training methods have not yet been standardized. Our goal is to demonstrate a communication intervention module that will improve student clinical skills based on the Obstetrics Communications Assessment Tool (OCAT) grading scale, which was created in a separate study.

**Methods:** We performed a literature review of peer-reviewed articles and prior studies with an inclusion criteria involving studies conducted within the last two decades across the U.S. and Europe, those involving education methods used in the medical environment, and those that had clearly defined study goals and methodology with relevant results. From there, we consolidated the information and included eighteen studies that we found had greatest clarity and methodology best suited for our small academic setting.

**Results:** We found that despite the many modalities used to train medical personal in communication skills, personal reflection, peer review, mentor guidance, interactions with real patients, and clinical simulations were found to improve levels of empathy, rapport building, and various other skills to healthcare providers. These five methods were combined into a training program to improve medical student communication abilities during clinical interactions.

**Conclusions:** As the evaluation of the OCAT is still incomplete, the training module cannot be assessed until later. At the moment, the literature review from the study has revealed that these four methods are most effective in communications training of medical personnel. Yet, in order to fully assess this topic, further investigation is still needed.

**Effect of Wet-Bulb Globe Temperature and Baseline eGFR on the Rate of Dehydration Injury in Guatemalan Sugarcane Cutters**

Kirk Hohsfield

Preceptor: Miranda Dally, MS

Site: Center for Health, Work & Environment

**Background:** An epidemic of chronic kidney disease of unknown etiology (CKDu) is occurring in tropical regions around the world, including Central America, where it predominantly affects young, male agricultural workers. This research aims to examine the effect of wet-bulb globe temperature (WBGT) and baseline estimated glomerular filtration rate (eGFR) on the rate of dehydration injury in sugarcane cutters working in Guatemala.

**Methods:** We used pre-employment survey data of 4,795 employees. Dehydration injuries were confirmed via clinical review with a nurse. The surveys occurred during two harvests across November 2016 – April 2018, and meteorological measurements were logged by a nearby weather station. Poisson regression modeled the rate of dehydration injuries per day by the 95th percentile WBGT across workers with low (<90 mL/min) and normal (>90 mL/min) eGFR.

**Results:** Previous harvests, origin, and age significantly differed between persons with low and normal eGFR (p<0.05). The rate of dehydration injuries decreased by 20.2% with each one-unit increase in WBGT (95% CI: 13.3%, 26.6%; p<.0001), and the rate of injuries is 91.7% less for low eGFR (95% CI: 90.0%, 96.1%; p<.0001).

**Conclusions:** WBGT and eGFR may not adequately predict the rate of dehydration injuries. Administrative controls may mitigate WBGT increases through rest, shade, and hydration. Workers with low eGFR had worked more previous harvests and lived near farms compared to workers with normal eGFR, which may suggest better acclimation. Further research needs to explore other predictors and longitudinal data to improve future models and minimize the rate of injuries in future harvests.

**Discovery Interviews: Ensures Smooth Implementation for a Smart Cities Web-based Key Performance Indicator Dashboard at Denver’s Department of Public Health and Environment**

Thora Holm

Preceptor: Agathe Dorel

Site: Denver Department of Public Health and Environment

**Background:** Denver Department of Public Health and Environment, DDPHE, partnered with MySidewalk to host its web-based Key Performance Indicator, KPI, Dashboard. MySidewalk provides data science services to public entities. The purpose of this study was to understand and address the concerns for the implementation of this dashboard as it relates to each of DDPHE's six divisions: Administration, Denver Animal Protection, Community and Behavior Health, Public Health Investigations, Environmental Quality, and the Office of Medical Examiner.

**Methods:** Qualitative research using discovery interviews were conducted with nine representatives from five of the six divisions. A total of 5 in-person interviews and two phone interviews were performed. Each interview consisted of an introductory PowerPoint explaining the project and a series of interview questions, which were recorded in writing. Thematic coding was used to analyze the results.

**Results:** Five main themes, from all answers, emerged showing concerns for 1. Access 2. Data logistics, 3. Partner sharing, 4. License/Contract, and 5. Sensitivity. These answers were then grouped by the similar theme and re-coded to better narrow for common concerns. From which a FAQ sheet was generated to use when introducing and training staff on the new dashboard and program.

**Conclusion:** Valuable information was gained from these discovery interviews, aiding in the training and adoption of DDPHE's new data platform and performance dashboard. By providing the answers to common questions during initial training, the staff is better informed and able to move forward with focusing on using and learning the platform, ultimately ensuring a smoother adoption.

**DNA Methylation Mediates the Relationship Between Family History of Type 1 Diabetes and Type 1 Diabetes Risk**

Amanda Ireton

Preceptor: Jill Norris, PhD

Site: Anschutz Medical Campus

**Background:** Given the increased risk of type 1 diabetes (T1D) in the offspring if the father has T1D compared to the mother, and the recent observation that T1D cases have different DNA methylation in an imprinted gene (DLGAP2) compared to controls, we examined whether methylation in the DLGAP2 gene region mediates the association between paternal history of T1D and T1D risk.

**Methods:** We performed a nested case-control study on 87 T1D cases and 87 controls from the prospective Diabetes Autoimmunity Study in the Young (DAISY) cohort. We first established the association between T1D family history and T1D case status. Next, we showed that T1D family history was significantly associated with methylation in the DLGAP2 region. Finally, using the Barron and Kenney test for mediation, we calculated the indirect effect, direct effect and total effect.

**Results:** The analysis was adjusted for one confounder, the HLA DR3/DR4 gene. Two probes in the DLGAP2 region (cg19530281 and cg16922753) were found to significantly mediate the relationship between T1D family history and T1D risk. There was a significant decrease in odds for both probes from approximately 3.2 to 2.7 when adjusting for DNA methylation.

**Conclusions:** The finding of DNA methylation significantly mediating the relationship between family history of T1D and T1D risk may suggest a role for epigenetics in T1D pathogenesis. Further studies should investigate the relationship between maternal T1D case status and T1D pathogenesis.

**Surveying Colorado Community Health Centers on Their Uptake and Utilization of Social Determinants of Health Screening Tools**

Cynthia Jimenez

Preceptor: Jessica Sanchez, APRN

Site: Colorado Community Health Network (CCHN)

**Background:** Social Determinants of Health (SDoH) account for up to 80% of health outcomes. SDoH screenings capture information of factors impacting the health of patients. They can further the understanding of providers and bridge the gap between the health and needs of patients. The purpose of this project was to survey Colorado community health centers (CHCs) on their uptake and utilization, challenges and best practices, and support they needed to implement or increase screening.

**Methods:** A 17 question mixed methods survey link and Word document version were emailed to 20 key individuals. The data collection was from January 21 to March 6, 2020 and three reminders were sent. To analyze the qualitative data, responses were coded based on keywords and clustered into themes; using Excel, themes were calculated for proportion. To analyze the quantitative data, responses were aggregated using Excel and calculated for value and percentage.

**Results:** There was a 90% response rate. Exactly 94.4% of CHCs were screening for SDoH. Over half had been screening for one to two years and 44% were screening at all sites and 33% at one to three sites. The top three challenges CHCs had were time and workflow, with providers, departments, and clinic staff, and electronic health record integration. Best practices included coordination and tailoring screenings to the needs of the CHC and patients.

**Conclusions:**

More CHCs than expected were already screening for SDoH. The work CCHN intended to do with implementation, can transition to expansion. Next steps include screening expansion and implementation of recommendations.

**Firearm Storage Maps: A Pragmatic Approach to Reduce Firearm Suicide During Times of Risk**

Timothy Kelly

Preceptor: Sara Brandspigel, MPH

Site: Program for Injury Prevention, Education, and Research (PIPER)

**Background:** Suicide is one of the leading causes of death in Colorado, and temporary out-of-home firearm storage is an evidence-based suicide prevention strategy meant to reduce access to lethal means. However, there are significant barriers to out-of-home firearm storage, including a lack of knowledge about locations that offer such services. We sought to develop a first-of-its-kind virtual map that lists locations that consider requests for temporary, voluntary firearm storage.

**Methods:** We systematically contacted every Colorado law enforcement agency and gun shop via phone and/or email to identify locations that consider requests for temporary, voluntary firearm storage and that were willing to be listed on a publicly available online resource. The map was built on the Google Map platform.

**Results:** Of 471 gun retailers and 215 law enforcement agencies contacted, 61 Colorado locations (46 retailers and 15 law enforcement agencies) considered requests for temporary firearm storage and were willing to be publicly listed. Overall, temporary gun storage locations were located in 50% (32/64) of Colorado counties. The firearm storage map is available at https://coloradofirearmsafetycoalition.org/gun-storage-map/ and has received 29,021 site visits to date.

**Conclusion:** Our experience demonstrates that firearm storage maps can support harm reduction approaches to prevent firearm-related injury and death, although significant practical and legal challenges remain. Future investigations should help clarify if firearm storage maps change patterns of firearm storage and/or help physicians and behavioral health evaluators provide more effective lethal means counseling to patients at risk of suicide.

**What Clinical and Behavioral Factors Impact Clinical Weight Loss? An Analysis of One Colorado Weight Loss Clinic**

Lisa Kisling Thompson

Preceptor: Jessica Wallace, PA, MPH

Site: Denver Health, Healthy Lifestyles Clinics

**Background:** Multi-component lifestyle intervention remains the cornerstone for clinical weight management, but variation among recommendations regarding each component’s importance remain. This study aims to describe the most impactful behavioral and clinical components of a real-world weight management practice.

**Methods:** This retrospective cohort study used patient data from Denver Health Healthy Lifestyles Clinics (HLC) from August 1, 2018 to December 31, 2019 (n=722). Behaviors including clinic visits, diet, and physical activity of each participant were collected from self-report questionnaires administered at each clinic visit. Multivariate logistic regression determined which behavioral factors contributed to clinically significant weight loss.

**Results:** 17.94% of patients had clinically significant weight loss (>= 5% total body weight). Increasing the number of visits (RR 1.31 95% CI: 1.17, 1.46), time between visits (RR 1.15 95% CI: 1.04, 1.08), total follow up time (RR 1.17 95% CI: 1.10, 1.25), medication use (RR 2.41 95% CI: 1.55, 3.74), fruit/vegetable intake (RR 1.88 95% CI: 1.21, 2.93), and physical activity (RR 1.48 95% CI: 1.15, 1.92) increased the odds of clinically significant weight loss. These all remained significant after adjusting for race/ethnicity, sex and age. With further adjustment, only number of visits(RR 1.82 95% CI: 1.19, 2.77), medication use (RR 2.62 95% CI: 1.30, 5.28), and fruit and vegetable intake (RR 2.43 95% CI: 1.23, 4.77) remained significant.

**Conclusions:** This data highlights the importance of consistency (overall follow up time) and accountability (HLC visit count) in effective weight management. It also reinforces the efficacy of weight loss medication.

**Intimate Partner Violence and HIV: A comparative analysis of experiences among people living with HIV in Colorado and Zambia**

Sara Kitchen

Preceptor: Karen Hampanda, PhD, MPH

Site: Center for Global Health

**Background:** HIV and intimate partner violence (IPV) are overlapping epidemics in both the United States and sub-Saharan Africa (SSA) with 38 million people globally living with HIV and an estimated 30% of ever partnered women have experienced IPV. This project has two aims: 1) to evaluate baseline data of IPV among all HIV positive patients being treated at Children’s Hospital Immunodeficiency Program (CHiP) and 2) to compare the occurrence and response to IPV among HIV positive women in Lusaka, Zambia.

**Methods:** A baseline chart review through an electronic patient charting program from CHiP was analyzed for IPV. Interviews of pregnant women living with HIV attending prenatal care at the University of Zambia Teaching Hospital were evaluated. A comparative analysis of both groups was completed.

**Results:** We reviewed 44 CHiP charts and 30 Zambia interviews. Most (28) CHiP participants were screened for IPV; with 32% (9) disclosing IPV. From 30 interviews, 67% of participants disclosed IPV. We found 11% (1) and 35% (7) disclosed HIV specific IPV from the chart review and interviews respectively.

**Conclusions:** The proportion of those screened who disclosed IPV between Colorado and Zambia differ, with Zambian participants disclosing more IPV. Participants reporting IPV specific to their HIV status was vastly greater in Zambia although this could be due to differences in screening methods.The comparison groups are both pregnancy and postpartum women, but a limitation is that a chart review and qualitative interviews are not easily comparable.

**Impact of Indoor Air Pollution and Allergens on Asthma in Low Income Children Living in the East Colfax Corridor**

Michelle Kleitsch

Preceptor: Fernando Holguín, MD, MPH

Site: University of Colorado, Anschutz Medical Campus

**Background:** Asthma, affected by environmental factors, disproportionately impacts children of lower socioeconomic status (SES). Our objective was to assess the relationship between indoor air pollutants and allergens and asthma in low income children in a Denver community.

**Methods:** Utilizing the data collected from the Colfax Corridor Environmental Needs Assessment, we analyzed the relationship between asthma, as defined by the International Study of Asthma and Allergies in Children (ISAAC) scores, and various exposures such as secondhand smoke, keeping windows open, pest allergens, and presence of mold. We conducted analyses with SAS software and described the relationships relative risk and Fisher’s Exact tests.

**Results:** A significant association was found between race and asthma, with a p-value of 0.0231. When controlling for gender, there was a significant correlation between leaks and asthma among girls (p=0.0342), and housing type and asthma among boys (p=0.0301). No association was found between asthma and dust allergens, income, sex, or secondhand smoke. A sub-analysis of the relationships between housing types and environmental allergens also showed no significance.

**Conclusions:** While this study did not find much significance among the environmental allergens and pollutants and asthma, it did find an association between race and asthma prevalence, a well-documented relationship. The study found gendered differences between exposures and asthma prevalence. Both findings point to disparities that may exist. Asthma is a destructive disease that disproportionately affects vulnerable populations. The small number of significant findings that were discovered in this study indicate that further research is needed to address this issue.

**Long-term Heavy Cannabis Use and its effects on Respiratory Health**

Kylie Kline

Preceptor: Greg Kinney, PhD

Site: Colorado School of Public Health/National Jewish Health

**Background:** In 2016 and 2017 the fourth leading cause of death in the United States was chronic lower respiratory diseases, such as Chronic Obstructive Pulmonary Disease (COPD) and asthma.The global and national trends of increased cannabis use and legalization could pose a public health risk if smoking cannabis is linked to lung disease. The purpose of this study is to look at the long-term lung function and chronic respiratory diseases in heavy cannabis users, in order to better guide public health recommendations.

**Methods:** The study design is cross-sectional; the population is comprised of 220 adults aged 21-80 who were residents of Colorado. Linear regression was used to model the association between DLCO, St. George’s Respiratory Questionnaire (SGRQ) scores and heavy cannabis use. Similarly, logistic regression was used to calculate the odds ratio of chronic respiratory illness among heavy cannabis users.

**Results:** After adjusting for smoking and age, people who have chronic respiratory diseases are 0.22 (-0.16, 1.74 95% CI) times less likely to be heavy cannabis users than people who don’t have respiratory disease. There was no significant association found between DLCO and heavy cannabis use (p=0.4450), but there was a significant association found between heavy cannabis use and a 5% increase in SGRQ scores (p= 0.0093).

**Conclusions:** The analysis suggests that heavy cannabis use surprisingly is not associated with developing chronic lower respiratory diseases or decreased gas exchange in the lungs. However, heavy cannabis users may be more likely to experience lower respiratory quality of life than non-users.

**Measuring the Impact of Positive Youth Development in Urban Garden Education:**

**The GrowHaus Evaluation Toolkit**

Catherine Kradel

Preceptor: Monica Amador

Site: The GrowHaus

**Background:** The GrowHaus, a non-profit indoor farm, marketplace, and education hub, provides tangible skills and knowledge focused on healthy eating, gardening, and food justice within their community. This project aims to develop a toolkit of evaluation methodsfor their After-School Education Program, in order to assess key beliefs and barriers of students’ health behaviors, as well as provide feedback and recommendations regarding the program’s reach, impact, and effectiveness.

**Methods:**I conducted a literature review of evidence-based evaluation tools for similar programs, which informed the development of a program Logic Model. The existing health education curriculum was then reviewed to define connections to relevant health behavior constructs (attitudes, beliefs, knowledge, self-efficacy, and perceived benefits/barriers). Based on these findings, quantitative and qualitative measurement methods were selected, compiled, and modified to accommodate the unique social, cultural, and linguistic needs of this community.

**Results:** This project resulted in a total of nine new evaluation methods, including surveys, feedback forms, observations tools, and other evaluation-focused activities. The resulting evaluation toolkit is designed to evaluate not just student outcomes, but also staff practices, program content, student experiences and expectations, parent perceptions and experiences, community-level health data, and other indicators of program reach, impact, and effectiveness.

**Conclusions:** Unique methods of evaluation are critical to properly assess youth knowledge, attitudes, beliefs, and skills as a result of after-school education programs. The GrowHaus’ Evaluation Toolkit is intended to positively impact the health of their community’s youth by providing rationale, mechanisms, and recommendations for program improvement through evaluation.

**Development of an Evaluation Plan for a Prenatal Wellness Program**

Rachael Lacy

Preceptor: Charlotte Farewell, PhD, MPH

Site: Rocky Mountain Prevention and Research Center

**Background**: Excessive weight gain during pregnancy poses many health risks, short and long term, to both the mother and the baby. Our objective aims to evaluate a prenatal wellness intervention program and its curriculum and provide tailored recommendations.

**Methods**: We designed an evaluation grid utilizing the logic model, short, medium and long term outcomes, and the overall curriculum documents. These documents were evaluated through the lens of scientific based best practices. Furthermore, the logic model and program objectives were evaluated to ensure there were accurate assessment tools to measure change.

**Results**: Overall, I found the program aims and the way they measured these aims were aligned to create an impactful change on overall excessive gestational weight gain. I found there were insufficient supports addressing maternal anxiety and depression. To combat this, documents were added into the curriculum to support these mental health issues. Additionally, as nutrition was not a primary outcome, I recommended the curriculum information regarding nutrition be minimized. Finally, the program needs to add more robust cultural insensitivity into the program’s curriculum as there is a large Hispanic population where the program will occur.

**Conclusions**: With increasing EGWG during pregnancy, MBMM+ is an essential tool for providers and pregnant women. An evidence-based program tailored to fostering social relationships while increasing physical activity will have an impactful change on the weight of pregnant women throughout their pregnancy.

**Analysis of Anaphylaxis Events in Colorado Public Schools, 2015-2019**

Bruce J. Lanser, MD

Preceptor: James Crooks, PhD, MS

Site: National Jewish Health

**Background:** Epidemiologic data regarding anaphylaxis and food allergy in schools is lacking. The Colorado Department of Education(CDE) has collected anaphylaxis data since 2014. We seek to analyze school anaphylaxis events from 2015-2019.

**Methods:** Colorado public school nurses are required to report details of every anaphylaxis event via online form. Deidentified data was obtained under IRB exemption. Descriptive statistics were prepared analyzing the 4 school years combined. Annual incidence was calculated using CDE PreK-12 yearly enrollment data.

**Results:** The rate of anaphylaxis in Colorado public schools ranged from 9.94 per 100,000 students in 2016-2017 to 12.96 in 2017-2018(n=90-104). Events were most common in middle school(42.4%, mean age 11.48+0.37y). Foods triggered 70.2% of reactions, with peanuts and tree nuts causing greater than half. Anaphylaxis occurred in children without a known allergy in 16.8% of events. For those with a known food allergy, the percent having an action plan on file decreased every year from 95.3% in 2015-2016 to 71.8% in 2018-2019. Epinephrine was most commonly administered in the health office(82.8%). The majority of reactions occurred in classrooms(50.8%). Reactions were treated within a mean of 10.04min (55.3% treated within 5min).

**Conclusions:** This is the first detailed analysis of such data. School staff must be trained in recognizing/treating anaphylaxis. Schools should have policies regarding food allergies, specifically food in the classroom. Efforts should be made to increase the number of action plans on file for children with a known food allergy. The CDE anaphylaxis data should be analyzed annually and compared to other states.

**A Comparison of Inspection Records Between Food Establishments in Two Massachusetts Towns with Differing Food Safety Regulations**

Maeve Lawlor

Preceptor: Jessica Tracy, RN

Site: Town of Dedham Health Department

**Background:** Training managers of food establishments in food safety helps to protect customers from foodborne illnesses. To date, it is not clear whether training all food handlers in food safety is effective. This study aims to determine whether training all food handlers in food safety decreases the amount of critical violations present during inspections.

**Methods:** A cross-sectional study was performed using food inspection records from two towns, one, where food handlers are trained annually, and another where only managers are trained every three years. A multivariate Poisson regression analysis was used to compare the number of critical food safety violations between the two towns. Other variables in the model include facility adequacy, chain, full service, kind of establishment, the interaction between facility adequacy and chain, and the interaction between facility adequacy and kind of establishment.

**Results**: For every inspection conducted in a food service establishment between October 2017 and December 2018, the odds of having a critical food safety violation in the town where only managers are trained, compared with the town where all food handlers are trained, was 4.3224 to 1.0000. The number of facility adequacy violations, whether a food service establishment is a chain, and the kind of establishment, significantly affected the number of critical violations present during inspection.

**Conclusions:** Training all food handlers in food safety is an effective way to decrease critical violations. Local health departments are encouraged to implement food safety training programs for all food handlers annually.

**Succession Planning to Meet the Future Leadership Needs of**

**Denver Public Health**

Jeremy Lee

Preceptor: Elizabeth Rumbel

Site: Denver Public Health

**Background:** National Public Health and Denver Public Health (DPH) workforce data highlight a significant percentage of staff and leaders plan to leave their jobs in the next 5 years. Contributing factors include an aging workforce and a lack of career advancement. The purpose of this project is to implement a succession planning pilot program to enhance leader development and identification at DPH.

**Methods:**  Thirty-nine DPH leaders took a survey to gather baseline data which supported the case for succession planning. Nine leaders subsequently volunteered to participate in a succession planning pilot. Pre-pilot data was collected from participants to understand their level of knowledge, practice, and perceived needs. A comprehensive toolkit was created to provide a roadmap for the pilot. Periodic evaluations provided feedback on the tools and processes for future improvement.

**Results:** In a pre-pilot survey, 75% of participants claim they are actively working on succession planning, 38% have documented key roles and responsibilities of their jobs, 50% have identified possible successors, and 50% are actively developing potential successors. Six of nine pilot participants are actively working through the succession planning toolkit. Progress is being monitored for completion of Phase I in June, 2020.

**Conclusions:** A lack of knowledge and expectations inhibit leaders from good succession planning practices. Collecting data to understand the current state, identifying barriers for leaders, and piloting tools and processes can help public health organizations adopt succession planning practices. This will contribute to developing the future leaders of public health.

**Improving Student-Run Free Clinic Community Partnerships:**

**An Evaluation of the Inaugural Year of a Community Board**

Katy Lehenbauer, MD

Preceptor: Kari Mader, MD, MPH

Site: DAWN Clinic

**Background:** The DAWN Clinic is an interprofessional student-run free clinic (SRFC) that provides primary care to uninsured patients in Aurora, Colorado. There is no literature describing feasibility or models of community advisory board (CAB) formation from an SRFC. The Community Leaders of DAWN (CLD) was created in 2018 and determined their mission was to promote healthy communities in Aurora.The purpose of this project is to share the process and outcomes evaluation of the inaugural year of DAWN’s community board.

**Methods:**Interventions included a kickoff day, monthly community group meetings, and planning committee meetings.Mixed-method evaluation utilizing pre-post surveys, student-leader exit surveys, focus groups, and key informant interviews assessed the facilitation process and impact on the community, community members, and student leaders. Quantitative data analysis employed frequencies and means; qualitative data analysis included two coders using an inductive approach.

**Results:** The CLD included eight actively-involved community members. Some disconnect existed between qualitative and quantitative findings related to group cohesion, self-efficacy to improve health, and conceptualization of oneself as a leader. Attendance was a serious challenge, yet a strong sense of “family” still emerged. Skilled facilitation and flexibility via technology were key processes for success. CLD was successful in generating a challenge for DAWN to increase access to care, and all members organically identified themselves as community ambassadors.

**Conclusions:**This evaluation provides DAWN with an opportunity to improve community responsiveness through working towards continued, sustainable engagement. Appropriately, additional CLD members will be recruited to engage with DAWN as ambassadors for their community.

**Cross-Sector Database Framework to Align Health and Housing in Brighton, Colorado**

Stephanie Leonard

Preceptor: Debra Bristol, MURP

Site: Brighton Housing Authority

**Background:** Cross-sector partnerships help establish a continuum of care between service providers to address social determinants of health (SDOH). My objective was to develop the framework for a cross-sector database that will facilitate data collection and exchange between members of the Health and Housing Work Group (HHWG) in Brighton, Colorado.

**Methods:** The project employed a mixed methods approach over four months. A literature review revealed how cross-sector databases have been developed and deployed in similar contexts. I established a key informant interview guide and conducted semi-structured interviews with HHWG members to identify existing data assets and needs. Using an inductive content analysis approach, I manually coded and analyzed the interviews to identify themes.

**Results**: Seven HHWG members participated in the key informant interviews, representing 2 housing providers, 2 medical providers, 1 social service provider, and 1 municipality. Analysis revealed shared priorities related to 1) standardized assessments to evaluate SDOH, 2) consistent interagency referral processes that help measure progress toward health improvement, and 3) virtual platforms to enable data exchange and collaboration across sectors.

**Conclusions:** For each priority, at least one HHWG organization has expertise to lead requisite key actions. The group should leverage this expertise to establish, evaluate, and formalize a standardized SDOH assessment and the interagency referral process. The data collected through these instruments will be the basis for a cloud-based data sharing platform. The database should be designed to align with HHWG capacity and best practices gleaned from the literature review.

**The Carbon Footprint of Travel**

Sarah Levine

Preceptor: Lee Newman, MD, MA

Site: Center for Health, Work & Environment

**Background:** Academic air travel is a large contributor to Greenhouse Gas emissions and makes up a considerable portion of the Center for Health, Work & Environment’s (CHWE) carbon footprint. The objective of this project is to analyze work-related air and ground travel in order to measure the associated carbon footprint and identify potential strategies for reducing CHWE’s carbon footprint.

**Methods:** The carbon footprint of CHWE from July 1st, 2018 to June 30th, 2019 was calculated by totaling the miles traveled and CO2 emissions from air and ground trips for 25 employees, who filed expense reports for that time period. I used the ICAO carbon footprint calculator to measure air-related emissions and the EPA’s estimate of 404g of CO2/mile to calculate car-related emissions. I implemented a pre- and post- survey to measure the intent for behavioral change of an educational training, which was analyzed using a paired t-test.

**Results:** CHWE had 23 employees who traveled 6,700 miles by car and emitted 6,000 lbs of CO2. 13 employees traveled 190,000 miles by air and emitted 62,000 lbs of CO2. Employees commute 2,000 miles per week. There were significant changes in employee intent for behavioral change and attitudes following the training. Participants created a list of recommendations for CHWE to reduce its organizational carbon footprint.

**Conclusions:** This study showed that employees of CHWE were motivated to make changes regarding their carbon footprint following the training. Participants intend to change some behaviors regarding work travel after the training, mainly pertaining to decision making.

**Predictors of Mortality in *Clostridium difficile* Infections**

Jessica Lopeman

Preceptor: Christopher Czaja, MD, MPH

Site: Colorado Department of Public Health and Environment

**Background:** Healthcare-associated infections, including *Clostridium difficile,* are a growing challenge leading to increased morbidity and mortality, increased costs, and increased length of stay. There are several known risk factors for *C. difficile* infections including antibiotic use, older age, and hospitalization, but few studies that have looked at predictors of mortality and severe disease in *C. difficile* infections. The purpose of this research is to evaluate whether certain antibiotic classes are risk factors for severe infection or 30 day mortality.

**Methods:** Data from a retrospective cohort study of patients with primary *C. difficile* infection was used to examine antibiotic usage in the preceding 12 weeks. Four classes of antibiotics (fluoroquinolones, 3rd/4th generation cephalosporins, carbapenems, lincosamides) were examined for association with severe *C. difficile* infection and death within 30 days. Logistic regression was used to analyze the differences and identify predictors of mortality.

**Results:** 866 observations were included in the study. Antibiotics of interest, a majority of which were fluoroquinolones or 3rd/4th generation cephalosporins, were used by 227 patients in the 12 weeks preceding diagnosis. The severe infection outcome could not be evaluated due to missing data, thus only the 30-day mortality was evaluated. Relative risk of death was calculated for each antibiotic category and both the crude and adjusted models showed no p-values that were significant to 0.05 and all confidence intervals included 1.

**Conclusions:** The results indicate no relation between selected antibiotic classes and 30-day mortality. Additional studies will need to be performed to look at the severe infection outcome.

**Direct Democracy and Suicide in Colorado: Exploring the Interaction of Civic Engagement and Public Health**

Michael Lott-Manier

Preceptor: Ethan Jamison, MPH

Site: Colorado Department of Public Health and Environment

**Background:** Suicide is a major public health issue in Colorado, which has one of the highest rates of suicide deaths in the United States. State-level policy responses to this trend have focused on expanding crisis services, while suicide prevention leaders increasingly advocate for building protective factors such as economic stability and health equity. This project examines the relationship between county-level suicide rates and votes on key ballot questions related to protective factors in Colorado to inform public health interventions and policy development.

**Methods:** This project used suicide mortality data from the Colorado Violent Death Reporting System and election results from the Colorado Secretary of State’s Office to measure the association between age-adjusted, county-level suicide rates and votes for health-promoting positions on eleven citizen-initiated ballot questions from 2004 to 2018 using a Spearman’s rank correlation coefficient.

**Results:** In nine of the eleven ballot questions studied, there was a negative correlation (ρ = -0.261— -0.013) between the share of votes for health-promoting positions and suicide rates at the county level. Counties that voted in favor of increasing social and economic protective factors against suicide tended to have lower suicide rates than counties that voted in opposition.

**Conclusions:** This project found a meaningful correlation between voting patterns on direct policy questions and suicide rates, indicating that political support for improving public health might be associated with other protective factors. Public health leaders should consider how to incorporate civic engagement as a multifaceted component of suicide prevention and other critical efforts.

**The Effects of Inter-Parent Relationship Quality on Parental Mental Health and Child Behavior Outcomes**

Sophie Luckett-Cole

Preceptor: Jenn Leiferman, PhD

Site: Population Mental Health and Wellbeing

**Background:** Parental relationship distress and depression may lead to anxiety, depression, and poor social/emotional competence for the child. This study aimed to understand the impact of inter-parent relationship quality and parent mental health on childhood behavior outcomes (e.g. withdrawnness, aggressiveness).

**Methods:** This was a retrospective cohort study using the Fragile Families Study, which collected data from children in large cities around the United States born in 1998-2000. The present study used 2,544 participants who were interviewed at birth, age 1 and 3 of the child. Parent relationship quality and mental health were categorized as good or bad based on the data and were aggregated for each time point. Child behavioral outcomes was continuous. A multivariate linear regression was conducted. Covariates included age, marriage status, poverty status, education, and race.

**Results:** Inter-parent relationship quality was associated with child behavioral outcomes at different time points (e.g. good across all time points led to a 0.08 point decrease in negative child behaviors, p < 0.0001). Parental mental health was associated with child behavioral outcomes at different time points (e.g. good across both time points led to a 0.11 point decrease in negative child behaviors, p < 0.0001). Mental health was not an effect modifier of inter-parent relationship quality (p = 0.38).

**Conclusions:** These results show that the duration and timing of good inter-parent relationship quality and parent metal health matters for child behavioral outcomes. Early and continual intervention to enhance parental relationships and mental health may lead to better child behavior.

**Factors Associated with Quality of Life in Kaposi Sarcoma Patients in Zimbabwe**

Hannah Marinoff

Preceptor: Dr. Thomas Campbell, MD

Site: University of Colorado Hospital

**Background:** Epidemic Kaposi Sarcoma is the third largest cause of death in people initiating antiretroviral therapy in Southern Africa; it’s also associated with a decreased quality of life in people with disease. Our objective is to determine if there is a significant difference in quality of life (QOL) measures before the Strategies to Improve Kaposi Sarcoma Outcomes (SIKO) interventions in patients with diagnosed Kaposi Sarcoma living in urban areas compared to those living in rural areas to determine necessity of SIKO interventions.

**Methods:** Baseline measures were collected at eight different locations, four rural and four urban clinics on 1102 patients. Functional Living Index-Cancer questionnaires were completed at visit and quality of life scores were calculated. A multivariable regression was calculated to determine whether there was a significant difference in quality of life (QOL) scores between rural and urban populations.

**Results:** Of participants, 70% lived in urban settings, 55% were male, and the average QOL score was 97.08 with a range from 7 to 154. After adjusting for age, sex, years since HIV diagnosis, previous chemotherapy, and four symptomatic types of KS. The regression model showed a statistically significant difference of 4.57 points (p= 0.0210) between QOL scores from rural to urban participants.

**Conclusions:** There was a significant difference in QOL scores between those living in urban areas and those in rural areas. Those living in rural populations had a 4.57 point lower quality of life score compared to those living in urban populations; thus indicating the necessity for SIKO intervention.

**Determine Correlations of Increased Female Suicide Rate in the United States: An analysis of the increased rate of suicide among females in western states and potential correlations with demographic factors**

Juan Martinez, MD

Preceptor: Penelope Bennett, PhD, CNM, MPH

Surveillance Reporting System: National Violent Death Reporting System (NVDRS), Center for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services (HHS)

**Background:** Suicide is a leading cause of death for all females, particularly ages 25 to 64. Evidence suggests increased rates are targeted among high-altitude western states. The CDC maintains a state-based system that collects unique suicide data elements from multiple sources. The purpose of this project is to understand the data in order to establish prevention efforts since suicide rates for female’s ages 25-64 is higher in 2017 than in 1999.

**Methods:** A descriptive analysis of the NVDRS variables utilized for research includes counties with the most prevalent female suicide rate. The analytic strategy includes the following: 1) means 2) geographic location 3) age 4) race 5) ethnicity 6) type of injury 7) year 8) and circumstances. The data analysis measured descriptive variables utilizing SPSS software.

**Results:** The 2008 to 2014 U.S. death annualized crude rate is 7.78. Case studies (aged 24-65) were evaluated from 6 states. Elevation mean among 12 counties is 7,800 feet. Average income is $31,182.00 and a total percentage of 87 have at least a high school education. Non-Hispanic White Females incorporate 83% with a median age of 45 years. 60% have a mental illness of 72% was diagnosed as depression. A total of 85% committed suicide within 24 hours of having an argument with an intimate partner.

**Conclusions:** State participation in the NVDRS can reduce suicidal behavior in females. Acknowledging the need for suicide prevention programs may provide a substantial public health impact. 24/7 telephone support lines are critical in response during the current pandemic.

**Co-Infections Among Patients Experiencing Homelessness Hospitalized with Influenza in Colorado**

Sarah McLafferty

Preceptor: Nisha Alden, MPH

Site: Colorado Department of Public Health and Environment

**Background:** Co-infections are known to contribute to worse health outcomes in patients hospitalized with influenza. Common risk factors for these infections can be more common among individuals experiencing homelessness. The purpose of this study was to calculate the incidence of co-infections among patients hospitalized for influenza in Colorado and to determine if there is an increased risk of co-infection among patients experiencing homelessness.

**Methods:** This study utilized adult cases fromColorado’s Emerging Infections Program’s Influenza Surveillance Program between the years of 2013 and 2019 (n = 8,382). A univariate analysis was performed to investigate the association between co-infections and socio-demographic characteristics, pre-existing conditions, and clinical outcomes. A multivariate logistic regression model was used to determine the odds of co-infection by residence type adjusting for co-variates.

**Results:** 630 cases had evidence of a co-infection for a cumulative incidence of 7.5% over 6 seasons. Co-infections led to worse health outcomes including acute respiratory failure, acute respiratory distress syndrome, pneumonia, ICU admission, mechanical ventilation and death. Individuals experiencing homelessness had 2 times greater odds of developing a co-infection compared to individuals living in a private residence.

**Conclusions:** Individuals experiencing homelessness have an increased odds of co-infections which can complicate the clinical course of an influenza infection.

**Streamlining the Process for Multiple Sclerosis Infusion Orders at University of Colorado Hospital**

Christopher McMahon

Preceptor: James Stith, MBA, Director of Process Improvement

Site: UCHealth: University of Colorado Hospital

**Background:** The process for completing multiple sclerosis (MS) infusion orders at University of Colorado Hospital lacks structure. This is resulting in extensive wait times for patients and creating more work for UCH employees with no benefit to UCH. The purpose of this project is to reduce the time it takes for MS patients to receive their infusions after they are ordered by UCH providers.

**Methods:** Our team mapped the current process for ordering and completing infusions for Multiple Sclerosis patients UCH and external sites. The group identified trends and bottlenecks within the process. Qualitative data points were audited from EPIC patient charts to draw quantitative insights about these bottlenecks. Audits were completed for 60 randomly selected patients who were prescribed either Rituximab or Ocrevus for their MS. Audits were made for infusions ordered between Jan. 1, 2019 and Dec. 30, 2019. Data were analyzed in excel to quantify our process issues.

**Results:** Time to treatment for Rituximab patients averaged 45.6 days and ranged from 12-127 days from the time the order was placed. Only 18/30 Rituximab patients had dates entered for when the patient’s infusion was received. 17 of these 18 were internal orders. Of the 30 Ocrevus patient charts audited, only 3 had infusion dates included. All 30 were ordered externally. 43 orders were external, and only 2/43 of those external sites provided communication about the patient receiving their infusion.

**Conclusions:** While it does not identify an accurate average time to treatment, our analysis of the randomly selected MS patients shed light on an underlying patient tracking issue. Looking forward, a method of tracking externally referred MS patients will be imperative to reducing patient’s time to treatment.

**Development and Implementation of a Medicare Annual Wellness Visit Workflow Improvement Project- a Look at Processes, Challenges, and Future Directions**

Lisa Mettler, MD

Preceptor: Sharry Veres, MD

Site: Centura Health

**Background:** Annual Wellness Visits (AWV) are a Medicare benefit that bolsters patient/provider relationship building, risk stratification, end of life planning, care coordination, and preventative screenings. However, these visits are significantly underutilized, with rates of only 15.6% being completed nationally. The objective of this project was to develop and implement a new workflow for the AWV to improve completion rates.

**Methods:** At Centura Health the low rate of completion for AWV led to the formation of a workgroup to develop a new workflow within the Electronic Health Record (EHR). Ideas and note smart phrases were taken from providers in the group and served as the framework for a new AWV template within the EHR. Additionally, common frustrations and inefficiencies were discussed by the group and taken into consideration for the workflow. Each new iteration then underwent a rapid Plan-Do-Study-Act (PDSA) cycle with providers in the group. Based on these PDSA cycles adjustments were made with additional input from others in the workgroup, including EHR and coding specialists.

**Results:** The workflow improvement project created a new EHR documentation template, lab test/preventative screening order set, and reorganized the display of information in these visits. Additionally, the workgroup developed standard work for staff and providers to clarify roles/responsibilities. Challenges within implementation include coding errors, poor communication, and confusion regarding access to the new workflow.

**Conclusions:** Creating a more user friendly EHR template and supporting staff/provider workflow is an important step in improving AWV utilization, which is good for both patients and providers.

**The Quality of Daily Volume Status Measures in Patients Hospitalized for Heart Failure and Its Association with Patient Outcomes**

Anna Metzger

Preceptor: Angela Keniston, MSPH

Site: UCHealth University of Colorado Hospital, Division of Hospital Medicine

**Background:** Acute decompensated heart failure (ADHF) is the leading admitting diagnosis in patients 65 and older in the U.S.1 Clinical guidelines recommend attaining optimal volume status measures before discharge and are often not recorded as recommended. These metrics measure liquid input/output (I/O) and daily weight (W). The purpose of this study is to determine the association of complete/incomplete I/O&W documentation for ADHF patients at UCH with length of stay (LOS), adjusting for acuity.

**Methods:** Administrative data (FY18) was collected for patients 18-89 years old with primary/secondary discharge diagnosis of heart failure. Predicted probability of being in the ICU was calculated for each participant to summarize ADHF acuity variables.2 A multiple linear regression analysis modeled LOS for treatment groups (Complete I/O&W, Complete W, Complete I/O, or Incomplete), adjusting for acuity, insurance and discharge disposition.

**Results:** Patients eligible for analysis (n=612) were on average 64 years old, 60.5% male, 59.5% had Medicare and 87% discharged home. Comparing against patients with incomplete data (n=111), those with complete I/O&W (n=243) had a LOS 1.5 days longer (p=.0007), complete I/O (n=174) had a LOS 4 days longer (p<.0001) and those with only complete weight data (n=84) had a LOS 1.5 days shorter (p<.0001).

**Conclusions:** Patients with complete I/O data have the longest LOS; therefore we fail to reject the null hypothesis. Of note, patients with complete weight data have the shortest LOS. This preliminary data supports premise there may be a difference in how physicians perceive the reliability of weight versus I/Os.

**Risk Factors for Carbapenemase-Producing Enterobacteriaceae**

**in Denver, Colorado: 2013-2018**

Betsy Feighner Miller, DVM

Preceptor: Helen Johnston, MPH

Site: Colorado Department of Public Health & Environment (CDPHE)

**Background**: Carbapenem-resistant Enterobacteriaceae (CRE) are multidrug resistant bacteria contributing to healthcare-associated infections. Among CRE, a subset of bacteria produce carbapenemase enzymes that break down antibiotics. Carbapenemase-producing CRE (CP-CRE) are an emerging threat due to the risk of transmission between patients. The purpose of this study was to identify risk factors for CP-CRE in Denver, Colorado between 2013-2018.

**Methods**: Case-control study utilizing CRE surveillance data collected by CDPHE from 2013- 2018. CRE isolates tested for a carbapenemase were included in the study (n=311), with CRE positive for a carbapenemase (CP-CRE) designated as cases (n=44). Demographic and clinical characteristics of CP-CRE and non-CP-CRE were described. Multivariable logistic regression was performed to identify underlying conditions and prior exposures associated with CP-CRE, adjusting for age, gender and ethnicity.

**Results**: Underlying conditions associated with CP-CRE include heart failure (OR 2.54 (95% CI: 1.08, 5.98)), myocardial infarction (OR 4.66 (95% CI: 1.58, 13.75)), renal disease (OR 2.6 (95% CI: 1.12, 6.02)), or a pressure or decubitus ulcer (OR 4.55 (95% CI: 1.86, 11.15)). Prior exposures associated with CP-CRE include hospitalization (OR 2.95 (95% CI: 1.35, 6.44)), long term care facility stay (OR 2.21 (95% CI: 1.03, 4.74)), or international travel with (OR 59.82 (95% CI: 4.50, 795.35)) or without (OR 23.86 (95% CI: 5.24, 108.62)) hospitalization abroad.

**Conclusions**: Select underlying conditions and prior healthcare exposures help predict CP-CRE. Recognizing risk factors can help clinicians identify patients at highest risk for a carbapenemase and guide testing and infection control efforts.

**Risk and Protective Factors for Intimate Partner Violence Among LGBTQ High School Youth in Colorado**

Mina Moghaddami

Preceptor: Emily Payne, MSPH and Marcy Campbell, BA

Site: Boulder County Public Health

**Background:** Intimate partner violence (IPV) is associated with negative health outcomes, which are magnified in communities already experiencing disparities. This study examined differences in association between substance use behaviors and past 12-month experience of IPV among lesbian, gay, bisexual, transgender, and questioning (LGBTQ) and cisgender and heterosexual (HC) high school students in County X and Colorado. Risk and protective factors for IPV, including substance use, depression, extracurricular activities, and familial support, were identified.

**Methods:** Secondary analysis of county (N=2,058) and statewide (N=47,146) data from the 2017 Healthy Kids Colorado Survey examined differences in risk and protective factors for IPV among LGBTQ and HC high schoolers using Chi-square significance testing, prevalence ratios, and logistic regression models.

**Results:** Overall, 7.3% (95% CI: 6.6, 7.9) of HC students and 18.8% (95% CI: 17.0, 20.6) of LGBTQ students in Colorado experienced IPV and 9.9% (95% CI: 9.1, 10.74) of HC students and 25.7% (95% CI: 22.6, 28.8) of LGBTQ students currently use substances. LGBTQ and HC students in Colorado using substances were 4.2 (p=<0.0001) and 2.1 (p=<0.0001) times more likely to experience IPV than students not using substances. Having an adult to go to about problems and parental knowledge of student’s location lowered risk of IPV by 67% (p=<0.0001) and 48% (p=<0.0001), respectively. Depressive symptoms and suicidal behaviors increased risk by 5.8 (p=<0.0001) and 10.2 (p=<0.0001) times, respectively.

**Conclusions:** Public health programs should encourage adult involvement and provide conversation-facilitating tools around substance use, gender identity and sexual orientation familial acceptance, and mental healthcare promotion.

**US Incarcerated Population: Exploring Factors Leading to Violent Death**

Allison Moore

Preceptor: Catherine Velopulos, MD, MHS

Site: University of Colorado Hospital

**Background:** The pervasiveness of physical violence in U.S. prisons culminating in violent death lacks proper estimation and characterization. The purpose of this project is to better quantify and characterize trauma associated deaths of the incarcerated population in the US.

**Methods:** Our methods were two-fold utilizing the de-identified, multi-state National Violent Death Reporting System (NVDRS) dataset. First, we examined suicides, homicides, and legal intervention death demographic information, weapon type, and level of healthcare from 2003-2017. Then, we utilized a propensity score matching analysis to compare medical care access between those in custody and the general population for suicide and homicide deaths.

**Results:** From 2003 to 2017 78.5% of the deaths were suicides, 13.5% were homicides, and 2.0% were due to legal interventions. 90.0% of suicides were committed by hanging, 26.1% of homicides were committed by personal weapons, and 61.8% of legal intervention deaths occurred from firearms. Propensity score matching showed significantly higher levels of care after matching for suicide (p <0.001) while there was no difference in higher levels of care after matching for homicide (p=0.5).

**Conclusions:** This examination shows that violent death during incarceration is more likely to occur by suicide than homicide or legal intervention. Initiating higher levels of care for those in custody likely did not contribute to violent death compared to the general population.

**Development of a Database for Colorado’s Medical Marijuana Registry Data for Tableau Dashboard Visualization**

Kyla Muñoz

Preceptor: Mariah La Rue

Site: Colorado Department of Public Health and Environment, Medical Marijuana Registry

**Background:** The Colorado Department of Public Health and Environment’s (CDPHE) Medical Marijuana Registry (MMR) reports data monthly for the purpose of informing legislature, researchers, and media on medical marijuana utilization in the state. Currently, the registry publicizes their data via PDFs, making it difficult to access and analyze. The purpose of this project was to consolidate all registry data into one, machine-ready format to allow the program to better manage their data going forward and use Tableauuj to provide visual, downloadable statistics to the public.

**Methods:** Data was manually extracted from 135 PDFs from 2009 to 2020. The data was consolidated into one Excel workbook with five tabs: MMR Report Statistics, By County, By Plant Count, Condition by Age, and Data Dictionary. The database was verified with a CDPHE Tableau dashboard developer and MMR staff to ensure both Tableau-compatibility and user-friendliness for manual entry. Additionally, a change log and guide were created to ensure consistent maintenance of the database.

**Results:** The finished product includes the database, data dictionary, change log, and guide. The database contains three main types of data: data originally reported in the monthly reports, data previously collected but not originally reported, and newly collected and reported data. While the Tableau dashboard creation was not a component of this project, examples of how the MMR could potentially visualize data using this source were created.

**Conclusions:** The database will be used to store all historic and future data gathered by the MMR in a single location. It will eventually be used to create an online Tableau dashboard to visually share all data reported by the MMR.

**Evaluating a Comprehensive Sexuality Education Program in Cusco, Peru**

Katherine Myers

Preceptor: Laura Verbert

Site: Chaska

**Background:** Comprehensive sexuality education (CSE) is and gender-focused and rights-based approach to addressing and improving the sexual and reproductive health of young people. The purpose of this evaluation was to assess the effectiveness of the curriculum and student perceptions of a CSE program in Cusco, Peru.

**Methods:** Pre- and post-surveys used the Theory of Planned Behavior (TPB) to measure attitudes, subjective norms, perceived behavioral control, and intentions for sexual risk reduction behaviors (SRRB). Open-ended questions in the post survey assessed student perceptions of the program. Observational data was collected at the time of program implementation.

**Results:** A comparison of means analysis showed there was no significant change between pre- and post- intervention in intention (p= .88), attitudes (p= .79), or subjective norms (p= .19). However, there was a significant improvement in overall perceived behavioral control (p= .01), and perceived behavioral control over condom use (p= .041). Thematic analysis identified that attitudes towards condom use are based on outcome-evaluations, and attitudes towards delay are influenced by social norms. Additionally, internal policies and procedures impact participant satisfaction with their learning environment.

**Conclusions:** This evaluation identified a need to conduct a process evaluation to assess the correctness of determinants and objective specifications. Future improvements to the program should incorporate environmental determinants of SRRB into the program. Future assessments should consider talking a qualitative approach to better understand the nature of TPB determinants, cultural relevance of sexual health topics, and sources of other sexual health messaging.

**Perspective of Veterans on Factors Affecting Transition to Home Following Discharge from Colorado State Veterans Home**

Nnamdi A Nwafo

Preceptor: Scotti Church, MD

Site: Colorado State Veterans Home

**Background:** Discharge to home following hospitalization or rehabilitation is a vulnerable period that can lead to adverse events. Interventions aimed at factors that affect transition to home can reduce these adverse events, readmissions and healthcare costs. My objective is to identify factors that affect safe transition from post acute care rehabilitation to home, from perspective of Veterans.

**Methods:** 5 qualitative, semi-structured phone interviews of veterans discharged home following rehabilitation at Colorado State Veterans Home, were completed; 4 males and 1 female. One other veteran declined interview, while another couldn’t be reached. Two coders coded the content of interviews utilizing inductive process. Queries of codes resulted in development of themes that formed the basis of the final report. Checking of data and information by members ensured quality of the study. Validity was ensured by triangulation, having combined information obtained from literature to that from the interviews.

**Results:** Factors affecting safe transition of veterans to home following a post acute rehabilitation admission include strong domestic support system, functional capacity of the veterans at discharge, quality of rehabilitation services provided at the state veterans home, provision of clear discharge instructions, availability of home health and physical therapy, and impact of the Coronavirus pandemic. Strong domestic support was the most common.

**Conclusions:** Veterans identified strong domestic support, home health and physical therapy services, quality of rehabilitation at the veterans home, and clear discharge instructions, as important factors affecting safe transition home. These are important areas of focus in discharge planning process and potential interventions.

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| **The Effect of Socioeconomic Status on HPV-Related Oropharyngeal Cancer Stage at Diagnosis: An Analysis of Colorado Cases.** |

Shannon O’Brien, MD

Preceptor: Jessica Cataldi, MD

Site: University of Colorado Cancer Center

**Background:** Oropharyngeal cancer rates are increasing in the U.S. driven by HPV-related disease in white men. Most cases are regional with high morbidity. Thus, improved risk-stratification and early detection is needed. This study sought to examine the socioeconomic risk factors associated with stage at time of diagnosis in HPV-related oropharyngeal cancers.

**Methods:** Data was collected from the Colorado Central Cancer Registry in this retrospective cohort study. The partial proportional odds model was utilized in SAS to test the association between socioeconomic indicators and stage at time of diagnosis. The Poverty Index and the Area Deprivation Index (ADI) served as the primary explanatory variable in Models 1 and 2, respectively. Covariates included sex and primary tumor site.

**Results:** Between 2013-2017, 1,574 cases of HPV-related oropharyngeal cancers were identified. Of those, 74.02% were regional and 13.53% were distant. Male sex was associated with higher stage at diagnosis in both models (OR=1.51, 95% CI: 1.08, 2.12; OR=1.53, 95% CI: 1.08, 2.18). Lower Poverty Index was significantly associated with reduced odds of distant disease, but not regional (ORindex1vs3=0.55, 95% CI: 0.35, 0.87; OR index1vs4=0.46, 95% CI: 0.28, 0.76; OR index2vs4=0.62, 95% CI: 0.39, 0.98). A similar pattern was found using the ADI; however, odds ratios between ADI deciles were not consistently significant.

**Conclusions:** This study demonstrated that cases with lower socioeconomic status had increased odds of distant HPV-related oropharyngeal cancer. These findings can be used to inform the development of risk-stratification and screening tools as well as to guide clinical and public health interventions.

**Elementary School Absenteeism and Ground-Level Ozone in Colorado**

Kathy Pang

Preceptor: Ben Allshouse, PhD, BSPH

Site: The Colorado School of Public Health

**Background:** Ground-level ozone is a “secondary” gas pollutant that forms by chemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of heat and sunlight. Ozone is irritant and can cause a variety of health effects disproportionately affecting vulnerable groups such as children. The purpose of this project was to assess if there was a relationship between ozone levels and elementary school attendance in two Colorado school districts (Denver Public Schools (DPS) and Adams 12 Five Star Schools (Adams 12)) during the 2018-2019 school year exists.

**Methods:** Using R, a multiple linear regression statistical analysis was conducted between ozone and total number of students present for DPS (*n*=44,650) and Adams 12 (*n*=14,865). The statistical analysis was adjusted for temperature and precipitation and included a lagged model of no-lag up to a 3-day lag model.

**Results:** For DPS, the no-lag and one-day lagged model showed a negative correlation between increased ozone levels and total number of students present (p-value < 0.05). For Adams 12, none of the models showed significance (p-value > 0.05) but showed a negative correlation between increased ozone levels and total number of students present for the no-lag and one-day lag model.

**Conclusions:** As ozone levels increase, schools can anticipate a decrease in overall attendance. However, there may not be a significant lagged time between ozone exposure and adverse health effects as anticipated and may be a more immediate impact as ozone can cause adverse health effects even among healthy individuals.

**Recurrence after Neoadjuvant Chemotherapy in Young Women with Postpartum Breast Cancer**

Hannah Parris

Preceptor: Virginia F. Borges, MD

Site: School of Medicine - Medical Oncology

**Background:** 10% of new breast cancer diagnoses are in women 45 and younger, and these women are more likely to be diagnosed with Postpartum Breast Cancer (PPBC) which has increased risk of recurrence and mortality. Studying Young Women’s Breast Cancer (YWBC) allows us to understand trends in their disease. Our objectives were to determine if young women with PPBC have increased risk of recurrence after neoadjuvant chemotherapy and if complete pathological response is associated with lower risk of recurrence.

**Methods:** This retrospective cohort study looked at women ≤45 diagnosed from 1990 to 2017. Parity status and pathological response were analyzed to determine if they were associated with disease recurrence. A multivariable cox proportional hazards analysis was performed, and pathological response was found to be significant. There were no other significant variables.

**Results:** When compared to PPBC, nulliparous women had similar rates of recurrence with a HR of 1.117 (p=0.7156), but the parous >5yrs group had lower rates of recurrence with a HR of 0.518 (p=0.0843). Women who achieved a partial pathological response had a HR of 2.123 (p=0.0078) when compared to those who had a complete pathological response.

**Conclusions:**

Women with a complete pathological response were at lower risk for recurrence, but there were no significant findings related to parity status. Due to our sample size, only pathological response was shown to be significant when included in the model. A larger study could determine if there is confounding from other variables.

**Seasonal Influenza Vaccination Surveillance in Pregnant Women in Uzbekistan, 2019-2020 influenza season**

Anna Pashalishvili, MD

Preceptor: Dr. Mark Katz, Consultant for World Health Organization Regional Office for Europe

**Background**. In Uzbekistan, influenza vaccination recommendations are not clearly described. While the vaccine is publicly available for residents of the long-term health care facilities, [orphanage](https://www.multitran.com/m.exe?s=orphanage&l1=1&l2=2)s, nursing homes and healthcare workers other individuals must get vaccinated privately. Seasonal influenza vaccination coverage among high-risk groups is not well understood in Uzbekistan. Our objective is to understand who gets influenza vaccination in Uzbekistan in order to improve seasonal influenza vaccination strategies for high risk groups.

**Methods:** We collected prospectively demographic data on persons who received influenza vaccination at three private designated private vaccination points (PVP) (two in Tashkent and one in Samarkand) that offered influenza vaccination during the 2019-2020 influenza season. We chose these PVP, because they had the largest average number of annually administered vaccine. Pregnancy status was checked for all women from 18 to 50.

**Results:** From 25 October 2019 through 31 December 2019 there were 2,369 influenza vaccines administered at three vaccination points. Out of 2,369 persons 1,284 (54.2%) were females and 1,085 (45.7%) males. The median age was 18. Out of 693 females above 18 participating in the study, only 61 were pregnant (2.6%).

**Conclusions:** During the 2019-2020 influenza season in Uzbekistan, at three private vaccination centers, very few pregnant women received an influenza vaccine. Because influenza vaccine is not available publicly, the influenza vaccination coverage among pregnant women is likely to be very low. Availability of publicly funded vaccine along with vaccination awareness campaign could improve influenza vaccine uptake among this high-risk group.

**Developing a Process Evaluation Plan for a Community Pilot Program**

Kimberly Phu

Preceptor: Dayna Scott, BA

Site: Broomfield Fellowship in Serving Humanity (FISH)

**Background:** Housing stability and homelessness prevention has become a priority across the City and County of Broomfield. To mobilize efforts, community non-profit and family resource center, Broomfield Fellowship in Serving Humanity (FISH), implemented a pilot program entitled “Keeping Families Housed” in early 2020. The program’s goals are to stabilize families to prevent homelessness and connect them to resources that support whole-family wellness. This project develops an evaluation plan to monitor both process and preliminary outcomes of the “Keeping Families Housed” program.

**Methods:** A literature review was conducted to outline best practices in program evaluation and understand the evaluation designs of similar rental assistance programs. The Center for Disease Control’s *Framework for Program Evaluation in Public Health* guided the evaluation process, including engaging local community partner organizations and working with staff from Broomfield FISH. Critical evaluation questions were identified which enabled a process evaluation using a mixed-methods triangulation design to be chosen to evaluate the program. Data collection materials were also developed and guided by pre-existing data collection tools, feedback from reviewers familiar with survey development, and readability as assessed by validated scales.

**Results:** An evaluation plan was developed which includes a logic model, focus group interview guide, and survey.

**Conclusions:** The evaluation plan will allow Broomfield FISH to identify areas for quality, performance and process improvement. This will ensure the program is working towards achieving intended outcomes that will reduce housing as a social determinant of health in the community and inform policy and funding opportunities.

**Climate Changes Everything: The Importance of Accounting for Precipitation in Studies of Sanitation and Diarrhea**

Christine Prissel

Preceptor: Elizabeth Carlton, PhD

Site: Colorado School of Public Health

**Background:** Many diarrheal illnesses are associated with fecal exposure. Precipitation patterns can impact classification of fecal exposure around home environments. Our purpose is to examine whether precipitation decreases the odds of observing feces around homes, and determine the odds of moderate to severe diarrhea (MSD) when exposed to feces while accounting for recent precipitation across Global Enteric Multicenter Study (GEMS) sites.

**Methods:** The GEMS case-control study was conducted between 2007 and 2011. Four of seven GEMS sites were used (N=12,635). Site-specific conditional logistic regression models were used to examine the association between exposure to feces and MSD stratified by precipitation. We assumed fecal exposure if feces were observed around home environments during GEMS home visits. Covariates include sanitation, hygiene, drinking water source, education, and household demographics. Climate Hazards Group InfraRed Precipitation with Station data provided daily precipitation at a resolution of 0.05 degree grids.

**Results:** We found no significant evidence that precipitation decreased the odds of observing feces around home environments. Our results indicated Kenya study participants within the little rainfall stratum had increased odds of MSD when exposed to feces (OR: 3.24, CI: 1.20-8.78). Yet, we found no significant difference in odds of MSD between precipitation strata.

**Conclusions:** While we found no significant evidence that precipitation biases the estimation of the effect of exposure to feces on the odds of MSD, precipitation may be influencing other predictors. Future studies should consider examining and accounting for effects of precipitation patterns on other predictors in studies of sanitation and diarrhea.

**Missed Opportunities: Following Syphilis Diagnoses to HIV Diagnosis in Coloradans**

Kaitlyn Probst

Preceptor: Megan Duffy, MPH

Site: Colorado Department of Public Health and Environment

**Background:** Behavioral risk factors are similar for Syphilis and HIV. Preventing HIV diagnoses is an important public health goal. Disease Intervention Specialists (DIS) at the Colorado Department of Public Health and Environment (CDPHE) interview syphilis cases, educate them on safe-sex practices, and link them to care. The objective is to determine whether an interview is protective against being diagnosed with HIV to potentially expand funding and identify high risk cases for DIS.

**Methods:** A retrospective cohort study was conducted on syphilis diagnoses in Colorado from 2009-2018 followed through the end of 2019 for a diagnosis of HIV. Syphilis cases that were HIV positive, those diagnosed with HIV within 30 days, and congenital syphilis cases were excluded. A logistic regression was conducted in SAS including meaningful covariates to determine if an interview with a DIS was protective against HIV.

**Results:** After adjusting for men who have sex with men (MSM), age, race/ethnicity, and number of syphilis diagnoses it was determined that syphilis diagnoses who did not have an interview with a DIS were 1.066 (95% CI: 0.63, 1.81) times as likely to be diagnosed with HIV when compared to those that did have an interview.

**Conclusions:** The analysis of syphilis diagnoses revealed that an interview with a DIS at the CDPHE is slightly protective against later being diagnosed with HIV, though this result was not significant. However, risk factors like being an MSM, age, race/ethnicity, or being diagnosed with syphilis multiple times put an individual at higher risk.

**Recommendations for the Implementation of Breastfeeding Friendly Accommodations at Outdoor Public Events in the City and County of Denver**

Nalleli Ramirez-Salinas

Preceptor: Christymarie Jackson, MPH

Site: Denver Public Health

**Background:** Despite breastfeeding health benefits and international recommendations, many women continue to face significant barriers to meet breastfeeding recommendations. Our objective is to develop recommendations for the implementation of breastfeeding friendly policies and practices at outdoor public events in the City and County of Denver.

**Methods:** We conducted a peer literature review on precedent lactation policies and practices for public spaces with an emphasis on outdoor public events. A survey using a convenience sample, was developed and disseminated via Google Forms to breastfeeding stakeholders including state and local public health departments, Denver city employees, and breastfeeding support groups to understand the need for and availability of lactation accommodations at public events.

**Results:** While there is limited published research on precedent lactation policies and practices for public spaces, strong public support exists. In total, 219 responses were received, 87.2% of respondents stated there were either no accommodations or they were not aware of any at public events they attended in the past year. The majority, 86% of respondents stated they would utilize lactation accommodations now or in the future if provided.

**Conclusions:** This project established a lack of published research on supportive public breastfeeding policies and practices. Additionally, we found a significant interest and support in the City and County of Denver, highlighting an urgent need for targeted efforts in both focus areas. Next steps in pursuing a system-level change involves partnering with breastfeeding stakeholders to implement a pilot program on the provision of lactation accommodations at outdoor public events.

**Modeling NAFLD Disease Burden in Singapore 2019-2030**

Kathryn Razavi-Shearer

Preceptor: Chris Estes, MPH

Site: Center for Disease Analysis Foundation

**Background:** Non‐alcoholic fatty liver disease (NAFLD) and non‐alcoholic steatohepatitis (NASH) account for an increasing proportion of liver disease in Singapore. Singapore is currently experiencing an epidemic of metabolic syndrome among its aging population. Our objective is to determine the burden of liver disease attributable to NAFLD and NASH in Singapore, including both the current burden and projections of future burdens.

**Methods:** A disease progression model was used to summarize and project fibrosis progression among the NAFLD populations of Singapore. A modified Delphi process was used to develop consensus estimates for all model inputs. Changes in the adult prevalence of obesity was used to extrapolate long‐term trends in NAFLD incidence. Uncertainty intervals were defined for key uncertain inputs including total NAFLD prevalence, excess non-liver mortality multipliers, and fibrosis transition probabilities. For all uncertain inputs, a Monte Carlo simulation and sensitivity analysis were conducted.

**Results:** In Singapore, prevalent NAFLD cases were projected to increase 20% during 2019‐2030, while prevalent NASH cases increase 35%. Incident cases of hepatocellular carcinoma are projected to increase by 80%, while incident decompensated cirrhosis cases increase 100% by 2030. Likewise, NAFLD‐related mortality is projected to increase 100% from 2019 to 2030. NAFLD disease burden is expected to increase alongside rising trends in metabolic syndrome and obesity among the population of Singapore. This leads to more cases of advanced liver disease and associated mortality.

**Conclusions:** Preventing the growth of diabetic and obese populations will be a key factor in reducing ongoing increases in NAFLD‐related disease burden in Singapore.

**Coflex Utilization for Treatment of Lumbar Spinal Stenosis: A Retrospective Cohort Study**

Bradley Reeves

Preceptor: Christopher Kleck, MD

Site: University of Colorado Hospital

**Background:** Treatment of symptomatic lumbar spinal stenosis (LSS) commonly involves surgical decompression by laminectomy. Due to high reoperation rates (23%) and exacerbation of pain scores, alternate surgical interventions with interspinous spacers, such as Coflex, were developed. Our objective is to evaluate radiographic changes and compare clinical outcomes in patients who underwent Coflex implantation vs. laminectomy for LSS.

**Methods:** A retrospective cohort study was conducted to assess radiographic parameters, subjective patient outcome scores, complication rates and reoperation rates following Coflex implantation vs. laminectomy for LSS at UCH from January 2013 through November 2016. Ninety-seven contiguous patients with pertinent perioperative records were included: Coflex 43 and laminectomy 54.

**Results:** Coflex preserves lumbar range of motion, has a similar complication rate and a lower rate of reoperation (11.6% vs 20.4%, P=0.28) compared to laminectomy. Coflex significantly increased mean anterior disc height (9.2 to 8.5 mm, P=0.02), decreased mean posterior disc height (4.5 to 5.1 mm, P=0.04), and decreased segmental sagittal angle (16.7° to 13.8°, P=0.0005) at the cephalic operative level. Laminectomy similarly decreased segmental sagittal angle (14.5° to 13.1°, P=0.01) of the cephalic operative level. Spinal parameters did not significantly change post-operatively for subsequent caudal levels in either cohort. Subjective patient outcome scores were similar between groups. A decrease in sagittal angle was correlated to a decrease in pain scores in the Coflex cohort (P=0.005).

**Conclusions:** Coflex implantation preserves lumbar ROM, provides similar symptomatic relief as laminectomy and should continue to be explored as a procedure to decrease reoperation rates following spinal decompression.

**Universal Lipid Screening or Missing the Target? An Examination of Current Practices and Outcomes in Pediatric Primary Care**

Meghan Rioth, MD

Preceptor: Sonali Patel, MD, PhD.

Host Site: The Child Health Clinic at Colorado Children’s Hospital

**Background:** Current guidelines recommend universal lipid screening between 9 and 11 years. We sought to describe the prevalence of lipid screening and familial hyperlipidemia (FH), differences in screening based on patient characteristics, and proportion of lab orders completed.

**Methods:** This retrospective cohort study followed patients aged 9 years in 2016 up to age 12 years in an academic, urban, primary care clinic. Differences in screening completion and patient characteristics of gender, race, insurance, preferred language and BMI were examined. The association between time to initial screening and weight category was examined using Cox proportional hazards regression. Initial lipid screening values were used to identify patients with likely FH.

**Results:** The cohort included 578 patients and 189 (33%) completed lipid screening. In the cohort, 39% (227/578) of patients were in a BMI percentile ≥85. Weight category was associated with screening; among those screened at age 9, 36 (59%) were in a BMI percentile ≥95. Patients in the highest percentiles (≥95) were more likely to be screened (HR: 3.50 p<0.01). Only language preference was associated with increased screening prevalence (p=0.046), but language preference was not associated with obesity (p=0.15). All initial screening orders were completed by patients, while follow-up (fasting) orders were completed in 30/72 (42%). No FH cases were identified.

**Conclusion:** Most children are not screened for FH. Initial orders for lipid screening were completed by all patients but follow-up lab completion was much lower indicating barriers to completion should be addressed in the clinical process.

**Policy Analysis and Recommendation on Injury Prevention in School Zones for the City and County of Denver**

Kathleen Risk

Preceptor: Lisa Diaz, MPH

Site: Denver Department of Transportation and Infrastructure

**Background:** Injury prevention in school zones (SZs) is critical so that children are safe enough to increase physical activity by walking and biking to school. Denver decisionmakers are considering a change to speed limit policy, but wish to make an informed decision. The objective of this project is to gather information on SZ injury prevention in other jurisdictions in order to inform Denver’s policy on speed limit and other important factors in SZs.

**Methods:** SZ policy experts in jurisdictions nationwide were interviewed using a semi-structured interview guide. The guide was developed with Denver employees in order to collect relevant information, and target jurisdictions were selected based on similarity in population and density. Contact information was gathered based on internet search for Safe Routes to School programs.

**Results:** Four people completed interviews via phone and one submitted answers via email. Data collection on injury in SZs was inconsistent, with a few relying on statewide traffic injury reporting systems. Speed limit varies across and within jurisdictions along with traffic enforcement and signage. Most jurisdictions have or are moving towards lower speed limits (i.e. 25MPH or less) in SZs.

**Conclusions:** The interviews highlighted the importance of and lack of systems for traffic injury data collection. Jurisdictions identified the need for greater enforcement and more information regarding SZ policies, and speed was recognized as another major factor in school zone safety. It is recommended that Denver improve SZ data collection and dissemination on traffic injury, lower speed limits, and reevaluate traffic violation enforcement.

**The Continuous Improvement Care Coordination Learning Series**

Taryn Robertson

Preceptor: Patricia Valverde MPH, P.hD

Site: Patient Navigator Training Collaborative

**Background:** Care Coordination aims to clarify health care workers individual roles and responsibilities within the healthcare team. The Patient Navigator Training Collaborative (PNTC) partnered with Extensions for Community Health Outcomes (ECHO) for the development of a Care Coordination remote learning series. The purpose of this study is to evaluate the credentials and profession of the registrants who were accepted as well as those who indicated that they completed at more than half of the sessions.

**Methods:** This is a retrospective cohort study. The cohorts consisted of 157 participants who registered and 84 approved for the PNTC-ECHO Care Coordination series from 2017-2018. Survey data provided the descriptive statistics that were used to analyze baseline characteristics of the registrant population. Logistic regression was used to determine an association between credentialed registrants and acceptance into the series, as well as completion of the Care Coordination series.

**Results:** Those who were non-credential health workers were more likely to be accepted into the care coordination series. There was no significant association between credentialed registrants and completion of more than half of the sessions. Survey response rate (53.5%).

**Conclusions:** The results from this will be used to inform future Care Coordination series. This study indicates that the series was able to register its target population. More research is needed to determine more about the credentials of the individuals who completed the series.

**Larimer County Sexual Health Assessment**

Brianna Robles

Preceptor: Kelli Curl, MPH

Site: Larimer County Department of Health and Environment (LCDHE)

**Background:** Understanding disparities in access to sexual healthcare among LGBTQ+ individuals is useful given their relationship to disproportionate risks of negative sexual health outcomes. LCDHE, in collaboration with the Comprehensive Sex Education Alliance (CSEA), is conducting a community-wide assessment of the needs and perceptions surrounding sexual healthcare services.

**Methods:** Participants included LGBTQ+ Larimer County residents (18-64 years) who completed an online cross-sectional survey on sexual healthcare experiences, barriers to accessing sexual healthcare, sexual violence experiences, and sexual behaviors. The survey was disseminated through social media pages and CSEA partners.

**Results:** Survey respondents (N=588) included 95.8% White and 15.6% Hispanic or Latino individuals. Nearly half (47.91%) of respondents identified as LGBQ and 9.3% identified as Transgender or Nonbinary. Residents reported in general, that their local sexual healthcare providers are not competent with LGBTQ+ sexual healthcare needs. Transgender respondents reported the highest frequency of barriers to sexual healthcare, with insurance coverage terms and fear of judgement being the most frequently reported. LGBQ respondents reported significantly more frequent barriers to sexual health than the general sample.

**Conclusions:** These data indicate a disparity in access to LGBTQ-competent sexual healthcare for sexual and gender minority Larimer County residents. Next steps in the assessment involve focus groups with LGBTQ+ residents and healthcare provider interviews. LCDHE will utilize the results of this survey, and the assessment, to improve access to inclusive and affirming sexual healthcare throughout the county.

**Understanding Factors Influencing Screen Use in Low-income Mexican-American Families: A Secondary Analysis**

Rebecca Rodriguez Salazar

Preceptor: Darcy Thompson, MD, MPH/MSPH

Site: Adult and Child Consortium for Health Outcomes Research and Delivery Science project (ACCORDS)​

**Background**: Childhood obesity is a significant problem. Low-income Latino children are disproportionately affected by obesity starting in early life. Child screen-use is associated with poor health outcomes and risk factors, including obesity. Children from lower-income homes spend an average of 1 hr. 39 min. more with screen media each day than those from higher-income homes (3 hrs. 29 min. vs. 1 hr. 50 min.). Although toddler screen use is essentially determined by the parents or guardians, there is limited research about the perceptions of parents of toddlers toward screen-use. This study aims to understand drivers of toddler (0-3 years of age) screen-use in low-income Mexican-American families.

**Methods:** Thirty semi-structured in-depth interviews conducted in Spanish or English with self-identified Mexican American mothers (22) and fathers (8) of toddlers recruited in a Denver clinic serving mainly low-income families to understand toddler screen use. Code reports for 2 domains of parenting practices (Behavior Regulation and Babysitting) were analyzed for differences by parent and parent language. Then, the literature was searched and triangulated with findings from the data.

**Results:** Parents use screen-devices as babysitters to calm, entertain, and/or distract toddlers. The type of device (TV vs cellphone). given to toddlers depend on location for Spanish-speaking mothers. Spanish-speaking mothers were more likely to allude to TV as a babysitter while the majority of English-speaking mothers alluded to cellphones, even in the home. Fathers only mentioned the use of screen-devices in the home. All parents said they used screen-use to control their child (i.e. calm, prevent/stop tantrums, keep in place, etc.). The majority of mothers said they did not use screen-devices to reward their toddlers. While most mothers said they limit screen devices when their child misbehaves, some said they did not because the child was too young and would not understand.

**Conclusion:** Parents are one of the greatest driving factors in toddler-screen use. Theories such as the family systems theory and socioecological model help explain factors that influence parental choices and behaviors. This study helps further understand the influences on screen-media use to inform future interventions for an underserved population.

**Augmenting Predictive Models for Hospital Readmissions with Social Determinants of Health**

Patrick Ryan, MD

Preceptor: John Rice, PhD, MSPH

Site: Denver Health

**Background:** Hospital readmissions are costly to healthcare systems and harmful to patients. Many predictive models exist to identify patients at high risk of readmission, but their performance in urban safety-net populations is unknown. We sought to determine the accuracy of existing readmission predictive models in an urban safety-net population, and whether adding novel variables addressing social determinants of health (SDH) improved their accuracy.

**Methods:** This retrospective cohort study included adults admitted to Denver Health from 2016-2018. The cohort was randomized 1:1 into training and validation cohorts and applied the LACE, LACE+ and Epic predictive models of readmission. We developed the LACE-SDH model using LACE variables and adding SDH variables in the training cohort. LACE-SDH model performance was tested in the remaining validation cohort. Model performance was assessed using C-statistics.

**Results:** The LACE-SDH performed significantly better than LACE (C-statistic 0.67 vs 0.65, p = 0.03). The variables most associated with readmissions in urban safety-net patients were: AMA discharge (odds ratio=3.19), mental health diagnosis (OR=2.06), and healthcare utilization (OR=1.94)). Overall, the Epic model performed significantly better than LACE, LACE+ and LACE-SDH (C-statistics 0.71, 0.65, 0.61 and 0.67, respectively, p < 0.05) in the validation set.

**Conclusions:** Adding non-traditional covariates to existing predictive models does significantly improve their performance in urban safety-net populations (p=0.02). These results demonstrate the value of accounting for socioeconomic status and mental health in evaluating readmission risk in this population. Some of the SDH variables are potentially modifiable, and if addressed can reduce unnecessary readmissions in this vulnerable population.

**The ‘Nanny State’ Perspective: Implications for Public Health Advocacy**

Mariah Salerno

Preceptor: Simon Capewell, MD, DSc

Site: Department of Public Health and Policy, University of Liverpool, UK

**Background:** The phrase ‘Nanny State’ (NSt) is a metaphor frequently used in debates on public health and policy, carrying connotations in regard to the government’s role to protect and promote the public’s health. Our objective is to explore the use of the phrase in relation to alcohol, tobacco and junk food interventions and compare the portrayal of NSt arguments favorable or opposed to public health to determine the implications for public health advocacy.

**Methods:** We conducted semi-structured interviews with five experts in the field of public health and health policy. Eligible participants were identified based on their knowledge and expertise of NSt issues. We took an inductive approach to derive the data and conducted a thematic analysis to evaluate responses for the major reoccurring themes, key messages, and specific arguments and evidence used.

**Results:** The experts highlighted a substantial gap in understanding between how NSt language is presented and how the information is perceived by the public and policy makers. Yet, there is opportunity for the NSt narrative to develop more positively. The most prominent themes identified were freedom and autonomy, messaging and misinformation. Key recommendations made were constructive reframing, increasing public awareness, and increasing the role of public health professionals.

**Conclusions:** The advent of public health crises and interventions may present new opportunities for public health advocates to frame positive messages in the media and highlight potential health benefits. Focused efforts on public education, empowerment and environment are critical areas to address for changing the culture of NSt rhetoric.

**Utilizing the Independent Sector in Outbreak Response: An Assessment of Immunize Colorado’s Hepatitis A Vaccination Outreach Campaign**

Jessica Serbus

Preceptor: Stephanie Wasserman, MSPH

Site: Immunize Colorado

**Background:** Colorado’s recent Hepatitis A outbreak primarily affected people experiencing homelessness. Local nonprofit, Immunize Colorado, was enlisted by the Colorado Department of Public Health and Environment (CDPHE) to develop additional public health strategies to augment their disease outbreak response in this hard-to-reach population. The purpose of this project was to evaluate the effectiveness of the resulting campaign and provide accountability to CDPHE and the funder.

**Methods:** Quantitative and qualitative data from several sources was collected and synthesized to assess the process and outcomes of Immunize Colorado’s Hepatitis A Vaccination Outreach Campaign. Surveys collected from volunteers (n=12) and people experiencing homelessness (n=11) at Point in Time magnet events in January 2020 were used to identify short-term outcomes. While semi-structured interviews with key informants (n=4) and Immunize Colorado staff were conducted to collect first-hand experiences regarding the implementation of the campaign.

**Results:** Increased awareness and knowledge were identified as short-term outcomes of Immunize Colorado’s Hepatitis A Vaccination Outreach Campaign, as was increased likelihood of receiving vaccination for people experiencing homelessness. In addition, several common operational solutions and challenges were identified.

**Conclusions:** This assessment demonstrates that leveraging non-profit sector reach and capacity can provide additional effective strategies in disease outbreak response. The lessons learned can be used to inform and strengthen future outbreak responses.

**Examining Differences in Timely Follow-up Between Refugee and Non-Refugee Children With Elevated Blood Lead Levels**

Puja Shah

Preceptor: Lori Kennedy, MPH

Site: Colorado Department of Public Health and Environment (CDPHE)

**Background:** Elevated blood lead levels pose a threat to the health and well-being of children as they can lead to neurodevelopmental problems. The Centers for Disease Control and Prevention lists low-income and refugee children as high-risk groups and has a set of initial and follow-up testing guidelines for these populations. This evaluation aimed to determine if there were differences in obtaining the recommended follow-up care between low-income non-refugee children and refugee children in Colorado.

**Methods:** A retrospective cohort study was conducted using CDPHE Refugee Health and Lead Program data for the years between 2014 – 2018 on 3,795 subjects. A multivariable logistic regression analysis was conducted, adjusting for gender, country of origin, and urbanicity.

**Results:** Refugee children between 6 months and 16 years were 2.248 times more likely to have appropriate follow-up when compared to non-refugee children of the same age in Colorado (OR: 2.248. 95% CI: 1.874, 2.697).

**Conclusions:** This study showed that a refugee child is more likely to have appropriate follow-up after an elevated lead examination in comparison to a non-refugee child. Examining this can be useful in identifying differences in lead outreach efforts between the refugee and non-refugee populations and can provide guidance for developing new outreach efforts.

**Spatial Analysis of the Relationship Between Youth Type 2 Diabetes Incidence and the Built Environment in a Rural American Indian Community**

Rachel Steinberg

Preceptor: Christy Hockett, PhD

Site: LEAD Center, Colorado School of Public Health

**Background:** American Indians have the highest incidence of youth type 2 diabetes (YT2D) of all racial/ethnic groups in the United States, but the spatial distribution of YT2D in this population and its relationship to the built environment are poorly understood. This ecological study identified high-risk clusters of YT2D and explored the association between built environment features and community-level incidence of YT2D in 0-19-year-olds living on a rural American Indian reservation.

**Methods**: 197 YT2D cases were ascertained from medical records between 2002-2016. Community-level cumulative incidences were calculated using 2010 US Census data. High-risk clusters of YT2D were identified using SaTScan, and densities of built environment features across five domains (food, physical activity, healthcare, and transportation) were calculated in ArcMap. Backward elimination logistic regression was used to identify built environment features associated with communities within the high-risk cluster.

**Results:** One significant high-risk YT2D cluster was identified (RR: 2.18, p=0.019). The nine communities within this cluster were associated with lower highway density (OR: 0.166, 95%CI 0.031 to 0.876) than communities outside the cluster. The other built environment domains were not significantly associated with community-level YT2D incidence.

**Conclusions:** There are spatial differences in the incidence of YT2D in this community. Further investigation of the relationship between YT2D and the built environment are needed to help inform prevention efforts that reduce disease burden in rural American Indian youth.

**Evaluating a School-based Garden Program to Improve Quality, Increase Parent Engagement and Investigate Mental Health Impact: *The Healthy Seedlings Experience***

Rhiannon Streight

Preceptor: Mikhaela Mullins, MPH

Site: Denver Urban Gardens

**Background:** Despite the state’s reputation as one of the healthiest in the nation, Colorado ranks 41st in child health. Healthy Seedlings (HS), a Denver-based school garden program, addresses this problem through nutrition education and by fostering a greater connection to each other and nature. The purpose of this study was to increase parent engagement, better understand program strengths and challenges, assess family health needs and priorities, and investigate the program’s impact on students and their mental health.

**Methods:** From September – December 2019, data were collected to evaluate HS in three elementary schools across Denver. Five key informant interviews (KII) and three focus groups (FG) with HS stakeholders addressed parent engagement, family health needs and priorities, program strengths and weaknesses, and impact on students. A survey was developed to aid in understanding the program’s effect on mental health. Using NVivo for analysis, FGs and KIIs were coded and themed. Demographic data from each school were obtained from state surveillance systems, local reports, and assessments. Qualitative results and secondary data were triangulated to produce an evaluative report.

**Results:** KIIs suggested a variety of positive changes brought on by the HS program, at both the individual and interpersonal level. FGs indicated that the use of phone-based communication could improve parent engagement. All data sources illuminated program challenges that are unique to each school.

**Conclusions:** The data studied suggest that, while HS positively impacts student socioemotional health, there are opportunities to improve the program through direct parent communication, community building efforts, and individualized support.

**Understanding Characteristics of Child Maltreatment Reporting and Foster Care Placement in the U.S. from 2005 to 2017**

Jessica L. Stubblefield

Preceptors: John Fluke, PhD and Rebecca Orsi, PhD, MS

Site: The Kempe Center for the Prevention and Treatment of Child Abuse and Neglect

**Background:** There are children that enter foster care through pathways outside of the traditional route of a Child Protective Services (CPS) report. This study contributes to the understanding of the patterns of out-of-home placement among children who lack a CPS report. The goal was to better understand longitudinal characteristics of national child maltreatment reporting and foster care placement between 2005-2017.

**Methods:** This study was a retrospective, secondary analysis of CPS administrative data and included 2,490,648 children with foster care placements between 2005-2017 whose data were obtained from the National Data Archive on Child Abuse and Neglect. Data were analyzed through descriptive statistics and logistic regression that tested whether specific removal reasons predicted presence or absence of a CPS report history.

**Results:** 14.3% of children in the study sample had been placed in foster care without any CPS report history. Child behavior problem (OR 3.14; 95% CI: 3.10 to 3.19), parental death (OR 2.42; 95% CI: 2.28 to 2.57), and relinquishment (OR 4.72; 95% CI: 4.52 to 4.93) removal reasons were found to significantly predict absence of a child’s CPS report history (p<0.0001).

**Conclusions:**  This is the first study to investigate children in foster care that do not have any history of CPS reports. These findings should encourage further hypotheses generation that will focus on understanding this subpopulation. This knowledge is necessary to inform the child welfare system of non-traditional pathways by which these children enter the system and how these pathways can be mitigated.

**Evaluating the Role of Physical Activity on Mood Disorder Symptom Development in Pre-Adolescents**

Robert James Suss

Preceptor: Gary Grunwald, PhD

Site: Adolescent Brain Cognitive Development (ABCD) Research Consortium, NIH Multi-Site

**Background:** The prevalence of mood disorders (e.g., major depressive disorder, bipolar disorder) increases from childhood through adolescence and adulthood. Previous findings suggest physical activity is protective against such disorders. However, more recent findings suggest that the protective effect may differ by sex. The purpose of this study is to evaluate the impact of baseline physical activity on change in mood disorder symptoms in American pre-adolescents, including a potential mediating role of prefrontal cortex.

**Methods:** We analyzed ABCD data collected from 9-11-year-old children. Linear mixed models were conducted to evaluate the association between physical activity and mood disorder assessment at one year, evaluating sex for interaction effects. Dorsolateral prefrontal cortex (dlPFC) volume was also evaluated as a potential mediator.

**Results:** Adjusting for socio-demographics and anxiety symptoms, the number of physical activities did not significantly affect CBCL Depression T-score (95% CI: -0.39, 0.11), or Bipolar Disorder symptoms (95% CI: -0.07, 0.11) at follow-up. DlPFC volume significantly increased with physical activity by an average of 3.96mm3, after adjusting for intracranial volume (95% CI: 0.540-7.39mm3). Physical activity significantly predicted decreased depression symptoms by an average of -0.20 points from baseline (95% CI: -0.02, -0.37).

**Conclusions:** These results suggest that dlPFC volume mediates the role of physical activity in the attenuation of depression symptoms in pre-adolescents, but the mechanism may differ for the development of bipolar disorder symptoms in this age cohort. Interventions to prevent the development of major depressive symptoms in pre-teens should consider underlying biological mechanisms when promoting physical activity.

**A Case Study: Evaluating the Colorado Black Health Collaborative’s Health Ministry Toolkit and the Standing of Faith Based Organizations in Public Health Using Organizational Theory**

BreAnna Teeters

Terri Richardson, MD

Site: Colorado Black Health Collaborative

**Background:** Churches, specifically those serving Black congregants, continue to function as mechanisms that provide health resources to a community that lacks trust in prominent health systems. This case study uses organizational theory to explore Faith-Based Organizations (FBO) as a system and the effectiveness of the Health Ministries Toolkit to support health promotion in present-day Black communities.

**Methods:** Churches that received the toolkit were evaluated as the organization of interest (~30). The surrounding environment the churches exist in was evaluated including the demographic, cultural, political, and social characteristics of the Denver-metro area. The influence of these areas was considered while evaluating the implementation and outcomes of the toolkit. Interviews were completed with health ministry leaders using a developed questionnaire. FBO-health partnerships in Colorado were identified to understand the gaps in resources. Finally, an analysis of systematic reviews on previous FBO programs was completed to consider the toolkit in reference to applicable literature.

**Results:** With implementation relying on church staff and volunteers, knowing the capacity of each church is very necessary. The willingness to do the work is present but increasing church support and community and congregant participation remains an obstacle. The literature finds that positive changes in health behavior often occur in FBO health promotion programs, but the effectiveness remains unmeasured.

**Conclusion:** Comprehensive community development ensured the toolkit is endeared to the community, even with the difficulties occurring during implementation. Next steps should include health professional support as implementation continues and establish protocols to evaluate the effectiveness of newly developed programs.

**Hunger Free Campus Checklist: Program Recommendations to Address Student Food Insecurity at Colorado Higher Education Institutions**

Kimberly L. Tolchinsky

Preceptor: Michael Vente

Site: Colorado Department of Higher Education

**Background:** Food insecurity is an overlooked issue that affects nearly 45% of U.S. college students and negatively impacts their academic success, financial stability, and mental health. The Hunger Free Campus Checklist is a statewide program plan for colleges to implement specific food security programs and policies that will designate them as a “Hunger Free” Campus. Our objective is to identify effective and feasible programs that schools can conduct to meet the needs of students and reduce food insecurity on college campuses.

**Methods:** Thirty food security programs were suggested from a literature review of existing national campus programs. Sixteen staff members at Colorado higher education institutions provided program feedback by attending a convening and completing a survey that identified student needs, existing campus resources, and the feasibility and effectiveness of each suggested program. CDHE met with partnering organizations to finalize the checklist by omitting programs that were not feasible, and mandating programs identified as essential in assisting students.

**Results:** Survey data showed that cost and campus capacity are the key barriers in program implementation. CDHE selected twenty-one programs to be included in the checklist, with four identified as mandatory "core programs" and seventeen programs split between three categories: Awareness, Access, and Integration.

**Conclusions:** To be designated as a “Hunger-Free” Campus, schools will need to implement four core programs and two programs in each of the three categories. CDHE will oversee the implementation and evaluation process and aid schools in accessing funding and resources to improve food security on their campuses.

**Water Tariff Analysis Across All *Water For People* Country Programs**

Ryan Tsipis

Preceptor: Kevin Wandolowski, MPH

Site: Water For People

**Background:** *Water For People* (WFP) is an international nonprofit that works in 30 districts in nine countries with an aim to promote the development of high-quality drinking water and sanitation services for everyone. The purpose of this project is to create visualizations of trends in water tariffs over a three-year period to encourage conversations and future programming within WFP.

**Methods:** Household survey (n~70,000) questions were aggregated into an excel document with their corresponding answers by year, district, and country. Visualizations of these correlations were created in Excel for basic assessment of average monthly trends in tariff costs and the affordability criteria metric by country. For more advanced visualizations a Tableau dashboard was created that displayed two graphics per district, for a total of 60 graphics. Both graphics displayed the average cost of water by household. Additionally, the first overlaid with affordability and the second overlaid with the number of households paying for water.

**Results**: Over the three-year period the 30 districts did not all follow a trend. Nuances between each country and districts are variable. It is recommended that more objective survey questions regarding affordability be implemented and individual country programs work with local governments to discuss subsidies and further programming as pertains to water tariffs.

**Conclusions**: These visualizations stimulated new conversations about water tariffs in the WFP community. After receiving feedback from country program directors about their individual district’s water tariffs, new programmatic ideas were generated, and next steps include further objective analyses of water tariffs.

**Boulder County Hospital Supply Chain Assessment**

Victoria Vela

Preceptor: Patrick Van Horne

Site: Boulder County Office of Emergency Management (BOEM)

**Background:** In the event of a crisis like a pandemic, the need for medical supplies may surpass the capacity of local hospitals and healthcare coalitions. The objectives of this assessment are to identify potential vulnerabilities in the medical supply chains of Boulder County hospitals and to create a survey tool that will help the Boulder Office of Emergency Management support future emergency planning efforts as a part of the Health And Medical Response (HAMR) Partnership.

 **Methods:** Hospital managers from the five Boulder county hospitals were asked to complete a structured, qualitative survey on the current supply chain vulnerabilities of their hospital and anticipated items needed from the Strategic National Stockpile (SNS). The 16-question survey was published using Qualtrics and emailed to the managers, with a response deadline for early March 2020. The responses were analyzed using an thematic coding approach, and organized into 5 topic areas: Items and Quantity, Item Categories, Sources, Lead Time, and SNS Items.

**Results:** We receivedresponses from three of the five hospitals in the county due to disruptions caused by COVID-19. The results show Personal Protective Equipment (PPE) as the most common item category vulnerable to shortage. The top items needed from the SNS include ventilators, respiratory protection, and N95 respirator masks.

**Conclusions:** These results can be attributed to the hospital managers anticipating the COVID-19 pandemic, which has caused PPE shortages across the nation. Next steps for Boulder OEM include incorporating the tool into long-term planning to better anticipate hospital supply needs.

**Educational Material for Community Members Working with the Greeley Refugee Population**

Leslie Walker

Preceptor: Alex Kloehn/ Amelia Ritchhart

Site: Lutheran Family Services and United Way

**Background**: Since 1980, an average of 1,650 refugees have arrived each year in the state of Colorado (Colorado.gov). Many refugee families in Greeley find themselves navigating the American Customs pertaining to health and education systems without adequate knowledge. Therefore, the purpose of this project is to create materials tailored specifically for them to increase the knowledge around the health and education system in their new host country.

**Methods**: Educational materials were developed to be used as teaching tools for use with refugee family clients. The training materials are tailored for refugee families and their needs and are provided in English and Spanish. A list of local resources was also created for providers working for Lutheran Family Services. A pre and post evaluation tool incorporating quantitative and qualitative questions, will be utilized to assess self-efficacy and knowledge impacts of the training for refugees and providers.

**Outcomes:** Materials are currently in English and Spanish but will be translated into additional languages to serve broader refugee communities. The tailored materials will help refugee families breakdown barriers related to education and health practices in the United States.

**Public Health Significance:** Education related to American culture and child-rearing customs in this country can increase confidence and resiliency in refugee families. Enhanced training for providers will enable them to better support refugee families.

**Non-Medical Exemption Policies in Child Care Centers: An Analysis of Colorado Practice Compared to National and Global Contexts**

Katherine Waters

Preceptor: Stephanie Wasserman, MSPH

Site: Immunize Colorado

**Background:** Immunization policies at child care centers help ensure children, including those who can’t be vaccinated, are protected vaccine-preventable diseases. Some child care centers in Colorado have implemented policies that remove non-medical exemptions to vaccination to enhance the level of protection. The objectives of this project were to 1) collect and analyze immunization policies between Colorado child care centers and 2) compare Colorado statute with other state and global contexts.

**Methods:** Immunization policies from a random sample of 50% of child care centers that reported immunization data to the Colorado Department of Public Health and Environment in 2018-2019 were collected and analyzed to determine if the policy permitted non-medical exemptions (personal or religious) to vaccination. Policies were collected from each facilities’ website. To provide context, Colorado’s state statute regarding a child care center’s ability to not accept non-medical exemptions was compared to other state statutes and relevant laws from other countries.

**Results:** Generally, the public-facing immunization policies of Colorado’s child care centers are lacking in completeness and clarity. A small number of child care centers in Colorado have immunization policies that clearly indicates the center only accepts medical exemptions and does not allow non-medical exemptions for enrollment.

**Conclusions:** This project provides example policies from child care centers with immunization policies that protect vulnerable children by only allowing vaccine exemptions for medically-valid reasons. Many Colorado child care centers could clarify their immunization and exemption policies and have the opportunity to learn from local facilities, as well as other states and nations.

**SAFE Act Passage and Incidence of Gun Violence in New York City**

Rachel Weber

Preceptor: None

**Background:** Gun violence in New York city has been in decline since the 1990s. In January 2013, following the Sandy Hook shooting, the State of New York passed the SAFE Act. This comprehensive legislation sought to reduce gun-violence state-wide. Knowing that incidence of gun violence can be impacted by many factors, it is important to assess the existence of benefit resulting from this legislation.

**Methods:** We conducted interrupted time series negative binomial regression to predict the number of shootings to occur on a single day given prior trends (2006-2019), to infer from the impact legislative action had on the probability of a shooting-free weekend. We also accounted for day of the week and month to accommodate temporal trends in gun violence.

**Results:** Gun violence in New York City has declined by about 2% each year since 2006. SAFE Act passage reduced daily incidence of gun-violence by 14%. Day of the week was a significant predictor of expected shootings with estimates rising on weekends and falling mid-week. Monthly estimates demonstrated that shooting incidence was lowest in February and highest in July and August.

**Conclusion:** Gun violence declined 6% faster from baseline in the 6 years following SAFE Act implementation. Such suggests that comprehensive gun legislation reduces gun violence.

**Understanding Motivators and Barriers for Participation in Farm to Early Care & Education among Colorado Providers**

Lauren Winchell

Preceptor: Wendy Moschetti, BASW, MCP

Site: LiveWell Colorado

**Background**: Farm to Early Care and Education (ECE) increases access to healthy, locally grown food and high-quality learning for young children. A recent survey of ECE providers in Colorado determined that 48% of centers participate in Farm to ECE activities. Understanding the factors that influence participation is critical for increasing participation rates. The purpose of this qualitative research project was to assess the perceptions, motivators, and barriers to Farm to ECE participation among providers in Colorado.

**Methods:** Keyinformant interviews (KIIs) were conducted among a purposeful and diverse sample of ECE providers. Semi-structured interviews took place by video conferencing and phone to investigate motivators for participation and barriers to starting or expanding Farm to ECE practices. KII transcripts were recorded, transcribed, and analyzed through constant comparison analysis. Data were systematically reduced to codes and developed into themes.

**Results**: Thematic analysis of KIIs revealed 10 themes and 6 subthemes. Perceptions were consistent across KIIs regardless of center size, geographic location, or length of program involvement. The majority of providers reported the positive impact on children’s eating behaviors and beneficial outcomes of experiential learning as motivators. Challenges with garden maintenance and seasonal barriers were expressed by all providers. Resource utilization and parent engagement varied by center.

**Conclusions**: There is excitement around Farm to ECE among providers in Colorado despite challenges to implementation. The positive benefits that providers witness is encouragement to overcome challenges. Providers would benefit from support in starting gardens, resources for overcoming regional growing challenges, and funding opportunities.

**An Evaluation of Clinical Trajectories for Respiratory Pathogens in the Pediatric Population**

W. Jon Windsor MLS (ASCP)cm

Preceptor: Molly Lamb, PhD

Site: Children’s Hospital Colorado

**Background:** Respiratory conditions are the number one reason for pediatric emergency department (ED) visits in the United States. No research has differentiated the clinical trajectories between common respiratory pathogens in the pediatric population. We explored how the pediatric risk for hospitalization and longer symptom duration differs based on their identified respiratory pathogen at ED presentation.

**Methods:** A randomized controlled trial was conducted in a pediatric-focused ED Dec 2018 – Dec 2019 in Aurora, CO. A secondary analysis was performed on 931 patients between 1 month and 18 years of age presenting with acute respiratory symptoms. We used multivariable Poisson regression models with robust variance to assess the hospitalization rates between commonly identified respiratory pathogens in children. Symptom duration differences were then compared using multivariable Cox proportional hazards models.

**Results:** Compared to Influenza, RSV and HRV/HEV were at higher risk for hospitalization (adjusted Risk Ratio [aRR]: 2.95, 95%CI: 1.17-7.45; aRR: 2.58, 95%CI: 1.05-6.35 respectively). Influenza patient symptoms resolved earlier compared with RSV and Parainfluenza patients (adjusted Hazards Ratio [aHR]: 2.01 95%CI: 1.39-3.13; AHR: .62, 95%CI: 1.02-2.55 respectively).

**Conclusions:** Children with RSV had greater risk for hospitalization and longer symptom durations compared to those with influenza.Compared to Influenza, children with HRV/HEV had greater risk for hospitalization with similar symptom duration; and children with Parainfluenza had similar hospitalization risk, but longer symptom durations. Early detection of respiratory pathogens with a higher hospitalization risk has potential to enable more rapid appropriate response and thus mitigates the severity of respiratory pathogens on the pediatric population.

**Understanding barriers and opportunities to improve adoption of genomic biomarker testing for colorectal cancer at the national level**

Marina Woolums

Preceptor: Reese Garcia, MPH

Site: Fight Colorectal Cancer

**Background:** Genomic testing is critical for identifying biomarker changes to select an appropriate type of treatment for metastatic colorectal cancer (CRC) patients. Our goal is to determine the reasons for using this testing less than expected and ways to increase its use to improve treatment efficiency to save lives.

**Methods: Scientific-medical literature and peer-reviewed articles were collected from credible journals, databases, public health organizations' websites. Specialists were interviewed for guidance and to better understand information related to the adoption of the genomic biomarkers for CRC testing in clinical, legal-political, and structural areas of the field. Analyzing, summarizing, and comparing the collected information was performed to develop useful recommendations on how to increase genomic biomarker screening.**

**Results:** The analysis of collected information suggests that CRC patients have low genomic biomarker screening rates due to various barriers. These include financial, legal, structural, individual, scientific, industrial, and other problem areas. Benefits include long term improvements for overall outcomes for patients, government, economy, and public health structure.

**Conclusions:**Improvements for increasing the use of genomic biomarker tests are creating awareness about genomic biomarker testing for doctors and patients. Other changes are supporting and improving further research, creating accessible sources of information, training physicians through mandatory seminars about the variety and purpose of the genomic-based biomarker screening tools. Providers will offer more genomic biomarker options to CRC patients, especially with a metastatic stage of the disease. That will improve personalized treatments, patients' longevity, life quality, to reduce medication side effects and mortality.

**HIV Pre-exposure Prophylaxis (PrEP) Program Expansion Evaluation**

Jason Wright, Pharm D, BCPS, AAHIVP

Preceptor: Mary Bessesen, MD

Site: Department of Veterans Affairs – Eastern Colorado Health Care System (VA ECHCS)

**Background:** HIV pre-exposure prophylaxis (PrEP) is one of many effective strategies to reduce HIV transmission. PrEP use requires screening for sexually transmitted infections (STIs) every 3 months, as STIs are associated with increased risk of HIV acquisition. Our objectives were to evaluate the impact of primary care prescribing on PrEP prescription rates; and influence of self-collection of extragenital STI screening on compliance with monitoring recommendations.

**Methods:** Historically, PrEP prescribing has been restricted to infectious disease providers and extragenital STI screenings required clinician-collected specimens at a Veterans Affairs hospital. PrEP prescription rates in a cohort of at-risk veterans for HIV acquisition were evaluated pre and post implementation of primary care prescribing. Additionally, extragenital STI screening rates were evaluated pre and post implementation of self-collected extragenital STI screening.

**Results:** The proportion of at-risk veterans on PrEP increased non-significantly during the study timeframe from 14.2% (82/578) to 14.9% (86/578) [p=0.38648]. Veterans on PrEP with rectal and pharyngeal STI screening increased significantly from 15.9% (13/82) to 39.0%(32/82) [p=0.00004] and 18.3%(15/82) to 41.5%(34/82) [p=0.00004] respectively. This resulted in the detection and treatment of four patients with a positive rectal STI screening and six patients with a positive pharyngeal STI screening.

**Conclusions:** Improved implementation efforts are warranted to expand primary care prescribing of PrEP in a cohort of veterans at risk for acquiring HIV. Given the increased risk of HIV acquisition associated with STIs, self-collection of STI screening in veterans receiving PrEP can be a useful tool to further reduce STIs and ultimately HIV acquisition risk.

**Clinical Presentation at Onset of Diabetes Does Not Predict Diabetes Treatment**

Erin Youngkin

Preceptor: Kimber Simmons, MD MS and Graham Ogle, MD

Site: Life For A Child

**Background:** Clinical presentation is often used to diagnosis diabetes, which may lead to misdiagnoses of diabetes type and impact prescribed treatments. The purpose of this study was to assess how clinical presentation at diabetes diagnosis affects treatment of diabetes in youth from Bangladesh, the Maldives, and Pakistan.

**Methods:** Between January 2018 and December 2019, we collected data on youth with diabetes including demographics, clinical characteristics at time of diabetes diagnosis, and current diabetes type and treatment. A multinomial logistic regression was used to determine risk ratios of treatment of diabetes in relation to each clinical symptom at diagnosis and a linear regression was used to determine insulin dose differences by exposure. Covariates were assessed for significance.

**Results:** Most youth had weight loss, polyuria, or polydipsia at onset and insulin therapy was most prescribed. None of the clinical symptoms at diabetes onset significantly predicted any type of diabetes treatment. After adjusting for country differences, those with malnutrition at diagnosis had significantly lower total daily doses of insulin (-20.7 units, p=0.042) compared to youth without malnutrition. Additionally, insulin doses increased in youth with weight loss (+11.7 units, p=0.015), polyuria (+11.5 units, p=0.025), or polydipsia (+14.3 units, p=0.006) at diagnosis compared to youth without those clinical symptoms.

**Conclusions**: Other methods of diagnosing and treating diabetes appropriately are needed in the Maldives, Bangladesh, and Pakistan. Insulin doses differed in youth with malnutrition, weight loss, polyuria, or polydipsia, which indicates additional research is needed to investigate factors that contribute to insulin sensitivity.

**Evaluating Pediatric Provider Communication Strategies and Self-Efficacy Regarding Routine Childhood Vaccinations**

Kelly Zavaleta

Preceptor: Christine Spina, MSPH

Site: Adult and Child Consortium for Health Outcomes Research and Delivery Science

**Background:** Health care provider use of presumptive format (PF) combined with motivational interviewing (MI) is an effective communication strategy to increase vaccine uptake in adolescents, but their effect in infants is not well known. Our objective is to evaluate communication strategies, time spent discussing vaccinations during routine well-child visits, and perceived provider self-efficacy (PSE) when talking to parents of newborn’s who hesitate to vaccinate.

**Methods:** Pediatric providers(n=210) in 24 primary care clinics across Colorado and Washington (May/2019-January/2020) were surveyed about using PF, MI, other communication strategies, time discussing vaccines, and PSE around vaccine initiation for hesitant parents. We conducted chi-square tests of categorical variables, and an adjusted and unadjusted logistic regression.

**Results:** Response rate was 99%(n=208). Most (93%) respondents used PF in vaccine discussions; 61% reported counter arguing with reasons why hesitant parent(s) should vaccinate their children. Most (70%) respondents spent <10 minutes discussing vaccines with hesitant parents. Over half (56%) of providers perceived themselves as self-efficacious. Physicians were less likely to use MI than mid-level providers (36% vs 52%, p=0.09). PF or time spent discussing vaccines were not significantly associated with PSE. In the unadjusted analysis, occupation (MD/DO) was significantly (OR: 1.94, CI:1.03-3.66) associated with PSE. After adjusting for provider type, MI (vs other communication strategies) was associated with PSE (OR: 2.18, CI: 1.00-4.78).

**Conclusions:** Most pediatric providers use PF when discussing vaccinations and over half of respondents perceived themselves as self-efficacious. Use of MI and provider type were significantly associated with provider self-efficacy.

**Examining Underlying Health Status in Guatemalan Sugarcane Workers and its Impacts on Productivity and Attrition During the Harvest Season: 2018-2019**

Farrah Zeort

**Preceptor:** Lyndsay Krisher, MPH

**Site:** Center for Health, Work and Environment (CHWE)

**Background:** The objective of this study was to assess the impacts that underlying health status, evaluated by biomarkers of kidney disease, diabetes, and anemia, had on overall productivity and attrition of male Guatemalan sugarcane workers during the 2018-2019 harvest season.

**Methods**: Complete Blood Count (CBC) data from the season was used to identify which of the 203 workers had abnormal lab results in January 2019 (mid-season). Productivity was measured by average tons of sugarcane cut per week for each worker, and attrition was determined by examining who dropped out prior to May 2019 (end of season).Logistic Regression was used to predict attrition based on each biomarker. Linear Regression was then used to predict productivity from each biomarker in workers who did not dropout. Adjustment variables included age, origin and body mass index (BMI).

**Results:** Out of 203 sugarcane cutters, 16 dropped out prior to May. There was no relationship between attrition and underlying health status. There was a strong linear relationship between productivity of workers and their origin, but not with underlying health status (p-value <.001).

**Conclusion**: No relationship was found between attrition, productivity and underlying health status. A strong linear relationship was found between origin of workers and productivity (p-value <.001). Further studies should focus on addressing health issues through supplementation and nutrition interventions.