Public Health Forum
Fall 2019

Friday December 6, 2019
Anschutz Medical Campus - Education 2 North Buildings and the Nighthorse Campbell Native Health Building

11:30 AM – 12:00 PM
MPH Public Health Forum Opening Session
Education 2 North Room 1206

12:00 PM – 3:30 PM
MPH Oral Presentations - Education 2 North Building
(see schedule)

3:45 PM – 4:15 PM
Poster Presentations and Reception
Nighthorse Campbell Native Health Building Lobby

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.

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

Fall 2019 MPH Capstone Faculty

Lisa McKenzie, PhD, MPH  
Madiha F. Abdel-Maksoud, MD, PhD, MSPH  
Lisa Miller, MD, MSPH  
Virginia Visconti, PhD, MAT  
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:

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
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<tbody>
<tr>
<td>Katherine A. James, PhD, MSPH, MS</td>
<td>Colorado School of Public Health</td>
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<tr>
<td>Paul Gillenwater, MPH</td>
<td>Colorado Department of Public Health and Environment</td>
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<td>Collin Cannon</td>
<td>Immigrant and Refugee Center of Northern Colorado</td>
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<td>Kacey Wulff, BA, MPH</td>
<td>Lieutenant Governor’s Office, Office of Saving People Money on Health Care</td>
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<td>Erika Moldow, PhD</td>
<td>National Mental Health Innovation Center at the University of Colorado</td>
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<td>Anschutz Medical Campus</td>
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<tr>
<td>Ed Hendrikson, PhD, PA-C</td>
<td>Salud Family Health Centers, Fort Lupton</td>
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<tr>
<td>Jennifer House DVM, MPH, DACVPM</td>
<td>Colorado Department of Public Health and Environment</td>
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<td>Ruthie Isoz</td>
<td>Trailhead Institute</td>
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<td>Mark Lucas, MPS CCP</td>
<td>University of Colorado Hospital</td>
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<td>Ariella Bak</td>
<td>Gainesville Fire Rescue</td>
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<tr>
<td>Jacquie Watson, MHS</td>
<td>Idaho Division of Public Health, Maternal &amp; Child Health Section</td>
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<tr>
<td>Molly Lamb, PhD</td>
<td>Center for Global Health (CGH) at the University of Colorado Anschutz Medical</td>
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<td>Patricia Valverde, PhD, MPH</td>
<td>Patient Navigator Training Collaborative</td>
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<tr>
<td>Edwin Asturias, MD and Joshua T.B. and Joshua T.B.</td>
<td>Center for Global Health at the University of Colorado Anschutz Medical Campus</td>
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<tr>
<td>Williams, MD</td>
<td>Universidad Francisco Marroquin</td>
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<td>Devin Miller, MPH</td>
<td>Colorado Department of Health Care Policy and Financing</td>
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<td>Katherine O’Connor, MPH</td>
<td>Children’s Hospital Colorado</td>
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<td>Kendra Young, PhD</td>
<td>Colorado School of Public Health</td>
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<td>Oliwier Dziadkowiec</td>
<td>Hospital Corporation of America</td>
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<td>Sarah Winbourn, MD</td>
<td>Kids First Health Care</td>
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<td>Karen Roof, PhD, MPH</td>
<td>Open Arms Assisted Living Facility</td>
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<td>Jessica Shouse</td>
<td>The Arc of Larimer County</td>
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<td>Donna McGregor, NP</td>
<td>UCHealth</td>
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<td>Noah Hull, MPH, PhD</td>
<td>Wyoming Department of Health</td>
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<td>Jim Becker, MNM</td>
<td>Partnership for Age Friendly Communities</td>
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<td>Kristen Nowak, PhD, MPH</td>
<td>Division of Renal Diseases and Hypertension at the University of Colorado</td>
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<td>Anschutz Medical Campus</td>
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Thank you
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<tr>
<th>TIME</th>
<th>Ed 2 North - Room 1308</th>
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<tbody>
<tr>
<td>12:00 PM</td>
<td>Heather Giudici – EPID</td>
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<td>The Impact of El Niño Severity on Human Incidence of Tularemia Via Wildlife Prevalence in Colorado</td>
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<td>Rebecca Waller – EPID</td>
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<td>BMI, Pain Levels and Quality of Life Indices in Patients with Autosomal Dominant Polycystic Kidney Disease</td>
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<td>12:30 PM</td>
<td>Phuong Banh – EPID</td>
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<td>The Association of Race/Ethnicity and Human Papillomavirus Vaccine Initiation in Colorado</td>
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<td>12:45 PM</td>
<td>Melodie Santodomingo – EPID &amp; BIOS</td>
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<td>Fatty Acid Metabolism Gene Variants are Associated with Autoantibody Positivity in At-Risk Relatives of Rheumatoid Arthritis, but not At-Risk Relatives of Systemic Lupus Erythematosus</td>
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<td>1:00 PM</td>
<td>Caleb Van Wagoner – EPID</td>
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<td>Analysis of Risk Factors of Chlamydia (Chlamydia trachomatis) Infection in Wyoming</td>
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<td>1:15 PM</td>
<td>Rohit Baal Balasundaram, BDS - EPID</td>
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<td>Effect of Marijuana Use on Tobacco Cessation Success Among Colorado Adults</td>
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<td>Sabrina Rahman, MBBS – EPID</td>
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<td>Association Between Healthcare Facility and Vaccine Delay in Guatemala City, Guatemala</td>
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<td>Alexandra Schwartz – BIOS</td>
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<td>The Link Between Marijuana Use and Opioid Rescue Analgesia after Injury: Is Longitudinal Modeling Superior?</td>
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<td>Elizabeth Landry – MCH</td>
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<td>Adaptation of a Pornography Literacy Curriculum: Recommendations for Implementation in Denver Area Schools</td>
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<td>Kelsey Robinson – MCH</td>
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<td>Adaptation and Pilot Testing of a Vaccine Hesitancy Survey Instrument in Rural Guatemala</td>
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<td>Matthew Mosca, MS – LPH</td>
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<td>Best Practices for Critically Ill Cardiothoracic Patients Requiring Life Support: Establishing Platinum Level Care</td>
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<td>Xenya Poole – MPH-MPA</td>
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<td>Idaho’s Maternal Mortality Review Committee: A Toolkit for Development and Implementation</td>
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**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!
<table>
<thead>
<tr>
<th>TIME</th>
<th>Speaker</th>
<th>Title</th>
</tr>
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<tbody>
<tr>
<td>12:00 PM</td>
<td>Rena Soller – CBH</td>
<td>Understanding the Health and Safety Aspects for Older Adults in Outdoor Spaces</td>
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<tr>
<td>12:15 PM</td>
<td>Sasha Ruey – CBH</td>
<td>Connecting Patients to Providers: Analyzing Telemedicine for Colorado Medicaid</td>
</tr>
<tr>
<td>12:30 PM</td>
<td>Jenny Duong – CBH</td>
<td>Planning Something Good For All Neighborhoods - Development of Needs Assessment Survey for Salud Family Health Centers</td>
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<tr>
<td>12:45 PM</td>
<td>Kelsey Campbell – HSMP</td>
<td>Coverage for All: Providing Health Insurance and Programs to Undocumented Individuals in Colorado</td>
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<td>Alexa Van Epern, PharmD – Custom</td>
<td>Recommendations for a TelePrEP Program in Rural Colorado</td>
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<td>Tess Santangelo - HSMP</td>
<td>Food Rx: Evaluating the Food Clinic Program at the Children’s Health Pavilion</td>
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<td>Kiernan Oknefski – HSMP</td>
<td>Community Resource Paramedic Program Cost Saving Study</td>
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<td>Swarnima Chaudhary – HSMP</td>
<td>Addressing Trauma in Classrooms: Exploring Teachers’ Perspectives on Using the Healthy Environments and Response to Trauma in Schools (HEARTS) Model of Trauma-Informed Teaching Practices</td>
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<td>Cathy Buschmeier – CHE</td>
<td>Health Concerns and Barriers to Health Equity in Individuals with Refugee Status</td>
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<td>2:30 PM</td>
<td>Amber Smith – CHE</td>
<td>Creating Inclusive Educational Materials For Standardized Clinical Education</td>
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<td>Abbey Tiell – CHE</td>
<td>Interpersonal Violence Prevention Curriculum for Individuals with Severe Intellectual/Developmental Disabilities</td>
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<td>Karena Wall – HA &amp; CHE</td>
<td>Aging in Place in Rural Larimer County: A PhotoVoice Study</td>
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Effect of Marijuana use on Tobacco cessation success among Colorado Adults

Rohit Balasundaram
Preceptor: Dr Katherine A. James, PhD, MSPH, MS
Site: Colorado School of Public Health

Background: The Attitude and Behavioral Health Survey (TABS) is conducted every 3 years among adults in Colorado, as part of the tobacco evaluation program with the State Health Department. It consists of a comprehensive survey of tobacco and marijuana (MJ) use, and secondhand smoke exposure. This study utilized data from TABS 2015 and the two follow-up surveys in 2016 and 2017 to investigate if concurrent use of tobacco and marijuana had a negative effect on tobacco cessation effort and success.

Methods: The 2015 TABS included 8616 participants with access to either a landline or cell phone. Weighted statistical analysis including descriptive statistics and logistic regression modeling were used to evaluate the association between current marijuana use and tobacco cessation success and effort. Models also accounted for known risk factors including age, sex, ethnicity, and socioeconomic status.

Results: At baseline 10.63% adults reported using MJ and Tobacco concurrently. Those who reported being a current user of MJ in 2015 were 1.16 times 95%C I: [0.96,2.87] less likely to successfully quit smoking after 1 year. However, after 2 years the difference in quit success was not statistically significant.

Conclusion: Concurrent smokers who use marijuana are less likely to successfully quit smoking. Future studies should evaluate the data from TABS 2019 to examine if the associations remain. If so, public health agencies should devote more resources for tobacco cessation programs among marijuana users.
The Association of Race/Ethnicity and Human Papillomavirus Vaccine Initiation in Colorado

Phuong Banh
Preceptor: Paul Gillenwater, MPH
Site: Colorado Department of Public Health and Environment

Background: Human Papillomavirus (HPV) vaccination was known to be effective at preventing sexually transmitted infections that led to various oral or genital cancers. Our objective was to determine the relationship between race/ethnicity and HPV vaccine initiation in Colorado.

Methods: A cross-sectional study using statewide representative data from the Colorado Immunization Information System was utilized to examine HPV vaccine initiation across teens 13 – 17 years old from 2001 – July 1, 2019. Multivariable regression using log-binomial modeling was used to obtain the prevalence ratios and 95% confidence intervals of race/ethnicity and foreign-born status to determine the association of race/ethnicity and HPV vaccine initiation.

Results: There were significant differences in racial/ethnic groups and HPV vaccine initiation. Hispanics of all race have 1.13 (95% CI: 1.13, 1.14) times higher prevalence of HPV vaccine initiation compared to non-Hispanic whites. After adjusting for gender, age, and primary health insurance, Hispanics of all race have 1.11 (95% CI: 1.11, 1.12) times higher prevalence compared to Non-Hispanic Whites. Overall, non-Hispanic African American and non-Hispanic Asian had higher prevalence of HPV vaccine initiation compared to non-Hispanic white group while other race/ethnicity groups had lower prevalence.

Conclusions: A complete case analysis showed lower prevalence ratio of HPV vaccine initiation in the native Hawaiian and native Alaskan/American Indian groups. More collection of birth-country data is needed to better assessments of its relationship to HPV vaccine initiation across race/ethnicity groups.
**Health Concerns and Barriers to Health Equity in Individuals with Refugee Status**

Cathy Buschmeier  
Preceptor: Collin Cannon, Director of Advocacy and Development  
Site: Immigrant and Refugee Center of Northern Colorado

**Background:** Individuals with refugee, asylum, and immigrant status are at a higher risk of disease and mental illness than their US-born counterparts.Attributing to this high risk are barriers that make obtaining adequate standards of health difficult. Individuals with refugee status in Northern Colorado need knowledge about and access to available resources on various health topics in order to become self-sufficient in meeting their health needs.

**Methods:** Tertiary data were extracted from previous literature pertaining to health, wellness, and determinants (positive or negative) of health for individuals classified as refugees, asylum seekers, or immigrants. The search for data was driven by the Social Ecological Model and the Social Determinants of Health Model. The data were used to create a literature review for the Immigrant and Refugee Center of Northern Colorado (IRCNOCO) use and reference, and guide the production of a resource hub on their website.

**Results:** Literature informed themes are barriers pertaining to: language, complex healthcare system, lack of health insurance, stigma and discrimination, provider mistrust, and lack of cultural competency. Main health concerns of this population surround accessing non-emergency care and women specific care.

**Conclusions:** A large gap exists in health assistance with many factors posing as barriers to obtaining positive health outcomes for this population. The web pages link IRCNOCO clients and advocates to helpful resources on health topics focused on the reduction of barriers to good health. Communicating the determinants of health increase awareness and increase public health efforts for individuals with refugee status in Northern Colorado.
**Coverage for All: Providing Health Insurance and Programs to Undocumented Individuals in Colorado**

Kelsey Campbell  
Preceptor: Kacey Wulff, MPH  
Site: Lieutenant Governor's Office, Office of Saving People Money on Health Care

**Introduction:** Public charge is a criterion used in the citizenship application process; it is based on a totality of circumstances and looks at whether or not an individual is likely to become dependent on government funds. The Trump administration is attempting to expand the number of programs that can be considered when determining an individual’s likelihood to become a public charge. Due to the recent nature of this change, there is limited information on how states can move forward. The goal of this policy proposal was to explore ideas that could provide consistent healthcare services for non-citizens. The vision is to create healthier communities in Colorado based on inclusivity and economic efficiency.

**Methods:** Semi-structured key informant interviews were conducted (n=7) with individuals who work with undocumented populations. Each interview was analyzed using the RADaR technique. A literature review was conducted, however many of the documents reviewed were policy analyses from non-governmental organizations and state documents. The final written deliverable was sent to interviewees to provide feedback via phone or email.

**Results:** All of the interviews touched on multiple themes, the most poignant being the current environment of fear, lack of culturally competent providers, pervasive absence of specialty care, and an overall lack of funding for programs.

**Conclusions:** Structural change is needed to mitigate human suffering, increase health outcomes, and decrease costs. Regulation of discount care programs is needed to improve access to specialty care. The Colorado public option will offer individuals access to the health insurance market.
Addressing Trauma in Classrooms: Exploring Teachers’ Perspectives on Using the Healthy Environments and Response to Trauma in Schools (HEARTS) Model of Trauma-Informed Teaching Practices

Swarnima Chaudhary
Preceptor: Erika Moldow, PhD
Site: National Mental Health Innovation Center at the University of Colorado Anschutz Medical Campus

Background: Exposure to traumatic events is a common experience worldwide. Children who experience trauma can develop emotional, behavioral, cognitive and social difficulties that adversely impact their ability to learn and succeed in school. In the United States, teachers are often ill-equipped to address the needs of these children, and benefit from integrating trauma-informed practices. The purpose of this qualitative training evaluation was to explore teachers’ perspectives on using the Healthy Environments And Response to Trauma in Schools (HEARTS) model of trauma-informed practices (TIPs) at an ethnically diverse, Title 1 elementary school in Colorado.

Methods: Researchers conducted classroom observations of 14 teachers and 24 semi-structured interviews with the principal and assistant principal, two HEARTS consultants, a former school psychologist and 19 teachers (preschool through fifth grade and specialists). All interviews were confidential, taped and transcribed. Thematic analysis was conducted using Nvivo.

Results: Overwhelmingly, teachers report that information on TIPs, self-care and burnout prevention was not available in their pre-service education. A majority of teachers experienced a mindset shift in understanding how trauma impacts the brain, learning and behavior. Teachers adapted their actions towards using appropriate, less punitive consequences. Several teachers did not shift their mindset because they felt that being strict is better practice and that TIPs are ‘one more thing’ and take more time that educators have to give.

Conclusions: Trauma-informed work is individualized and takes time and practice to implement; therefore, it would be valuable to begin learning and practicing TIPs during pre-service education, before stepping into the classroom.
Planning Something Good for All Neighborhoods
Development of Needs Assessment for Salud Family Health Centers

Jenny Duong
Preceptor: Dr. Ed Hendrikson, PhD, PA-C
Site: Salud Family Health Centers, Fort Lupton

**Background:** Salud provides comprehensive health care services to low-income, medically underserved populations and migrant seasonal farmworkers. The goal of this project was to develop a needs assessment survey to gain knowledge on how the clinic could better assist these populations.

**Methods:** Our survey questions were based on information from a comprehensive literature review on what underserved populations find lacking in the health care system. Based on this information, we modified 20 questions obtained from the Mexican Family Life Survey, St. Catherine of Siena Medical Center, and National Health Interview Surveys. Our survey consisted of 4 fill in the blank, and 16 multiple choice questions. 50 sets of surveys were created, 25 in English and 25 in Spanish, and piloted at the Salud Fort Lupton, CO clinic. Participants were asked to fill out the survey while waiting to be seen by their provider.

**Results:** The total response rate of the surveys was 50%. 72% of respondents were Hispanic, and of those 64% were female. Diabetes, blood pressure, and routine wellness checkups were the top 3 health concerns patients wanted more information on. The fill in the blank questions yielded 0% response rate while multiple choices yielded 80%.

**Conclusions:** Our response rate of 50% indicates that with some improvements the survey may be an effective needs assessment tool. Improvements could include rewriting fill in the blank questions into multiple-choice questions, recruiting interviewers to conduct the survey, and have a larger sample of patients to gather complete demographic data.
The Impact of El Niño Severity on Human Incidence of Tularemia Via Wildlife Prevalence in Colorado

Heather Giudici  
Jennifer House DVM, MPH, DACVPM  
Colorado Department of Public Health and Environment

**Background:** El Niño is a cyclical weather phenomenon which impacts temperature and precipitation in the United States, including Colorado. Years which end up being El Niño result in greater precipitation than other non-El Niño years. Precipitation increases lead to greater vegetation growth. Lagomorphs and rodent species thrive on extra vegetation. As the host species of tularemia, it’s important to explore the impact this has on the incidence of human disease. The purpose of this study was to evaluate whether El Niño years affect cases of tularemia in Colorado.

**Methods:** This was a cross-sectional study. Human data were collected from 1973-2017 totaling 285 cases and animal data from 2005-2017 totaling 246 cases. A simple linear regression was used to calculate predictive data of expected tularemia cases and actual tularemia cases in non-El Niño compared to El Niño years respectively.

**Results:** For humans, regression analysis shows 3.34 tularemia cases predicted each year in non-El Niño years. In El Niño years for every degree Celsius increase, cases are predicted to increase by an additional 5.82, p-value = 0.002, 95% CI (2.18, 9.45). With the same analytical methods, 13.45 animal cases are predicted each non-El Niño year. During El Niño years for the Celsius temperature increase, a predicted additional 11.02 cases will occur, p-value = 0.053, 95% CI (-0.16, 22.19).

**Conclusions:** The research suggests a positive correlation between El Niño years and increased incidence of tularemia cases for human and animal populations in Colorado.
Adaptation of a Pornography Literacy Curriculum: Recommendations for Implementation in Denver Area Schools

Elizabeth Landry
Preceptor: Ruthie Isoz
Site: Trailhead Institute

Background: Nearly half of all U.S. adolescents have viewed pornography in the past year. Although limited studies exist on consequences associated with pornography-viewing by U.S. adolescents, evidence demonstrates links to unsafe sexual behaviors. Due to these potential consequences, pornography literacy should be included as a part of comprehensive sex education curricula. Currently, only one known published curriculum on pornography literacy exists in the United States, titled The Truth About Pornography. This curriculum has demonstrated effectiveness in changing attitudes among adolescents, but has not been used in schools. The purpose of this project was to develop recommendations to adapt this curriculum to meet National Sexuality Education Standards, based on the most widely understood consequences of pornography-viewing.

Methods: First, a literature review was conducted to understand consequences of pornography-viewing by adolescents, including existing resources from Trailhead Institute’s Working to Institutionalize Sex Education (WISE) Program. Review of The Truth About Pornography was also conducted, then cross-referenced with research on consequences to determine overlapping themes. Themes were then matched with National Sexuality Education Standards in order to develop recommendations for the adaptation of The Truth About Pornography and implementation of an adapted curriculum.

Results: Three major themes emerged from the research: reinforcement of gender norms, sexual violence perpetration, and sexual permissiveness. These were matched with eight National Sexuality Education Standards to guide recommendations.

Conclusion: Current lesson plans should be adapted to incorporate pornography literacy curricula, in order to meet National Sexuality Education Standards, and to improve the sexual health of Denver adolescents.
Best Practices for Critically Ill Cardiothoracic Patients Requiring Mechanical Life Support: Establishing Platinum Level Care

Matthew Mosca, MS CCP
Preceptor: Mark Lucas, MPS CCP
Site: University of Colorado Hospital

Background: The Extracorporeal Life Support Organization (ELSO) Award of Excellence recognizes hospital centers that provide exceptional care for artificial heart-lung patients. The scoring system is not fully described making it difficult to prioritize program improvements to achieve a higher designation (Silver, Gold, or Platinum). The purpose of this evaluation was to further elucidate the ELSO scoring system in order to develop a strategy to elevate the University of Colorado Hospital (UCH) from Gold to Platinum status.

Methods: We conducted a systematic review of 10 Platinum and 10 Gold centers selected from the ELSO registry. We assessed differences between Platinum and Gold centers in sections of our UCH application that did not meet Platinum criteria. The characteristics that distinguished Platinum from Gold centers were used to create an action plan for UCH to achieve Platinum.

Results: We identified differences in structural components, system processes, and details of documentation between Platinum and Gold centers. Platinum centers had more developed provider education, best practice integration, family and patient incorporation, and workforce experience. Platinum centers also described in greater detail how they exceeded guidelines in their award application.

Conclusions: An improved understanding of ELSO’s scoring system and the program characteristics linked to being Platinum can be used to help elevate hospital centers to Platinum. This may improve hospital recognition and provide better quality of care for critically ill patients on life-support.
Background: Many communities are challenged by poor health and high emergency service usage, which has led to the need for innovative strategies. The community paramedicine model has emerged as a promising evidence-based approach to address patient’s social needs in an effort to reduce usage. In this model, Fire/EMS departments utilize front-line paramedics in collaboration with interdisciplinary partners to address the needs of high volume users. These needs include food scarcity, transportation, and support system. The Community Resource Paramedic (CRP) program was created by Gainesville Fire Rescue in search of a new paradigm for delivering emergency medical services. A cost-savings study found financial and primary care provider impacts due to CRP.

Methods: This retrospective analysis compared CRP participant’s use of the UFHealth/Shands hospital system emergency department and primary care providers (PCP) during the six months before the program was implemented to the six months after the program was implemented. Using average charge data from the hospital system, we analyzed cost saved per patient, total hospital system charges for the cohort, and the change in PCP visits.

Results: There were 39 users between September 2017 and February 2019 whose average charge saved per patient at UFHealth/Shands hospital system was $4,444 with a total of $346,632. PCP visits were completed on average 15% more post intervention.

Conclusion: The intervention significantly impacted emergency department treat and releases, admissions, and PCP visit completion rate. The CRP program plans to use these findings to increase funding sources in order to maintain the program and improve quality of service.
Idaho’s Maternal Mortality Review Committee: A Toolkit for Development and Implementation

Xenya Poole
Preceptor: Jacquie Watson, MHS
Site: Idaho Division of Public Health, Maternal & Child Health Section

Background: The maternal mortality rate (MMR) is decreasing in all developed countries across the globe, except in the United States, where it has doubled in the past 15 years. In Idaho, the MMR is 27.1 per 100,000 live births, higher than the national average. To reduce MMRs, states have created Maternal Mortality Review Committees (MMRC) to analyze causes of death and make prevention recommendations. In 2019, Idaho passed a law to establish an MMRC; however, there is no literature on the process of successfully implementing one. The purpose of this project was to develop a toolkit that would assist Idaho in the development and implementation of its MMRC.

Methods: By utilizing the Review to Action website, we were able to identify approximately 30 states with a current MMRC and reviewed their processes and documents. We then created a workplan based on a report from the CDC that outlined attributes of successful MMRCs. Documents and processes were utilized based on their applicability and necessity of Idaho’s workplan.

Results: We identified one state with published recommendations for establishing successful MMRCs. A final toolkit was created, including letters, processes, applications, and other documents to be utilized in the implementation phase. All process and documents were combined to create the Idaho MMRC Toolkit.

Conclusion: We successfully developed a toolkit to support the implementation of the Idaho MMRC. This toolkit can also be utilized by other states hoping to create an MMRC. More research is needed to determine what a “successful” MMRC looks like.
Association between Healthcare Facility and Vaccine Delay in Guatemala City, Guatemala

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Background: Research shows that, vaccine acceptance has decreased drastically in both High-Income Countries and Low and Middle Income Countries (LMICs) but the patterns of, or reasons for, vaccine delay in LMICs have not been adequately researched. This study aimed to determine if healthcare facility type was associated with vaccine delay in Guatemala.

Method: A survey-based cross-sectional study was conducted on 527 parents in public and private facilities in Guatemala City from November 2017–August 2018. Vaccine delay (outcome) was defined as any delay beyond 30 days from the due date for any of the scheduled vaccines. Multivariable regression analysis was conducted to determine the association between healthcare facility and vaccine delay, adjusted for confounding variables. Parental education was assessed for effect modification.

Results: Parents seeking care at private facilities were 1.14 (95%CI:1.01,1.28, p = 0.03) times more likely to delay a vaccine compared to those seeking care at public facilities, adjusted for religion. College-educated parents, who sought care at private facilities were 1.5 (95%CI:1.1,1.9, p = 0.009) times more likely to delay vaccines compared to parents seeking care at public facilities. Non-college educated parents, who sought care at private facilities were 0.9 (95%CI:0.8,1.1, p = 0.389) times less likely to delay vaccines compared to parents seeking care at public facilities.

Conclusion: This study shows that college-educate parents seeking care at private facilities are more likely to delay vaccines. A facility focused educational campaign targeting this group of parents could potentially improve the knowledge gap and vaccination timeliness in the future.
Adapting and Pilot Testing a Vaccine Hesitancy Questionnaire in Rural Guatemala

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Background: Vaccine hesitancy is a global public health threat. Prior attempts to measure vaccine hesitancy in Guatemala have been unsuccessful. The purpose of this study was to adapt and pilot test a modified Spanish-language vaccine hesitancy questionnaire. A secondary aim was to explore associations between parental scores and children’s under-immunization status.

Methods: Three researchers reviewed and simplified a Spanish-language version of the Parent Attitudes about Childhood Vaccines (PACV) long and short forms. We piloted the instrument with ten local Guatemalan nurses, implementing feedback. The questionnaire was administered to a convenience sample of 150 community members. Parents with children under five also provided immunization cards. We calculated PACV scores and analyzed associations between parental scores and missed or delayed vaccine doses at 19 months.

Results: Overall, 139 children had available immunization cards and 87 were at least 19 months old. Of those, the mean number of missed or delayed vaccine doses was 3.8 out of a possible 10. Bivariate analyses found a correlation between the PACV short form and immunization status. Those with a PACV score of four or greater on a 0-10 scale were more likely to have children with missed or delayed doses, even after adjusting for covariates (OR = 2.5, 95% CI 1.18, 5.38).

Conclusion: The short form of the Spanish PACV predicted higher rates of missed and delayed vaccine doses. This work suggests vaccine hesitancy may contribute to under-immunization in rural Guatemala. Future work will verify these preliminary findings on a larger scale and in additional settings.
Connecting Patients to Providers: Analyzing Telemedicine for Colorado Medicaid

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Background: Telemedicine is a reimbursable mechanism for delivering health care services to Medicaid members. The purpose of this study was threefold: to analyze telemedicine utilization for Colorado Medicaid members, identify benefits and barriers for providing specialty care via telemedicine, and provide recommendations for future telemedicine expansion.

Methods: Twenty-two articles were reviewed to identify target populations and specialties using telemedicine, benefits of telemedicine, and barriers for providers delivering telemedicine. In addition, 2094 Colorado Medicaid physical health claims records from 2018-2019 were analyzed to determine a baseline for telemedicine utilization.

Results: Rural and urban areas along with members with limited mobility and accessibility benefit most from telemedicine. The top three specialties of note were neurology, pulmonology, and cardiology. Benefits for members using telemedicine include improved care management, convenience, and empowerment. Benefits for providers delivering telemedicine include cost effectiveness, flexibility, and increased patient satisfaction. Barriers for providers include quality of care standards, costly equipment, and liability. Analysis of Colorado Medicaid claim records showed the most utilized specialties for telemedicine in Colorado to be neurology, endocrinology, and speech therapy. Colorado Medicaid telemedicine services are used most by women under the age of 21 living in urban areas.

Conclusion: Recommendations to encourage future telemedicine growth in Colorado Medicaid include increasing provider and member education on benefits of telemedicine. Additional recommendations include policy updates to incentivize providers and cross-sector collaboration on internet access expansion.
Food RX: Evaluating the Food Clinic program at the Children’s Health Pavilion

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Preceptor: Katherine O’Connor MPH
Site: Children’s Hospital Colorado

Background: Nearly 1 in 11 Coloradoans struggle with hunger and 1 in 7 Colorado kids may not know where to get their next meal. The Food Clinic will tackle food insecurity in our community. The purpose of this project was to develop an evaluation tool to assess the impact of Healthy Roots Food Clinic on food-insecure families utilizing Children’s Hospital Colorado.

Methods: I conducted a literature review of food insecurity programs and their evaluations. I also administered a survey to stakeholders on what issues the evaluation should focus on. The design of the evaluation tool kit incorporated the themes that I discovered in the survey and literature review.

Results: Based on the literature review and stakeholder survey I narrowed the focus of the evaluation tool kit to the programs’ sustainability, financial changes and the health impact of the program. Through literature review, I determined a list of guiding questions that helped me the design of the evaluation. I added questions to the intake form which is available in paper format and electronically through a REDCap survey.

Conclusions: This program has the potential for a significant public health impact in the community with a solution to food insecurity. The evaluation tool kit will be able to provide short term and long-term information on program sustainability, financial changes and health impact. In the future, this program and others like it will become a priority for stakeholders and public health professionals.
Fatty Acid Metabolism Gene Variants Are Associated with Autoantibody Positivity in At-Risk Relatives of Rheumatoid Arthritis But Not At-Risk Relatives of Systemic Lupus Erythematosus

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Site: Colorado School of Public Health

Background: Rheumatoid Arthritis (RA) and Systemic Lupus Erythematosus (SLE) are chronic diseases that affect the musculoskeletal system. Omega-3 fatty acid levels are associated with measures of RA and SLE autoimmunity, including autoantibodies seen early in these conditions. The purpose of this study was to determine if variants in fatty acid metabolism genes (FAMG) were associated with RA and SLE autoantibody positivity in first degree relatives (FDR) of clinically diagnosed RA and SLE patients in the United States.

Methods: 192 autoantibody positive (aAb+) and 184 autoantibody negative (aAb-) RA FDRs, and 145 aAb+ and 159 aAb- SLE FDRs were included in this case-control study. Multiple logistic regression adjusting for sex and age was used to test the odds of being aAb+ and the presence of minor allele differences in variants in four FAMG (FADS1, FADS2, EVOVL2, EVOVL5). Adjusted Odds ratios (AOR) and 95% confidence intervals (CI) are reported.

Results: Variant rs174605 in FADS2 (AOR 0.15, 95% CI 0.02 – 0.61) and variant rs2281591 in EVOVL2 (AOR, 5.14, 95% CI 1.25-34.90) were significantly associated with decreased and increased odds, respectively, of being aAb+ in RA FDRs for those with 2 minor alleles differences compared to those with 0 minor alleles differences. No significant associations with being aAb+ in FADS1 and EVOVL5 variants were found in RA FDRs, and no significant associations in FADS1 and FADS2 variants were found in SLE FDRs.

Conclusion: Variants in FADS2 and EVOVL2 may affect preclinical autoimmunity in RA, but not SLE, FDRs at increased risk of disease.
The Link Between Marijuana Use and Opioid Rescue Analgesia after Injury: is Longitudinal Modeling Superior?

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Site: Hospital Corporation of America

Background: Marijuana use may increase the need for opioid rescue analgesia for pain management after injury. Limitations in research include small sample size, nonhomogeneous injury type, and lack of longitudinal models that may better explain the temporal complexities of this relationship. This analysis will determine if differences exist in opioid rescue analgesia required for marijuana users and non-users after injury and compare longitudinal and cross-sectional models for model fit and detected differences.

Methods: We performed a retrospective analysis of electronic medical record data from hospitals in 18 states between January 1, 2007 to January 1, 2017. Of 4813 adults hospitalized for one or more rib fractures in this sample, 326 used marijuana and 4430 received opioid rescue analgesia during days 1-14 of hospitalization. Models included cross-sectional linear regressions and longitudinal mixed models, each tested with and without covariates, to detect differences by marijuana status in opioid analgesia, and how these observed differences and model fit varied between models.

Results: All models estimated higher mean opioid analgesia for marijuana users. We detected the largest mean difference using a longitudinal mixed model with no adjustment for covariates (difference=1.30, p < .01). Linear regression adjusting for covariates showed best model fit evidenced by Adjusted R-Squared and AIC, but cross-sectional and longitudinal modeling yielded statistically non-significant results after adjusting for covariates.

Conclusions: Higher estimated mean opioid analgesia for marijuana users was consistently detected, but further research is needed regarding best modeling techniques because of mixed results of model fit and effect of covariates.
Creating Inclusive Educational Materials For Standardized Clinical Education

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Preceptor: Sarah Winbourn, MD
Site: Kids First Health Care

**Background:** Students and their families rely on school-based health centers and community clinics to meet their needs for a full range of age-appropriate health care, including reproductive and sexual health services. Sexual and reproductive health is an important aspect of normal adolescent growth and development. For adolescents who do not identify with their sex assigned at birth, the provision of gender inclusive sexual and reproductive health resources is not a widespread practice for most health care clinics.

**Methods:** In partnership with Kids First Health Care (KFHC), a nonprofit pediatric organization, a self-assessment survey was distributed to all ten KFHC clinics. The survey results helped identify the gap in inclusive educational materials used for reproductive and sexual health visits. Clinic materials and consent forms previously used during reproductive visits were changed to use inclusive language. Sexual health curricula were reviewed for the creation of new inclusive educational materials.

**Results:** The deliverables from this project include a series of materials provided organization wide that use inclusive language and imaging that is comfortable for all adolescents to use. These materials are intended to teach adolescents about sexual health and reproductive practices that expand on preventative behaviors.

**Conclusions:** Gender Queer/Non-Binary individuals face higher rates of harassment and discrimination in healthcare settings compared to cisgender individuals, resulting in approximately 28% postponing medical care. Therefore, providing non-heterosexual/non-binary reproductive and sexual health educational materials for use in community clinics and school-based health centers can create a more inclusive atmosphere for adolescents.
Understanding the Health and Safety Aspects for Older Adults in Outdoor Spaces

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Site: Open Arms Assisted Living Facility

Background: Colorado’s older adult population is projected to increase by 80 percent within the next 15 years. To reduce barriers, this project promotes design and use of outdoor space to ensure health and safety for older adults. The objective of this study was to identify health features that either promote or restrict physical and mental abilities for older adults in outdoor spaces for assisted living facilities.

Methods: We administered 20 in-person questionnaires with residents in multiple types of Senior Living facilities. The domains assessed comfort, safety, and activities related to the outdoors. Response options were multiple choice, Likert Scale, open-ended, and choose all that apply. The data technique used to evaluate qualitative was inductive thematic analysis and for quantitative data was descriptive analysis.

Results: We determined that older adults will use their outdoor space, if they feel safe and are comfortable (e.g. there are handrails to prevent falls or an alert system that can be activated in case of an accident). Primary benefits to being outside were fresh air, sunshine, and vitamin D. Important features for the outdoor space are benches, handrails, and plenty of shade.

Conclusions: Older adults are more likely to use the outdoor space more if it looks and feels safe, which will then entice them to use it more frequently. An outdoor space that promotes comfort and safety, will engage, entice and sooth those who use it. These results are useful to ensure health and safety when planning and designing outdoor spaces for assisted living facilities.
Interpersonal Violence Prevention Curriculum for Individuals with Severe Intellectual/Developmental Disabilities

Abbey Tiell
Preceptor: Jessica Shouse
Site: The Arc of Larimer County

Background: According to the U.S. Department of Justice, from 2011-2015, the rate of violent victimization against persons with disabilities was at least 2.5 times higher than for those without disabilities [1]. Persons with Intellectual/Developmental Disabilities (I/DD) had the highest rate of total violent crime, serious violent crime and simple assault among the disability types measured [1]. Individuals with I/DD are rarely given the education and skills necessary to prevent this type of violence and/or seek help if they are a victim [2]. No interpersonal violence curriculum currently exists for individuals with severe I/DD.

Methods: An interpersonal violence prevention curriculum was created for individuals with severe I/DD by first conducting a comprehensive literature review and then working with professionals in the field of special education.

Results: The final product is a curriculum composed of six lesson plans. Each lesson plan uses visual aids, GIFs, and signs to engage students with severe I/DD and/or those who are nonverbal. Use of these teaching methodologies provides education on the specified topics without the need for reading, writing, or verbal discussion.

Conclusions: Individuals with I/DD are disproportionately affected by interpersonal violence and are often either excluded from or not given proper accommodations for current violence prevention education. This curriculum will fill this gap and give all students access to interpersonal violence prevention with the adaptations necessary for students with severe I/DD. Future recommendations include educating special education teachers and parents of children with I/DD to provide continuous education on this topic for individuals with severe I/DD.
Recommendations for a TelePrEP Program in Rural Colorado

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Site: UCHealth

Background: HIV pre-exposure prophylaxis (PrEP) has been shown to reduce HIV incidence in at-risk populations. Geographic location can hinder access to PrEP due to resource limitations. The purpose of this analysis is to assess the needs in rural Colorado for providing PrEP via videotelephony and to develop recommendations that increase awareness of TelePrEP so that participation by individuals who are at high-risk of acquiring HIV is maximized.

Methods: A literature search and direct contact of study personnel were used to assess outreach methods of other TelePrEP programs throughout the country. Incidence and prevalence data from AidsVu were used to provide an assessment of geographical needs. Possible referral sites were found with a search engine. A literature search was used to identify inclusive patient communication and potential provider education tools.

Results: Four TelePrEP programs were analyzed for recruitment strategies and found that internet applications, public health programs, primary care doctors (PCPs), and word-of-mouth provided the most frequent referrals. The four rural counties with the highest prevalence rates were Crowley, Fremont, Summit, and Pitkin with rates per 100,000 of 358, 284, 183, and 156, respectively. PCPs, pharmacies, public health facilities, dental offices, and emergency departments were identified in each county and listed as possible referral sites. Common provider educational tools included webinars and in-person trainings. Effective patient educational tools were ones that were destigmatized and removed language barriers.

Conclusions: Using the available data and existing TelePrEP programs as guidance, recommendations for a targeted TelePrEP program in rural Colorado were made.
Analysis of Risk Factors of Chlamydia (*Chlamydia trachomatis*) Infection in Wyoming

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Site: Wyoming Depart of Health

**Background:** Chlamydia (*Chlamydia trachomatis*) is the most common sexually transmitted disease in the United States. This disease is on the rise in Wyoming, with a 350% increase in cases between 2009 and 2018. The purpose of this study is to identify chlamydia risk factors among Wyoming residents.

**Methods:** In this Case – Control study of 41,500 Wyoming residents tested for Chlamydia between 2014 and 2018, we compared four Chlamydia risk factors, age (< 20, ≥20), gender (male, female) geographic location (eastern or western Wyoming), and the facility where the sample was collected (public health nursing, other facilities). The facility where the samples were taken was used as a proxy for SES. After censoring patients due to no age data, no gender information, no reported county information, and no test result information due to broken samples, we were left with 37,071 people in our study population. We identified 3209 cases as a positive Chlamydia test and 33862 controls as a negative test. We used multivariate logistic regression to analyze the results of the study.

**Results:** Cases were more likely to be less than 20 years old (OR: 0.57; 95% CI 0.53, 0.62), more likely to be male (OR: 1.27; 95% CI 1.18, 1.38), and more likely to have been tested in a public health nursing facility (OR: 1.16; 95% CI 1.08, 1.25). Geographic location was not found to have a significant association with Chlamydia infections in Wyoming.

**Conclusion:** Male gender, age less than 20 years, and lower SES, were all identified as Chlamydia risk factors in Wyoming. Individuals with these risk factors should be targeted for intervention using sexual education programs.
Aging in Place in Rural Larimer County: 
A PhotoVoice Study

Karena Wall, MPHc  
Preceptor: Jim Becker, MNM  
Site: Partnership for Age Friendly Communities (PAFC)

**Background:** Aging in place is defined as an older adult’s ability to remain in their community and residence of choice for as long as possible [1]. Despite Colorado’s recent legislation to become an age-friendly state, more research is needed to determine aging in place factors for rural residents.

**Methods:** A PhotoVoice design was used to assess negative and positive determinants influencing the ability to age in place for older adults in rural Larimer County. Red Feather Lakes residents (n=10) ages 60 and older were asked to take 6 photographs and develop accompanying narratives to answer the following questions: (1) What are three things that help you age in your community? and (2) What are three things that might prevent you from aging in your community?

**Results:** A total of 51 narratives with 27 ‘positive’ photos and 28 ‘challenge’ photos were submitted and analyzed using a free coding method in NVivo. Seven ‘positive’ themes emerged including: community and social support, connection, open spaces and exercise, environment, safety, resilience and emergency services. Eight ‘challenge’ themes emerged including: transportation and driving distance, natural disasters, health issues, weather conditions, lack of services, separation from family, property maintenance and reliance on firewood. Findings were disseminated to the community through a group meeting, formal presentation, and an art display.

**Conclusions:** Utilizing this method allowed community members to identify aging in place factors relevant to their rural mountainous lifestyle and promoted community inspired change. Any subsequent interventions will be meaningful and lead to sustainable solutions.
BMI, Pain Levels, and Quality of Life Indices in Patients with Autosomal Dominant Polycystic Kidney Disease

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Site: CU Renal Division

Background: Body mass index (BMI) has been associated with an increased rate of disease progression in individuals with autosomal dominant polycystic kidney disease (ADPKD). Patients with ADPKD commonly report increased levels of abdominal, back and radiating-nerve pain. We examined the association between increased BMI and levels of pain experienced in ADPKD patients.

Methods: We performed a cross-sectional study on Halt PKD study participants from 2006-2014. We used self-reported pain levels from a questionnaire given to study participants at the beginning of Halt A & B studies. Multivariable logistic regression was used to calculate odds of experiencing pain by those who are classified as normal weight (19-24.9), overweight (25-30) or obese (>30).

Results: Of the 967 subjects, 360(37.23%) were overweight and 279(28.85%) were obese. Gender, exercise frequency, employment status, average glomerular filtration rate, marital status and highest level of education were significantly associated with increased BMI (p<0.05). Having a BMI between 25-30 was not associated with increased levels of back, abdominal or radiating back/nerve pain. A BMI >30 was associated with increased levels of back pain (OR=1.90, 95% CI 1.24-2.91) and also increased levels of radiating back/nerve pain (OR 1.75, 95% CI 1.21-2.54).

Conclusions: The increased level of back and radicular pain experienced by ADPKD patients with a BMI >30 illustrates the need for education and intervention at an early stage of disease. This allows for increase quality of life and decrease reliance on pain medications. This study will help tailor education, clinical recommendations, and treatment for these patients.