

## **ERF 3.1.a. College of Public Health Department and Center Research Descriptions**

The following is a brief description of the research focus of the five departments and seven centers of the College of Public Health (College).

### **Department of Biostatistics**

The biostatistics faculty is involved in research with a wide range of theoretical and applied statistics. Their research includes collaborative work on numerous studies/projects and with within the College and the University of Nebraska Medical Center (UNMC) and with external partners. The faculty are currently involved in research in the following areas of biostatistics: clinical trials, study design, survival analysis, missing data, generalized linear models, longitudinal analysis, survey methodology, and analysis of microarray gene-expression data and other high-dimensional data. Specific projects include:

- The Department of Biostatistics is the home of the Biostatistics Shared Resource of the Fred and Pamela Buffett Cancer Center (a National Cancer Institute-designated cancer center), providing expertise and experience to Cancer Center members for planning, conducting, and reporting of basic, translational, clinical, and population-based research projects
- Members of the Department of Biostatistics serve as the Biostatistics core for the Fred and Pamela Buffett Cancer Center Specialized Program of Research Excellence (SPORE) grant in pancreatic cancer
- Directed by Dr. Schmid, members of the Department of Biostatistics serve as the Biostatistics Core Center for Communication Disorders at Boys Town National Research Hospital
- The Department of Biostatistics serves as the Data Coordinating Center for the Prostaglandin Inhibition for Emphysema study. Directed by Dr. Schmid, the center oversees the database development, data collection, cleaning, and analysis as well as all statistical aspects of the trials, including progress reports and reports for the Data Safety Monitoring Committee.
- Bayesian methods for high-throughput data analysis, widely used to study the association between gene/protein expression and disease progression or prevention
- Biostatistical methods to address missing response and missing covariates in a longitudinal data setting

## **Department of Environmental, Agricultural, and Occupational Health**

Department faculty conduct both basic and applied research in the areas of environmental health, toxicology, and occupational and agricultural safety and health. The research focus is on improving environmental, agricultural, and occupational health and safety. Research in the department is funded by the National Institutes of Health, the National Institute for Occupational Safety and Health, the U.S. Health Resources and Services Agency, the U.S. Department of Health and Human Services, the National Science Foundation, the U.S. Environmental Protection Agency, the Centers for Disease Control and Prevention, the Department of Defense, the Nebraska Department of Health and Human Services, and the Nebraska Research Initiative. Specific projects include:

- Toxic effects of runoff from confined animal feedlot operations and agricultural runoff on sentinel fish in the Elkhorn River
- Effects of alcohol and cigarette smoke on inflammatory processes in the lung
- Airway inflammation from exposure to feedlot dust
- Effects of secondary methamphetamine exposure on lung cells
- Airborne microorganisms and other contaminants in the environment and in hospital situations
- Dust exposures in various occupational environments
- Human factors, ergonomics and workplace safety
- Research on deaths due to accidents in agricultural settings
- Interventions to improve health and safety on farms
- Prevention of hearing loss due to agricultural activities
- Biomechanical issues leading to gait problems in the elderly and other compromised persons
- Education of Latino households on environmental hazards in homes
- Fate and bioavailability of environmental contaminants in Chilean rivers
- Pesticide occurrence, ecological effects and environmental security in the Syr Danya River Basin, Kazakhstan
- Etiology and prevention of cancers initiated by exposure to estrogens
- Infection control measures for handling highly infectious patients and clinical settings
- Uses of wearable technology in hospital settings

## **Department of Epidemiology**

The epidemiology faculty is actively involved in a broad range of research activities that correspond closely to their academic and work experiences. This research includes work on studies with both domestic and international collaborators on cancer, infectious disease, maternal child health, and mental health. Specific projects/studies include:

- A multidisciplinary cancer epidemiology research program in underserved and minority populations. This has led to a strong research infrastructure with several centers in Cyprus, Egypt, Tunisia, Morocco, Ghana, Tanzania, Uganda, Kenya and Malawi to investigate the epidemiology of colorectal, pancreatic, hematopoietic and breast cancers.
- NCI-R25 E supported Cancer Epidemiology in Special Populations (CEESP) to educate, train, and develop the careers of public health students. The program emphasizes underserved populations in both U.S. and other countries.
- Research focuses on systemic links, causes, and treatment of head and neck diseases.
- NIH-funded study of growth factors in wound healing using NHANES data.
- HIV bio-behavioral survey study among fishing communities in Uganda.
- Lung cancer study funded by the Patient-Centered Outcomes Research Institute.
- A study of gene by environment interactions in Chronic Obstructive Pulmonary Disease and asthma
- A study to investigate roles of infectious agents in development of cancer – with a specific focus on Kaposi's sarcoma in Zambia
- Research in India with a specific focus on pathogenesis of infectious and inflammatory diseases of the G.I. tract.
- Projects through the Center for Biopreparedness, Biosecurity and Emerging Infectious Disease. Investigation and treatment of Ebola and other emerging infectious diseases in the U.S. and abroad.
- Refugee cohort initiative to develop research infrastructure to investigate chronic and infectious disease risk factors and prevention/control methods.
- Evaluation of a binge drinking screening and intervention program in primary care and specialty settings
- A project to study mental health workforce issues in rural communities.

## **Department of Health Services Research and Administration**

Through the College's Center for Health Policy Analysis and Rural Health Research, department faculty members lead research teams that study how health services and public health services are financed, organized, and delivered and how public policies affect the health and well-being of both rural and urban populations. Research projects have studied:

- Public health services and systems research, including workforce capacity, governance, partnership building, resource allocation, quality improvement initiatives and accreditation strategies
- Economic analysis, including programs of the Nebraska Department of Health and Human Services (DHHS), economic evaluation of novel screening programs, comparison of treatment programs, outcomes for at-risk adolescents, economic impacts of agricultural injuries, and telehealth policies, as well as supporting economic analyses for UNMC faculty research projects
- Evaluation research for Nebraska DHHS, community-based program initiatives
- Veterans' Administration research, to examine the communication practices of VA and non-VA clinicians and to test and validate a survey of prosthetics satisfaction
- Cancer research, including outcomes and costs of care for elderly pancreatic patients, and identification of individual, provider and delivery-system level factors associated with colorectal cancer screening rates in rural Nebraska
- Immigrant health research to quantify the impact of immigrants on the U.S. healthcare system
- Traffic safety research, including analysis of drug and alcohol impairment and distraction among drivers, as well as the economic costs associated with treatment of injuries from bicycling.

### **Department of Health Promotion, Social and Behavioral Health**

Department faculty perform health promotion research and training in a broad spectrum of public health issues, including obesity, nutrition, physical activity, substance use, adolescent risk behaviors, sexual health, smoking, environmental sustainability and health, community health, health disparities, cross-cultural and global health, ethics, and law. The department's research spans the discovery, development, and delivery phases of science and policy and involves epidemiological, intervention, evaluation, and dissemination studies, using a mixture of qualitative, quantitative, and systems tools. Recent research projects have studied:

- Analysis of factors that influence breastfeeding duration, support and intent

- Analysis of data to understand elementary and middle school students' knowledge of food groups
- Analysis and development of health literacy assessment tools for environmental health, rural health, and respiratory diseases in relation to agricultural exposures
- Childhood, adolescent and adult obesity prevention and control
- Delivering of nutrition curriculum and physical activity education to disadvantaged middle schools to instigate peer-to-peer efforts and community trends geared toward health-promoting lifestyles
- Development of a test communication campaign to reduce the stigmas associated with home visiting programs
- Development of a communication tool for patients and their healthcare provider team
- Evaluation of the academic and health impact of school-based health centers, multi-component community-wide obesity and STI interventions, and community survey data
- Examination of the needs of employees who care for disabled adults and frail elderly for leave and respite resources, as well as employer policies
- Identification of community-driven solutions to address farm injuries
- Laboratory and molecular nutrition
- Marriage and fertility outcomes for people leaving school during economic down cycles
- Research and evaluation in community health
- Tobacco control research, including studies on smoking cessation, social disadvantage, population-level policies, and tobacco marketing
- Translating an in-home Alzheimer's caregiver stress and burden intervention into a primary care setting
- Visual disparities among immigrants in the U.S.

#### **Center for Biosecurity, Biopreparedness, and Emerging Infectious Diseases**

The Center is focused on activities directed toward preparedness for public health emergencies, as well as related traditional academic and community activities in the fields of preparedness and infectious diseases. The Center's research focuses on preparedness planning, long term care evacuation, and the use of social media in disasters. The Center studies preparedness for natural and man-made disasters, including pandemic influenza in various settings (hospitals, nursing homes, and community and public health departments).

#### **Center for Collaboration on Research Design and Analysis**

The Center seeks to advance clinical, basic, translational, and public health research at UNMC and in the community and region. The Center focuses on quantitative sciences, including biostatistics, epidemiology, and health services research, and coordinates collaborative design, planning, conduct, analysis, and interpretation of laboratory, clinical, and public health research studies. The Center also provides educational opportunities of quantitative sciences graduate students and public health, clinical and translational investigators.

### **Center for Environmental Health and Toxicology**

The overall research focus of the Center is collaborative intercampus, interdisciplinary research programs on issues important locally, regionally, nationally, and internationally. Currently, the research efforts are focused on

- Toxic effects of runoff from confined animal feedlot operations and other agricultural activities on sentinel fish in the Elkhorn River in eastern Nebraska
- Fate and bioavailability of environmental contaminants in Chilean rivers
- Pesticide occurrence, ecological effects and environmental security in the Syr Danya River Basin, Kazakhstan.

### **Center for Global Health and Development**

The Center is engaged in biomedical, behavioral, and public health informatics research that has worldwide utility. With its well-established research platforms in hospitals and community settings, study cohorts, US-based and overseas laboratories, and data centers, investigators at the Center work on:

- Surveillance of neonatal and infant infections in developing countries
- Design and implementation of cost-effective preventive therapies such as oral probiotics for prevention of neonatal infections
- Change in human colon microbiota during infancy and aging with the ultimate goal of using specific probiotics and prebiotics for better immune function and health
- Study on carriage of antibiotic-resistant organisms
- Chronic disease surveillance using computer-mediated platforms to support prevention, monitoring, and management of chronic diseases, using a multifaceted intervention approach
- Computer-mediated health education and health promotion for stakeholders in hospital and community settings, including use of multilingual E-Kiosk models
- Implementation and evaluation of different modalities of tele-home care services

- Cervical cancer, HPV screening, and vaccine acceptability in rural India

### **Center for Health Policy Analysis and Rural Health Research**

Through state, regional, and national leadership in health services research, the faculty and staff of the Center seek to influence the content and implementation of public policies in ways that improve the population health for Nebraska and elsewhere. Center researchers study how health services and public health services are financed, organized, and delivered and how public policies affect the health and well-being of both rural and urban populations. The research expertise of the Center faculty and staff includes health services research design and data analysis, economic evaluation, comparative effectiveness research, mixed research methods, organizational theories, project design and management, and program evaluation. Center's research projects have covered the areas of public health services and systems research, health care workforce, economic analysis, veterans care research, cancer prevention research, immigrant health research, and traffic safety research.

### **Center for Reducing Health Disparities**

The Center for Reducing Health Disparities (CRHD) in the College of Public Health at the University of Nebraska Medical Center (UNMC) is a unique organization with a mission to promote equity and social justice in health and health care by leading collaborative efforts to generate and disseminate evidence-based, policy-relevant solutions. The goals include (1) Enhancing the role of UNMC in addressing disparities in health outcomes among Nebraskans through consistent community engagement, partnerships, and advocacy; (2) Promoting translational research that would help reduce disparities in health status and health care at the local, state, national, and global levels; (3) Diversifying the sources of funding support for the Center and gradually reduce its dependence on internal support from UNMC; and (4) Supporting UNMC's education initiatives in health disparities.

Selected current Center projects include (1) "Stress and Mental Health Among Latino Migrant Farmworkers," Survey Research (Central States Center for Agricultural Safety and Health-funded); (2) "Tobacco Free Communities of Excellence," Intervention (Region 6 Behavioral Healthcare-funded); (3) Program Evaluation for the Project "Remote Interventions Improving Specialty Complex Care (RIISCC)" funded by Centers for Medicare and Medicaid Services"; and (4) Parenting Education in Nebraska, funded by Nebraska Department of Health and Human Services.

## **Central States Center for Agricultural Safety and Health (CS-CASH)**

CS-CASH has been a National Institute for Occupational Safety and Health-funded center since 2010. It develops and supports, research service and education to rural populations engaged in agricultural activities throughout a seven-state region (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota and South Dakota). The Center supports research through pilot projects and larger projects in the following areas:

- **Safety and Health Education of Non-Traditional Farm Families.** This 5 year, 7 states project engaged agricultural communities in the development of age and farm-type specific safety and health materials.
- **Preventing Hearing Loss among Farmers by Point Source Hearing Protection Strategy.** This community-based 5 year project involves Nebraska and Iowa farm families in research to determine strategies to reduce the incidence of hearing loss.
- **AGHealth Nebraska** research project examined a health care based system for the agricultural community that incorporates wellness and injury prevention measures into a sustainable business model for rural providers.
- **Certified Safe Farm** project PIs developed a wellness and injury prevention program that is used by the University of Nebraska Kearney - College of Nursing to bring together nursing students and the agricultural community. The community benefits by gaining access to health and farm safety assessments while the nursing students learn about possible injury and health hazards in agriculture.
- **Stress and Mental Health among Latino Farmworkers** research project surveyed migrant farm workers in Nebraska communities finding high levels of stress and depression. A guide to locating mental health and wellness services in Nebraska is being produced in both English and Spanish for dissemination to migrant workers.
- **Imminent Hazards in English and Spanish** research project PI worked with a community advisory panel to gain consensus on the 15 most dangerous agricultural tasks. Informed by this community based research, 10 pictograms were created in both English and Spanish and have been disseminated to farms, ranches and feed yards in Western Nebraska and serve as an enduring resource on the CS-CASH website.
- **Community Driven Solutions to Address Farm Injuries** research project tested an innovative participatory decision-making approach by engaging member of the farming community in co-creating an intervention to prevent farm injuries. The group is in the process of pre-testing two safety reminder strategies in the community.

- **Antelope Memorial Hospital Agricultural Safety Program** project examined the feasibility and efficacy of using a hospital based program to disseminate farm and ranch safety and health materials to the community through health fairs and farm events. This project has become self-sustainable.
- **Health and Job Hazards of Latino CAFO Workers in Missouri** project will develop a community cohort of hog confinement workers and their families to explore opportunities for safety and health educational interventions.