

GREAT PLAINS CENTER FOR AGRICULTURAL HEALTH
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Annual Report
FY 10 (Oct. 1, 2009-Sept.30, 2010)

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GREAT PLAINS CENTER FOR AGRICULTURAL HEALTH**

I. INTRODUCTION AND SUMMARY OF THE PROGRAM

The Great Plains Center for Agricultural Health (GPCAH) at The University of Iowa serves as the NIOSH Agricultural Health and Safety Center with a focus on health and safety concerns among agricultural workers and their families in the Midwestern states of Iowa, Missouri, Kansas, Nebraska, Illinois, Wisconsin, Minnesota, South Dakota, and North Dakota. This is America's most agriculturally intensive region. The GPCAH advances knowledge about agricultural injuries and illnesses through its research activities and prevents them through its education, outreach, and intervention efforts.

Overall goals of GPCAH are to:

1. Conduct a multidisciplinary agricultural health and safety research program targeting national research priorities for agricultural health and safety.
2. Develop and evaluate novel disease and injury prevention models that assess educational, outreach, and intervention programs targeting farm workers and their family members.
3. Develop and implement training of health professionals including industrial hygienists, epidemiologists, ergonomists, veterinarians, and physicians for career development in the area of agricultural health and safety with emphasis on their professional training needs.
4. Provide agricultural health and safety technical assistance and consultation in research methods, training, and education to health professionals and community-based organizations.
5. Maintain and strengthen linkages with health professionals in academic institutions, state and federal agencies, and international organizations regarding agricultural health and safety research, training, and prevention programs.

GPCAH members contribute to a wide range of professional venues locally, nationally, and internationally. GPCAH members participated in an array of forums with students, producers, cooperative extension, and healthcare providers by providing technical presentations, training courses, and publishing trade and scientific papers. GPCAH members serve on boards for the National Education Center for Agricultural Safety, Farm Safety 4 Just Kids, and the National Institute for Farm Safety, Inc. Members also serve on technical committees and in leadership roles related to agriculture health and safety for the National Institute for Farm Safety, the American Conference of Governmental Industrial Hygienists, the American Industrial Hygiene Association, and the American Society of Agricultural and Biological Engineers. GPCAH members serve as associate editors and are frequent reviewers of technical articles related to agricultural health and safety for various journals, including the Journal of Agricultural Safety and Health, the Agromedicine Journal, the American Journal of Industrial Medicine, Environmental Health Perspectives, and the Journal of Occupational and Environmental Health.

This FY2010 reported period is the fourth year of the GPCAH five year grant funding cycle. Three GPCAH projects, one each in research, prevention and education/translation areas continue into this 2006-2011 funding cycle. Four feasibility/Pilot Projects were awarded for funding during FY 2010 and are described in the Administration Planning and Outreach Core section of this report. The GPCAH Outreach program for FY2010 funded conferences such as the Midwest Rural and Agricultural

Safety and Health (MRASH) conference entitled , "Planting the Seed", held November 18-19, 2009 in Johnston, Iowa, and the AgriWellness Conference held in August 2009 in Sioux Falls, IA,. Outreach funds also supported our quarterly *Alive and Well* newsletter, as well as the *Farm Agricultural Injury Monitoring System (FAIMS) – Press Clippings* surveillance for our 9-state region.

A brief overview of the status of the Research, Prevention/Intervention, and Education and Translation projects is provided below. More detailed descriptions of these projects are provided in sections III, IV, and V.

The Keokuk County Rural Health Study

The Keokuk County Rural Health Study (KCRHS) is the major Research Project of the GPCAH. This population-based, prospective study has followed the health status and environmental exposures of a large, stratified, random sample of residents in one rural Iowa County for the past 17 years. The KCRHS focuses on injury and respiratory disease. It monitors health care delivery, geriatric, reproductive, mental health, and other health outcomes. Rounds 1 (1994-1998) and 2 (1999-2004) have been completed. Round 3 began in December 2006. Each participant over the age of eight receives a medical screening in our research facility in Sigourney, IA, the county seat. These screenings include measurement of height, weight, and blood pressure; skin testing for 20 allergens; spirometry; methacholine challenge; vision and hearing tests; triceps skinfold, facial, and waist measurements; and venous blood drawing for future serological studies. To these medical tests, in Round 3 we added blood lead testing; blood, saliva, or buccal cell samples for DNA analysis; computer-assisted neurobehavioral tests to examine the effects of neurotoxins; measurement of hand grip strength; and physical functioning tests (chair stands, gait speed, standing balance) for subjects over the age of 50. Those 18 and over are interviewed at length about their health and behavioral risk factors for injury. In addition, they complete detailed occupational surveys, reporting every job (including type of work and duties) they have had since age 12. To the Round 3 interview we added SF-36 questions; detailed questions about vision and hearing; and questions about sun exposure. Adolescents (ages 12-17) are interviewed about farm work and behavioral risk factors for injury, and parents are interviewed about the health of their children (newborn - 17). Each farm household receives an in-depth environmental assessment of their property. In addition to detailed interview questions about farm practices, animals, crops, and use of agricultural chemicals, this survey includes sampling of hydrogen sulfide, ammonia, carbon monoxide, carbon dioxide, humidity, PM 10/2.5, respirable dust, inhalable dust, and lead paint; using aerial photographs of subjects' property, documentation of homes, wells, shop areas, buildings, livestock feedlots, confinement livestock buildings, manure lagoons, other manure storage areas, areas containing refuse, junk or waste, grain storage, permanent feed milling or grinding area, feed supplement storage, ponds, children's play areas, and pesticide storage areas. In Round 3 so far we have collected medical and interview data from 144 men, 204 women, and 137 children in 208 households. The KCRHS continues to be a rich source for collaboration with other investigators, for mentoring students, and for connecting with the community through a newsletter, website, and a Community Advisory Committee (CAC). The CAC continues to provide guidance to the study and to serve as a liaison between the study and the community.

Determinants of Gas and Dust Exposures Among Swine Workers

The major Prevention/Intervention project in the GPCAH is the Determinants of Gas and Dust Exposures project. The long-term goal of this project is to protect workers from inhalation hazards in swine confinement buildings. The primary objective is to identify both tasks and building characteristics that cause elevated concentrations of gases and dusts in these buildings. Our central hypothesis is that

dust and gas exposure levels are highly variable because of the many work tasks associated with rearing swine and the varied characteristics of the buildings in which these tasks are performed. A secondary hypothesis is that the contaminant dose received by a worker may be reduced substantially through occasional respirator use when performing specific tasks that are associated with high dust exposures. Activities over the past fiscal year have included field assessments of workers associated with the large, corporate-owned swine facilities we have access to as well as building-related sampling in smaller buildings in a rural area of Iowa (Keokuk Co.). We have now completed a full round of field sampling in each of two large “gestation/farrowing” facilities. Both facilities have a similar layout – 5 interconnected buildings holding a total of up to 3500 swine. A crew of 8 to 10 employees worked in each sampled operation; however we only sampled 6 subjects per site visit due to equipment restrictions. We have sampled each facility once during a summer, winter, and spring time period. We have accrued enough data from these sampling episodes to prepare a meaningful journal manuscript as we have 2 sites x 3 sample periods x 6 subjects per period for a total of 36 subjects. Although both dust and gas contaminants were measured, the paper will focus on task-specific dust levels only.

Building Capacity of Health and Safety Professionals

Building Capacity of Health and Safety Professionals is the major Education and Translation project. This project will impact farmers in a 10-state area by providing specialized training for the health care professionals who treat them. In addition, certificate and graduate programs at the University of Iowa address the critical shortage of agricultural occupational health and safety researchers and program leaders by educating agricultural safety and health instructors. These “train the trainer” strategies will support translation of research information and disseminate educational and intervention programs developed at Iowa and other NIOSH-supported agricultural health centers.

This project again experienced a dramatic increase in activity, primarily due to the incorporation of distant learning methods such as online courses and the use of systems such as Adobe Connect to bring speakers to some of the more distant sites (Vermont, Illinois) where the program was given.

A list of courses offered in this grant period includes:

Oct. 21, 2009 - Musculoskeletal Symptoms Among Crawfish Farmers

Nov. 12, 2009 - Zoonotic Diseases: Their Importance and Neglect

Dec. 22, 2009 - Oral Health: The Identification of Risk and Evidence-based Interventions

Jan. 28, 2010 - Farmworkers and Influenza: Planning for their health and safety during outbreaks

Feb. 25, 2010 - Musculoskeletal Injuries in Agriculture

Mar. 16, 2010 - What's New in Diabetes Research and Care

Apr. 28, 2010 - First Aid for Farm Families: Using Interactive Modules to Improve Emergency Preparedness

May 12, 2010 - AHEC: What does it mean for you?

June 17, 2010 - Cancer Findings in the Agricultural Health Study

Aug. 24, 2010 - Neurological Disease & Disorders in the Ag Health Study

Sept. 16, 2010 - The ATV Injury Epidemic