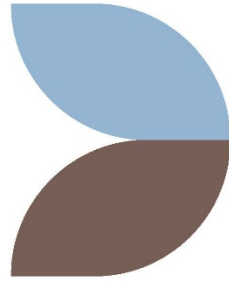


# Midwest Public Health Innovation and Research Expo

November 3, 2023  
College of Public Health  
University of Nebraska Medical Center



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## I. MORNING SESSIONS

### Theme: Messages and Messengers

#### Session 1—Forging Collaboration Across Disciplines

Chair: Eleanor Rogan, PhD

○ 9:00 – 9:10 AM

#### **Ali Khan, MD, MPH, MBA**

Dean and Professor, College of Public Health  
University of Nebraska Medical Center (UNMC)

*Welcome*

○ 9:10 – 9:20 AM

#### **Derek McLean, PhD**

Dean and Professor, Institute of Agriculture and Natural Resources (IANR)  
University of Nebraska-Lincoln

*Welcome and Introduction to UNL Institute of Agriculture and Natural Resources*

○ 9:20-10:15 AM

#### **Elizabeth VanWormer, PhD**

Associate Professor School of Veterinary Medicine & Biomedical Sciences,  
Director of One Health, IANR  
University of Nebraska-Lincoln

*Interface of humans, animals, and the environment*

**Amy T. Desaulniers, PhD**

Assistant Professor of Reproductive Physiology, School of Veterinary Medicine & Biomedical Sciences, IANR

University of Nebraska-Lincoln

*Physiological effects of atrazine on swine: implications for agriculture and human health*

**Christopher Gustafson, PhD**

Associate Professor of Behavioral Economics & Health Disparities, Agricultural Economics, IANR

University of Nebraska-Lincoln

*Using choice process variables to understand consumer food choice behavior in complex environments*

**Roma Subramanian, PhD**

Associate Professor of Communication, College of Communication, Fine Arts and Media

University of Nebraska at Omaha

*Substance abuse in rural Nebraska*





## Session 2—Public Health Equity and Disparities in Healthcare

Chairs: Edward Peters, DMD, SM, ScD, FACE, and Stacey Coleman, MPA

○ 10:30-10:55 AM

**Robin Lally, PhD, MS, BA, RN, AOCN, FAAN**, Director of the Center for Patient, Family, & Community Engagement in Chronic Care Management and Bertha L. Pankratz Professor of Nursing, College of Nursing  
UNMC

*What are we doing about cancer-health disparities and inequities? Review of two local implementation studies*

○ 10:55-11:15 AM

**Athena Ramos, PhD**

Associate Profession, Health Promotion, College of Public Health  
UNMC

*Cattle Feedyard Worker Health Study*

○ 11:15-11:45 AM

**Qingzhao Yu, PhD**

Interim Associate Dean for Research, School of Public Health  
Louisiana State University Health Sciences Center at New Orleans

*Inference on Moderation Effect with Mediation Analysis--Application to Explore the Trend of Racial Disparity in Oncotype DX Test for Breast Cancer Treatment*

○ 11:45 AM-12 noon

Panel Discussion

Introductory comments from Stacey Coleman; panelists were Drs. Lally, Ramos, and Yu





## II. AFTERNOON SESSIONS

### Theme: Public Health Problems and Solutions

#### Session 3—Poster Presentations

Chair: Dana Verhoeven, PhD

○ POSTERS PRESENTED FROM 12:00-1:00 PM

#### Grace Mabilia-Maye

Department of Health Services Research & Administration (HSRA)

College of Public Health, UNMC

Co-authors: Abbie Raikes, Marcus Waldman, Katelyn Hepworth

*Food Insecurity and Child Development in Nebraska: The Role of Income, Home Learning Environment, and Family Socio-Demographic Factors*

#### Maria Mickles

Department of HSRA

College of Public Health, UNMC

Co-author: Dana Verhoeven

*Examination of the National Cancer Institute's Comprehensive Cancer Centers' Survivorship Program Websites*

#### Aatiya Ahmad

Department of HSRA

College of Public Health, UNMC

Co-author: Dana Verhoeven

*Examining conflicts between multidisciplinary teams in cancer care*

#### Todd Wyatt

Department of Environmental, Agricultural and Organizational Health (EAOH)

College of Public Health, UNMC

Co-authors: K. L. Bailey, D. R. Samuelson, and D. L. Knoell

*Triple-hit model of alcohol, zinc deficiency, and cigarette smoke exposure impairs lung inflammatory and immune responses*

#### Runqiu Wang

Department of Biostatistics (BIO)

College of Public Health, UNMC

Co-authors: Ran Dai, Hongying (Daisy) Dai, Cheng Zheng

*Controlling FDR in selecting group-level simultaneous signals from multiple data sources with application to the National Covid Collaborative Cohort data*

**Kyei Baffour Afari**

Department of BIO

College of Public Health, UNMC

Co-author: Dr. Christiana Lewis Nicole

*Performance Comparison of Imputation Methods for Mixed Data Missing at Random with Small and Large Sample Data Set with Different Variability*

**Juliana Monono**

Department of Epidemiology

College of Public Health, UNMC

Co-author: Dr. Joseph Fauver

*Understanding Perceptions of Tick-Borne Disease (TBD) Risk and Prevention in Agricultural Operators and Their Healthcare Providers in the Plains States*

**Hanh Pham**

Department of BIO

College of Public Health, UNMC

Co-authors: Hongying Daisy Dai PhD, Pham Hanh BS, Nick Guenzel PhD, Mathuri Morgan BS, Ellen Kerns PhD, Jonathan P. Winickoff MD, MPH

*Adoption of Vaping Cessation Methods by U.S. Adolescent E-cigarette Users*

**Apu Chandra Das**

Department of BIO

College of Public Health, UNMC

Co-authors: Dr. Lynette Smith, Dr. Ran Dai, Dr. Anna Lokshin

*Stability Selection Ensemble Learning Framework for Identifying Biomarkers for Early Cancer Detection*

**Jiani Zhang**

Department of BIO

College of Public Health, UNMC

Co-author: Su Chen

*Effects of parity and other reproductive factors on breast cancer risk and age at diagnosis*

**Amber Brown Keebler, MD**

Assistant Professor, Division of General Internal Medicine, College of Medicine

UNMC



Co-authors: Kaleb Michaud, PhD and Sofia Pedro, MS  
*Financial toxicity among patients with rheumatoid arthritis and non-inflammatory rheumatic conditions*

**Vaibhavi Mone**

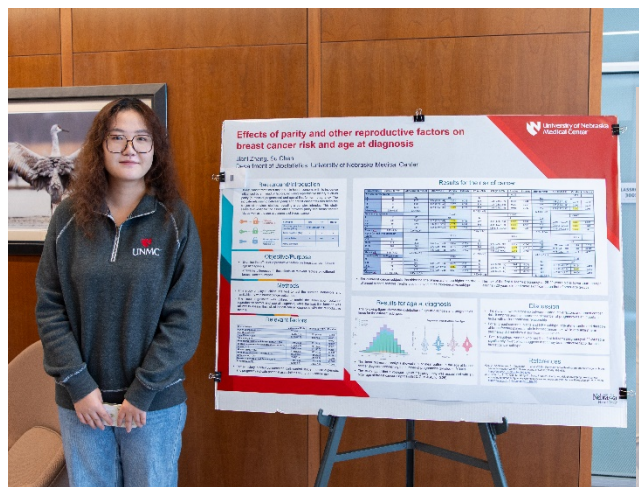
Department of HSRA  
College of Public Health, UNMC  
Co-authors: Jungyoon Kim, Hongmei Wang, Paul Estabrooks, and Jane Potter  
*Sociodemographic Variability in Telehealth Utilization Among Older Adults During The Covid-19 Pandemic*

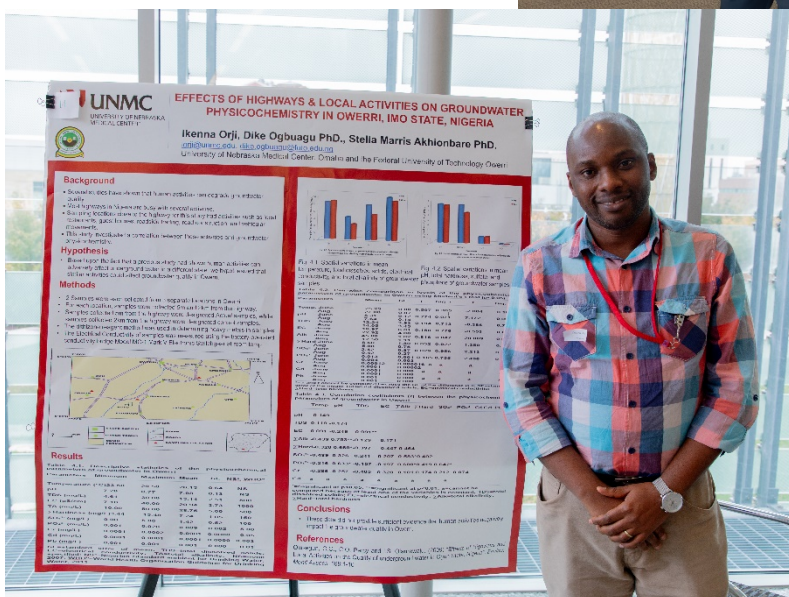
**Cleo Zagurski**

Creighton University  
Co-authors: Tzeyu Michaud PhD, George Johnson MSPH, Kathryn E. Wilson, PhD, Gwenndolyn C. Porter, PhD, Paul A. Estabrooks PhD  
*Reach and weight loss of comparison group participants that engaged in the active intervention following a diabetes prevention trial*

**Ikenna Orji**

Department of EAOH  
College of Public Health, UNMC  
Co-authors: Dr. Dike Ogbuagu, Dr. S.M.O. Akhionbare  
*Effects of Highways and Local Activities on the Physicochemistry of Groundwater in Owerri, Imo State, Nigeria*





## Session 4—Special Topic Breakout Rooms

### ○ BREAKOUT ROOMS FROM 12:00-1:00 PM

#### Room #1: Promoting Public Health Communication through Team Science and Innovation

Chairs:

**Jesse Bell, PhD**

Associate Professor of Environmental, Agricultural and Occupational Health

College of Public Health, UNMC

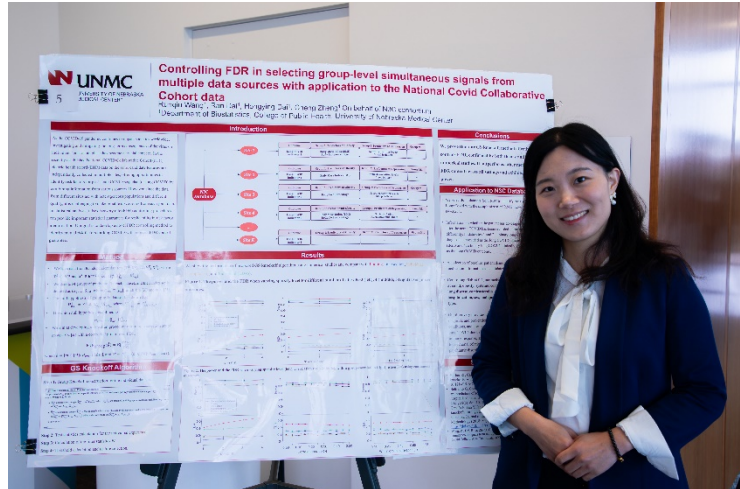
**Derek McLean, PhD**

Professor and Dean, Institute of Agriculture and Natural Resources, UNL

## Room #2: Global Health and Student Engagement

Chair:

- **Danielle Thies, MPH, MA**  
Program Manager, Center for Global Health and Development,  
College of Public Health, UNMC



## Session 5—Research Innovation

Chair: Ronnie Horner, PhD

○ 1:00-1:20 PM

### **Cheryl Beseler, PhD**

Associate Professor of Environmental, Agricultural and Occupational Health

College of Public Health, UNMC

*Trajectories in exposure to discrimination among US adults during the COVID-19 pandemic*

○ 1:20-1:40 PM

### **Jungyoon Kim, PhD**

Assistant Professor of Health Services Research & Administration

College of Public Health, UNMC

*BEAT Cancer: A Cross-Sectoral Partnership to Improve Cancer Prevention among African Americans*

○ 1:40-2:00 PM

### **Todd Wyatt, PhD**

Professor of Internal Medicine, Division of Pulmonary, Critical Care, Sleep & Allergy, College of Medicine, and EAOH, College of Public Health, UNMC

*Triple-hit model of alcohol, zinc deficiency, and cigarette smoke exposure impairs lung inflammatory and immune responses*



## Session 6—Student Research and Awards Ceremony

Chair: Daisy Dai, PhD

- 2:00-2:20 PM

*Chambers Fellowship*

**Taylor Clarkson, MPH student of Epidemiology**

College of Public Health, UNMC

Faculty advisor: Joseph Fauver, PhD

- 2:20-2:25 PM

*NIH F31 Applicants*

**Louis Fok, PhD student of Epidemiology**

Faculty advisor: Abraham Mengist, PhD

- 2:25-2:35 PM

*Student Research Conference Awardees*

**Rishad Ahmed, PhD student of Health Promotion**

Faculty advisor: Athena Ramos, PhD

**Emma Hymel, PhD student of Epidemiology**

Faculty advisor: Shinobu Watanabe-Galloway, PhD

**Josiane Kabayundo, PhD student of Epidemiology**

Faculty advisor: Shinobu Watanabe-Galloway, PhD

**Rashmi Lamsal, PhD student of Health Services Research & Administration**

Faculty advisor: David Palm, PhD

**Emiliane Lemos Pereira, PhD student of Health Promotion**

Faculty advisor: Tzeyu Michaud, PhD

**Vaibhavi Mone, PhD student of Health Services Research & Administration**

Faculty advisor: Jungyoon Kim, PhD

**Natalia Santos, PhD student of Health Promotion**

Faculty advisor: Fabiana Silva, PhD

**Harlan Sayles, PhD student of Biostatistics**

Faculty advisors: Lynette Smith, PhD, and Chris Wichman, PhD

**Sarah Tucker, PhD student of Environmental, Agricultural and Occupational Health**

Faculty advisor: Aaron Yoder, PhD

**Xiaoqing Wang, MPH student of Biostatistics**

Faculty advisor: Ran Dai, PhD

### III. AWARD

## College of Public Health Research Recognition Award

### ***Alumni Research Award***

Kavita Mosalpuria, PhD

Assistant Professor of Public Health in Brody School of Medicine

East Carolina University, NC

Dr. Mosalpuria received her PhD in Health Services Research, Administration and Policy in August 2021



## IV. POSTER ABSTRACTS

**Aatiya Ahmad**

**Department of Health Services Research & Administration**

**College of Public Health, UNMC**

**Co-author: Dana Verhoeven**

***Examining conflicts between multidisciplinary teams in cancer care***

### Background and objective

Cancer is an intricate and complex disease that requires multiple specialist teams to work closely together to delivery care. A multidisciplinary team (MDT) promotes more precise and comprehensive care to cancer patients, which is why it has grown in popularity in the last decade. MDTs work as a team-of-teams, or multiteam systems, which can create challenges both within and between teams for care coordination due to specialization differentiation and goal discordance. This paper proposes a theoretical framework for understanding how goal alignment impacts cancer care delivery and care coordination both within and between care teams. The objective of this research is to develop a framework for goal alignment within MDTs by 1. Defining goal conflicts that commonly arise between teams, 2. Why they occur, and 3. Discuss ways to minimize or resolve them.

### Methods

We conducted a review of prominent frameworks and seminal papers relating to goal discordance, goal concordant care, and goal conflict for MDTs in cancer care. We identified common themes and examined how these conflicts impacted patient outcomes.

### Results

We found four main drivers of goal discordance between teams, including communication failures, lack of shared mental models, lack of understanding of patient preferences, and interoperability of the electronic health record. We organized our results under an organizational theory framework. The poster will define each of these drivers, provide a case study example, and proposed solution.

### Application to the field/research

As the prevalence of cancer continues to rise, there is an increased demand for well-coordinated cancer care delivery across MDTs. To address this need, we developed a framework that identifies common barriers related to goal alignment across care teams. Our research can shed light on common causes of conflict between teams using organizational theory and ways that teams can reduce discordance while promoting positive patient outcomes.



**Kyei Baffour Afari**

**Department of Biostatistics**

**College of Public Health, UNMC**

**Co-author: Dr. Christiana Lewis Nicole**

***Performance Comparison of Imputation Methods for Mixed Data Missing at Random with Small and Large Sample Data Set with Different Variability***

### Background and objective

Missing data is considered as an unstored data value for a variable in observation of interest. As complete data sets are needed to help firms and institutions to produce more accurate and precise results, the presence of missing data rather leads to inaccurate results, bias in parameter estimation and reduction in statistical power.

Missing data invariably give rise to reduced sample size and thus, leads to a less precise confidence interval and reduced power in the tests of significance. All these pitfalls lead to incorrect conclusions and invalid recommendations. The study assesses the best multiple imputations by chain equation (MICE) procedure for handling missing data for large and small mixed data sets with different variability and with different percentage levels of missingness.

### Methods

Data containing both quantitative and categorical variable (mixed data) that has missing values can be imputed using several different methods. The methods focused in this paper includes classification and regression trees, predictive mean matching, and random forest using several different methods. The methods focused in this paper includes classification and regression trees, predictive mean matching, and random forest. For each of the 6 complete data sets of sample sizes 30 and 500 and variabilities of small, regular, and large, the first level of missingness was achieved by removing 10% of the observations from the predictor variables using the R function prodNA. The next 20% level of missingness was achieved by removing 10% level of missingness from the initial 10% removed. The next 30% level of missingness was also achieved by removing 10% level of missingness from the previous 20% and this continued in that sequence till 50% level of missing

was attained. This produced a total of 30 missing datasets. Each of the three imputation methods for mixed dataset namely, the predictive mean matching (PMM), classification and regression tree (CART) and the random forest (RF) imputation methods were applied on the 30 missing datasets. For each imputation method,  $n = 50$  imputed data sets were created. We then fit a regression model for each of the 50 imputed datasets. The regression coefficient estimates ( $\beta^0$  to  $\beta^4$ ) from the 50 imputed data sets were then pooled together and stored. This is repeated for 1000 iterations and the average of each of the 1000 regression coefficients for each variable were computed and compared to the coefficients of the complete data set.

### Results

A performance analysis on the 30 mixed datasets based on the PDI's of the three different imputation methods showed that the CART method was the best imputation method for dataset with sample size of 30 with small, regular and large variabilities as well as datasets with sample size of 500 with large variability. On the other hand, the RF method was the best imputation method for datasets with sample size of 500 with small and regular variabilities.

### Application to the field/research

The PMM method is considered as the default imputation method in the R package for all types of dataset irrespective of sample size and variabilities. However, this study helps to assign specific imputation methods to handle missing data in specific mixed datasets based on the sample size and variability serving as a key for data analyst in the health sciences.

**Amber Brown Keebler, MD**

**Assistant Professor, Division of General Internal Medicine**

**College of Medicine, UNMC**

**Co-authors: Kaleb Michaud, PhD and Sofia Pedro, MS**

***Financial toxicity among patients with rheumatoid arthritis and non-inflammatory rheumatic conditions***

### Background and objective

Often not evaluated in clinical visits, financial distress associated with medical costs, known as financial toxicity, has emerged as an important factor affecting patient health due to reduced medication adherence, stress, and negatively impacted relationships. Originally utilized in oncology, the FACIT-COST questionnaire provides a quantitative measure of financial toxicity validated in chronic diseases such as diabetes and cardiovascular disease. Financial toxicity has never been described in rheumatology, and we aimed to quantify financial toxicity and identify associated factors in participants with rheumatoid arthritis (RA) versus non-inflammatory rheumatic disease (NIRD).

### Methods

Adult participants were enrolled in FORWARD, The National Databank for Rheumatic Diseases, had RA or NIRD, and completed the FACIT-COST in 2023. Comprehensive health and sociodemographic information were collected. The FACIT-COST score was analyzed as a continuous variable (higher score indicates less financial toxicity) and as a binary variable with a cutoff: no toxicity ( $\geq 26$ ) vs any ( $< 26$ ). LASSO was applied to linear regression and logistic regression to select the best multivariable models evaluating association between financial toxicity and other covariables.

### Results

There were 1918 participants with RA and 1241 with NIRD. RA patients had a mean (SD) of 32.6 (9.3) vs 33.6 (8.6) for NIRD and 28.3% of RA participants had any financial toxicity vs 17.7% of NIRD participants. Irrespective of disease group, characteristics associated with any financial toxicity included age, sex, household income, education, being retired, Medicaid insurance, and comorbidities. Significant associations were observed between financial toxicity and comorbidities, specifically cancer, diabetes, and depression.

Patient global assessment score was associated with worse financial toxicity. For RA only, no DMARD use was associated with financial toxicity. Prednisone use was associated with financial toxicity in all models and diseases.

#### Application to the field/research

This first analysis of financial toxicity in rheumatology surprisingly showed no association with use of expensive DMARD therapies, which may highlight the large number of effective therapies available and patients' unlikely use and prescription of treatments that they cannot afford. The strongest association was with current depression status; future studies should examine the causal directionality. The financial toxicity threshold provided more statistically important differences and areas for future evaluation.

**Apu Chandra Das**  
**Department of Biostatistics**  
**College of Public Health, UNMC**  
**Co-authors: Dr. Lynette Smith, Dr. Ran Dai, Dr. Anna Lokshin**  
***Stability Selection Ensemble Learning Framework for Identifying Biomarkers for Early Cancer Detection***

Background and objective

A growing number of biological markers are being tested to identify sensitive and specific biomarkers for early cancer detection, tumor regrowth, or metastasis. The biomarkers can be obtained by simple blood tests, making them an inexpensive, noninvasive method for detecting cancer. Modern biomarker analysis often result in high-dimensional data sets with many more biomarkers than subjects ( $n \ll p$ ). However, there is no guarantee that all the signal variables will be selected by existing regularization approaches. Since ovarian cancer and endometrial cancer have poor prognoses, we aim to identify biomarkers that show excellent performance in both the discovery and validation phases of early cancer detection.

Methods

The study of biomarkers often involves a large number of measured variables (such as proteins, autoantibodies, etc.), but not all of them are predictive to the response. Model overfitting occurs when a lot of noise variables are erroneously selected, leading to poor performance upon validation. In addition, selection results may be highly sensitive to model misspecification. Stability selection methods have been used to prevent overfitting and to select true signals reliably. Ensemble learning methods have been developed to build robust methods against model misspecification. We built a novel framework consisting of a biomarker selection stage using stability selection and a prediction stage using an ensemble of machine learning (ML) methods, namely the stability selection ensemble learning (STABEL). We incorporate a collection of ML methods including LASSO, random forest (RF), and support vector machine (SVM) for cross-sectional biomarker studies. We apply the new approaches to simulated and real datasets.

## Results

We have used 869 subjects from PLCO data, including 432 having either endometrial or ovarian cancer and 437 controls. When LASSO was integrated with stability selection, Geotaxin, GCSF, SILR11, and VEGF biomarkers were selected as predictive of cancer in a multivariable model. Later, the performance was investigated through logistic regression model, RF, and SVM techniques using STABEL framework.

## Application to the field/research

Our results demonstrate the power of integrating ensemble learning with stability selection for selecting endometrial and ovarian cancer biomarkers. This technique has a broad range of applications in biomarker selection for any cancer.

**Grace Mabilia-Maye**

**Department of Health Services Research & Administration**

**College of Public Health, UNMC**

**Co-authors: Abbie Raikes, Marcus Waldman, Katelyn Hepworth**

***Food Insecurity and Child Development in Nebraska: The Role of Income, Home Learning Environment, and Family Socio-Demographic Factors***

### Background and objective

Food insecurity is a well-known risk factor for delayed child development. Still, the contribution of other factors, such as income, home learning environment (HLE), and family socio-demographic factors, remains to be determined. Therefore, the study aimed to determine the association between food insecurity and child development and assess the role of income, HLE, and family socio-demographic factors in that association.

### Methods

We used secondary data from the Nebraska Early Childhood Study, a cross-sectional study of caregivers of children under five years old in Omaha and Lincoln. Child development, food insecurity, and HLE were measured using a caregiver report of child development. We used multiple regression to analyze the data.

### Results

The results showed that food insecurity was negatively related to developmental outcomes (Est = -0.217, SE = 0.091, ES = -0.109,  $p = .018$ ) even after adjusting for Income (Est = -0.222, SE = 0.092, ES = -0.112,  $p = .048$ ). HLE was positively associated with children's developmental outcomes after controlling for income, child's age, sex, race, and ethnicity (Est = 0.376, SE = 0.092, ES = 0.198,  $p < .001$ ). HLE did not moderate the association between food insecurity and children's developmental outcomes (Est = -0.287, SE = 0.185, ES = -0.095,  $p = .121$ ). These results indicate that even if a child has access to a stimulating HLE, they may still experience developmental setbacks if they do not have enough nutritious food.

### Application to the field/research

This research reveals the impact of food insecurity on childhood development and the complex factors influencing outcomes. The study highlights needs for

research on causal links and differential impacts, expanded food security policies and programs, investments in early childhood education for at-risk families, screening and referrals for food assistance, and parent coaching on stimulating home activities. Most importantly, the findings underscore the urgent need to prioritize initiatives that address basic nutrition and learning opportunities for young children in poverty. Collaborative efforts across sectors are imperative to meet the needs of vulnerable children during this critical window. Access to nutritious food and nurturing early learning environments must be priorities to promote health and development.



**Maria Mickles**

**Department of Health Services Research & Administration**

**College of Public Health, UNMC**

**Co-author: Dana Verhoeven**

***Examination of the National Cancer Institute's Comprehensive Cancer Centers' Survivorship Program Websites***

### Background and objective

There are an estimated 16.9 million cancer survivors in the US, and that number is expected to grow to more than 22.1 million by 2030 (Miller et al., 2019, 2022). To address the increased need for cancer treatment and survivorship care, the National Cancer Institute's (NCI) established Comprehensive Cancer Center designation status to recognize cancer centers delivering quality care. However, despite the increased prevalence, little is known about the cancer survivorship programs in place to handle the growing population (Miller et al., 2022). This study reviewed and evaluated the quality of survivorship care programs offered by NCI Comprehensive Cancer Centers by systematically reviewing their public-facing websites using Nekhlyudov and colleagues (2019) framework. Results outline survivorship care quality in terms of 1. Contextual Domains of Health-Care Delivery, 2. Domains of Cancer Survivorship Care Pertaining to Cancer and its Treatment, and 3. Domains of Cancer Survivorship Pertaining to General Health Care factors.

### Methods

We conducted a review of the 55 National Cancer Institute's Comprehensive Cancer Centers' survivorship programs. Website pages of intuitions' survivorship programs, patient resources, and homepages were assessed for information using Nekhlyudov and colleagues (2019) framework for quality of cancer survivorship from February to June 2023. We included programs for adult survivors and childhood-onset cancers. Data were extracted from the websites using a standardized data extraction form based on our adapted framework for quality cancer survivorship care.

### Results

Of the 55 included cancer centers, 23.64% included a survivorship clinic. Most centers (67.27%) provided survivorship information, resources, and/or

services, but did not clearly indicate an available clinic for survivors. Survivorship care plans were described on 63.64% of the centers' websites to facilitate patient transitions to primary care following treatment.

#### Application to the field/research

Results of this study summarize the quality of cancer survivorship services offered across NCI designated comprehensive cancer centers that are included on their websites. Findings reiterated the importance of improving the quality of cancer survivorship website usability, cancer survivorship resources, and how this offers one way to leverage the expertise of multiple specialties to deliver integrated, patient-centered care for the growing population of cancer survivors with MCC.

**Vaibhavi Mone**

**Department of Health Services Research & Administration**

**College of Public Health, UNMC**

**Co-authors: Jungyoon Kim, Hongmei Wang, Paul Estabrooks, and Jane Potter**

***Sociodemographic Variability in Telehealth Utilization Among Older Adults During The Covid-19 Pandemic***

### Background and objective

There is a limited understanding of the sociodemographic factors to improve Telehealth-based preventive care use for older adults. This study explored the changes in utilization of Medicare annual wellness visits (AWV) among older patients in primary care settings before and during the COVID-19 pandemic when delivery via telehealth became an option. The study will also examine how these changes are associated with sociodemographic characteristics of patients.

### Methods

Patients were categorized into five groups based on their AWV utilization before and during pandemic (Group-1: In-person to In-person; Group-2: In-person to telehealth; Group-3: In-person to no visit; Group-4: none to in-person visit; and Group-5: none to telehealth visit). Descriptive, bivariate, and multinomial logistic regression examined de-identified medical records for the association between utilization patterns and patients' sociodemographic characteristics.

### Results

The study sample included 14,262 older (>65) patients from 14 primary care clinics who had at least one AWV from 3/1/18-2/29/2020 (two years before), and 3/1/2020-3/31/22 (two years after) start of the pandemic. Patients' age, gender, race, language, marital status, and residence rurality are significantly associated with AWV utilization. Compared to younger (65-74) patients, older (>75) patients were more likely to switch from 'in-person' (pre-pandemic) to 'telehealth' AWV during the pandemic. Females were more likely to switch from in-person to telehealth AWV rather than staying in-person (OR: 1.66, 95% CI: 1.24-2.23). However, those who did not have an AWV before COVID were less likely to visit in person during COVID. Interestingly, compared to

Non-Hispanic White, non-Hispanic Black (OR: 1.18, 95% CI: 1.03-1.35), and other race group (R: 1.37; 95% CI: 1.09-1.71) were more likely to change their utilization patterns from none to in-person AWW. Residence in rural areas made it more likely to switch from none to telehealth (OR 1.71, 95% CI: 1.14-2.56).

#### Application to the field/research

AWV utilization patterns before and during the pandemic were associated with patients' sociodemographic characteristics and previous AWW use. The study informs practitioners and policymakers on sociodemographic variability in telehealth utilization for preventive health services.

**Juliana Monono**

**Department of Epidemiology**

**College of Public Health, UNMC**

**Co-author: Dr. Joseph Fauver**

***Understanding Perceptions of Tick-Borne Disease (TBD) Risk and Prevention in Agricultural Operators and Their Healthcare Providers in the Plains States***

Background and objective

Ticks are rapidly expanding their geographical ranges across the U.S., including into new regions in the central plain's states.

Specific Aim 1- Develop and deploy a questionnaire to understand agricultural operators' perceptions of tick-borne disease risk and prevention.

Specific Aim 2- Adapt and expand an existing questionnaire aimed at understanding healthcare provider and veterinary professionals' knowledge of tick-borne diseases to additional plains states.

Methods

Three unique surveys have been designed for agricultural operators, healthcare providers, and veterinary practitioners. For agricultural operators specifically, we have designed the survey to assess i) their perception on occupational exposures to ticks and TBD, ii) their current tick bite prevention practices and willingness to take precautions to reduce tick bites, and iii) their history of exposures to tick-bites. The healthcare and veterinary workers survey was adapted from a previous survey of healthcare providers in Nebraska. For healthcare providers, we have included questions to assess i) their knowledge of symptoms of and evidence-based treatments for various TBDs and Alpha-Gal syndrome, ii) whether they have sought diagnostic testing and treatment options for TBDs, iii) whether they provide their patients with information on tick bite prevention. In the veterinary survey the questions were adapted for ticks and TBD that affect animals in the plain's states. All surveys were designed using Qualtrics and consist of questions with binary yes/no, check all that apply, and Likert scale formats. The survey design process began in January 2023 after conducting the background analysis and literature review regarding ticks and TBD in the study catchment area. The questionnaires have been reviewed extensively by our collaborators at the

UNL Bureau of Sociological Research (BOSR), Meghan Brashear (Qualtrics expert), Cheryl Beseler, and Ellen Duysen.

### Results

Data collection is ongoing. Initial surveys for healthcare providers and veterinary workers have been sent out by BOSR. We anticipate sending out agricultural operator's surveys in September.

### Application to the field/research

TBDs represent an emerging threat in the great plains' region served by CS-CASH. This study represents the first comprehensive assessment of agricultural operators, health care providers, and veterinary workers knowledge, attitudes, and perceptions of TBDs in our region.

**Ikenna Orji**

**Department of Environmental, Agricultural and Occupational Health  
College of Public Health, UNMC**

**Co-authors: Dr. Dike Ogbuagu, Dr. S.M.O. Akhionbare**

***Effects of Highways and Local Activities on the Physicochemistry of  
Groundwater in Owerri, Imo State, Nigeria***

### Background and objective

#### Background

- Several studies have shown that human activities can degrade groundwater quality.
- Most highways in Nigeria are busy with several activities.
- Sampling locations close to the highway for this study had activities such as local restaurants, guest houses, roadside trading, road construction, and vehicular movements.
- The study investigated a correlation between these activities and groundwater physicochemistry.

#### Objectives

- To determine possible temporal variations in the physicochemistry of groundwater proximal to highways in Owerri, Imo.
- To compare the levels of the physicochemical parameters with regulatory standards for drinking water.

#### Methods

##### Research Design and Sampling

- Samples were collected from 3 different locations in Owerri, Imo State.
- two samples were collected from each sampling location.
- For each sampling location, samples were collected 5m and 2km from the highway.
- Samples collected 5m from the highway were designated Actual samples, while control samples were collected 2km from the road.
- Samples were collected twice for all locations in June and August.

##### Sampling Techniques

- Samples were collected using a 1-liter plastic container for each sample.

- Sampling containers were thoroughly rinsed with sample and filled to one-quarter of the sample container.
- Temperature measurements were carried out on site.
- Samples were analyzed for several physicochemical parameters.

### Results

- At  $p < 0.05$ , pH correlated positively with PO<sub>4</sub><sup>3-</sup> ions ( $r = 0.633$ ), total alkalinity correlated with SO<sub>4</sub><sup>2-</sup> ions ( $r = 0.583$ ) and PO<sub>4</sub><sup>3-</sup> ions ( $r = 0.688$ ), and SO<sub>4</sub><sup>2-</sup> ions correlated with PO<sub>4</sub><sup>3-</sup> ions ( $r = 0.642$ ) as shown below:
  - At  $p < 0.01$ , pH correlated positively with total alkalinity ( $r = 0.753$ ), and TDS correlated with electrical conductivity ( $r = 0.991$ ).
  - At 5m from the roads, mean water temperature, TDS, EC, and total alkalinity were  $25.67 \pm 0.79$  °C,  $15.57 \pm 4.38$  mg/L,  $24.27 \pm 6.67$  µS/cm and  $30.00 \pm 7.52$  mg/L respectively. However, at 2km from the roads, their mean values were  $26.58 \pm 2.61$  °C,  $10.72 \pm 2.47$  mg/L,  $17.62 \pm 3.51$  µS/cm, and  $27.50 \pm 7.27$  mg/L, respectively, as shown below:
    - At 5m from the roads, mean pH was  $8.08 \pm 0.19$ , and total hardness was  $8.03 \pm 1.56$  mg/L, SO<sub>4</sub><sup>2-</sup> ions was  $1.42 \pm 0.82$  mg/L and PO<sub>4</sub><sup>3-</sup> ions was  $0.010 \pm 0.003$  mg/L. At 2km from the roads, their respective mean values were lower and as follows:  $7.87 \pm 0.19$ ,  $6.45 \pm 1.48$  mg/L,  $1.42 \pm 0.74$  mg/L, and  $0.007 \pm 0.002$  mg/L, respectively, as shown below:

### Application to the field/research

There is no evidence to suggest that highways, in conjunction with human activities, have adversely impacted the groundwater physicochemistry at these locations. However, frequent monitoring could be a valuable tool in improving public health outcomes in the future.



**Hanh Pham**

**Department of Biostatistics**

**College of Public Health, UNMC**

**Co-authors: Hongying Daisy Dai PhD, Pham Hanh BS, Nick Guenzel PhD,  
Mathuri Morgan BS, Ellen Kerns PhD, Jonathan P. Winickoff MD, MPH**

***Adoption of Vaping Cessation Methods by U.S. Adolescent E-cigarette Users***

### Background and objective

A large number of adolescent e-cigarette users intend to quit vaping or have past-year quit attempts. However, it remains unknown which methods they use in their vaping cessation efforts.

### Methods

We analyzed current (past 30-day) e-cigarette users who made  $\geq 1$  quit attempt in the past 12 months from the 2021 National Youth Tobacco Survey (NYTS) to examine the prevalence and associations of sociodemographic factors, vaping behaviors, and harm perception with the adoption of different vaping cessation methods.

### Results

In the 2021 NYTS, there were 1,436 (7.6%) current vapers, and 889 (67.9%) had made a past-year quit attempt. Of those, 575 (63.3%) (Weighted N=810,000) reported they did not use any resources (unassisted quitting). Peer support (14.2%), help on the Internet (6.4%), a mobile app or text messaging (5.9%), and parent support (5.8%) were the top four cessation methods. Female (vs. male) vapers were less likely to solicit parent support (AOR[95% CI]=0.3[0.1-0.7]), while Hispanic (vs. White) vapers were more likely to seek friend support (AOR[95% CI]=2.1[1.1-3.9]) and parent support (AOR[95% CI]=3.2[1.2-8.8]). Those who perceived vaping to be harmful were less likely to get friend support, but more likely to use a mobile app or text messaging program. Dual users of e-cigarettes and any other tobacco product were more likely to get help from a teacher/coach, a doctor/health care provider, and treatment from medical facilities than sole e-cigarette users.

### Application to the field/research

This study examined the adoption of different vaping cessation methods among U.S. adolescents. Most adolescent vapers reported unassisted quit attempts. For adolescents who did seek quit assistance, they used peer and parent support more often than a doctor or healthcare provider. Adoption of different vaping cessation methods was associated with demographic factors and vaping behaviors.

**Runqiu Wang**

**Department of Biostatistics**

**College of Public Health, UNMC**

**Co-authors: Ran Dai, Hongying (Daisy) Dai, Cheng Zheng**

***Controlling FDR in selecting group-level simultaneous signals from multiple data sources with application to the National Covid Collaborative Cohort data***

### Background and objective

As the COVID-19 pandemic continues to impact societies worldwide, investigating and mitigating the long-term consequences of the virus on individuals' post-acute phase has become a crucial concern. In the recently established National COVID Collaborative Cohort (N3C), electronic health record (EHR) data on the same candidate features are independently collected in multiple sites, offering opportunities to identify risk factors for post-acute COVID sequelae (or long COVID) by combining information from various sources. However, since the data from different sites are with heterogeneous populations and different quality, it is challenging to make reliable discoveries from such joint data. In statistical analysis, false discovery rate (FDR) controlling procedures can provide important statistical guarantees for replicability in risk factor identification. This study aims to develop a novel FDR controlling method to identify mutual risk factors for long COVID with an exact FDR control guarantee.

### Methods

We introduce a General Simultaneous (GS) knockoff algorithm for precise FDR control in group-level mutual signal selection across multiple conditional tests. Ideal for machine-learning models targeting complex variables, the algorithm comprises four steps: 1) knockoff construction, 2) test statistics calculation, 3) filter statistics, and 4) thresholding for feature selection. We apply the proposed GS knockoff method to the N3C data for selecting risk factors of long COVID from a collection of baseline patient demographics, comorbidity, and medication information.

### Results

We prove that our GS knockoff method effectively controls FDR, confirmed by both theory and numerical studies. It outperforms other methods in FDR

control across all settings and exhibits good power. From the analysis of the N3C data, we identified 6 risk factors for long COVID, namely age at COVID, obesity, systemic corticosteroids, depression, chronic lung disease, and usage of corticosteroids during COVID hospitalization.

#### Application to the field/research

Our discovery provides important insights for the long COVID diagnosis and prevention. Older age, obesity, pre-existing lung conditions, and corticosteroid use are linked to a higher risk of long COVID due to factors like severe initial illness, impaired immune response, and longer recovery times. Additionally, a bidirectional relationship exists between COVID-19 and psychiatric disorders, each increasing the risk of the other.

**Todd Wyatt**

**Department of Environmental, Agricultural and Organizational Health  
College of Public Health, UNMC**

**Co-authors: K. L. Bailey, D. R. Samuelson, and D. L. Knoell**

***Triple-hit model of alcohol, zinc deficiency, and cigarette smoke exposure impairs lung inflammatory and immune responses***

### Background and objective

Alcohol misuse is a known risk factor for pneumonia. However, combined life exposures (the exposome) are poorly understood in the context of alcohol misuse. Previously, we demonstrated that alcohol prevents effective mucociliary clearance and the combination of cigarette smoking+alcohol results in aldehyde-mediated inflammation and protein adduction altering injury repair. Immune function is mediated by zinc, an essential nutrient and cofactor with insufficient dietary intake negatively impacting one-third of the world's population. We hypothesized that a complex model of alcohol, smoking, and zinc deficiency would result in a significant impairment of innate infection defense compared to each condition alone.

### Methods

We developed a novel “triple-hit” alcohol-fed, smoke-exposed, and zinc deficient (ZD) mouse model. Zn sufficient or ZD mice were segregated into the following groups 1) Control sham-treated mice, 2) Smoke exposure only, 3) Alcohol feeding only, and 4) Smoke+alcohol co-exposure. We used the Meadows-Cook ad libitum alcohol feeding model and environmental tobacco smoke exposure system (TE-10; Teague Enterprises). After a ramp-up period, mice were co-exposed for 8 weeks. Mice were then infected by intranasal instillation with *S. pneumoniae*. Control mice were instilled with sterile saline. Mice were infected with  $1 \times 10^5$  CFU of *S. pneumoniae* (ATCC BAA-334) via intranasal instillation and sacrificed 48 hour post infection. Bacterial burden was determined by plaque assay and inflammation characterized by lung pathology, lung PKC activity, and BAL cytokine release. Lung function was assayed by live animal micro CT.

### Results

The unique combination of alcohol, smoke, and Zn deficiency leads to a significant increase in pulmonary bacterial burden. Lung histology revealed

that the triple-hit mice exhibited less pulmonary inflammation compared to control mice, which suggests overall defects in the ability to mount a balanced immune response. Both total number of immune cells and amount of TNF alpha in lung was significantly decreased in the triple-hit mice. Additionally, triple-hit mice failed to activate PKC in response to smoke+alcohol. A significant difference in lung volume was observed between zinc sufficient and ZD mice in the smoke+alcohol infected group.

#### Application to the field/research

Together, this demonstrates that the exposomal combination of alcohol, smoke, and Zn deficiency leads to an aberrant immune response to *S. pneumoniae* that is detrimental to the host.

**Cleo Zagurski**

**Creighton University**

**Co-authors: Tzeyu Michaud PhD, George Johnson MSPH, Kathryn E.**

**Wilson, PhD, Gwenndolyn C. Porter, PhD, Paul A. Estabrooks PhD**

***Reach and weight loss of comparison group participants that engaged in the active intervention following a diabetes prevention trial***

### Background and objective

We examined the reach and weight loss outcomes of comparison group participants in a diabetes prevention trial who enrolled in the active intervention (i.e., digital-based diabetes prevention program) after the trial ended.

### Methods

These outcomes were evaluated using the Wilcoxon signed-rank test and one-sample z-test.

### Results

Results indicated high reach among comparison group participants who did not lose satisfying weight during the trial and comparable weight loss outcomes at 12 months relative to intervention group participants during the trial period.

### Application to the field/research

Findings support increasing access to the evidence-based intervention for the comparison/control group participants and examine the cost-effectiveness.

**Jiani Zhang**

**Department of Biostatistics**

**College of Public Health, UNMC**

**Co-author: Su Chen**

***Effects of parity and other reproductive factors on breast cancer risk and age at diagnosis***

### Background and objective

Breast cancer stands as a significant health concern, influenced by various factors, including one's reproductive history such as parity, and age at first full-term pregnancy. Prior studies have shown that parity can have complicated effects on breast cancer. This study aims to investigate both linear and nonlinear relationships between parity and breast cancer risk, as well as ages at diagnosis of breast cancer.

### Methods

This study employed generalized linear models to test the linear and quadratic relationship between parity, as well as its interaction with other reproductive factors, and breast cancer outcomes. The identity link function was utilized to model the association between reproductive factors and age at diagnosis, while the logit link function was utilized to assess the odds of breast cancer diagnosis with the number of pregnancies.

### Results

The linear regression analysis showed a curvilinear pattern in the age at breast cancer diagnosis concerning the number of pregnancies ( $p$ -value < 0.0001). There was an increase before the 6th gestation, followed by a subsequent decrease, with the peak age of diagnosis observed at 60 years. Furthermore, the study found that a younger age at first pregnancy was associated with an older age at breast cancer diagnosis (95% CI = -0.45 to -0.25). Logistic regression demonstrated that with each additional pregnancy, the odds of breast cancer diagnosis increased by approximately 36% (odds ratio = 1.36, 95% CI = 1.16 to 1.60).

### Application to the field/research

Understanding this relationship can help in developing more targeted screening and prevention strategies for breast cancer. The results underscore



the importance of considering both the number of pregnancies and the age at first pregnancy when assessing breast cancer risk, providing valuable guidance for future research and clinical practice in breast cancer epidemiology.

## V. SPONSORS AND CO-SPONSORS

### College of Public Health

### University of Nebraska Medical Center

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The mission of the College of Public Health is to transform lives and to create a healthy future for all individuals and communities through premier education, research, and service to Nebraska, the nation, and the world. The COPH is accredited by the Council on Education for Public Health (through July 1, 2024); only 50 of the 134 academic medical centers in the United States have accredited public health colleges. COPH faculty work with collaborators from the other UNMC colleges on funded and unfunded research projects.

The COPH is housed in the Harold M. and Beverly Maurer Center for Public Health (MCPH). The MCPH is a 61,423-square-foot facility in which are offices, workspaces, and meeting spaces for College students, faculty, and staff. Included herein are approximately 11,880 square feet of lockable office space for faculty and professional staff and 3,550 square feet of modular office space for staff and teaching and research assistants. Centrally located space for core support functions (mail, copying, and general workspace) is provided on each of the facility's three floors.

The facility has four conference rooms plus three rooms that facilitate collaborative learning/research available to College administration, faculty, and staff. Three conference rooms are equipped, at minimum, with Smart Board technology. Additionally, one of these conference rooms is equipped to provide streaming Internet video and two-way video conferencing. COPH students learn in nine classrooms, all of which have full digital technology including Zoom capability (two-way video conferencing). Additionally, four of them have Echo 360 video/audio recording technology. Classrooms range in size from an 82-seat auditorium to multiple 16-20 seat classrooms. The combined education and student support area is approximately 6,740 square feet.

The COPH provides ample common space—both formal and informal—to encourage student, community, and faculty interactions. The lobbies are

designed to provide semi-private meeting areas as well as open areas for interaction. A variety of seating configurations allow distinct areas for discussion, group work, and individual studying.

## **Institute of Agriculture and Natural Resources**

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### **University of Nebraska-Lincoln**

The University of Nebraska Institute of Agriculture and Natural Resources (IANR) at UNL was created by the Nebraska Legislature in 1973 through the enactment of LB149. This legislation culminated more than ten years of discussion by state leaders, University officials, and agriculture interests in Nebraska who were concerned that agriculture was not being given proper financial support, administrative access, and prominence within the University—especially considering the unquestioned importance and contributions of agriculture and natural resources to the state’s economy and success.

IANR is composed of the College of Agricultural Sciences and Natural Resources (CASNR), the Agricultural Research Division (ARD), Nebraska Extension and the ARD and Extension components of three departments in the [College of Education and Human Sciences](#). IANR innovation in research, teaching, and extension education places Nebraska on the leading edge of food production, environmental stewardship, human nutrition, business development, and youth engagement.

**[College of Agricultural Sciences and Natural Resources \(CASNR\)](#)** prepares students for careers in everything from animals to plants, soil to climate, golf to business, mechanization to leadership, and food to forensic science. Students are prepared for successful careers and a lifetime of informed decisions through the development of food, fuel, water, and landscape systems as models for formal and informal science education.

**[Agricultural Research Division \(ARD\)](#)** is the only public entity in Nebraska charged with conducting agricultural research vital to Nebraska where agriculture is the leading industry. Many ARD scientists, who currently are working on approximately 300 research projects throughout Nebraska, also hold teaching or extension appointments. That means exciting new discoveries move quickly from the field or laboratory into the classroom and across Nebraska.

**Nebraska Extension** delivers research-based knowledge Nebraskans can immediately use in their lives, businesses, families and communities. Extension's key focus areas are animal agriculture, crops for the future, children, youth and families, entrepreneurship, food, nutrition and health, water and environment. Approximately 144,000 Nebraska youth are involved in extension's 4-H program.

## **Great Plains IDeA-Center for Translational Research**

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### **University of Nebraska Medical Center**

The Great Plains IDeA-CTR, funded by the National Institute of General Medical Sciences, is tasked with building infrastructure for investigators in the state of Nebraska. The cores of the Great Plains IDeA-CTR support the following objectives: 1) to support the development and/or enhancement of infrastructure and human resources required to address clinical and translational research needs in IDeA-eligible states/jurisdictions, (2) to strengthen clinical and translational research that addresses the broad spectrum of health challenges faced by populations in IDeA-eligible states/jurisdictions, and (3) to foster and coordinate collaboration in clinical and translational research within an IDeA-CTR network and with other institutions.

#### Administrative Core

The Administrative Core oversees the GP IDeA-CTR and provides resources for consultations and research navigation services.

#### Biomedical Informatics, Bioinformatics, & Cyberinfrastructure Enhancement (BERD)

The BERD core provides critical research design, epidemiological, and biostatistical expertise for collaborative research, education, and training in the advancement of CTR within the GP IDeA-CTR network.

#### Biostatistics, Epidemiology, & Research Design (BIBCE)

The BIBCE core provides informatics infrastructure necessary to support CTR, including support for the Clinical Research Analytics Environment (CRANE), Nebraska Biobank, Electronic Health Record Data Access Core, and the Bioinformatics and Systems Biology Core.

#### Community Engagement & Outreach (CEO)

The CEO core facilitates and disseminates high-quality and locally relevant community-engaged research that advances CTR and aligns with the state's health priorities.

### Professional Development (PD)

The PD core provides a wide array of professional development opportunities, such as seminars, a research scholar program, an early career investigator program, research studios, and mini sabbatical funding.

### Pilot Projects Program

The Pilot Projects Program provides opportunities for pilot funding through various mechanisms including: team research, tech transfer, heart and vascular, data science, community engagement, design methodology, and innovation grants.

### Tracking & Evaluation (T&E)

The T&E core conducts activities to determine the effectiveness of the GP IDeA-CTR, and works alongside evaluators from similar programs to determine best practices in evaluating infrastructure building programs.