

MIDWEST CENTER FOR OCCUPATIONAL HEALTH AND SAFETY (MCOHS)
A NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH FUNDED
EDUCATIONAL RESOURCE CENTER

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IAN A. GREAVES, B MED SCI, MB, BS, FRACP, FAAAS, CENTER DIRECTOR
DIVISION OF ENVIRONMENTAL HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF MINNESOTA
420 DELAWARE STREET SE, MAYO MAIL CODE 807
MINNEAPOLIS, MN 55455

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* Prepared by MCOHS current leadership team and reviewed by Ian A. Greaves, B Med Sci, MB BS

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List of Abbreviations

Abbreviation	Definition
AAOHN	American Association of Occupational Health Nurses
ABET	American Board of Engineering and Technology
ABPM	American Board of Preventive Medicine
ACGIH	American Council of Governmental Industrial Hygienists
ACGME	American Council on Graduate Medical Education
ACMT	American College of Medical Toxicology
ACOEM	American College of Occupational and Environmental Medicine
AIHA-UM	American Industrial Hygiene Association-Upper Midwest section
AIHCE	American Industrial Hygiene Conference and Exposition
AIIR	Airborne Infection Isolation Room
AOHC	American Occupational Health Conference
APHA	American Public Health Association
APT	Appointment, Promotion and Tenure
ASABE	American Society of Agricultural and Biological Engineers
ASH	Agricultural Safety and Health
ASSE-NW	American Society of Safety Engineers – Northwest
ATSDR	Agency for Toxic Substances and Disease Registry
B Med Sci	Bachelor of Medical Science
BAE	Biosystems and Agricultural Engineering
BS	Bachelor of Science
CHEST	Council on Certification of Health Environmental and Safety Technologists
CDC	Centers for Disease Control and Prevention
CE	Continuing Education
CEPH	Council on Education for Public Health
CEU	Continuing Education Unit
CGR	Community Grand Rounds
CHMM	Certified Hazardous Materials Manager
CIH	Certified Industrial Hygienist
CIHR	Comprehensive Industrial Hygiene Review
CMF	Composite Microporous Fibers
CMS	Centers for Medicaid and Medicare Services (formerly Health Care Financing Administration)
COPD	chronic obstructive pulmonary disease
CPHEO	Centers for Public Health Education and Outreach
CSOMA	Central States Occupational Medicine Association
CSP	Certified Safety Personnel
DLG	Digital Learning Group
DNR	Minnesota Department of Natural Resources
DPS	Minnesota Department of Public Safety
EMS	Emergency Medical Services or Emergency Medical System
EnHS or EHS	Division of Environmental Health Science
ERC	Education and Research Center
ERPIQ	Emergency Response Plan IQ
FAAN	Fellow of the American Academy of Nursing
HPM	Health Policy and Management
HSAT	Hazardous Substances Academic Training Program
HST	Hazardous Substances Training
HUD	Housing/Urban Development
HVAC	heating, ventilating, and air-conditioning
IH	Industrial Hygiene

IT	Institute of Technology
ITV	Interactive Television
JD	Doctor of Jurisprudence
M.D	Medical Doctor
MAOHN	Minnesota Association of Occupational Health Nurses
MBBS	Bachelor of Medicine and Surgery
MCOHS	Midwest Center for Occupational Health and Safety
MEHA	Minnesota Environmental Health Association's
MN DOER	Minnesota Department of Employee Relations
MNDOT	Minnesota Department of Transportation
MnTAP	Minnesota Technical Assistance Program
MPCA	Minnesota Pollution Control Agency
MPH	Master of Public Health
MS	Master of Science
MSC	Minnesota Safety Council
MT	Medical Toxicology
NACCHO	National Association of County and City Health Officials
NAGCAT	North American Guidelines for Children's Agricultural Tasks
NCICP	National Center for Injury Prevention and Control
NCOEMA	North Central Occupational and Environmental Medicine Association
NIOSH	National Institute for Occupational Safety and Health
NORA	National Occupational Research Agenda
OEHN	Occupational and Environmental Health Nursing
OEM	Occupational and Environmental Medicine
OHSRP	Occupational Health Services Research and Policy Program
OIECP	Occupational Injury Epidemiology and Control Program
OIPRTP	Occupational Injury Prevention Research Training Program
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
P and A	Professional and Administrative
PDCs	Professional Development Courses
PH Cert-OHS	Public Health Certificate in Occupational Health and Safety
PhD	Doctor of Philosophy
PHI	Public Health Institute
PPRTP	Pilot Projects Research Training Program
PubH	Public Health
R2P	Research to Practice
RN	Registered Nurse
RRC	Preventive Medicine Residency Review Committee
RRV	Red River Valley
RWJ	Robert Wood Johnson Foundation
Sc.D	Doctor of Science
SEP	Special Emphasis Panel
SPH	School of Public Health
TLV	Threshold Limit Value
UMAB	University of Maryland, Baltimore
UMN Partnerships	University's Regional Partnership for Sustainable Development
USDA	United States Department of Agriculture

II. Introduction and Executive Summary

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A. Introduction

The mission of the Midwest Center for Occupational Health and Safety (MCOHS) Education and Research Center (ERC) is to ensure a Center of Excellence that provides: 1) cutting-edge interdisciplinary academic and research training to prepare exceptional leaders who make significant contributions to the field of occupational health and safety, and (2) continuing education to prepare professionals in the field to address current and emerging threats to the nation's health and safety. This ERC, one of 16 nationwide, was designed in response to a mandate of the National Institute for Occupational Safety and Health (NIOSH) -- to provide an adequate supply of qualified personnel to carry out the purposes of the Occupational Health and Safety Act and reduce the national burden of work-related injury and illness. The MCOHS, recognized regionally, nationally and internationally for its impact, has a service area that includes Minnesota, Wisconsin, and North and South Dakota. The MCOHS provides graduate degree programs, continuing education and outreach activities, and serves as a regional resource for industry, labor, federal, state, and local government agencies, agriculture, and other interested parties.

For over 30 years, the MCOHS has successfully served the educational and research needs of occupational health and safety professionals and workers in the upper Midwest and nationally and, more recently, at the global level. Outstanding graduate and continuing professional education programs have been created in: occupational medicine; industrial hygiene; occupational and environmental health nursing; occupational injury prevention research; and occupational health services research and policy. Selected academic and continuing education (C.E.) training programs also offer innovative specialization tracks and continuing education in agricultural safety and health and hazardous substances to better meet the health and safety needs of a diverse workforce. The Minnesota ERC is an interdisciplinary NIOSH-supported consortium, encompassing various academic units at the University of Minnesota, clinics at HealthPartners/Regions Hospital, and numerous government, industry, and community sites for trainees' practical experiences. An external advisory board, consisting of occupational safety and health practitioners and community leaders, advises the Center's administration and faculty on trends shaping practice in occupational safety and health and implications for the Center's education, research, and outreach efforts.

B. Executive Summary

During the reporting period July 1, 2006 to June 30, 2007, 15 students successfully completed degrees: 10 Master of Public Health (MPH); one Master of Science (MS); two dual degree (MS/MPH); and two doctoral (PhD). During the same time, 32 masters' students and 19 doctoral students were enrolled. Information on trainee theses and dissertations is located in the tables provided.

An extensive number of externally-funded research grants, generated by program faculty (n=96, including five new grants), in concert with center support, provided strong support for the high quality of research production by the programs. MCOHS faculty and trainees produced a total of at least 101 peer-reviewed publications and reports, and made at least 77 presentations concerning their work on related occupational safety and health issues. Presenting these results to audiences beyond our immediate MCOHS region extends the reach, visibility, and reputation of our Center. Many of the papers and presentations provided a basis for translation of research into practice (R2P). (Refer, also, to a brochure: <http://www.cpheo.sph.umn.edu/img/assets/9114/rtp.pdf>). Responsible conduct of research training has been provided for all NIOSH-supported trainees and others participating in the occupational health and safety program.

Trainees and faculty have earned several awards for their meritorious research, teaching, outreach and service during this reporting period. A minimum of seven masters' and doctoral students and seven faculty members received such awards.

Continuing education (CE) offerings to occupational safety and health professionals, managers, organized labor representatives, workers, and members of the general public, totaled 35 courses (11 were multidisciplinary, representing seven disciplines) with 614 face-to-face and 1,012 multidisciplinary online registered attendees for the respective courses; with the addition of 108 Agricultural Safety and Health program attendees and 242 Hazardous Substances Training program trainees, this accounted for a total of 1,976 participants. A total of 2,817 online users also downloaded from the various website offerings occupational safety and health.

The Minnesota ERC is responsible for preparing and maintaining the online NIOSH Catalog of CE Courses offered by all ERCs in the nation. The individual ERC's update their information on a regular basis and the MCOHS reviews and maintains the website, develops, prints and mails the brochure and associated materials to the individual centers. Relevant links are provided to the various ERC CE Programs.

Outreach efforts are conducted by all faculty in the ERC and embrace national, regional and local groups. Occupational safety and health practitioners, industry, labor groups, individual workers and the general public have all received assistance from the ERC faculty. Of particular note is the participation of the Center's Director and Deputy Director in national discussions about the structure and funding of ERCs, and the future roles and activities of these Centers.

The Occupational and Environmental Medicine (OEM), Industrial Hygiene (IH), Occupational and Environmental Health Nursing (OEHN), and Occupational Injury Epidemiology and Control (OIECP) programs updated prior surveys of alumni, which asked them to

rate the value of, and personal proficiency in, core competencies for their respective disciplines. The most recent survey, completed in 2006, provided findings that graduates of occupational health and safety programs continue to rank our competency set as high in value and report high levels of proficiency in most competencies. The findings from this survey have been reported in a manuscript, prepared for peer-reviewed publication.

New faculty positions include: 1) Jeffrey Mandel, MD, MPH, who was appointed in 2006 as a faculty member in the Division of Environmental Health Sciences, School of Public Health. He has served on the Graduate Faculty at the University of Minnesota since 1989 and is board certified in internal medicine and occupational medicine and is a fellow in the American College of Occupational and Environmental Medicine. His research interests have focused on occupational exposures and health outcomes. Specific expertise includes clinical and epidemiologic aspects of asbestos, silica, benzene, trichloroethylene and other halogenated solvents, isocyanates, acrylates, vinyl chloride, methylene chloride and several fluorinated compounds. Disease categories of interest include occupational cancer, occupational asthma and occupational health disease. Dr. Mandel has been involved with the OEM program, and center at-large, to enhance collaborative research efforts. 2) Heidi RoeberRice, MD, MPH, who in January 2007, assumed the role of OEM Residency Program Director when Dr. Baker resigned from that position for personal reasons. Dr. Baker worked closely with Dr. RoeberRice to transfer program leadership responsibilities and continues to be involved in program teaching and research. Dr. RoeberRice also works closely with Drs. Michael McGrail and Jeffrey Mandel in this leadership capacity, both of whom directed the program previously, and with Dr. Ian Greaves, who also has an in-depth understanding of the program. She is also involved in collaborative research with OEM trainees and faculty members from other ERC programs. She currently serves as a member of the American College of Occupational and Environmental Medicine, the American College of Preventive Medicine, the Residency Advisory Committee, Occupational Medicine Residency, and the Graduate Medical Education Committee, HealthPartners Institute for Medical Education.

A number of new courses or curricula were developed, both for academic and continuing education credit. These include: a new "Genomics Project" (principles, ethics/legal issues and implications of genomics to public health practice for on-campus and online delivery) involving several partners; four, three-hour Hazardous Materials Awareness Trainings, customized to include blood borne pathogen content; two hours of toxic awareness training for the Eco Education consortium of middle/high school teachers, St Paul, Minnesota; Hazardous Material (Haz Mat) High Pressure Equipment training; Hazard Awareness Training for Solid Waste Workers, Leech Lake Reservation, Cass Lake, Minnesota; "The FUN of Aerosols: Fine, Ultrafine, and Nano Particles in Workplace Atmospheres;" a newly integrated academic and practicum program for Occupational and Environmental Medicine Residency (OEM) Training Program, allowing for earlier clinical exposure to issues of employee health and safety, as well as providing more evenly distributed research time throughout the training program; Measurement and Properties of Air Contaminants and PubH 6100: Advanced Topics in Human Exposure Science. Measurement and Properties of Air Contaminants deal with the techniques of air sampling for gases, vapors, and aerosols and the physical principles underlying measurement methods and properties of airborne contaminants; Advanced Topics in Human Exposure Science addresses exposure assessment strategies in occupational and non-occupational settings, statistical methods for handling exposure data, techniques such as source apportionment, dose reconstruction, professional judgment and Bayesian methods; reorganization of PubH 6122 Safety in the Workplace Seminar Series, involving key guest faculty from: Occupational Safety and Health Administration; Department of Labor and Industry; Carpenters' Union; Federal Aviation Agency; Private Safety Consulting Business; General Mills Corporation; and the University of Minnesota Transportation Research Laboratory.

Although the MCOHS is located in a region where minority populations are proportionately small, relative to other areas of the country, the Center has maintained a trainee enrollment of 10-15% students of color over the last five years; this compares with a general population level of approximately 9% in the Twin Cities and less than 5% in rural Minnesota and elsewhere in the region. Numerous strategies have been successful in attracting highly qualified students including: national and local advertising; dissemination of brochures at conferences, directed postal and email communication; presentations in undergraduate courses; program websites; and collaboration with the Director of the SPH Recruitment and Multicultural Services. Alumni and current students continue to recruit highly qualified applicants to the program. The SPH has also implemented a tuition-incentive program. This program grants in-state tuition rates to qualified out-of-state students who have career aspirations in serving underrepresented populations.

The Midwest Center for Occupational Health and Safety has continued to provide excellence in graduate and continuing professional education in occupational safety and health and incorporate novel distance learning technologies to serve the needs of a diverse workforce. Through these efforts, the MCOHS has continued to produce the leaders who make important contributions to the safety and health of the nation's workforce. The Center assures excellence in occupational health and safety education and research for the Midwestern United States that is recognized globally.

A. Major Accomplishments

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A. Major Accomplishments

1. Overview

The Midwest Center for Occupational Health and Safety (MCOHS) had a very productive year in training occupational health and safety practitioners, translating research into practice, and collaborating on research and educational opportunities in numerous ways that impact the Occupational Health Practitioners in the immediate MCOHS region and beyond. During the past year, 15 students successfully completed degrees: 10 Master of Public Health (MPH); one Master of Science (MS); two dual degree (MS/MPH); and two doctoral (PhD). These graduates have successfully obtained positions such as: Industrial Hygienists, Occupational and Environmental Health Nursing Specialist, Regulatory Affairs Specialist, Health Officer of a county health department, manager of a medical and health department, and a Post Doctoral fellow. (Refer to program tables for complete information.) As a result of their MCOHS training, alumni of the MCOHS were surveyed in 2006, and reported valuing and feeling proficient in key occupational health and safety competencies. The survey results confirmed that the MCOHS has made great strides in research and training in the past; these results also assist in strategic planning for the future of the Center.

2. Research Publications and Presentations

Publications in peer-reviewed journals addressed research in occupational health and safety. Major themes of this Education and Research Center's (ERC) research are noted below, with specific examples of faculty, student and staff publications identified. A list of 101 publications is included in the Appendices. Faculty regularly encourage students to present their research at professional meetings; 77 faculty and student research presentations are also identified in the Appendices and include research disseminated at local, regional, national and international professional meetings. Students were directly involved in a minimum of 36 publications and 32 presentations. Presenting these results to audiences beyond our immediate MCOHS region extends the reach, visibility, and reputation of our Center. Many of the papers and presentations provided a basis for translation of research into practice (R2P). Many of the papers and presentations provided a basis for translation of research into practice (R2P). (Refer, also, to a brochure: <http://www.cpheo.sph.umn.edu/img/assets/9114/rtp.pdf>).

3. Newly Funded Research Grants in Occupational Health and Safety

Key and Supporting ERC faculty have extensive funded research efforts, including at least 96 currently funded grants, with at least 11 newly funded in the last period. These and other research efforts provide major opportunities for student involvement. Selected examples of newly funded projects for this reporting period follow.

Dr. Mandel joined the ERC's occupational and environmental medicine faculty in 2006 and has been instrumental in developing a new research project focused on the taconite mining industry in northeastern Minnesota. This is a collaborative effort with the Minnesota Department of Health that is a three-part investigation including a cohort mortality study of employees in the taconite mining industry (n=72,000), a nested case-control study of mesothelioma cases occurring within the above cohort, and a cross-sectional assessment of respiratory health within current and former miners of the taconite industry. Initial funding was provided by the University of Minnesota under special arrangement with the Minnesota Legislature. Other ERC faculty and staff collaborating with Dr. Mandel include Drs. Alexander, Ramachandran, Greaves, and Bender.

Drs. Raynor and Shutske are co-investigators on a new Centers for Disease Prevention and Control (CDC) funded Upper Midwest and Thailand Zoonotic Disease Cooperative Research Center. This Center, funded in the latter half of 2006, is directed by Dr. Marguerite Papaioanou (Division of Epidemiology and Community Health) and is focused on the ability of low-pathogenic avian and swine influenza viruses to be transmitted from animal hosts to humans. A key part of Dr. Raynor's effort is to measure the effect that hygiene and personal protection interventions have on the rates of virus transmission to persons working with infected animals. Dr. Raynor has also started a new collaboration with staff members of the Center for Infectious Disease Research and Policy on developing guidance documents for the response to actionable results from the national BioWatch airborne pathogen detection program. This activity is funded by the Department of Homeland Security.

Ms. Schermann, Agricultural Safety and Health (ASH), also has funding to collect data from chicken and duck farmers, market managers, veterinarians and animal health workers, and local government officials in the Red and Mekong River Delta Regions of Vietnam. Goals are to: learn about the behaviors, practices, and beliefs of poultry producers related to HP Avian Influenza Virus (AIV) H5N1 transmission and prevention; learn from producers about current interventions and their ideas for new interventions for prevention; identify barriers to current interventions; learn about communication channels and perceived effectiveness; and learn about surveillance practices.

Dr. Ramachandran is serving as coinvestigator on a new project, funded by the National Science Foundation, that is evaluating oversight models for active nanostructures and nanosystems. With funding from 3M Company in 2006-2007, Dr. Raynor has been working with Dr. Ramachandran to measure occupational exposures to nanoparticles and to determine the most appropriate metrics for measuring exposure to nanoparticles in workplaces worldwide.

Professor Ramachandran is also serving as coinvestigator on a new project titled, Healthy Homes Technical Studies Grant Program, funded by the United States Department of Housing/Urban Development (HUD). The project investigates the physical factors that affect the retention of allergens in settled dust in carpets. These studies have potential applications to office workplace settings that typically have commercial carpeting of the type studied in this project.

Dr. McGovern was awarded funding from the Academic Health Center Health Disparities Research Program to support a qualitative investigation of women's perception of pesticide exposures in Minnesota's Red River Valley. Maggie Stedman Smith, (Occupational and Environmental Health Nursing (OEHN) and ASH doctoral student) has been using these data for her dissertation research. Collaborators on the project include: University of Minnesota Regional Sustainable Development Partnerships; the White Earth Tribal Community College; the Immigrant Development Center, Moorhead, Minnesota; the Women, Infant and Children Program, Quin Community Health Services, Hallock, Minnesota; and the MCOHS Continuing Education Program (Kathy Smith and Ruth Rasmussen).

Dr. Gerberich was awarded funding from NIOSH for a five year study, "Consequences of Injuries among Children," in collaboration with research team colleagues (Drs. Alexander, Church, McGovern, Dowd, others), staff (A. Ryan), and OIPRTP doctoral student Q. Williams. The major goals of this research are to identify physical, psychosocial, and economic consequences of injuries that occur among children and youths living/working in agricultural operation households, in a five-state region; a unique design enables examination of potential changes between baseline and follow-up data, comparing injured and non-injured households while controlling for important factors including injury/illness experience among other household members. This study has been implemented in the mid-west region, involving Minnesota, Wisconsin, North and South Dakota, and Nebraska, in collaboration with the United States Department of Agriculture (USDA), National Agriculture Statistics Service, and agricultural extension representatives in each state.

Drs. Shutske and Raynor and student Peri Periakruppen were funded by the Minnesota Department of Agriculture and National Institute for Occupational Safety and Health to conduct a comprehensive, quantitative analysis of Minnesota's fluid milk system. An objective was to identify risks to workers from their exposures to chemical or biological agents that could be used in a contamination event.

Dr. Shutske collaborated with Goodwill/Easter Seals Minnesota in a USDA funded project which provides research-based information, on-site visits, individualized assessment, and education for Minnesotans with disabilities who have goals to safely continue farming and/or farm-related occupations. The project targets farmers, farm family members, agricultural workers, rural health care providers and agri-business leaders through educational presentations, regular mailings, collaborative service agreements, a peer support network, and on-site visits.

Dr. Shutske was also funded by the USDA to develop a comprehensive, research-based assessment (titled "ERPIQ" – Emergency Response Plan IQ) educational programs to improve the skills of growers and encourage specific actions and behaviors that will help growers improve their business and reduce risk.

Dr. Alexander was funded by the CDC for a respiratory health screening study of a population with potential environmental exposures to asbestos from a vermiculite processing plant in northeast (NE) Minneapolis, Minnesota. The NE Minneapolis study is the first study to examine potential health outcomes at the community level from a vermiculite processing plant outside of Montana and the findings will be important in addressing the potential health risks in the hundreds of other communities that also processed Libby vermiculite. In addition to the communities, at large, this is of particular importance to the workers as well as others, including families and significant others, who may experience secondary hazardous exposures.

4. New Courses or Curricula

New courses or curricula were developed, both for academic and continuing education credit. Highlights from the reporting period are noted below:

The Center for Public Health Education and Outreach (CPHEO: Director, Associate Dean Olson) has been instrumental in developing innovative educational programs for academic credit and continuing professional education, and providing synergy among ongoing educational programs to enhance the capacity of the MCOHS efforts in continuing education throughout the region. Examples of new efforts include the following:

Associate Dean Olson serves as co-principal investigator of a new "Genomics Project" with Environmental Health Sciences (EHS) division head, Professor William Toscano. Through a partnership with the Division of EHS, the Minnesota Department of Health, the Centers for Public Health Education and Outreach (CPHEO) has developed academic credit courses on the principles, ethics/legal issues and implications of genomics to public health practice for on-campus and online delivery. The first session was presented at the May 2007 Public Health Institute in which there were 26 attendees, representing current professional workers, community advocates, and future public health workers.

Under the direction of Lois Harrison, new or newly revised curricula were developed for the Hazardous Materials continuing education program. This included four, three-hour Hazardous Materials Awareness Trainings that were customized to include blood-borne pathogen content. These courses were presented to separate audiences for the City of White Bear Lake, Minnesota (MN) during

2007, reaching over 100 City employees. Additionally, two hours of toxic awareness training were offered to the Eco Education consortium of middle/high school teachers, St Paul, MN in November 2006, and Hazardous Material (Haz Mat) High Pressure Equipment training was offered to workers in Federal Dam, MN (adjacent to Leech Lake Reservation) with 23 attendees, April, 2007.

Also serving the needs of the Hazardous Materials continuing education program, Dr. Raynor served as Instructor for Hazard Awareness Training for Solid Waste Workers, Leech Lake Reservation, Cass Lake, MN, August 2006 (n = 8 trainees). Dr. Raynor also served as a co-instructor, "The FUN of Aerosols: Fine, Ultrafine, and Nano Particles in Workplace Atmospheres", Professional Development Course #425, *2007 American Industrial Hygiene Conference and Exposition*, Philadelphia, Pennsylvania (n = ~40 trainees). Over the past year, Drs. RoeberRice and Baker have developed a new two-year integrated academic and practicum program for Occupational and Environmental Medicine Residency (OEM) Training Program. Key elements of curriculum change include an integration of the academic and practicum components of the OEM residency training program over the full two-year period. This allows for earlier clinical exposure to issues of employee health and safety, as well as more evenly distributed research time throughout the training program.

Dr. Ramachandran developed two new courses, PubH 6100: Measurement and Properties of Air Contaminants and PubH 6100: Advanced Topics in Human Exposure Science. Measurement and Properties of Air Contaminants will deal with the techniques of air sampling for gases, vapors, and aerosols and the physical principles underlying measurement methods and properties of airborne contaminants. Advanced Topics in Human Exposure Science will deal with exposure assessment strategies in occupational and non-occupational settings, statistical methods for handling exposure data, techniques such as source apportionment, dose reconstruction, professional judgment and Bayesian methods. The courses are designed for 25 students each. Both courses are two credits each and, together, replace PubH 6171 (3 credits). They are required of all Industrial Hygiene and Hazardous Substance Academic Training (HSAT) MS and MPH students, but students from other subdisciplines and departments are also be interested in these courses.

Dr. Gerberich reorganized PubH 6122 Safety in the Workplace Seminar Series for Spring 2007 that also involved key guest faculty from: Occupational Safety and Health Administration; Department of Labor and Industry; Carpenters' Union; Federal Aviation Agency; Private Safety Consulting Business; General Mills Corporation; and the University of Minnesota Transportation Research Laboratory.

5. New Collaborations with Other Organizations

In addition to the collaboration on grant opportunities, described above, a Memorandum of Understanding to establish an affiliation between the University of Minnesota Division of EHS, School of Public Health and HealthPartners Research Foundation was recently signed. HealthPartners Research Foundation (HPRF), located in Bloomington, Minnesota, is the research arm of HealthPartners managed care organization. This integrated health care system consists of a large network of owned and contracted clinics, medical and dental centers that provide health care services and coverage to more than 650,000 members in the Twin City metro area. The HPRF has a professional support staff of over 90 members, including 20 career research scientists, 45 clinician researchers, and 11 programmer/analysts. This year, HPRF is conducting more than 170 research projects encompassing preventive care, clinical care, health services, outcomes, guideline evaluation, epidemiology and basic science. HPRF has dedicated research administration staff, a data collection center, and a human participant's protection staff. The memorandum formally acknowledges a collaborative effort between the two institutions for the conduct of research relating to the environment and its effect on human health. While researchers in both organizations have collaborated for many years on research of mutual interest, the intent of this memorandum was to set up a structure that is deliberate in facilitating linkages and collaboration among researchers from these institutions.

Another example of a new regional collaboration includes a CE effort. Ms. Smith, CE Director, worked with the Iowa ERC and Central States Occupational Medicine Association (CSOMA) to plan and organize the CSOMA fall 2006 conference. She also worked with the new occupational safety and health coordinator for Environmental Resource Management (ERM) in China to conduct the OSHA 511 Occupational Safety and Health Standards for General Industry for 32 employees in Shanghai, People's Republic of China.

6. Awards/Promotions

Faculty and students have earned several awards for their meritorious research, teaching, outreach and service during this reporting period. Selected examples include the following.

- Dr. Susan Gerberich, was appointed to Mayo Professor of Public Health, School of Public Health (SPH). This award is the school's highest recognition of its faculty members. The professorship recognizes the achievements of senior SPH faculty members who demonstrate excellence in research, teaching and outreach. Gerberich is best known for helping to found and being a major contributor to the field of injury prevention research.
- Dr. Patricia McGovern was promoted to the rank of full Professor in June 2007.
- Associate Professor Dr. Brosseau was named the 2007 American Council of Governmental Industrial Hygienists (ACGIH) Meritorious Achievement Award recipient. This award is presented annually to members who have made an outstanding, long-term contribution to the field of occupational health and industrial hygiene.

- Associate Dean Olson was inducted into the Fellows of the American Association of Occupational Health Nurses in recognition of occupational and environmental health nurses who have made significant contributions to the field of occupational and environmental health nursing in the areas of clinical practice, education, research, management, or policy (2007).
- Professor John Shutske received the "Superior Paper" award from American Society of Agricultural and Biological Engineers (ASABE), given to the top 2.5% of published journal articles in ASABE's three primary peer-reviewed journals, for the paper: Testing and Creation of a Safety System to Disengage the PTO of a Tractor, *Applied Engineering in Agriculture* 22(1): 5-12.
- Assistant Professor Nancy Nachreiner received the "Faculty Excellence Award" from the graduating class of 2007 in the Division of EHS.
- Statistical Applications Analyst, Andrew Ryan, received the School of Public Health (SPH) Academic Professional and Administrative (PandA) Excellence Award for outstanding initiative, skill, and commitment that he contributes to the mission of the school (2006).
- Doctoral student, Kathleen Ferguson Carlson received the Injury Control and Emergency Health Services Section (ICEHS) Student Paper Competition Award in 2006 at the American Public Health Association (APHA) meeting in Boston ("Regional Rural Injury Study - II: Children's Behavioral Traits and Risk of Agricultural Injury," Advisor: Dr. Gerberich). She also received the Harold R. Shipman Award for Outstanding Academic Achievement in Environmental and Occupational Health, University of Minnesota (U of M), Division of EHS, 2006.
- Doctoral candidate, Denise Feda, was elected to serve as the U of M campus liaison to the Student Assembly of the American Public Health Association. Campus liaisons advance the mission of the Student Assembly of APHA to enhance students' education and professional development. (Advisors: Drs. Gerberich and Alexander)
- Doctoral student, Rolando Gonzalez, received an award from the Association for Professionals in Infection and Control and Epidemiology Research Foundation's Student Grant Program for his research project titled, "Evaluating Factors Affecting the Performance of Airborne Infectious Isolation Rooms." (Advisors: Dr. Raynor, and Andrew Streifel, MPH). The investigators developed a methodology to evaluate airborne infection isolation room (AIIR) containment of contaminated air using carbon dioxide as a tracer gas.
- Occupational medicine resident, Eileen Greenwald, received the American College of Occupational and Environmental Medicine Residents' Research Presentation Award for her study, "Curvilinearity in an expiratory flow-volume curve and the severity of chronic obstructive pulmonary disease (COPD)" at the American Occupational Health Conference in New Orleans, LA, in May 2007.
- Doctoral candidate, Starr Kelly Sage, (Advisor: Dr. Gerberich), was awarded the Minnesota Environmental Health Association's (MEHA) Mary Lauren Olson Memorial scholarship. Starr's primary research interest is in addressing the undue burden of injuries and hazardous exposures on persons of color and low-income individuals. She was recognized at the MEHA winter conference in January 2007.
- Doctoral student, Maggie Stedman-Smith, (Advisor: Dr. McGovern) was awarded a fellowship for her dissertation research involving a needs assessment of pesticide exposures among women and children in the Red River Valley. The fellowship was awarded by the Society for Public Health Education, and the Agency for Toxic Substances and Disease Registry (ATSDR)
- Masters student, Girard Griggs, (Advisor: Dr. Ramachandran) won the 2007 3M Industrial Hygiene Scholarship Award. Girard has also been awarded the 2007-2008 TSI/Arthur J. Abrams Memorial Scholarship by the Board of Trustees of the American Industrial Health Association

The MCOHS has a solid history of successfully educating students and conducting research over the past 30 years. As evidenced by these examples of numerous research publications and presentations, newly gained funding, new courses, awards and promotions of faculty, staff and students, the MCOHS continues to be an innovative and dynamic center that positively influences the field for Occupational Health Practitioners, both in the local region and beyond. Graduates of the MCOHS have found the skills they have learned to be valuable for their work as Occupational Health Practitioners, and the Center will continue to train and translate cutting-edge research to practice for the next generation of practitioners.

B. Significant Changes - July 1, 2006–June 30, 2007

Significant Changes - July 1, 2006 – June 30, 2007**New faculty positions include:**

1) Jeffrey Mandel, MD, MPH, Associate Professor, was appointed in 2006 as a faculty member in the Division of Environmental Health Sciences, School of Public Health. He has worked extensively with faculty and residents to increase research opportunities, and serves also as a member of the Residency's Advisory Committee. He has served on the Graduate Faculty at the University of Minnesota since 1989 and is board certified in internal medicine and occupational medicine and is a fellow in the American College of Occupational and Environmental Medicine. His research interests have focused on occupational exposures and health outcomes. Specific expertise includes clinical and epidemiologic aspects of asbestos, silica, benzene, trichloroethylene and other halogenated solvents, isocyanates, acrylates, vinyl chloride, methylene chloride and several fluorinated compounds. Disease categories of interest include occupational cancer, occupational asthma and occupational health disease. Dr. Mandel has been involved with the OEM program, and center at-large to enhance collaborative research efforts.

Since his arrival on the faculty, Dr. Mandel has initiated two major efforts:

a) Dr. Jeff Mandel, with Professor McGovern, implemented a Memorandum of Understanding in 2007 between HealthPartners and the School of Public Health, Division of Environmental Health Sciences (EHS) to collaborate on research endeavors. HealthPartners Research Foundation (HPRF), located in Bloomington, Minnesota, is the research arm of HealthPartners managed care organization. This integrated health care system consists of a large network of owned and contracted clinics, medical and dental centers that provide health care services and coverage to more than 650,000 members in the Twin Cities metro area. The HPRF has a professional support staff of over 90 members, including 20 career research scientists, 45 clinician researchers, and 11 programmer/analysts. This year, HPRF is conducting more than 170 research projects encompassing preventive care, clinical care, health services, outcomes, guideline evaluation, epidemiology and basic science. HPRF has dedicated research administration staff, a data collection center, and a human participant's protection staff. The memorandum formally acknowledges a collaborative effort between the two institutions for the conduct of research relating to the environment and its effect on human health. While researchers in both organizations have collaborated for many years on research of mutual interest, the intent of this memorandum is to set up a structure that will be deliberate in facilitating linkages and collaboration among researchers from these institutions. This creates a new opportunity to more easily access clinical data and cost information, and provides a strong research partnership. The HealthPartners Research Foundation may also have small amounts of money for pilot projects for students and junior faculty.

b) Dr. Mandel has also been instrumental in developing and leading a new research project focused on the taconite mining industry in northeastern Minnesota. This is a collaborative effort with the Minnesota Department of Health that is a three-part investigation including a cohort mortality study of employees in the taconite mining industry (n=72,000), a nested case-control study of mesothelioma cases occurring within the above cohort, and a cross-sectional assessment of respiratory health within current and former miners of the taconite industry. Initial funding was provided by the University of Minnesota under special arrangement with the Minnesota Legislature. Other ERC faculty and staff collaborating with Dr. Mandel include Drs. Alexander, Ramachandran, Greaves, and Bender.

2) Heidi RoeberRice, MD, MPH, assumed the role of OEM Residency Program Director, on January 1, 2007, when Dr. Baker resigned from that position for personal reasons. Dr. Baker worked closely with Dr. RoeberRice to transfer program leadership responsibilities and continues to be involved in OEM program teaching and research. Dr. RoeberRice also works closely with Drs. Michael McGrail and Jeffrey Mandel in this leadership capacity, both of whom directed the program previously, and with Dr. Ian Greaves, who also has an in-depth understanding of the program. Dr. RoeberRice was appointed as a faculty member in the Division of Environmental Health Sciences, School of Public Health and is involved in collaborative research with OEM trainees and faculty members from the other ERC programs. She currently serves as a member of the American College of Occupational and Environmental Medicine, the American College of Preventive Medicine, the Residency Advisory Committee, Occupational Medicine Residency, and the Graduate Medical Education Committee, HealthPartners Institute for Medical Education. In addition to her involvement in teaching in the residency program, Dr. RoeberRice has also worked with Dr. McGovern to host the OEHN students in the required 1 credit field experience (PubH 7196) and Occupational and Environmental Medicine (OEM) clinical rotation. She also facilitates monthly Community Grand Rounds in OEM, guest lectures in PubH 6170 (Introduction to Occupational Health and Safety), served as course faculty for the NIOSH spirometry training program through the MCOHS, and assists with student groups in PubH 6150 (Interdisciplinary Evaluation of Occupational Health and Safety Field Problems).

C. ERC Website

Midwest Center Website: <http://cpheo.sph.umn.edu/mcohs/>

1. Links to Academic Programs: <http://cpheo.sph.umn.edu/cpheo/mcohs/about/activities.html>

IH: <http://enhs.umn.edu/files/ih.html>

OEHN: <http://enhs.umn.edu/files/ohn.html>

OEM: <http://ime.healthpartners.com/IME/Menu/0,1637,1925,00.html>

OHSRP: <http://enhs.umn.edu/ohsrp/index.html>

OIPRTP: <http://enhs.umn.edu/oiprtp/index.html>

HSAT: <http://enhs.umn.edu/files/hazsub.html>

ASH: <http://safety.coafes.umn.edu/>

2. Links to CE Programs: <http://cpheo.sph.umn.edu/mcohs/>

3. Faculty/Staff Directory: http://cpheo.sph.umn.edu/cpheo/mcohs/about/Executive_Committee.html

III. Program Progress Reports

A. Centerwide Programs: Center Administration

A.1.1. Center Administration

A.1.2. Program Director: Ian A. Greaves, B Med Sci, MB BS, FRACP, FAAS

A.1.3. Program Description

The mission of the Minnesota Education and Research Center (ERC) is to provide outstanding academic and continuing education programs to professionals in the key disciplines of occupational health and safety, to conduct outreach to various stakeholders and community groups, and to undertake research of occupational health and safety problems in keeping with priorities of the National Occupational Research Agenda of NIOSH. The region served by the Minnesota ERC includes the states of Minnesota, Wisconsin, and North and South Dakota. Within that region is one NIOSH Training Program Grants (TPGs), located at the University of Wisconsin-Stout. The Minnesota ERC has interactions with this TPG and also co-sponsors programs and collaborates with neighboring ERCs at the University of Iowa and the University of Illinois–Chicago. The Center Advisory Board comprised 14 practitioners and community leaders in occupational health and safety, representing government, industry and labor groups, who provided advice on OSH issues pertaining to the activities of the ERC. The Minnesota ERC is a consortium of efforts involving various departments at the University of Minnesota and at HealthPartners/Regions Hospital (Table 1, below).

Table 1. Core/Supplementary Programs and Participating Sites

<u>Program</u>	<u>Primary Location(s)</u>	<u>Other Locations</u>
Occupational Medicine Residency	DM/SPH	CR
Industrial Hygiene	SPH	ME/BAE
Occupational Health Nursing	SPH	DM/BAE
Continuing Education/Outreach	SPH	
Agricultural Safety and Health	BAE/SPH	MES
Hazardous Substance Training	SPH	
Hazardous Substance Academic Training	SPH	
Occupational Health Services Research and Policy	SPH	
Occupational Injury Prevention Research Training	SPH	ME/BAE
NORA	SPH	

Abbreviations:

DM = Dept of Medicine, HealthPartners/Regions Hospital SPH = School of Public Health
 CR = Clinical rotations MES = Minnesota Extension Service
 BAE = Dept of Biosystems and Agricultural Engineering ME = Dept of Mechanical Engineering

Dr Ian Greaves, Center Director, monitored the administration and budget of the grant, including the day-to-day administration and overall direction of the ERC. He interacted with NIOSH staff and other ERC Directors on issues relating to the management and direction of the NIOSH ERC Program, attending national and other meetings to represent the Minnesota ERC.

Dr Lisa Brosseau, Deputy Director, performed much of the day-to-day administration, in consultation with Dr Greaves, and had responsibility for monitoring the various budgets and spending within the ERC. She supervised the grant Coordinator in her tasks, and interacted with the accounting and support staff to facilitate the ERC's functions.

Ms Ann Fredrickson, Coordinator, worked with Dr Brosseau on program evaluation efforts with surveys and focus groups with alumni and employers, including design, data collection, analysis, and preparation of articles for publication. She also coordinated outreach efforts with labor groups in development of the economic toolkit, production of grant renewal applications, annual reports to NIOSH, and general administrative matters.

Ms Sarah Waldemar and Mr Jim Fisher provided financial planning, budgeting and accounting assistance. Ms Waldemar was also the Office Manager in the Division of Environmental Health Sciences and assigned tasks to secretarial and other support staff as needed. Ms Karen Brademeyer provided word processing and secretarial support.

The ERC's Executive Committee (Table 2) was comprised of the Director, Deputy Director and the directors of the various Core and Allied Programs (including Continuing Education, NORA and Hazardous Substance Training). The Executive Committee met at four to six week intervals to discuss ERC administration and emerging issues, including reports and grant renewals. The meetings were used also to develop center-wide policies and to discuss interdisciplinary collaboration and other center-wide matters pertaining to the integration of the ERC.

Table 2. Executive Committee Members

ERC Director, Dr Ian Greaves
 ERC Deputy Director, Dr Lisa Brosseau
 Director, Occupational Medicine Residency – Dr Beth Baker (through 12/31/06); Dr Heidi RoberRice (01/01/07 - present)

Director, Industrial Hygiene – Dr Gurumurthy Ramachandran
 Director, Occupational Health Nursing – Dr Patricia McGovern
 Director, Continuing Education/Outreach – Ms Iris Staubus
 Director, Agricultural Safety and Health – Dr John Shutske
 Director, Hazardous Substance Academic Training – Dr Peter Raynor
 Director, Hazardous Substance Training - Ms Iris Staubus
 Director, NORA Drs Ian Greaves and Lisa Brosseau
 Co-Directors, Occupational Health Services Research and Policy - Drs Patricia McGovern and Bryan Dowd
 Co-Directors, Occupational Injury Prevention Research Training – Drs Susan Gerberich and Bruce Alexander

a. Goals and Objectives (Accomplishments for the MCOHS, based on these objectives are identified in subsequent sections, below.)

1. Provide outstanding academic education programs
2. Provide outstanding continuing education programs
3. Conduct outreach to various stakeholders and community groups
4. Undertake research of occupational health and safety problems in keeping with priorities of the National Occupational Research Agenda of the National Institute for Occupational Safety and Health

b. Responsible Conduct of Science Training

The School of Public Health considers ethics a core competency area of public health. All students seeking MPH degrees must take one of two Public Health courses: *Ethics in Public Health Practice and Policy*, PubH 6741, (1 credit) or *Ethics in Public Health Research and Policy*, PubH 6742, (1 credit). All students seeking MS or PhD degrees must take the latter course, which has half of the content devoted to the protection of human subjects and data confidentiality. Also, in PubH 6150, *Interdisciplinary Evaluation of Occupational Health and Safety Field Problems*, a substantial portion of the first class is devoted to research involving human subjects. All students are required to complete the University of Minnesota's online Informed Consent Tutorial, and to review a Human Subjects Guide, covering many aspects involving ethics and human subjects.

The University of Minnesota requires that all personnel involved in research with human subjects, including students, receive instruction in protecting human subjects in one of the following ways: a. review online materials available through the Collaborative Institutional Review Board Training Initiative (CITI) (hosted by the University of Miami Medical School server); b. review the University's Office of Human Research Protections' CD-ROM entitled *Investigator 101*; or c. the online *Human Participant Protection Education for Research Teams* from the National Institute of Health and the National Cancer Institute. These materials include the definition of human subjects in research; the responsibilities of the investigator; authority, composition, and procedures of Institutional Review Boards (IRBs); ethical principles; risk and benefits; the elements and process of informed consent; how to prepare an application and consent document; inclusion and recruitment of vulnerable populations; adherence to study protocol; and continuing review. There are advanced training resources available through the University's IRB website with links to materials addressing *The Responsible Collection, Retention, Sharing and Interpretation of Data* (<http://onlineethics.org/reset/mod/data.html>). The University also requires personnel with access to human subject data to take HIPAA training and complete annual updates.

c. Faculty Participation

Ian Greaves, MB BS, FRACP, FAAAS, Center Director, is an occupational and environmental medicine specialist who has directed the Minnesota ERC since 1990. As the Principal Investigator, he is responsible for overall management and productivity of the ERC, and has budgetary authority over the allocation and use of funds, according to NIOSH guidelines. Dr Greaves represents the ERC at national and regional meetings of ERC Directors, and interacts with the NIOSH Director and Staff, as necessary, on matters of policy and administration of the NIOSH ERC Program.

Lisa Brosseau, ScD, CIH, Center Deputy Director, is a nationally renowned industrial hygienist who formerly directed the ERC's Industrial Hygiene Program (1998-2004) and has been Deputy Director of the Center since 2004. Dr Brosseau is responsible for the day-to-day administration of the ERC, coordinating the efforts of the administrative, financial, and secretarial support staff. She oversees preparation of grant submissions and other reports to NIOSH, and assumes the responsibilities and authorities of the Center Director when Dr Greaves is traveling or otherwise unavailable. She interacts as necessary with NIOSH Staff to facilitate the daily functions of the ERC.

d. Curricula

Program curricula, including general course requirements and sample curricula, for each funded academic program, are provided in the **Appendices**.

A.1.4. Program Activities and Accomplishments

a. Progress toward goals and objectives (Accomplishments for the MCOHS, based on these objectives are identified in the sections, below.)

1. Provide outstanding academic education programs (Refer to specific program reports for greater detail.)

- Within the **MCOHS**, the Occupational and Environmental Medicine, Industrial Hygiene, Occupational and Environmental Health Nursing and Occupational Injury Epidemiology and Control (OEM, IH, OEHN, and OIEC) programs updated prior surveys of alumni, which requested graduates from 1992-2005 to rate the value of, and personal proficiency in, core competencies for their respective disciplines. (There were no graduates in the OIPRTP doctoral program, prior to 2005, since that is a recently implemented program; the OHSRP had a similar situation.) The most recent survey, completed in 2006, provided findings that graduates of occupational health and safety programs continued to rank the general MCOHS ERC competency set as high in value and reported high levels of proficiency for most competencies.
- **OEM**: One of the major accomplishments has been the implementation of a new curriculum model. The curriculum modifications were addressed to reflect the updated requirements and recommendations of the American Council on Graduate Medical Education (ACGME), American Board of Preventive Medicine (ABPM), CEPH and NIOSH. The Preventive Medicine Residency Review Committee (RRC) approved this change in 2006. Integrating these experiences throughout the two-year period facilitates earlier clinical exposure, provides increased flexibility to accommodate courses and allow for more evenly distributed research time.
- **IH**: IH results from the MCOHS survey of alumni for their satisfaction with, and perceived value and proficiency in their academic training, relevant to discipline-specific and cross-cutting professional competencies, were as follows: 75% (46 of 61) of the IHS contacted participated; 72% were "highly satisfied" or "satisfied" (24%) with their graduate education in occupational safety and health (OSH) and 89% were working in OSH. Among those who responded, 79% had current certification as CIHs and 37% as CSPs
- **HSAT**: Results of the alumni survey, involving the Hazardous Substances Academic Training Program (HSAT), a program within **IH**, indicated that 10 of 46 IH graduates also identified themselves as alumni of the HSAT Program. Most HSAT alumni were "very satisfied" (60%) or "somewhat satisfied" (30%) with their education and 90% were currently working in OSH positions.
- **OEHN**: Results from the MCOHS survey of alumni for their satisfaction with and perceived value and proficiency in their academic training, relevant to discipline-specific and cross-cutting professional competencies, were 73% (24) of those contacted, participated; 92% were "highly satisfied" and 8% were "satisfied" with their education and 63% were working in occupational health and safety.
- **OHSRP**: As evidenced by the examples of research publications and papers in press and presentations, new projects, courses, awards and promotions of faculty and students, and examples of impact on the field, this program continues to be both innovative and dynamic and positively influences the field for occupational health services research.
- **OIPRTP**: During this period, two students graduated in 2006 and have acquired excellent positions (Table 5). The program research efforts have been strongly supported by many externally funded grants generated by the program faculty; numerous publications and presentations, involving students and faculty, resulted (**Appendix**). Students, as well as faculty, were also the recipients of many prestigious awards during this period (OIPRTP Program Report).
- **ASH**: This is a supporting program that has collaborated with IH, OEHN, and OIPRTP, thus, providing enhanced program opportunities for these students. This program has been most successful in addressing unique agricultural populations.

2. Provide outstanding continuing education programs (Refer, also, to specific program reports.)

- The CE Program, in concert with ERC academic program directors, added to the successful NORA presentations in June 2007, by presenting a "Research-to-Practice (r2p) Symposium (now available as a webcast), involving two key national speakers and a research poster session of student and faculty research; 45 participants were involved in this onsite program.
- The CE Program continues to expand its strong tradition of collaboration, outreach and leadership with professional organizations. The Team Approach is a unique interdisciplinary effort – sponsored annually by the American Society of Safety Engineers – Northwest (ASSE-NW) chapter, American Industrial Hygiene Association-Upper Midwest section (AIHA-UM - Minnesota Association of Occupational Health Nurses (MAOHN), North Central Occupational and Environmental Medicine Association (NCOEMA), North Star Chapter of the Academy of Certified Hazardous Materials Managers, MCOHS and the Minnesota Safety Council (MSC). The 2006 Team Approach Program was presented through multiple teaching approaches, including face-to-face, online, etc.
- Significant progress was made in distance-based education, visible in: 1) online course components available as part of the MCOHS Regents Certificate in OSH and three additional public health certificates; 2) modularized core OSH program academic course content and developed into distinct web-based learning activities; 3) National Occupational Research Agenda (NORA) programs - expanded their reach with online webcast/video-streamed versions of face-to-face programs; 4) blended courses offered for two certification review courses; and 5) Team Approach program "Pandemic: Are You Ready", captured and offered as a free web-cast.
- During 2006-2007, face-to-face courses were marketed through a variety of new venues, including the Minnesota Fire Chief's Association, the Minnesota Police Chief's Association, the Minnesota Pollution Control Agency, the University of Minnesota's Technical Assistance Program, the Minnesota State Fire Department Association, and the Minnesota Governor's Conference on Emergency Preparedness. The HST program also maintained strong partnerships with the Minnesota Pollution Control Agency, MN OSHA, the Minnesota Department of Natural Resources, the Minnesota Department of Agriculture, the Minnesota Department of Public Safety, and Minnesota Department of Health. Hazardous Substance Training courses were marketed through regional professional organizations and through MCOHS and NIOSH ERC exhibits at national and local professional meetings.

- During 2006-2007, HST-CE 22 face-to-face courses were offered to over 220 participants. Courses ranged from three-hour hazardous awareness trainings to 40-hour (five-day) emergency response. Courses were offered to a variety of audiences, including public health departments, tribal entities, fire departments and city public works departments, both at their location and at the CE training center. Twenty-three requests for HST tuition subsidies were received and support was provided for the courses.

3. Conduct outreach to various stakeholders and community groups (Refer, also, to specific program reports.)

- The Center's history of outreach to other organizations, institutions, agencies and professional associations is substantial. This is facilitated by the adoption of outreach and service as a core value of the School of Public Health. In 2007, the role of the CE Program with the Minnesota Safety Council (MSC) expanded to not only active planning responsibilities but, also, the suggestion of a panel discussion on the topic of inclusion of culture in the workplace, which led to moderation of relevant panel discussions.
- Several agency partnerships with the Leech Lake Band of Ojibwe were established, bringing training to tribal workers across disciplines. These include the Leech Lake Department of Resource Management, tribal Police, Cass Lake Volunteer Fire Department, tribal Ambulance/Emergency Medical Services, tribal Health, and the Community Education Department of Leech Lake Tribal College.
- Four tailored three-hour Hazardous Materials Awareness courses were presented to the City of White Bear Lake (January 23 and 24, 2007); these courses reached over 120 participants from a variety of city sectors including police and fire departments and public works employees. One three-hour Hazardous Materials High Pressure Awareness course, April 4, 2007, was offered in Federal Dam, Minnesota; 24 fire department volunteers attended, most from the Leech Lake Tribal Community. One toxic awareness and identification course was offered to a diverse neighborhood group in Minneapolis for 12 individuals, in August 2006, at their request.

4. Undertake research of occupational health and safety problems in keeping with priorities of the National Occupational Research Agenda of the National Institute for Occupational Safety and Health (Refer, also, to Major Accomplishments, specific program reports, and Table 2.)

An extensive number of externally-funded research grants (Table 2), that provided strong support for the high quality of research production have been generated by key and supporting program faculty; *a total of 96 currently funded grants, including 11 new ones, were identified for the past year.* (Refer to **Major Accomplishments** section.) Resulting publications in peer-reviewed journals and professional presentations at the local, national and international levels, have addressed cutting-edge research in occupational health and safety (Appendices). Disseminating these results to audiences beyond our immediate MCOHS region extends the reach, visibility, and reputation of our Center. Most importantly, many of the papers and presentations have also provided a basis for translation of research into practice that are being used to impact worker protection. Examples of the impact on worker protection, based on faculty/student research and outreach activities, include the following that represent only a small proportion of the MCOHS activities. (Refer, also, to the brochure developed by current leadership: cpheo.sph.umn.edu/img/assets/9114/rtp.pdf):

b. Trainee honors, awards, scholarships (Refer to Executive Summary and Major Accomplishments Section.)

Trainees have received at least seven awards for their meritorious efforts during this reporting period, as reported in the Major Accomplishments section.

c. Faculty honors, awards, appointments (Refer to Executive Summary and Major Accomplishments Section.)

Faculty have received at least seven awards for their meritorious research, teaching, outreach and service during this reporting period and are identified in the Major Accomplishments section.

d. Trainee theses and dissertations

Please refer to Table 10. Resulting publications and presentations are identified in the Appendices.

e. New faculty positions (Refer to Major Accomplishments section and the section, "Significant Changes Since FY 2006 Annual Report.")

f. New courses (Refer to Major Accomplishments section)

New courses (n=12) or curricula (one, OEM) were developed, both for academic and continuing education credit. Highlights from the reporting period are reported in the Major Accomplishments section.

g. Trainee Recruitment Including Diversity Efforts (Refer, also, to specific academic program reports.)

In addition to recruitment, in general, the University of Minnesota has made a major commitment to recruit students from underrepresented groups with 52 programs directed to the recruitment, retention, and graduation of minorities. The Director of Multicultural Services in the SPH has worked closely with faculty members of the EnHS/MCOHS to: visit and provide recruitment materials to historically Black colleges, and colleges with significant numbers of American Indian students; develop relationships with local high schools focused on the health professions; and present information about the School at relevant health network meetings.

Although the MCOHS is located in a region with proportionately small minority populations, relative to other areas of the country, the Center has maintained a trainee enrollment of 10-15% students of color; this compares with a general population of 9% in the Twin

Cities and less than 5% in rural Minnesota and elsewhere in the region. Numerous strategies, including a tuition-incentive program, have been successful in attracting highly qualified students. Alumni and current students have also been integral to this process.

A.1.5 Program Products (Refer to Executive Summary and Major Accomplishments section.)

Examples of key products of the ERC, in the last year, included the following:

- Graduation of 13 masters' students and two doctoral students
- A total of 101 publications by ERC faculty and trainees
- A total of 77 presentations by ERC faculty and trainees
- A total of 96 currently funded research efforts – 11 acquired during the reporting period
- A total of 35 Continuing Education courses were provided (11 were multidisciplinary, representing seven disciplines) with 614 face-to-face and 1,012 multidisciplinary online registered attendees for the respective courses. With the addition of 108 Agricultural Safety and Health program attendees and 242 Hazardous Substances Training program trainees, this accounted for a total of 1,976 participants. A total of 2,817 online users also downloaded from the various website offerings occupational safety and health.

a. Publications and presentations of program faculty and trainees (Refer to Appendices.)

b. Conferences/symposia sponsored

On June 13, 2007, the MCOHS hosted two seminars focused on the theme "Occupational Health and Safety Research to Practice," that involved the center and other program advisory boards. Speakers and topics included: Laura Punnett Sc.D, Professor, Department of Work Environment, University of Massachusetts Lowell and Jane Lipscomb PhD, RN, FAAN, Professor and Director, University of Maryland Baltimore (UMAB) School of Nursing, Work and Health Research Center. Professor Punnett presented: "Socioeconomic Disparities in Health and in Occupational Exposures: Relevance for Workplace Health Promotion and Protection Programs," and Professor Lipscomb presented: "Evaluation of Workplace Violence Prevention Interventions." Faculty and trainees presented posters of their work for advisory board members and other attendees. The presentations illustrated the breadth and depth of research conducted by our center, and stimulated excellent discussion and feedback.

c. Continuing Education (CE) courses presented (Refer to Program Activities and Accomplishments section and to specific CE Program report.)

d. Successful R2P projects (Refer to Section IV. Report on Specific Improvements in OSH Resulting from ERC Programs and the brochure developed by current center leadership: cpheo.sph.umn.edu/img/assets/9114/rtp.pdf)

e. Research projects completed having significant trainee involvement (Refer to Appendices for lists of publications for the respective programs and to Table 10.)

f. Unique training courses presented (Refer to New Courses in the Program Accomplishments section.)

A.1.6 Future Plans (based on objectives)

a. Provide outstanding academic education programs

Work with individual academic program faculty to ensure outstanding programs, with enhancement as feasible and appropriate. Continue to recruit excellent students and enhance diversity. Maintain the excellent record of generation of external research support for training opportunities for doctoral and masters' students. Provide multiple opportunities for students to present papers and participate at the local/national/international levels.

b. Provide outstanding continuing education programs

Engage in new continuing education/outreach activities with support of the center academic and other faculty.

c. Conduct outreach to various stakeholders and community groups

Ensure continuation of excellent outreach activities by the center programs and enhance collaboration with the Wisconsin Training Program Grant faculty and students.

d. Undertake research of OSH problems with priorities of the NIOSH National Occupational Research Agenda

Ensure conduct of research activities that address relevant NORA priorities. Continue to increase r2p efforts across the center programs.

Centerwide Programs: Outreach Program

A.2.1 Outreach Program

A.2.2. Program Director, Ian A. Greaves, B Med Sci, MB BS, FRACP, FAAAS

A.2.3. Program Description

Community outreach has been a primary goal of the Midwest Center for Occupational Health and Safety (MCOHS) from its inception. Every program engages in outreach activities that directly enhance and impact the practice of workplace safety and health.

The faculty and staff of each program contribute to the improvement of workplace safety and health by participating in outreach service activities. Academic program faculty contribute by delivery of courses and lectures to a broad range of community groups, educational and scientific consultation, and participation in professional organizations. Continuing Education staff contribute through educational collaborations with a broad range of communities and groups. The Center Director is responsible for encouraging and supporting outreach efforts by individual programs and may also initiate, develop or support Center-wide outreach activities.

A.2.4. Program Activities and Accomplishments

The MCOHS has completed many outreach activities in the past year. Specific examples, based on objectives, include:

a. Offer activities in a variety of learning formats:

1. Previous NORA seminars were recorded and placed on the MCOHS website: some as video; some as PowerPoint slides synchronized with digital audio recordings; and some as a Podcast activity (<http://cpheo.sph.umn.edu/cpheo/mcohs/home.html>), that are available 24 hours a day/seven days per week.

2. A 40-hour Emergency Response Training for the employees, within the Leech Lake Reservation Tribe's Public Works Department, was offered in 2006. Eleven tribal members successfully completed the training. Several members of other tribes (Fond du Lac Reservation, Bad River Reservation) have attended the National Institute of Environmental Health Sciences sponsored hazardous materials trainings as Hazardous Substance Training (HST) funded participants.

3. At the latest annual Public Health Institute (2007), nine universities and 39 community organizations partnered with the UMN to offer 59 courses attended by 302 students from 28 states. Focus areas included: culturally responsive public health practice; environmental health (e.g., "Ergonomics and Prevention of Workplace Hazards;" "Personal Protective Equipment and Respiratory Protection"); evaluation methods; food safety and biosecurity; infectious disease epidemiology; public health leadership and public health preparedness, response and recovery. ERC faculty have contributed, as follows: a) Dr. Raynor taught several courses on respiratory protection and personal protective equipment; b) MCOHS collaborated with the University of Minnesota Center for Public Health Preparedness for Public Health Workers to attend preparedness-related courses such as Respiratory Protection; c) Dean Olson and Dr. Paul Allwood, have offered two internet courses on issues in environmental and occupational health that allow regional access to graduate and undergraduate students; d) Dean Olson and an OEHN student, Linda Carlson, developed free online modules (A Glimpse into Occupational Health and Safety; History of Occupational Health and Safety) as an introduction to occupational health. These modules have been used by undergraduate programs to introduce environmental and occupational health into their curriculum.

b. Collaborate with other academic units and institutions to integrate OSH within curricula:

1. The OEM faculty lecture twice a year in the University of Minnesota's Occupational Medicine/Sports Medicine course for family practice residents, which involves eight family practice residencies in Minneapolis and St. Paul.

2. Dr. Shutske (ASH) provided bi-annual workshop sessions for the University's Family Practice residents on topics of agricultural injury and disease, rural preparedness, and homeland security for agricultural and food system workforce.

3. Through the ASH Program, Dr. Shutske has also provided consultation on curricula development to programs in IL, IN, WI, SD, OH, and FL. He interacts with other ASH and preparedness colleagues to facilitate integration of OHS within other curricula (e.g., Biosystems and Agricultural Engineering and the Executive Program in Public Health Practice).

c. Collaborate with professional and scientific organizations to deliver OHS awareness information:

1. Dr. Ramachandran has been teaching professional development courses (PDCs) on "Mathematical Modeling of Occupational Exposures" and "Bayesian Decision Making in Exposure Assessment" at the annual American Industrial Hygiene Conference and Exposition (AIHCE) for the past five years. Dr. Raynor taught a PDC titled, "The FUN of Aerosols: Fine, Ultrafine, and Nano Particles in the Workplace Atmospheres" at the AIHCE in 2006.

2. In November 2006, the CE Program partnered with the Upper Midwest Section of the American Industrial Hygiene Association to organize a workshop on current trends as it relates to OHS.

3. The CE Program collaborated with the Minnesota Safety Council in planning and moderating their annual Spring conference, May 2007, which reached over 1100 practitioners.

4. Ruth Rasmussen served as course coordinator for Current Issues in Agricultural Safety and Health, NIOSH Agricultural Safety and Health CE, and "Business Preparedness Planning for Fruit and Vegetable Growers," as part of a combined initiative with the University of Minnesota Center for Public Health Preparedness.

5. Kathy Smith worked with the new occupational safety and health coordinator for Environmental Resource Management (ERM), China, to conduct the OSHA 511 Occupational Safety and Health Standards for General Industry for 32 employees in Shanghai, People's Republic of China.

d. Initiate the translation of research to practice (r2p):

Please refer to: Section IV. **Report on Specific Improvements in Occupational Safety and Health Results from ERC Programs.** (Refer, also, to a brochure developed by the new leadership: <http://www.cpheo.sph.umn.edu/img/assets/9114/rtp.pdf>)

e. Encourage active participation by MCOHS faculty with various peer-reviewed journals.

Numerous MCOHS faculty are involved with peer-reviewed journal, as Editors, Editorial Board Members and Reviewers. This information is provided in the Appendix Outreach reports for each of the programs.

f. Provide new courses (Refer to Major Accomplishments section)

New courses (n=12) or curricula (one, OEM) were developed, both for academic and continuing education credit. Highlights from the reporting period are identified in the Major Accomplishments section.

A.2.5. Program Products

Faculty in the OEM, IH, OEHN, OHSRP, OIPRPT, ASH, and HSAT academic programs participate in a wide range of outreach activities that include educational and scientific presentations, consultation on curriculum development, participation in conferences and symposia, and research. A few examples are described here, with more details provided in each of the program reports. (Refer, also to **Appendices**.)

a. Publications and presentations of program faculty and trainees – dissemination of research findings

A list of 101 publications is included in the **Appendices of publications and presentations**. Faculty regularly encourage students to present their research at professional meetings; 77 faculty and student research presentations are identified in the **Appendices** and include research disseminated at local, regional, national and international professional meetings. Students were directly involved in a minimum of 32 presentations and 36 publications. Presenting these results to audiences beyond our immediate MCOHS region extends the reach, visibility, and reputation of our Center. Many of the papers and presentations provided a basis for translation of research into practice (R2P). Refer to the **Appendices** for publications and presentations identified for the respective program faculty and trainees.

b. Conferences/symposia sponsored

In June 2007, the MCOHS organized a NORA symposium that included a research poster session to facilitate discussion of faculty and student research efforts. Key Plenary Speakers, Laura Punnett, Sc.D., Professor, Department of Work Environment, University of Massachusetts Lowell, and Jane Lipscomb, PhD, RN, FAAN, Professor and Director, University of Maryland Baltimore (UMAB) School of Nursing, Work and Health Research Center, presented their research findings, pertinent to r2p, at this symposium; 45 participants were involved in this onsite program. Presentations from this symposium have been made available as a webcast and have attracted 1,012 participants.

c. Continuing Education (CE) courses presented (Refer, also, to CE Program reports.)

Continuing education (CE) offerings to occupational safety and health professionals, managers, organized labor representatives, workers, and members of the general public, totaled 35 courses (11 were multidisciplinary, representing seven disciplines) with 614 face-to-face and 1,012 multidisciplinary online registered attendees for the respective courses; with the addition of 108 Agricultural Safety and Health program attendees and 242 Hazardous Substances Training program trainees, this accounted for a total of 1, 976 participants. A total of 2,817 online users also downloaded from the various website offerings occupational safety and health.

d. Successful R2P projects

A minimum of 17 research-to-practice (r2p) efforts have involved faculty and students during this past year. Examples of the impact on worker protection, based on faculty/student research and outreach activities, representing only a small proportion of the MCOHS activities, are identified at the following website: cpheo.sph.umn.edu/img/assets/9114/rtp.pdf

Another important effort is that led by Dr Nachreiner (OEHN), in which all students in PubH 6150, *Interdisciplinary Evaluation of Occupational Health and Safety Field Problems*, evaluated work environments and presented written and oral recommendations for the control of work-related problems to company personnel. Participating sites included the Minneapolis Police Department, Toro, and Lund Food Holdings Incorporated. Final reports and presentations are shared with local site contacts.

e. Research projects completed, having significant trainee involvement

Refer to **Appendices** for identification of trainee involvement in research projects, pertinent to publications and presentations. Also, refer, to specific program reports and Table 10.

f. Unique training courses presented

A minimum of 10 unique training courses, that were presented during the past year, are identified in Program Activities and Accomplishments

A.2.6. Future Plans

The MCOHS ERC and its programs will continue their current outreach activities, as described above and in the respective program reports. New outreach efforts are also planned with particular attention to underserved populations, labor unions and professional organizations.

Specific plans include:

a. Positively impact the OSH professionals by offering activities in a variety of learning formats. Example activities include:

1. Continue and expand the well-received National Occupational Research Agenda (NORA) seminars that were recorded and placed on the MCOHS website as a Podcast activity (<http://cpheo.sph.umn.edu/cpheo/mcohs/home.html>). The MCOHS will expand its popular seminar offerings by addressing themed topics in the next two years. This past year the theme was r2p. A proposed annual symposium is designed to raise awareness of the social, demographic and economic trends shaping the experience of work and influencing worker health and safety. This event will feature nationally renowned speakers who will attract professionals in the field, as well as students and faculty, and engage all participants in discussion. The session will be a half-day session to enable ERC faculty and students and regional experts to present findings on NORA-related research that complements the keynote speaker's address. These seminar series will subsequently be placed on appropriate websites as part of the stored NORA series, available to students and professionals for academic credit or continuing education credits, as prescribed by the profession. Usefulness and importance of the information and the series will be evaluated through pre- and post-test evaluation tools. Online participant tracking will be incorporated.

2. The MCOHS will continue to develop and enhance relationships with tribal communities to provide outreach activities, according to their needs. For the next reporting period, Dr. Peter Raynor (IH, HSAT, HSCE) will collaborate with Ms. Ruth Rasmussen (CE), and the leadership of the Leech Lake Department of Resource Management to provide personal protection training, relevant to hazardous substances, for workers employed by the Leech Lake Band of Ojibwe. (Refer to letter of support for 2006 application.)

3. The CE staff will work with ERC faculty to expand and continue the courses delivered during the University of Minnesota's Public Health Institute (PHI) offered in May. For example, Dr. Raynor will continue to teach at least one course per year in the University of Minnesota Public Health Institute, e.g., "Personal Protective Equipment and Respiratory Protection." Dr. Ramachandran (IH) has developed a course on Nanoparticle Health Risks that will continue to be offered at the PHI.

b. Establish partnerships with NIOSH-funded Training Project Grant (TPG) Programs

Within our region, one TPG is located at the University of Wisconsin-Stout. We have invited the director, Dr. Sorrell, to visit the MCOHS in the near future to discuss informally and/or provide a presentation pertinent to their efforts and to determine if there are common interests that we might pursue. Dr. Sorrell has responded that he is interested in exploring possible opportunities with our ERC and will contact us early in the fall semester to follow up.

c. Continue to collaborate with other academic institutions to integrate OSH within curricula. Example activities include:

1. Dean Olson will continue to offer courses with community faculty, Dr Paul Allwood, that introduce participants to the field of occupational health and safety, such as "Issues in Environmental and Occupational Health, PubH 6102 (2 credits), which is offered to students in nursing, public health and health care administration. She also co-teaches "Issues in Environmental and Occupational Health," PubH 3102 (3 credits), an undergraduate option that meets the requirements of the Council on Liberal Education to help inform pre-nursing and liberal arts students of the possible career options in environmental and occupational health. Offered on the Internet, it allows for regional access to potential candidates and attracts over 130 students annually. Thirteen online modules will be completed for the introduction of occupational health concepts from theory and practice to women in the trades. Marketing of these opportunities to labor unions, undergraduate programs and other organizations will promote OSH integration into curricula and workforce training.

2. The MCOHS faculty will expand their outreach efforts with family practice residency programs. The OM faculty will continue to lecture twice a year in the University of Minnesota's Occupational Medicine/Sports Medicine course for family practice residents, which involves 8 family practice residencies in Minneapolis and St. Paul. In a new collaborative effort, the OM faculty will also work with the University's Department of Family Practice to develop an online module on occupational medicine, thus expanding educational offerings to both urban and rural participants. Dr. John Shutske (Agricultural Safety and Health--ASH) will continue to provide bi-annual workshop sessions for the University's Family Practice residents on topics of agricultural injury and disease risk factor recognition, rural preparedness, and homeland security for agricultural and food system workforce.

3. Through the ASH Program, Dr. Shutske has consulted with and will continue to interact with comparable programs in Illinois, Indiana, Wisconsin, South Dakota, Ohio, and Florida to provide consultation and relevant curricula. In particular, Dr. Shutske will continue to collaborate with Dr. Robert Aherin who operates an ASH NIOSH-funded agricultural safety and health program within the Illinois Occupational and Environmental Health and Safety Education and Research Center. Through this partnership, he will exchange information regarding the progress and successes of the respective programs which may lead to curriculum and course revisions. Dr. Shutske will also continue to interact with other agricultural safety, health, and preparedness colleagues to share curricula and

exchange information to facilitate integrating OSH within curricula including courses in the ERC and related programs (e.g., Biosystems and Agricultural Engineering and the Master of Public Health Executive Program).

4. The IH faculty will continue to teach Professional Development Courses (PDCs) at the annual American Industrial Hygiene Conference and Exposition (AIHCE). Dr. Ramachandran has been teaching a PDC on "Mathematical Modeling of Occupational Exposures" for the past five years, and the course has been recognized as one of the "top-ten" for several of those years. Last year, he was a co-instructor for a PDC on "Bayesian Decision Making in Exposure Assessment".

5. Building on her previous efforts, Dean Olson will continue to work to bring tribal colleges' educational experiences into public health by integrating a focus in tribal health at the School's Public Health Institute. Dean Olson directs the Public Health Institute through the Centers for Public Health Education and Outreach (CPHEO). This annual event (offered May-term) has evolved into a forum for discussion of emerging public health issues. At the 2007 Institute 59 courses were offered, and 302 students attended representing 28 states. Focus areas included culturally responsive public health practice, environmental health (e.g., "Personal Protective Equipment and Respiratory Protection"), evaluation methods, food safety and biosecurity, infectious disease epidemiology, public health leadership and public health preparedness, response and recovery.

d. Provide consultation and curriculum materials in occupational health and safety to other institutions. Example activities include:

1. The MCOHS will be playing a lead role in a new initiative to help create a public health infrastructure in India. In recognition of the lack of trained personnel in occupational health professions in India, the Indian government launched an unprecedented new effort in March 2006 to address this issue. At an international meeting in New Delhi, the Public Health Foundation of India (PHFI) announced a comprehensive strategy to build a public health workforce in India. The PHFI is a private-public partnership that seeks to establish schools of public health in each of India's major regions, with the goal of eventually producing 10,000 public health professionals and scientists/year to meet the need of the nation's 1.2 billion people. The new schools will offer multi-year academic programs (a one-year Diploma in Public Health, a flagship two-year Master's in Public Health; and a Ph.D.) as well as short-term (typically a six- to 12-week) training programs responding to specific needs. A significant part of this strategy includes partnering with major US schools of public health through the Association of the Schools of Public Health (ASPH) to provide training and exchange programs in research and teaching; the University of Minnesota SPH is one of those schools. One component of this exchange will be the development of curricula for OSH training programs in several disciplines. With support of the School of Public Health, Drs. Alexander and Ramachandran, with Dr. Toscano (EHS Head), recently traveled to India to discuss establishing first, an occupational and environmental health nursing program and, then, an Environmental Medicine Program which will cover occupational medicine and health, injury prevention, and exposures in the workplace – with a particular focus in agricultural and manufacturing environments. This has been initiated in collaboration with Dr. Bobby Joseph, Professor, Community Health, Division of Work Environment, St. John's Medical College, in Bangalore.

2. Dr. Nachreiner (OEHN) will be consulting with the Life Crisis Institute on an NIH proposal regarding training of nurses on work-related violence curricula. The investigators plan to develop a web- based multi-media training curriculum to assist nurses to understand, recognize, avoid, and diffuse work-related violence. Dr. Nachreiner will assist in review of these training modules.

3. The ASH program maintains a website, <http://safety.cfans.umn.edu>; all pertinent publications, data, and other outreach information are placed on the site. This coming semester, Dr. Shutske will make the entire PPT curriculum for BAE 5212 available on the site for use by other institutions. This site generates about 15,000 to 20,000 hits per year. Other courses may potentially be added to this website, based on their appropriateness for the online learning environment.

4. Dr. Zheng (OM Program) anticipates collaborating with federal government officials representing occupational health and safety in China (National Institute of Occupational Health and Poisoning Control) to develop a plan that will ultimately facilitate positive change pertinent to occupational health regulations and practice. He is currently exploring the Chinese officials' interest in an exchange between this ERC and OSH professionals and researchers.

e. The ERC will promote visiting scholars/ faculty activities including participation of labor and management leaders. Example activities include:

1. ASH will invite Drs. Steve Kirkhorn (specialist in agriculturally-focused occupational medicine) and Mark Purschwitz (expert in agricultural safety engineering) from Marshfield, Wisconsin's National Farm Medicine Center (NFMC) to assist in teaching BAE 5212 at the University of Minnesota.

2. Dr. Gerberich (OIPRTP) also plans to involve Dr. Purschwitz in the PubH 6122 Seminar: Safety in the Workplace.

3. As a complementary activity, all ASH students will continue to be encouraged to enhance their professional capacities by spending time at the NFMC or comparable institution, participating in activities related to research, data collection and outreach. Participation in these cross-center activities will impact the future practice of program graduates and will transform future agricultural worker training through continuing education and outreach performed by the ASH program's graduates.

4. With the addition of labor and management representatives on our Center advisory board and faculty, we will collaborate to explore potential opportunities mutually beneficial to the involved parties.

f. Continue to cooperate and collaborate with professional and scientific societies and associations to deliver OSH awareness information and delivery of OSH and H awareness seminars to undergraduate programs, secondary education, labor and business groups, and community organizations. Example activities include:

1. Faculty from the OEHN Program will continue to engage in opportunities for providing guest introductory lectures at regional undergraduate schools of nursing. Additionally, the faculty will continue to provide outreach to practicing professionals using oral and poster presentations. For example, OEHN faculty and students routinely work with AAOHN to present research and continuing education at annual meetings. For example, Dr. McGovern presented a CEU program with David Cossi, JD, Adjunct Assistant Professor at the AAOHN 2007 Symposium and Expo in Orlando, Florida on "Serious Health Conditions and the Family Medical and Leave Act," which has implications for OEHN practice.

2. Dr. Shutske will continue to interact with other agricultural safety and health colleagues through various venues and national conferences. Dr. Shutske plans to continue his involvement to provide introductory lectures at the following: National Institute for Farm Safety, American Society of Biological and Agricultural Engineers Extension Disaster Education Network and National AgrAbility Project network conferences.

3. Dr. Gerberich will continue to provide an introductory lecture on occupational injury to undergraduates in the PubH 3001 course (~200 students in 2007), and she plans to continue this over the next five years.

4. The ERC will market the mini module "A Glimpse into Occupational Health and Safety" to individuals seeking general information about a new field of study. Additionally, a series of topical online modules are being developed for those looking to enter the OSH field. The modules will be adapted from the graduate course, PubH 6170: "Introduction to Occupational Health and Safety" taught by Dr. Nachreiner. (OEHN). The topical online modules may be used as an introduction to a topic, a topic refresher or supplemental material in a course.

5. The CE Program will assist with the planning and program delivery for professional groups, such as assisting the Minnesota Safety Council with its three year conferences conducted in various regions of the state and the annual fall conference for UMS-AHIA as requested.

6. Dr. Nachreiner plans to continue participation with the Life Sciences Undergraduate Research program to increase the awareness of OSH careers for undergraduates. This program is designed to recruit highly qualified students to the graduate life science programs.

Centerwide Programs: Interdisciplinary Coordination

A.3.1. Interdisciplinary Coordination (Refer, also, to specific program reports.)

A.3.2. Director, Ian A. Greaves, B Med Sci, MB BS, FRACP, FAAAS

A.3.3. Program Description

Interdisciplinary coordination has been a primary goal of the Minnesota ERC from its inception. Interdisciplinary interactions between faculty and students, and among students in the various programs, are expected to take place throughout the ERC, including all CE and Academic programs. Faculty, staff and students from each program are required to interact, wherever possible, with those of other ERC Programs in course work, practicum experiences and research. Responsible conduct of science training is required for faculty and students and described in the Center Administration section. Academic program faculty have ensured that interdisciplinary interactions take place by developing cross-cutting curricular requirements. All programs are expected to work together on educational and outreach activities, to ensure that a broad perspective is offered. The Center Director is responsible for encouraging and supporting interdisciplinary activities among individual programs.

A.3.4. Program Activities and Accomplishments

a. Coursework (Refer to **Appendices** for curricula.)

The interdisciplinary interaction of students and faculty has been enhanced through creation of common core occupational health and safety courses required for all NIOSH trainees. This interdisciplinary coordination plan has proven to be effective, as demonstrated by the most recent survey of Midwest Center for Occupational Health and Safety (MCOHS) alumni. In this survey, graduates ranked "Function effectively on an interdisciplinary team" as their most proficient competency of the 29 competencies assessed. All program plans in the Center require substantial coursework that involves interactions among the various disciplines; most programs involve a minimum of 20 credits of interdisciplinary coursework. There are four levels of core class requirements: School of Public Health (SPH); Division of Environmental Health Sciences (EHS); Occupational Safety and Health (OSH); and Specialty Disciplines (SD) (Occupational and Environmental Health Nursing: OEHN, Occupational Medicine: OM, Industrial Hygiene: IH, Occupational Injury Prevention Research Training Program: OIPRTP, Occupational Health Services Research and Policy: OHSRP, Hazardous Substances Academic Training: HSAT). These requirements may be thought of as a pyramid, with SPH courses constituting the base, followed by EHS, OSH, then SD at the pinnacle of the pyramid. All SPH students take core courses in epidemiology, biostatistics and ethics. The EHS division requires three core courses in environmental hazards, health effects, and environmental health policy.

Students in all of the MCOHS academic programs must take three core occupational safety and health courses: PubH 6130, Occupational Medicine (Greaves/Baker); PubH 6150 Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (Nachreiner); PubH 6170 Introduction to Occupational Health and Safety (Nachreiner). In this latter course, students work on cross-disciplinary teams to address various safety and health problems at industrial sites. As part of this exercise, they must develop and conduct class tours, develop written reports and deliver oral presentations to company representatives and their peers and faculty. Students rate these interdisciplinary activities very highly in evaluations of the course. Course assignments and in-class activities ensure interactions across all disciplines. Faculty from the core academic programs (OEHN, OIPRTP, IH, and OEM) serve as lead and supporting instructors in these courses, to ensure that information and perspectives from all disciplines are included.

Additionally, some programs require students to complete four to five credits of field experience in occupational safety and health where they work closely with occupational and health practitioners from all OSH disciplines. Students work closely with occupational and environmental health nurses and physicians, safety specialists, industrial hygienists, engineers, and other professionals. Examples of previous internship sites include: Centers for Disease Control and Prevention and the National Institute for Occupational Safety and Health; Honeywell; 3M; Medtronic; the Minnesota Department of Health; major construction companies; and numerous others. In addition, masters' research projects and doctoral dissertations involve faculty from diverse disciplines, affording another opportunity for interdisciplinary collaboration within various schools and organizations. Examples include faculty from the Divisions of Biostatistics, Epidemiology, Health Policy and Management, and Epidemiology, the School of Nursing, and Departments of Mechanical Engineering, Biosystems and Agricultural Engineering, Psychology/Occupational Psychology, and the College of Forestry, Agriculture, and Natural Resources.

Furthermore, the interaction of occupational health and safety professionals from diverse University and community settings is exemplified by the adjunct and affiliated faculty and community preceptors involved with the Center. These professionals serve as preceptors for practica and research training, and as guest lecturers/content experts in various courses, such as PubH 6170 and PubH 6150.

b. Faculty Interactions

The interaction of occupational health and safety professionals from diverse University and community settings involving adjunct and affiliated faculty and community preceptors, is extensive. These professionals serve as preceptors for practicum and research

training, and as guest lecturers/content experts in various courses and were identified for the respective programs in the 2006 application.

c. Clinical Rotations

During clinical rotations, OEM residents interact with industrial hygienists, toxicologists, nursing, and other professionals. OEM residents rotate through orthopedics, pulmonary medicine, dermatology, physical medicine and rehabilitation, and physical therapy. Interdisciplinary interaction continues in the clinical setting through combined practicum experiences and conferences with OEM and OEHN faculty and trainees. All OEHN students complete a one-credit rotation with OEM faculty and residents. OEM residents are also involved in interdisciplinary interaction with occupational health and safety professionals in corporate and government settings. During the industrial rotations, residents work with industrial hygienists, toxicologists, occupational and environmental health nurses, safety professionals, health physicists, lawyers and corporate management.

d. Community Grand Rounds

The OEM program sponsors monthly rounds that bring together occupational and environmental medicine physicians and nurses in the community with students and faculty from all of the ERC programs for problem-based discussions.

e. Seminars

PubH 8120 (OIPRTP Research Seminar) provides an interdisciplinary venue for students and faculty to present and discuss current research projects and innovative research methods; the primary purpose is to facilitate progress on doctoral research theses. Faculty and students typically represent OIPRTP, OEHN, and OHSRP.

f. Interdisciplinary Research Projects

With rare exceptions, research projects involve interdisciplinary participation of both faculty and students. This is essential to ensure the overall quality through rigorous investigation of those with relevant expertise from a variety of disciplines.

g. Input to NIOSH National Occupational Research Agenda

Faculty, as well as students, have been involved in reviewing and critiquing and providing additional suggestions to the NORA.

h. CE Program (Refer, also, to CE Program report.)

All CE courses involved multidisciplinary planning groups and the vast majority included presenters from diverse professional backgrounds. Attendees to most courses are drawn from a variety of professional disciplines. All courses encouraged interactions between the participants in an interdisciplinary manner, through facilitated discussions, small group exercises, etc.

A.3.5. Program Products

Faculty in the OEM, IH, OEHN, OHSRP, OIPRPT, ASH, and HSAT academic programs participate in a wide range of interdisciplinary activities. A few examples are described here, with more details provided in each of the Program reports.

a. Executive Reports of Specific OSH Investigations Provided to Companies

The written reports and presentation materials from the student teams in the PUBH 6150 Field Problems course are shared with the site contact, who is invited to attend the oral presentation. These reports include specific recommendations and a comparison of costs among alternative solutions. The following sites hosted student teams in the past year:

- *Minneapolis Police Department* – evaluating musculoskeletal injuries encountered by the cadets and recruits in the Minneapolis Police Academy
- *Toro Inc.* – Job hazard analysis for the blacksmith position
- *Lund Food Holdings, Inc.* – Ergonomic issues for upper extremities in the packaging department

b. Publications and presentations of program faculty and trainees

Large proportions of the publications and presentations by program faculty and trainees involve multiple disciplines. (Refer to Appendices.)

c. Conferences/symposia sponsored

Specific conferences/symposia (e.g., NORA Symposia and Seminars) provided by the MCOHS, have typically involved interdisciplinary participation by the faculty and students and, also community participants. (Refer, also, to the Continuing Education Program report.)

d. CE courses presented

The majority of Continuing Education efforts involve multiple disciplines as identified in the Continuing Education Program report.

e. Successful R2P projects

Faculty and students from various disciplines have typically been involved in research efforts and resulting research-to-practice endeavors. (Refer, to Center Administration section for elaboration on r2p efforts and to a brochure developed by the new leadership: <http://www.cpheo.sph.umn.edu/img/assets/9114/rtp.pdf>)

f. Research projects completed having significant trainee involvement

Refer to Appendices for lists of publications for the respective programs and to Table 10.

g. Unique training courses presented

Refer to New Courses in the Program Activities and Accomplishments section.

A.3.6. Future Plans

The Center Director will continue to encourage interdisciplinary efforts among the ERC Programs. Specific plans include:

a. Expansion of the MCOHS website with more extensive information on interdisciplinary efforts, including symposia, research efforts and opportunities, and research-to practice efforts among the programs in the center. Enhanced linking to each of the ERC programs and within the programs will be facilitated.

b. Implementation of a proposal to rename and reorganize the PubH 8120 OIPRTP Research Seminar as the Occupational Health and Safety Research Seminar. This seminar provides an interdisciplinary venue for students and faculty to: present and discuss current research projects and innovative research methods, with the primary purpose to facilitate progress on doctoral research theses; and enable students to present and receive feedback from their research. Recent topics by guest faculty included causal modeling and Directed Acyclic Graphs, Factor Analysis, and Latent Variable Modeling. Faculty and students typically represent OIPRTP, OEHN, and OHSRP. Students and faculty from all programs can participate, as appropriate. Guest lecturers have joined the class from various departments within the University (e.g., Biostatistics, Health Policy and Management, Mechanical Engineering, Psychology/Occupational Psychology, Health Services Research), and from outside the University, such as two recent seminars from NIOSH researchers.

c. Students and faculty from all OSH disciplines will be involved with the planned NORA symposia, which will feature nationally renowned and local experts. In addition to interdisciplinary involvement in the guest lectures, OSH students and faculty will continue to present research findings at the poster and oral sessions incorporated into these symposia.

d. Beginning in fall 2007, an ERC-wide seminar series, facilitated by Dr. Bruce Alexander, will be established to bring together trainees and faculty on a regular basis. This seminar series will include a broad range of topics, including emerging issues in occupational health and methods to improve the scientific integrity of research. The latter will include presentations and discussions pertaining to the collection, management and safeguarding of health-related data, and the need for a multi-disciplinary understanding of research methods.

e. Directors responsible for Academic and CE Education and Outreach programs will be encouraged to further enhance these programs pertinent to interdisciplinary efforts.

Pilot/Small Projects Program
No program during the July 1, 2006 – June 30, 2007 period

**NORA Research Support Program
July 1, 2006 – June 30, 2007**

A.4.1. NORA Research Support Program

A.4.2. Co-Directors: Ian A. Greaves, B Med Sci, MB BS; Lisa Brosseau, ScD

A.4.3. Program Description

The primary goals of the NORA Research Program are to: recruit and support graduate research training by offering tuition, stipends and limited travel funds to supplement support of doctoral students in the approved academic programs; and support interdisciplinary research projects that include faculty and students from two or more Core or Allied Programs and demonstrate a high chance of leading to an R01 application.

Program success is gauged by the students supported and their progress toward degree completion. Success is also determined by the numbers of publications and external grant applications and awards resulting from the small research grants.

The Program Directors oversee research program awards, including peer reviews, human subjects' reviews, and financial oversight. The Program Directors ensure that student training support is applied in an equitable manner and meets Agency guidelines.

A.4.4. Program Activities and Accomplishments

a. Doctoral student and faculty and staff research support

In this reporting period, a proportion of the program funding was allocated to student tuition and stipend support. Funding was also allocated to students to enable them to present their research papers at scientific meetings. (Refer to **Appendices** for relevant publications and presentations; student and faculty research efforts embrace the NORA priorities.)

To facilitate the various research efforts, focused on NORA priorities, students as well as faculty (Drs. Greaves, Brosseau, Gerberich, Ramachandran McGovern, Nachreiner, and Alexander) and staff (Ann Fredrickson, Senior Scientist and Andrew Ryan, Statistical Applications Specialist) were involved in providing research training to the program doctoral students.

b. Interdisciplinary research grants

A NORA-funded project, from the previous reporting period, that assessed factors that influenced successful return-to-work experiences, following a cancer diagnosis or serious work-related injury, and included an evaluation of compliance with the Americans with Disabilities Act, resulted in *two new proposals* by the PI, Dr. Nancy Nachreiner. It also resulted in a recent publication: Nachreiner, Nancy M; Dagher, Rada; McGovern, Patricia M.; Baker, Beth; Alexander, Bruce; Gerberich, Susan Goodwin. Successful return to work for cancer survivors, AAOHN 55(7):290-295, 2007.

Dr. Nachreiner led this effort, with cooperation from: Dr. McGovern, who has expertise in focus groups and policy evaluation; Dr. Gerberich, with expertise in injury epidemiology; Dr. Alexander, with expertise in injury epidemiology and cancer research; and Dr. Baker, with expertise in return-to-work issues associated with occupational injuries and illnesses. The respective programs involved were: OEHN, OHSRP, OEM, and OIPRTP. The new proposals include a Career Development Award, submitted to the National Cancer Institute and a "Building Interdisciplinary Research Careers in Women's Health" application, a K12 application submitted to the Office of Research on Women's Health (NIH).

c. NORA Symposium

MCOHS faculty and students were involved in organizing a NORA Symposium, pertinent to Research-To-Practice In June 2007. This symposium featured two national plenary speakers, Laura Punnett, ScD, Professor, Department of Work Environment, University of Massachusetts Lowell, and Jane Lipscomb, PhD, RN, FAAN, Professor and Director, University of Maryland Baltimore (UMAB) School of Nursing, Work and Health Research Center, who presented their research findings at the 2007 NORA symposium. Faculty, students, advisory board members, and community partners participated in this effort. A major feature also involved a research poster session of student and faculty research.

A.4.5. Program Products

a. Doctoral student support

The doctoral trainees supported from the NORA funds made satisfactory progress on their courses and dissertations, with assistance of this funding and faculty and staff support. Results of their efforts are evident in the listings of presentations and publications, identified in the **Appendices** and in Table 10.

b. Interdisciplinary research grants

As noted, above, two new proposals submitted by Dr. Nancy Nachreiner, as result of the previous NORA funding, include a Career Development Award, submitted to the National Cancer Institute and a "Building Interdisciplinary Research Careers in Women's Health" application--a K12 application submitted to the Office of Research on Women's Health (NIH).

Refer, also, to Table 2, that identifies external research funding, generated by program faculty who were provided with supplemental support.

An interdisciplinary NORA-focused research project was funded in 2006-2007 titled, "The Psychosocial Work Environment and Maternal Postpartum Depression: A Longitudinal Analysis" with collaborators including Professors McGovern (Occupational Health Services Research and Policy--OHSRP and OEHN), Dowd (OHSRP), Roeber-Rice (Occupational and Environmental Medicine), Alexander (OIPRTP), and Gerberich (OIPRTP), and doctoral candidate, Rada Dagher. This work has resulted in a minimum of two presentations and publications that are in final preparation.

c. Faculty and student publications and presentations

As noted above, a specifically funded NORA project, directed by Dr. Nachreiner, recently resulted in a recent publication: Nachreiner, Nancy M; Dagher, Rada; McGovern, Patricia M.; Baker, Beth; Alexander, Bruce; Gerberich, Susan Goodwin. Successful return to work for cancer survivors, AAOHN 55(7):290-295, 2007.

Additional publications and presentations of faculty and students, that focused on NORA research priorities, are included in the **Appendices**.

A.4.6. Future Plans

Although specific NORA Research Support program funds are no longer available, it is planned to continue the MCOHS NORA Symposia and Seminar Series. This will not only involve program faculty and staff but, also, will involve participation by national occupational safety and health experts. In particular, an increased focus will be on research-to-practice efforts.

B. Industrial Hygiene Program

B.1. Industrial Hygiene Program

B.2. Program Director: Dr. Gurumurthy Ramachandran

B.3. Program Description

a. Goals and Objectives

The overarching goal of the industrial hygiene program is to provide a source of well-qualified, well-rounded professional industrial hygienists to meet the continuing needs of industry and society, both in the region served by the program and nationally. The specific objectives for the Industrial Hygiene program are: (a) provide an academic curriculum that emphasizes the multi-disciplinary elements of Industrial Hygiene while maintaining a strong emphasis on practical applications and relevance to issues in occupational and environmental health; (b) provide opportunities for field experience and Master's project (research) work that enable students to develop their practical professional and investigative skills; (c) maintain an active advisory board that includes representation from stakeholders; (d) maintain student enrollment into the Master's and doctoral student program; and (e) support the Midwest Center's continuing education mission by providing training sessions and course content to persons outside the Center interested in Industrial Hygiene.

b. Responsible Conduct of Science Training

All students seeking MS or Ph.D. degrees must take Ethics in Public Health: Research and Policy (PubH 6742) and all investigators and research personnel involved in research with human subjects, including students, receive instruction in protecting human subjects in one of the following ways: review online materials available through the Collaborative Institutional Review Board Training Initiative (CITI) (hosted by the University of Miami Medical School server); review the University of Minnesota's Office of Human Research Protections' CD-ROM entitled "Investigator 101;" or review the online "Human Participant Protection Education for Research Teams" from the NIH and NCI. For any research effort, or project involving human subjects, students must prepare and submit an application to the Internal Review Board, Human Subjects' Committee, University of Minnesota, for approval, prior to implementation. This application is completed under the guidance of the advisor and co-signed by the advisor.

c. Faculty Participation

The three core faculty members, Drs. Gurumurthy Ramachandran, Lisa Brosseau, and Peter Raynor are regular faculty members in the Division of Environmental Health Sciences.

Dr. Gurumurthy Ramachandran (Ph.D., CIH) has directed the Industrial Hygiene program since 2004. His research and teaching interests focus on various aspects of occupational and environmental exposure assessment including retrospective exposure reconstruction for epidemiology, statistical and mathematical modeling, physical measurements, and industrial hygiene decision-making. He is lead instructor for required course PubH 6171 (*Exposure Assessment for Airborne Contaminants*) and PubH 6103 (*Exposure to Environmental Hazards*).

Dr. Lisa Brosseau (Sc.D, CIH), an Associate Professor in the Division of Environmental Health Sciences, has considerable research expertise in respiratory protection, filtration, aerobiology, aerosol sampling, intervention effectiveness and small business health and safety. She received the prestigious Alice Hamilton Award from the American Industrial Hygiene Association in 2006. Dr. Brosseau will continue to teach the primary course required of IH and HSAT students, PubH 6172 (*Industrial Hygiene Applications*). Furthermore, she will advise and supervise the research of students in the IH Program.

Dr. Peter Raynor (Ph.D) is an Assistant Professor in the Division of Environmental Health Sciences in the University of Minnesota School of Public Health. In addition to being a core IH faculty, he has directed the university's HSAT program since 2004. His primary research interests are in air filtration and other methods of air pollution control, and in the control of workplace hazards. Dr. Raynor is lead instructor for required course PubH 6174 (*Control of Workplace Exposure*) and PubH 6175 (*Industrial Hygiene Measurements Laboratory*) and co-instructor in PubH 6103 (*Exposure to Environmental Hazards*). He also teaches relevant elective courses including PubH 6173 (*Exposure to Physical Agents*) and several emergency preparedness classes in the annual University of Minnesota Public Health Institute.

Table 1
Key Supporting Faculty Industrial Hygiene Program¹

<i>Faculty Name, Title</i>	<i>Organizational Affiliation</i>	<i>Expertise: Occupational</i>	<i>T</i>	<i>A</i>	<i>R</i>
Michael Austin, JD, Adjunct Faculty	Env. Health and Safety	Industrial Hygiene	Yes	No	Yes
Gerhard Knutson, Ph.D., Adjunct Faculty	Knutson Ventilation	Industrial Hygiene	Yes	No	Yes
Nicole Vars McCullough, Ph.D., Adjunct Faculty	3M Company	Respiratory Protection	Yes	No	No
Charles McJilton, Ph.D., Adjunct Faculty	Consulting	Industrial Hygiene	No	Yes	No
John R. Mulhausen, Ph.D., Adjunct Faculty	3M Company	Exposure assessment	Yes	Yes	Yes
Gary Olmstead, Ph.D., C.S.P., C.I.H., Safety Director/Adjunct Faculty	General Mills	Corporate Safety	Yes	No	No
John Adgate, Ph.D., Associate Professor	EHS	Exposure assessment	Yes	Yes	Yes
Bruce Alexander, Ph.D. Associate Professor	EHS	Occupational Epidemiology	Yes	Yes	Yes
Mrinal Bhattacharya, Ph.D., Professor	BAE	Ag. Products	No	No	Yes
Timothy Church, Ph.D., Professor	EHS	Occupational Epidemiology	Yes	No	Yes
Susan Gerberich, Ph.D., Professor	EHS	Injury prevention	Yes	No	No
Ian Greaves, Associate Professor	EHS	Occupational Medicine	Yes	No	No
Craig Hedberg, Ph.D., Associate Professor	EHS	Env. Microbiology	Yes	No	No
David Kittelson, Ph.D., Professor	ME	Aerosol measurements	No	No	Yes
Thomas Kuehn, Ph.D., Professor	ME	Aerosol measurements	No	No	Yes
Patricia McGovern, Ph.D., Associate Professor	EHS	Policy/Evaluation/Injury/Violence	Yes	No	Yes
Peter McMurry, Ph.D., Professor	ME	Aerosol measurements	No	No	Yes
Nancy Nachreiner, Ph.D., MPH, Assistant Professor	EHS	Injury/Violence	Yes	No	No
David Pui, Ph.D., Professor	ME	Aerosol measurements	No	No	Yes
John Shutske, Ph.D., Professor	BAE	Safety Engineering/ Risk Control	Yes	Yes	Yes
Matt Simcik, Ph.D. Associate Professor	EHS	Environmental Chemistry	Yes	No	No
Deborah Swackhamer, Ph.D., Professor	EHS	Environmental Chemistry	Yes	No	No
Elizabeth Wattenberg, PhD, Associate Professor	EHS	Toxicology	Yes	No	Yes

¹ Key to Abbreviations on Table 1: T: teaching; A: advising, R: research; EHS: Environmental Health Sciences; BAE: Biosystems and Agricultural Engineering, ME: Mechanical Engineering

d. Curricula

Students take courses in four core areas - Public Health (SPH), Environmental Health Sciences (EnHS), Occupational Health and Safety (OHS), Industrial Hygiene (IH) - each of which builds upon the other (see Appendix). At the base are the core requirements for all School of Public Health (SPH) students mandated for accreditation by the Council on Education for Public Health (CEPH). These requirements include classes in biostatistics (PubH 6414 or 6450), epidemiology (PubH 6320), ethics (PubH 6741 or 6742), behavioral science (PubH 6020), and management (PubH 6751 or 6752). Building upon the SPH core, a core of five courses is required for all Master's students in the Division of Environmental Health Sciences (EnHS). These courses include PubH 6103 (Exposure to Environmental Hazards), PubH 6104 (Environmental Health Effects: Introduction to Toxicology), and PubH 6105 (Environmental and Occupational Health Policy). The Master's Project (PubH 7194) and the Field Experience (PubH 7196) are also part of the EnHS core. The third core required of all Occupational Health and Safety (OHS) students includes PubH 6170 (Introduction to Occupational Health and Safety), PubH 6130 (Occupational Medicine), and PubH 6150 (Interdisciplinary Evaluation of Occupational Health and Safety Field Problems). Finally, four core courses are required of all students in the Industrial Hygiene (IH) program: PubH 6171 (Exposure

Assessment for Air Contaminants), PubH 6172 (Industrial Hygiene Applications), PubH 6174 (Control of Workplace Exposures), and PubH 6175 (Industrial Hygiene Measurements Laboratory). Students are also required to take at least six credits of relevant elective courses, for a total minimum of 48 credits.

B.4. Program Activities and Accomplishments

a. Progress towards goals and objectives

Provide an academic curriculum that emphasizes the multi-disciplinary elements of Industrial Hygiene while maintaining a strong emphasis on practical applications and relevance to issues in occupational and environmental health. Surveys of industrial hygiene and HSAT alumni graduating in the last 10-15 years are conducted regularly, the last in 2006, to assess suitability of coursework. A recent employer survey showed that employers' expectations of knowledge and skills for newly-graduated and experienced Master's-trained industrial hygienists are properly aligned with the IH program's objectives and outcomes (Brosseau et al., 2005). Students complete evaluation forms, which include both quantitative measures and qualitative remarks, at the end of each course; these are collated and analyzed by the School of Public Health. Statistical reports are then sent to the Division and lead faculty. An end-of-year focus group allows students to comment on their learning in the context of the IH and HSAT programs' educational objectives and expected outcomes. The program was also re-accredited by ABET for a full six-year term in 2007.

Provide opportunities for field experience and Master's project (research) work that enable students to develop their practical professional and investigative skills. Students have a wide range of opportunities for field experience at a number of locations locally and nationally. During this reporting period, students have worked at large and medium scale manufacturing companies (e.g., 3M Company, and Honeywell Corp), and smaller consulting companies. Students undertake laboratory-, field-, and literature-based research projects. In most cases, students are encouraged to pursue projects related to faculty research interests. The results of some of these studies are usually presented at the Student Poster sessions at the annual American Industrial Hygiene Conference and Exposition, and some are published as articles in peer-reviewed journals.

Maintain an active advisory board that includes representation from stakeholders. The IH Program's Advisory Board, consisting of diverse stakeholders in the Program, meet with the Program faculty annually to participate in the Program's development and review the educational requirements. The advisory group comprises representatives from industry (3M Company, HB Fuller Co., St. Paul Co., Honeywell, General Mills, TSI, Inc., Gopher Recycling), consulting companies (EHS Mgmt Partners, Knutson Ventilation), labor (United Transportation Union), state and local agencies (MN OSHA, Minnesota Pollution Control Agency, Metro Transit, Metro Council Environmental Services), and other organizations (University of Wisconsin and University of Minnesota Department of Environmental Health and Safety).

Maintain student enrollment into the Master's and doctoral student program. The Industrial Hygiene Program attracts four to six new students each year, which yields a student: faculty ratio of approximately 3:1. This makes us a relatively small graduate program, allowing an adequate amount of one-on-one interaction between students and faculty. In 2006-2007, 12 Master's-level students enrolled (6 MPH, and 6 MS). Of these, one was a part-time trainee. There are currently five Ph.D students enrolled.

Support the Midwest Center's continuing education mission by providing training sessions and course content to persons outside the Center interested in Industrial Hygiene. Working cooperatively with representatives of the Midwest Center's CE, IH core faculty frequently find themselves with opportunities to make presentations in Minnesota or surrounding states regarding issues related to occupational hygiene. Faculty have made presentations on a variety of topics including clean-up of methamphetamine labs, uses of expert judgment in industrial hygiene, and indoor mold and carpet allergens, among others. All three core faculty will also continue to teach regularly in the Prep Course for the CIH exam that is offered by Midwest Center's CE. In addition, faculty also regularly teach in Professional Development Courses (PDCs), offered at the annual American Industrial Hygiene Conference and Exposition (AIHCE). Previous courses have been on topics such as Nanoparticle Sampling and Measurement, Mathematical Modeling of Workplace Exposures, and Bayesian Decision Analysis. These activities will continue in the foreseeable future.

b. Trainee honors, awards, scholarships

Girard Griggs was awarded the AIHA Foundation Scholarship as well as the 3M Student Scholarship in 2007.

c. Faculty honors, awards, appointments

Faculty Membership in Scientific Organizations and Bodies. Drs. Ramachandran and Brosseau are editorial board members of the *Journal of Occupational and Environmental Hygiene*. Dr. Raynor is an editorial board member of *Aerosol Science and Technology*. Dr. Brosseau is a regular member of the NIOSH study section (SOH-1) for reviewing extramural research proposals. Dr. Ramachandran is an *ad hoc* member of the same.

Board of Scientific Counselors, NIOSH: Dr. Ramachandran was appointed to the BSC, NIOSH in 2007 for a two-year period.

Alice Hamilton Award: Dr. Lisa Brosseau is the 2006 Alice Hamilton Awardee from the American Industrial Hygiene Association.

Academy of Industrial Hygiene: Dr. John Mulhausen, an Adjunct Faculty member became elected as the President-Elect for the AIH in 2007.

d. Trainee theses and dissertations

Four industrial hygiene students completed their degrees during this reporting period. Of these, seven students were from the HSAT program.

Tricia Carmody: "Determination of an Air Sampling Protocol for Methamphetamine to be Used in Former Clandestine Laboratories"

Amanda Blasiak: "Noise Exposure Assessment of a Manufacturing Facility";

Deanna Brown: "Construction of Similarly Exposed Groups (SEGs) from Mapping Measurements of Nanoparticles and Respirable Particles at the Campus Club, University of Minnesota, Twin Cities";

Beth Regan: "Diffusion Efficiency of Air Filter Fibers with Non-circular Cross Sections"

All these graduates are currently employed as industrial hygienists.

e. Trainee recruitment including diversity efforts

The majority of students are recruited through the Division website and through word-of-mouth via alumni. Other recruitment efforts include advertisements in local and regional college and university newspapers, faculty participation at career fairs and the Minnesota Safety Council conference, and mailed pamphlets to college and university science and engineering departments. Most of the doctoral students have themselves sought out specific faculty to work with on their doctoral dissertations. The current international doctoral students in the IH program were strongly recommended by their faculty advisors in Korea and India who are personally known to the IH faculty. Some of the US doctoral students (e.g., Perry Logan) were known by their professional reputation to IH faculty. The IH Program has been successful in recruiting students from minority communities. Rolando Gonzales is a current doctoral student of Hispanic ethnicity and Teng Vang is a current MS student of Hmong ethnicity.

f. Accreditation of the Industrial Hygiene Program by ABET The Industrial Hygiene Master's (MPH and MS) programs are accredited (2002 to 2008) by the American Board of Engineering and Technology (ABET). A site visit for re-accreditation occurred in September 2007, and we have been unofficially notified that we will receive re-accreditation for another six years.

B.5. Program Products

a. Publications and Presentations. Faculty and students have been very productive in terms of research output. These are listed in Appendices B and C.

b. CE Courses Presented. Dr. Raynor's expertise in respiratory protection and building safety and ventilation led to the development of three courses that are offered during the summer Public Health Institute. PubH 7200, Section 128 (Personal Protective Equipment and Respiratory Protection), PubH 7200, Section 129 (Preparedness for Buildings), and PubH 7200, Section 133 (Workers as Partners in Emergency Preparedness and Response). Dr. Ramachandran's expertise in nanoparticle exposures and risk assessment led to the development of a course PubH 7200 (Nanoparticle exposures and hazards: What should the occupational health and safety professional do?).

c. Alumni Survey. In 2006, the MCOHS surveyed alumni for their satisfaction with, and perceived value and proficiency in their academic training in regards to discipline-specific and cross-cutting professional competencies. All alumni graduating between 1992 and 2005 were mailed a self-administered survey. Findings revealed that IH alumni were "highly satisfied" (72%) or "satisfied" (24%) with their graduate education in occupational health and safety (OHS) and 89% were working in OHS. Among those who responded, 79% had current certification as CIHs and 37% as CSPs.

The discipline-specific competencies with the most frequent ratings of "very valuable" were: identifying hazards associated with specific sources and processes (87%); describing physical, chemical and biological aspects of the generation of hazards (89%); knowing health and safety laws and regulations (78%); gather, manage and evaluate data (82%); assessing aspects of exposure assessment, dose response and risk characterization (80%); designing and implementing an appropriate exposure assessment strategy (69%); understanding basic principles of sampling and its use for evaluating exposures and controls (87%); prioritizing hazards and exposures and the actions necessary for eliminating or controlling them (74%); recommending, evaluating and implementing appropriate engineering, administrative and personal protective controls (87%); selecting the most appropriate control methods for a given situation (83%); and validating the effectiveness of selected control methods (77%). In all the above competencies, the IH alumni perceived themselves as "proficient" or "very proficient".

d. Employer Focus Groups. We conducted four focus groups with individuals responsible for IH and OSH professionals in firms of various sizes in the manufacturing, government, and consulting sectors. Each group was asked to address five key questions: 1) In your organization, what are the current needs for industrial hygienists or individuals with health and safety responsibility? 2) What do you think are the future needs for industrial hygienists or individuals with health and safety responsibility? 3) What are your organization's expectations about training and qualifications when hiring IHes and OHS professionals? 4) How does your organization find and hire IH or OHS professionals? 5) When you hire IHs, does it matter if they come from an ABET-accredited program? In general, individuals representing these employment sectors foresee a continuing future demand for IHs in their organizations. They

seek IH and OSH professionals with broad knowledge and skills, with the expectation that specialization will occur after hiring. All groups consistently emphasize the importance of good communication skills, both verbal and written. They also agree that "hard" or basic science knowledge and technical skills are a prerequisite to hiring.

B6. Future Plans

Future plans are to continue to : 1) build upon the current program goals and objectives in order to further enhance the high quality curriculum that provides a strong foundation for industrial hygiene research and training and further strengthen visibility at the local, regional, and national levels; 2) enhance recruitment of excellent students to sustain diversity; 3) generate external research support and provide interdisciplinary training opportunities for research projects and theses; 4) provide multiple opportunities for students to present papers and participate at the local/national/international levels; 5) engage in new continuing education/outreach activities. Faculty in the EnHS Division are also developing a more integrated Exposure Science curriculum. The main effect of this for IH students will be an increase of two required course credits. Instead of taking the current *Exposure Assessment for Airborne Contaminants* (PubH 6171), they will take two courses - Properties and Measurement of Air Contaminants, and Human Exposure Assessment. These courses will provide a broader and deeper treatment of the topics currently being covered in PubH 6171.

C. Occupational and Environmental Health Nursing Program

C.1. Academic Training Program in Occupational and Environmental Health Nursing

C.2. Program Director: Patricia M. McGovern, PhD, MPH, RN

C. 3. Program Description

a. Goals and Objectives

This Occupational and Environmental Health Nursing (OEHN) Program provides excellent interdisciplinary education in occupational health and safety for nurses with the goal of creating a cadre of OEHNs who will work to decrease the nation's burden of occupational illness and injury and promote and protect the health of its workforce. This OEHN Program offers a Master of Public Health (MPH) degree, a dual degree (i.e., an MPH and a Master of Science degree, MS, with a major in Nursing), and a Doctor of Philosophy (Ph.D.) in Environmental Health. The specific objectives for this program include: (a) provide an academic curriculum that emphasizes the multidisciplinary elements of occupational and environmental health nursing while maintaining a strong emphasis on practical applications and relevance to the field; (b) provide opportunities for field experience and master's-level research work that enable students to develop their practical professional and investigative skills; (c) maintain an active advisory board that includes representation from key stakeholders; (d) maintain student enrollment; and (e) support the Midwest Center's continuing education mission by collaborating with the staff on research seminars and practitioner courses for Center alumni and persons outside the Midwest Center.

b. Responsible Conduct of Science Training

All students seeking MS or Ph.D. degrees must take Ethics in Public Health: Research and Policy (PubH 6742), and all investigators and research personnel involved in research with human subjects, including students, receive instruction in protecting human subjects in one of the following ways: review online materials available through the Collaborative Institutional Review Board Training Initiative (CITI) (hosted by the University of Miami Medical School server); review the University of Minnesota's Office of Human Research Protections' CD-ROM entitled "Investigator 101;" or review the online "Human Participant Protection Education for Research Teams" from the NIH and NCI. For any research effort, or project involving human subjects, students must prepare and submit an application to the Internal Review Board, Human Subjects' Committee, University of Minnesota, for approval, prior to implementation. This application is completed under the guidance of the advisor and co-signed by the advisor.

c. Faculty Participation

The core faculty includes Patricia McGovern, Debra Olson, and Nancy Nachreiner, all of whom teach, conduct occupational health and safety (OHS) research, and advise students. **See Table C-1 (below) for a list of participating faculty.**

Patricia McGovern, PhD, MPH, RN was promoted to full professor as of July 1, 2007. She also serves as Program Co-director of the Occupational Health Services Research and Policy Program and Deputy Director of the Midwest Center. She teaches a required course for EHS masters and doctoral students, "Environmental and Occupational Health Policy" (PubH 6105). Dr. McGovern focuses her work in health services research and policy as applied to occupational health and safety issues. Her recent research includes studies of employed women's postpartum health, work-related violence prevention, and qualitative research methods applied to issues of environmental justice.

Dean Debra Olson, MPH, COHN-S (Associate Dean for Public Health Practice Education), has expanded her role to include the greater public health community, including issues of public health preparedness, distance learning, and research on professional competencies in relation to curriculum development and program evaluation. Dean Olson's courses include "Issues in Environmental and Occupational Health," for graduate students, and PubH 6102 and "Issues in Environmental and Occupational Health," PubH 3102 offered to undergraduate pre-nursing and liberal arts students to support career options in environmental and occupational health. Offered on the Internet, it allows for regional access to potential candidates.

Nancy Nachreiner, PhD, MPH, COHN-S (Assistant Professor) is a key faculty member in the OEHN program, directs the Outreach Program and leads development of interdisciplinary linkages across core occupational health and safety classes such as "Introduction to Occupational Health and Safety" (PubH 6170), and "Interdisciplinary Evaluation of OHS Field Problems" (PubH 6150). Within these classes and other avenues for outreach, she links students and faculty to the community to facilitate research to practice opportunities. Dr. Nachreiner also conducts injury prevention research focused on work-related violence, and return-to-work issues for cancer survivors.

d. Curricula

This OEHN Program offers two masters options including a Master of Public Health (MPH) degree, a dual degree (i.e., an MPH and a Master of Science degree, MS, with a major in Nursing), and a Doctor of Philosophy (Ph.D.) in Environmental Health. There have been no major changes to this program since our last report. (See Appendix C-1). All programs include substantial interdisciplinary coursework, minimally 36 semester credits as detailed below.

Public Health: Public Health Management, PubH 6752; Fundamentals of Epidemiology, PubH 6320; Biostatistical Methods I; PubH 6414, Fundamentals of Social and Behavioral Sciences, PubH 6020; and Ethics in Public Health Practice and Policy, PubH 6741 or Ethics in Public Health Research and Policy, PubH 6742.

Environmental Health: Exposure to Environmental Hazards, which includes industrial hygiene content, PubH 6103; Environmental Health Effects, which includes toxicology, PubH 6104; Environmental and Occupational Health Policy, PubH 6105; Field Experience, PubH 7196, and Environmental and Occupational Health Master's Project, PubH 7194.

Occupational Health and Safety: Introduction to Occupational Health and Safety, PubH 6170; Occupational Medicine, PubH 6130; and Interdisciplinary Evaluation of Occupational Health and Safety Field Problems, PubH 6150.

Discipline-specific knowledge is taught by Dr. Nachreiner in courses such as Introduction to Occupational Health and Safety (PubH 6170), and Interdisciplinary Evaluation of Occupational Safety and Health Field Problems (PubH 6150). Public health nursing content is taught by School of Nursing faculty through Advanced Public Health Nursing (Nurs 8600,) and Research in Nursing (Nurs 8170). Students synthesize and apply coursework to their future practices through internships, and attendance at Community Grand Rounds.

The MPH curriculum minimally involves 42 required credits, including two electives, and takes two years of full-time study. The dual degree (MS-MPH) program plan minimally involves 59 credits, and builds upon the MPH program by adding credits in nursing and health care finance. It requires two and one-half years of full-time study. Students also complete a research project that is evaluated by the advisor and a final oral examining committee.

The PhD degree curriculum builds upon the existing doctoral training program within the Division that culminates in a Ph.D. in Environmental Health. Having completed all the OEHN-MPH requirements (described above), students complete additional courses (noted below) for a total of 46 required credits, including dissertation credits and electives.

Public Health: Biostatistics I, PubH 6450 and Ethics in Public Health Research and Policy, PubH 6742.

Research Methods: Occupational and Environmental Epidemiology, PubH 6140; Biostatistics II, PubH 6451, Occupational Injury Prevention Research Training Program Doctoral Research Seminar, PubH 8120; and Validity Concepts in Epidemiologic Research, PubH 8140.

Nursing: Research in Nursing, Nurs 8170, 3 credits, and Advanced Public Health Nursing, Nurs 8600, 2 credits; Qualitative Research Design and Methods, Nurs 8171.

Students must produce a scholarly thesis that makes an original contribution to the body of knowledge in environmental and occupational health, and withstands the scrutiny of the academic community. Students complete a written and oral examination, and an oral defense of their dissertation. This program requires a minimum of three full-time years beyond a master's degree. A student's program plan is reviewed by faculty to ensure it is sufficient for students' dissertations and career objectives.

C. 4. Program Activities and Accomplishments

a. Progress towards goals and objectives

1. Provide an academic curriculum that emphasizes the multidisciplinary elements of occupational and environmental health nursing while maintaining a strong emphasis on practical applications and relevance to issues in occupational and environmental health.

In 2006, the MCOHS surveyed alumni for perceived satisfaction, value and proficiency of their academic training in regards to discipline-specific and cross-cutting professional competencies. Findings revealed that OEHN alumni were "highly satisfied" (92%) or "satisfied" (8%) with their graduate education in occupational health and safety (OHS), and 63% were working in OHS. Among those whose primary role was not in OHS (rather public or environmental health), the majority (88%) reported using the knowledge and skills learned in the graduate program in their current job. Almost all OHN alumni rated most OEHN competencies as "very valuable" or "valuable." Competencies that alumni perceived themselves as relatively less proficient at included "negotiating vendor contracts" (50%), "developing/ managing a case management program" (58%), and "developing/ coordinating a company's health and corporate disability management programs" (51%). In response to these issues, Dr. Nachreiner will integrate content on vendor contracts into PubH 6150, and OEHN faculty will work with CPHEO staff to integrate more case management content into the curricula.

2. Provide opportunities for field experience and master's-level research work that enables students to develop their practical professional and investigative skills.

Students have a wide range of opportunities for field experience at a number of locations locally and regionally. During this reporting period, students have worked at hospital-based occupational health provider services groups (e.g., Ridgeview Business Health), large scale manufacturing companies (e.g., 3M Company), metropolitan-area school systems and with Native American tribes (e.g., Leech Lake Band of Ojibwe Health Division). For masters research projects, students undertake literature-based research projects or field-based or professionally-related pilot studies. The results of selected studies are often presented at the poster sessions at the AAOHN Symposium and Expo, and some are published as articles in peer-reviewed journals (see Hart, Olson, Frederickson, and McGovern. Competencies most valued by employers - Implications for master's prepared OHNs. AAOHN Journal, Appendix C-2).

<i>Faculty Name</i>	<i>Organizational Affiliation</i>	<i>Expertise</i>	<i>T</i>	<i>A</i>	<i>R</i>
Bruce Alexander, PhD, Associate Professor	EHS	Occupational Epidemiology	Yes	Yes	Yes
Heidi Roeber Rice, MD, MPH, Director, Occupational Medicine (OM) Residency	Region's OM Clinic	Occupational Medicine	Yes	Yes	No
Jean Bey, MPH, COHN-S, Adjunct faculty and OHS Manager	3M	OEHN	Yes	Yes	No
Tim Church, PhD, Professor	EHS	Biostatistics	Yes	Yes	Yes
David Cossi, J.D., Adjunct faculty	GCL Inc.	Employment Law	Yes	No	No
Mary Findorff, PhD, RN, Adjunct faculty	SON	OEHN	Yes	No	No
Susan G. Gerberich, PhD, Professor	EHS	Injury Epidemiology	Yes	Yes	Yes
Linda Glazner, DrPH, COHN-S, CCM; CE faculty	Consultant	OEHN and Case Management	Yes	No	No
Ian Greaves, MD, Associate Professor	EHS	Occupational Medicine	Yes	No	No
Jean Johnson, Ph.D., Adjunct faculty and Epidemiologist	MN Dept. Health	Epidemiology/Risk Communications	Yes	No	Yes
Madeline Kerr, PhD, RN, Associate Professor	SON	PHN	Yes	Yes	Yes
Carol O'Boyle, PhD, RN, Assistant Professor	SON	PHN	Yes	Yes	Yes
Gurumurthy Ramachandran, Ph.D., Professor	EHS	Industrial Hygiene	Yes	No	No
John Shutske, Ph.D., Professor	BAE	Agricultural Safety and Health	Yes	Yes	Yes
Elizabeth Wattenberg, Ph.D., Associate Professor	EHS	Toxicology	Yes	No	No

3. Maintain an active advisory board that includes representation from key stakeholders.

The OEHN Program's Advisory Board meets annually with the program faculty and continuing education staff to participate in the Program's ongoing development, management and evaluation. The advisory group comprises representatives from key stakeholders (e.g., 3M Company, Ridgeview Business Health; Guidant Corporation; Valspar Corporation; Unisys Corporation; AOH Risk Services; the Minnesota Department of Health and the Minnesota Department of Labor and Industry).

4. Maintain student enrollment

The Occupational and Environmental Health Nursing Program maintains student enrollment of least five full-time equivalent students, which yields a student: faculty ratio of approximately 3:1. This makes us a relatively small graduate program, allowing an adequate amount of one-on-one interaction between students and faculty. In 2006-2007, 11 master's-level students were enrolled (7 MPH, and 4 dual degree). Of these, eight were part-time trainees. Additionally there was one PhD student enrolled. Five students graduated (3 MPH and 2 MS-MPH);

5. Support the Midwest Center's continuing education mission by collaborating with the continuing education staff on research seminars and practitioner courses to Center alumni and persons outside the Midwest Center interested in Occupational and Environmental Health Nursing.

Through Dean Olson's leadership the Centers for Public Health Education and Outreach (CPHEO) creates and maintains over 40 online courses and hundreds of online modules that include the School's core public health curriculum. Key courses already online include "Introduction to Occupational Health and Safety" (PubH 6170, 3 credits; Dr. Nachreiner), and "Environmental Health and Nursing," (eight, three-hour modules, Dean Olson). Dean Olson and Dr. Paul Allwood also offer two internet courses on issues in environmental and occupational health that allow regional access to graduate and undergraduate students. Dean Olson and an OEHN student, Linda Carlson, developed free online modules (A Glimpse into Occupational Health and Safety; History of Occupational Health and Safety) as an introduction to occupational health.

Another innovative option is the Public Health Institute, an annual event (offered May-term) that is a forum for discussion of emerging public health issues. At the latest annual PHI (2007) 9 universities and 39 community organizations partnered with the UMN to offer 59 courses attended by 302 students from 28 states. Focus areas included: culturally responsive public health practice;

² Key to Abbreviations on table 1 include the following: T: Teaching; A: Advising, R: Research; SON: School of Nursing; PHN: Public Health Nursing; and BAE: Biosystems and Agricultural Engineering.

environmental health (e.g., "Ergonomics and Prevention of Workplace Hazards;" "Personal Protective Equipment and Respiratory Protection"); food safety and biosecurity; and public health leadership and public health preparedness, response and recovery.

b. Trainee honors, awards, scholarships

Doctoral student, Maggie Stedman-Smith, (Advisor: Dr. McGovern) was awarded a fellowship for her dissertation research involving a need assessment of pesticide exposures among women in the Red River Valley. The fellowship was awarded by the Society for Public Health Education, and the Agency for Toxic Substances and Disease Registry, 2006-2007.

c. Faculty honors, awards, appointments

- Dr. McGovern was promoted to the rank of full Professor in June 2007.
- Dean Olson was inducted into the Fellows of the American Association of Occupational Health Nurses in 2007.
- Assistant Professor Nancy Nachreiner received the "Faculty Excellence Award" from the graduating class of 2007 in the Division of EHS.

d. Trainee masters-level research papers and dissertations

Five masters-level students completed their degrees during this reporting period. Their research paper (plan B) title and job title follow their names.

- Rebecca Anderson, MPH: "Utilizing the Voice of the Customer Tool in Six Sigma to Evaluate and Improve an Occupational Health Clinic Process;" OEHN specialist, Canadian Pacific Railroad.
- Kelly Johnson, MPH: "Travel Health Services: Perceived Needs of Current Occupational Health Clients," Regulatory Affairs Specialist, Medtronic, Inc.
- Mary Navara, MPH: "Impact on Public Health Workforce and Amplification of Contacts as a Return on Investment: The UMN Public Health Institute," Manager, Cancer Survivor Network, CentraCare Health System.
- Charlotte Sortedahl, MPH, MS, "Schools and Public Health Disasters," Health Officer, St. Croix County.
- Ronda Weiss, MPH, MS, "Occupational and Environmental Health Nursing Alumni: Findings on the Perceived Value and Proficiency with Core Competencies," Senior Manager, Medical and Health Management, The Home Depot Corporation.

e. Trainee recruitment including diversity efforts

The majority of students are recruited through the Division's website and by word-of-mouth via alumni. Other recruitment efforts include faculty and student participation at career fairs and professional meetings. While no student of color was enrolled in the OEHN Program in academic year 2006-2007, the Program had one student of color in 2005-2006 and a new student of color enrolled for academic year 2007 (both are African American).

C.5. Program Products

a. Publications and Presentations. Faculty and students have been very productive in terms of research output (Appendices C-2, C-3).

b. Conferences and Symposia Sponsored. Drs. McGovern, Gerberich and the continuing education staff hosted scientists from the NIOSH Division of Safety Research. Dr. Jim Collins presented his NORA award winning studies "Research on Safe Patient Lifting and Slip, Trip, and Fall Prevention in Health Care Workers." Dr. Harlan Amandus presented, "Directions for Future Workplace Violence Research" July 18, 2006.

c. CE Courses Presented. Dr. McGovern presented a CEU program with David Cossi, JD, Adjunct faculty at the AAOHN 2007 Symposium and Exposition, Orlando, Florida on "Serious Health Conditions and the Family Medical and Leave Act," which has implications for OEHN practice.

d. Alumni and Employer Surveys. (See section C-4.a., above, and Appendix C-2 (Hart, Olson, Fredrickson and McGovern, 2006, Competencies most valued by employers. AAOHN Journal).

C. 6. Future Plans

Future plans are to continue to: 1) build upon the current program goals and objectives to further enhance the high quality curriculum that provides a strong foundation for occupational and environmental health nursing research and practice and further strengthen visibility at the regional and national levels; 2) enhance recruitment of excellent students to sustain diversity; 3) generate external research support and provide interdisciplinary training opportunities for research; 4) provide opportunities for students to present papers at the local and national levels; 5) collaborate with the CE staff to facilitate new continuing education/outreach activities.

OEHN Appendices: 1. Curricula; 2. Publications; 3. Presentations; 4. Outreach

C. Occupational and Environmental Medicine Program

D.1. Occupational and Environmental Medicine (OEM)

D.2. Director: Beth Baker, MD, MPH (June-December 2006); Heidi Roeber Rice, MD, MPH (January 2007-Present)

D.3. Program Description

a. Description and goals

The Occupational Medicine Residency Training Program is located within the Department of Occupational and Environmental Medicine of the HealthPartners Medical Group, and is affiliated with the University of Minnesota, School of Medicine and the School of Public Health. Within the latter, is The Midwest Center for Occupational Health and Safety (MCOHS), which is a collaborative effort between the Occupational Medicine Residency and the University of Minnesota, School of Public Health (SPH) where the required academic training is provided through the Division of Environmental Health Sciences. The goal of the OEM program is to train physicians who will improve the health and safety of workers and be able to practice in a wide range of venues including government agencies, corporate health departments, clinical practice, or academia. Central to this training has been an emphasis on providing a solid clinical basis for the practice of occupational medicine and the management of patients with work-related health problems, as well as the identification and remediation of occupational risks and hazards in the workplace.

b. Responsible conduct of science training

The University of Minnesota School of Public Health considers ethics to be one of the six core competency areas of public health. All students in the HSAT Program seeking MPH degrees must take PubH 6741 (Ethics in Public Health: Practice and Policy). All students in the MS track must complete PubH 6742 (Ethics in Public Health: Research and Policy). In addition, the University of Minnesota requires that all investigators and personnel involved in research with human subjects, including students, receive instruction in protecting human subjects in one of the following ways: review online materials available through the Collaborative Institutional Review Board Training Initiative (CITI), review the University of Minnesota's Office of Human Research Protections' CD-ROM entitled "Investigator 101", or review the online "Human Participant Protection Education for Research Teams" from the National Institutes of Health and the National Cancer Institute. These materials include: the definition of human subjects in research; the responsibilities of the investigator; authority, composition, and procedures of Institutional Review Boards; ethical principles; risk and benefits; the elements and process of informed consent; how to prepare an application and consent document; inclusion and recruitment of vulnerable populations; adherence to study protocol; and continuing review.

c. Faculty Participation

1. Core Faculty:

Beth Baker MD, MPH, FACOEM, FACMT was Residency Director through December 2006. She is board-certified in occupational medicine, internal medicine, and medical toxicology. Dr Baker will maintain teaching and research ties to the program. She is a Fellow of the American College of Occupational and Environmental Medicine, and presently chairs the Academic Section of the American College of Occupational and Environmental Medicine (ACOEM), and is active in ACOEM's Toxicology Committee, Academic Council, Maintenance of Certification Committee, and Practice Guideline Committee. Dr Baker is a member of the Board of Trustees for the Minnesota Medical Association (MMA); and chairs the Medical Services Review Board for the Minnesota Department of Labor and Industry. Dr Baker is currently collaborating with Dr. Bruce Alexander (Occupational Epidemiology) on his CDC and ATSDR funded study, *Respiratory Health and Community Asbestos Exposure*, to evaluate the prevalence of respiratory abnormalities, through radiograph and pulmonary function testing in a cohort of current and former residents of a neighborhood in NE Minneapolis. Dr Baker is an Adjunct Assistant Professor in the School of Public Health and Assistant Professor in the Department of Internal Medicine.

Ian Greaves, BMedSci, MB BS, FRACP, FAAAS, Associate Professor, has extensive research experience in occupational lung diseases. An internationally known educator in occupational safety and health, he provides research supervision, is lead instructor for *Occupational Medicine: Principles and Practice* (PubH 6130), and also teaches courses on global health, general environmental health, and research methods. Dr Greaves is an internationally recognized expert on occupational and environmental medicine issues, lecturing widely in the Philippines, India, Nepal, and Australia. Dr Greaves has been a member of American Conference of Government and Industrial Hygienists' (ACGIH) Threshold Limit Value[®] Chemical Substances Committee since 1997, serving on the Dust and Inorganic Subcommittee and Membership Committee. His research interests in the last year focused on: environmental factors associated with childhood asthma; occupational and environmental medicine aspects of global health; and toxic effects of mercury among historical figures.

Heidi Roeber Rice, MD, MPH, Assistant Professor, joined the OEM faculty in July 2006 after an exemplary performance during her MPH and occupational medicine residency clinical rotation years. Having demonstrated a keen interest in the program, and exhibiting energy and strong organizational skills as Chief Resident, Dr. Roeber Rice assumed the role of Program Director in January 2007.

Jeffrey Mandel, MD, MPH, Associate Professor, joined the School of Public Health faculty in Fall, 2006. Dr Mandel, a prior Residency Director of the OEM Residency Program, has extensive research and consulting experience, and has served on the Graduate Faculty at the University of Minnesota since 1989. Dr Mandel is board certified in internal medicine and occupational medicine and is a fellow in the American College of Occupational and Environmental Medicine. He was previously employed as Senior Managing Scientist, Exponent Inc, Chicago, and Director of Occupational Medicine, 3M Company, St. Paul, Minnesota. His research and consulting interests have focused on occupational exposures and health outcomes, and his specific expertise includes clinical and epidemiologic aspects of asbestos, silica, benzene, trichloroethylene and other halogenated solvents, isocyanates, acrylates, vinyl chloride, methylene chloride and several fluorinated compounds.

2. Supporting Faculty:

Michael McGrail Jr., MD, MPH, is a senior member of the Regions-HealthPartners OM Faculty and preceded Dr Baker as OM Residency Program Director. He is board certified in Occupational Medicine, Medical Toxicology, and Family Medicine and continues active involvement in the supervision and teaching of occupational medicine and medical toxicology fellows. Dr McGrail also serves as the Associate Medical Director for the Primary Care division of HealthPartners Medical Group and, in that capacity, has administrative oversight of the Department of Occupational and Environmental Medicine. Dr McGrail is an Adjunct Assistant Professor at the School of Public Health and is an Assistant Professor in the Department of Family Medicine and Community Health, University of Minnesota.

Ralph Bovard, MD, MPH is currently the Section Head of Sports Medicine for HealthPartners and previously served as Department Head for the Occupational and Environmental Medicine Department from March 2004 through July 2005. Dr Bovard is board certified in General Preventive Medicine, and is a member of the Board of Trustees for the American College of Sports Medicine. Dr Bovard is also an Assistant Professor in the Department of Family Medicine and Community Health, University of Minnesota His academic and research interests include work and sports-related musculoskeletal injury clinical care and epidemiology. Dr Bovard participates in all aspects of the residency, including clinical preceptorship, rounds, and journal clubs.

Fozia Abrar, MD, MPH is the Section Head of the Occupational and Environmental Medicine Department at HealthPartners, and is a graduate of the Minnesota OMR Program and Tufts University General Preventive Medicine Residency. She is board certified in Occupational Medicine and General Preventive Medicine, and an Assistant Professor in the Department of Family Medicine and Community Health. A native of Somalia, she has special interests in both international health and health care provider cross-cultural competencies, and is a well known regional and national lecturer on these issues. Dr Abrar worked previously for the Office of Maternal and Child Health and the Office of AIDS Activities, Washington, DC. Dr Abrar participates in all aspects of the residency and also serves as Assistant Residency Director.

CJ Zheng, MD, PhD graduated from the OEMR Program and joined the faculty July, 2004. Dr Zheng completed a postdoctoral fellowship at the University of California, Berkley and received his PhD in epidemiology from the University of Washington. In 2005, Dr Zheng was appointed as Assistant Residency Director for Research. His research interests include occupational lung disease, pulmonary function testing, genetics, and statistical modeling. Dr Zheng participates in all aspects of the residency, including clinical preceptorship, clinical rounds, journal clubs, grand rounds, and project development and design. Dr Zheng was a guest lecturer at China National Institute of Occupational Health and Poisoning Control (NIOHPC) in 2006, and is currently trying to establish an exchange between U.S MCOHS and Chinese occupational health professionals and researchers to influence occupational health regulations and practice in the Peoples Republic of China. Dr Zheng has a current grant from the HealthPartners Research Foundation to explore a new pulmonary function indicator.

Kirsten McGrail, MD, MPH joined the OM faculty in July, 2006 after serving as Adjunct Clinical Faculty for several years. She is the Medical Director of HealthPartners Worksite Health Managed Care Plan and organizes the OEM residency's journal club. Dr Kirsten McGrail is a 2001 alumnus of the OEMR Program.

d. Curricula

The OEM program continues to receive substantial support from the Regions-HealthPartners Institute for Medical Education and the local occupational medicine community. The Occupational and Environmental Medicine (OEM) Residency Program was last reviewed by the ACGME in October 2003, and is fully accredited with the next anticipated site visit in 2009. The OEM program offers PGY-2 and PGY-3 level training for three residents per year but, due to the extraordinary educational opportunities available, was approved by the Preventive Medicine Residency Review Committee (RRC) in 2006 to expand to four residents per year.

D.4. Program Activities and Accomplishments

Throughout the past year, the OEM program continues to demonstrate successful achievement of its goal of training physicians who will improve the health and safety of workers and be able to practice in a wide range of venues including government agencies, corporate health departments, clinical practice, or academia. Three trainees graduated in 2006-2007, all of whom are presently employed in the clinical practice of OEM. One of the accomplishments toward our goal of increased research contributions within our

specialty during this period is demonstrated by the recognition of our graduate, Eileen Greenwald, MD, MPH, who was awarded the Resident Research Award after presenting her research at the American Occupational Health Conference in May 2007. She was mentored by, and worked in collaboration with, Dr. CJ Zheng, an OEM faculty member involved in the development of a proposed spirometric index for the identification of airflow obstruction in workers.

The program was enhanced with the addition of Dr. Jeffrey Mandel to the OEM faculty. His participation in resident education and research efforts have included Community Grand Rounds presentations on areas of toxicology and epidemiology, and with his assistance, the program has implemented a new curricular element, Resident Research Rounds. To further enhance research opportunities, Dr. Jeff Mandel and Professor McGovern have been successful in implementing a Memorandum of Understanding in 2007 between HealthPartners and the School of Public Health, Division of Environmental Health Sciences (EHS) to collaborate on various research endeavors. The memorandum formally acknowledges a collaborative effort between the two institutions for the conduct of research relating to the environment and its effect on human health. While researchers in both organizations have collaborated for many years on research of mutual interest, the intent of this memorandum is to set up a structure that will be deliberate in facilitating linkages and collaboration among researchers from these institutions. This creates a new opportunity to more easily access clinical data and cost information, and provides a strong research partnership. The HealthPartners Research Foundation may also have small amounts of money for pilot projects for students and junior faculty.

The diversity of our clinical faculty has assisted the program's effort to attract minority applicants, as our director of research and department chair provide excellent role models for the professional practice of OEM in an expanding and inclusive community. During the past year, three trainees entered the OEM program, one of whom is an American of African birth and a second is of African birth as well.

As an example of the strength of our clinical faculty, they are often included as "Top Docs" in the community, including Dr. Michael McGrail and Dr. Ralph Bovard in 2007 (Mpls/St. Paul Magazine). Dr. Fozia Abrar is consistently recognized as a leader within the Somali community and has completed several educational videos within the previous year which are used to improve the health of all workers.

Occupational medicine and industrial hygiene faculty (Professors Baker, Roeber Rice, Greaves, and Brosseau) and resident physician trainee Dr. Sharda Katyal completed a manuscript which was accepted for publication in the past year, evaluating residency education and the application of core competencies in occupational medicine practice. The data collected from program graduates describes the professional competencies acquired during graduate training. The results of each of these needs assessments have identified focus areas within the OEM curriculum to better serve the needs of employers, physicians and workers and the results of this effort will be used to improve graduate curriculum throughout the Center.

D.5. Program Products

During the most recent funding year, faculty and residents have demonstrated the ability to contribute to both the science and practice of occupational and environmental medicine.

OEM resident trainee Dr. Sharda Katyal completed her research and recently submitted a paper with Drs. Baker, Greaves and Roeber Rice which was accepted for publication during this period, evaluating residency education and the application of core competencies in occupational medicine practice. The data collected from program graduates describes the professional competencies acquired during graduate training. Further, this needs assessment is being utilized to improve training program design and educational experiences of OEM trainees within our program, as well as participating programs throughout the country.

Dr. Baker, who was involved in several research efforts with numerous publications, during the previous year, is a member of the Education Committee and Long Range Planning Committee of the American College of Medical Toxicology (ACMT). Dr. Baker has been involved in the as the Co-Director of the ACMT national spring medical toxicology conferences for 2006 and 2007 -- a course which provides an opportunity for medical toxicologists such as PharmDs, poison center staff, and physicians in multiple specialties from around the country to develop awareness about issues of toxicology related to occupational and environmental exposures.

During the previous year, the first collaborative Environmental Exposure Conference was jointly sponsored by the OEM program through the HealthPartners Institute for Medical Education, Minnesota Department of Health, and the U of M School of Public Health, Division of Environmental Health Sciences.

D.6. Future Plans

The progress achieved throughout the past year, particularly the strategic planning process, has solidified strategies and collaborative relationships to facilitate clinical research and has resulted in a list of potential topics, faculty resources and funding possibilities which will serve as a focus for the next year.

The new curriculum design, which offers an integrated two year experience combining academic coursework with practicum training experience has presented a unique opportunity to evaluate program strengths and areas for improvement and these will be closely examined throughout the upcoming year. As our clinical and practicum experiences continue to be noted as among the greatest strengths of the residency program, we will continue identify new opportunities for resident education and strengthen current rotations with a focus on enhancing practical experience and training in the science of ergonomics, partnering with our industrial rotations. In addition, two new training experiences, on involving organized labor as well as an additional rotation in disability evaluation/independent medical examination, are in the planning stages.

The program plans to continue efforts toward the expansion and development of additional research opportunities, and we are pleased to report progress toward these efforts, to date, that will continue.

- In addition to the formalization of a collaborative relationship with the HealthPartners Research Foundation, as described elsewhere, faculty have been involved in additional efforts such as Dr. Zheng, who has begun the process of establishing occupational/environmental health ties internationally, specifically with the People's Republic of China, where he has an existing network in the science community.
- The OEM program, as it strives to expand interdisciplinary and educational outreach activities, plans to begin efforts to establish a presence within the medical school curriculum at the University of Minnesota, as well as the University of North Dakota Schools of Medicine. The recognition of OEM as a distinct medical specialty, and increased awareness among medical students, is anticipated to result in increased interest in entering the specialty as a primary training track. As a result, the OEM program includes in its future plans exploring the possibility of establishing/partnering with a Transitional Training Program to offer an initial post-graduate year of training.
- The program plans to continue to collaborate and offer expertise in occupational and environment medicine to core academic courses including: Occupational Medicine: Principles and Practice, PubH 6130; Introduction to Occupational Health and Safety, PubH 6170; and Interdisciplinary Evaluation of OHS Field Problems, PubH 6150. The OEM Program also contributes a valuable clinical component to the OEHN Program by providing a venue for participation in the Regions OEM Clinic for the Field Experience in Environmental Health, PubH 7196.

Through its graduate and continuing education efforts, this program will continue to produce leaders in occupational health and safety who will make important contributions to the health and safety of the nation's workforce.

E. Occupational Health Services Research Program

E.1. Occupational Health Services Research and Policy Program

E.2. Program Director: Dr. Bryan Dowd and Dr. Pat McGovern

E.3. Program Description

a. Goals and Objectives

The goal of this training program is to prepare doctoral students with expertise in both occupational health and safety and health services research and policy. Graduates of the program will be the future experts and leaders in the emerging field of occupational health services research working in academia, governmental agencies, industries and health plans, to meet the needs for researchers both in the region served by the program and nationally. The specific objectives for the Occupational Health Services Research and Policy program are to: 1. provide an academic curriculum that emphasizes the multi-disciplinary elements of occupational health services research and policy while maintaining a strong emphasis on research to practice applications; 2. maintain enrollment of a minimum of three full-time equivalent students in the program including representation of diverse backgrounds; 3. maintain an active advisory board that includes representation from stakeholders; 4. collaborate with the Midwest Center's continuing education mission on providing an annual seminar that enhance the knowledge base of researchers and practitioners in occupational health and safety, and 5. develop one to two web-based modules, per year, relevant to OHSRP.

b. Responsible Conduct of Science Training

All students seeking MS or Ph.D. degrees must take Ethics in Public Health: Research and Policy (PubH 6742) and all investigators and research personnel involved in research with human subjects, including students, receive instruction in protecting human subjects in one of the following ways: review online materials available through the Collaborative Institutional Review Board Training Initiative (CITI) (hosted by the University of Miami Medical School server); review the University of Minnesota's Office of Human Research Protections' CD-ROM entitled "Investigator 101;" or review the online "Human Participant Protection Education for Research Teams" from the NIH and NCI. For any research effort, or project involving human subjects, students must prepare and submit an application to the Internal Review Board, Human Subjects' Committee, University of Minnesota, for approval, prior to implementation. This application is completed under the guidance of the advisor and co-signed by the advisor.

c. Faculty Participation

Professors Bryan Dowd and Pat McGovern provide the leadership and the institutional linkage needed for programmatic success. They have successfully collaborated on research and academic training programs since 2000, and will continue their efforts with this OHSRP training grant.

Dr. Bryan Dowd (Ph.D.) is a tenured professor in Health Policy and Management (HPM), and has just stepped down as the Director of Graduate Studies for the doctoral program in Health Services Research, Administration and Policy, after serving for seven years in that position. He continues as principal investigator for the AHRQ / NRSA doctoral training grant in the HPM Division. During the past year he chaired the School's Appointment, Promotion and Tenure (APT) committee. He teaches health policy and advanced health services research methods (PubH 8801: Health Policy and PubH 8811, "Seminar: Health Services Research Methods") and currently serves as chair of AcademyHealth's Methods Council, a national committee of experts in health services research methods. His primary research interests are markets for health insurance and health care services, and the application of econometric methods to health service research problems. His recent research includes studies of the cost-impact of a disability prevention program, evaluation of the HIFA Medicaid waivers, insurance theory, causal modeling, health plan choice, enrollment and disenrollment in Medicare HMOs, Medicare reform, and the Medicare Part D drug benefit.

Dr. Pat McGovern (Ph.D., M.P.H., R.N.) was promoted to full professor as of July 1, 2007. She also serves as Program Director of the Occupational and Environmental Health Nursing (OEHN) Program. She teaches a required course for EHS masters and doctoral students, "Environmental and Occupational Health Policy" (PubH 6105). Dr. McGovern focuses her work in health services research and policy as applied to occupational health and safety issues. Her recent research includes studies of employed women's postpartum health, work-related violence prevention, evaluation of professional competencies in occupational health and safety education, and qualitative research methods applied to issues of environmental justice. Most recently her research has extended to environmental

determinants of health for women and children as principal investigator of a new award to serve as a study center for the National Children's Study.

Additional Program Faculty

One of the strengths of this program is that between the Divisions of Health Policy and Management (HPM) and Environmental Health Sciences (EHS), there is a wealth of productive, research-oriented faculty upon which to draw. While potentially any faculty member in either division could participate in the proposed program, the faculty whose expertise is most relevant to occupational health services research are identified below. Professors Dowd and McGovern work with faculty to elicit their involvement with student training and advising. The faculty from EHS have expertise in the occupational health and safety disciplines (e.g., occupational medicine and nursing, injury prevention, industrial hygiene and toxicology); related methods (e.g., occupational and environmental epidemiology and biostatistics); or specialty areas such as exposure assessment. The faculty from HPM have expertise in quantitative methods and analytic methodologies applied to the health services field, and core social science disciplinary perspectives, including economics, sociology, and policy analysis. The key faculty from both divisions are described below.

<i>Faculty Name</i>	<i>Organizational Affiliation</i>	<i>Expertise</i>	<i>T</i>	<i>A</i>	<i>R</i>
Bruce H. Alexander, PhD, Associate Professor	EHS	Epidemiology	Yes	Yes	Yes
Kathleen Call, PhD, Associate Professor	HPM	Sociology	Yes	Yes	Yes
Timothy R. Church, PhD, Professor	EHS	Biostatistics	Yes	Yes	Yes
David Cossi, J.D., Adjunct faculty	GCL Inc.	Employment Law	Yes	No	No
Susan G. Gerberich, PhD, Professor	EHS	Injury Epidemiology	Yes	Yes	Yes
William Lohman, MD, Adjunct faculty	SPH	Occupational Medicine	Yes	No	No
George Maldonado, PhD, Associate Professor	EHS	Epidemiology	Yes	Yes	Yes
Ira Moscovice, PhD, Professor	HPM	Health policy	Yes	Yes	Yes
Nancy Nachreiner, PhD, MPH, COHN-S	EHS	OEHN	Yes	Yes	Yes
John Nyman, PhD, Professor	HPM	Health Economics	Yes	Yes	Yes
Gurumurthy Ramachandran, Ph.D., Professor	EHS	Industrial Hygiene	Yes	Yes	Yes
Todd Rockwood, PhD, Associate Professor	HPM	Sociology	Yes	Yes	Yes
John Shutske, Ph.D., Professor	BAE	ASH	Yes	Yes	Yes
Beth Vernig, PhD, Associate Professor	HPM	Epidemiology	Yes	Yes	Yes
Betsy Wattenberg, Ph.D., Associate Professor	EHS	Toxicology	Yes	Yes	Yes

¹ Key to Abbreviations on Table 1.

d. Curricula

This program in Occupational Health Services Research and Policy (OHSRP) builds on the doctoral programs already being offered by both the Divisions of Environmental Sciences (EHS) and Health Policy and Management (HPM). The program emphasizes quantitative methods and analytic methodologies applied to the fields of health services research and occupational health and safety. Additionally, the program incorporates social science disciplinary perspectives, including economics, sociology, and policy analysis. All students take a rigorous two-year program of coursework that is tailored to their background, interests and division of enrollment. Coursework includes content in research design, sampling, survey methodology, biostatistics or econometrics, health economics or cost benefit analyses, exposure to environmental hazards, environmental health effects, environmental and occupational health policy, an introductory interdisciplinary course on occupational health and safety, at least one elective in occupational health and safety, and ethics in research and policy. Doctoral students enrolled in EHS complete a supporting program⁴ in health policy and management.

³ Key to Abbreviations on table 1 include the following: T: Teaching; A: Advising, R: Research; EHS: Environmental Health Sciences; HPM; Health Policy and Management and BAE: Biosystems and Agricultural Engineering; ASH: Agricultural Safety and Health

⁴ The Graduate School at the University of Minnesota establishes the requirement for a supporting program at twelve semester credits. Students in the OHSRP training program typically complete more than the minimum credits.

Doctoral students enrolled in HPM⁵ complete supporting course work in environmental health sciences and occupational health and safety. Students undergo formal evaluation by passing preliminary written and oral examinations and final oral examinations on their dissertation research with their department of enrollment. Students complete a dissertation project based on original research that makes a significant contribution to knowledge in the field of occupational health services research, and earn a Doctor of Philosophy degree. (See OHSRP Appendix 1, curricula).

E.4. Program Activities and Accomplishments

a. Progress towards goals and objectives

Provide an academic curriculum that emphasizes the multi-disciplinary elements of occupational health services research and policy while maintaining a strong emphasis on research to practice applications.

Students matriculate through their curriculum as described above. Table E-1 describes the curriculum for students entering the program from the Division of EHS, and Table E-2 describes the curriculum for students entering the program from the Division of HPM (see OHSRP Appendices). Each program plan includes a minimum of 21 interdisciplinary course credits through course content in occupational health and safety, environmental health sciences, biostatistics and bioethics. Additionally all students are minimally involved in one ERC-sponsored seminar per year that focuses on research to practice as described below.

Maintain enrollment of a minimum of three full-time equivalent students in the program.

Five students were enrolled between July 1, 2006 to June 30, 2007.

Maintain an active advisory board that includes representation from stakeholders.

The board has met annually. It includes representation of industry, labor, state agencies, and health insurance plans. The faculty invites the board's insights on trends in occupational health services research and policy, academic program planning, student recruitment and job placement for graduates.

Collaborate with the Midwest Center's continuing education mission on providing an annual seminar that enhance the knowledge base of researchers and practitioners in occupational health and safety.

Professor McGovern collaborated with other ERC faculty to combine the annual OSHRP seminar with those intended for all ERC students. Laura Punnett Sc.D, Professor, Department of Work Environment, University of Massachusetts Lowell, and Jane Lipscomb PhD, RN, FAAN, Professor and Director, University of Maryland Baltimore (UMAB) School of Nursing, Work and Health Research Center provided seminars focused on translating research to practice on June 13, 2007. Professor Punnett presented: "Socioeconomic Disparities in Health and in Occupational Exposures: Relevance for Workplace Health Promotion and Protection Programs," and Professor Lipscomb presented: "Evaluation of Workplace Violence Prevention Interventions." Earlier in the year, Dr. McGovern worked with Dr. Gerberich and the Midwest Center Continuing Education staff to host Dr. Jim Collins, who presented his award-winning (i.e., National Occupational Research Agenda or NORA awards) studies "Research on Safe Patient Lifting and Slip, Trip, and Fall Prevention in Health Care Workers," and Dr. Harlan Amandus presented, "Directions for Future Workplace Violence Research" on July 18, 2006. Both speakers are from NIOSH, Division of Safety Research, Morgantown, West Virginia.

Develop one to two web-based modules per year relevant to OHSRP

Dr. McGovern worked with technical consultants to adapt one to two modules per year from "Environmental and Occupational Health Policy" (PubH 6150) into online modules to gradually develop an online alternative to the in-person class. In 2006-2007 modules were created on "Bioterrorism, Public Health Preparedness and Risk Communications" (Dr. Richard Danila, Adjunct Professor, Section Chief, Acute Disease Investigation and Control, Minnesota Department of Health and Dr. Pat McGovern), and "Institutionalized Violence: When Does Care Giving Become Submission to Violence?" Dr. McGovern and Mr. David Cossi, J.D, Adjunct Professor).

b. Trainee honors, awards, scholarships

Mira Grice, OHSRP trainee, received the Delta Omega Award for the best abstract from the School of Public Health, "The Impact of work-family conflict on maternal health six months after childbirth," from her dissertation research, and she was one of 20 national Delta Omega award winners who presented their research at the Annual American Public Health Association Meeting in November, 2006.

⁵ The official name of the doctoral program in HPM is "Health Services Research, Policy and Administration." For brevity, we refer to this program as the HPM doctoral program throughout this proposal.

She also received the School's Community Partner Star Award at an annual ceremony, October 3, 2006. In 2007, she accepted a position as an assistant professor at State University of New York, Brooklyn, New York.

c. Faculty honors, awards, appointments

During the past year Dr. Dowd chaired the School's Appointment, Promotion and Tenure (APT) committee. He currently serves as chair of AcademyHealth's Methods Council, a national committee of experts in health services research methods. He is also on the editorial board of *Medical Care Research and Review*. Dr. McGovern was promoted to the rank of full Professor in June 2007.

d. Trainee theses and dissertations

One student completed her dissertation during this reporting period. Mira Grice: "The Impact of Work-Family Conflict on Maternal Health Eighteen Months after Childbirth." Upon completing her degree, Dr. Grice accepted a position at State University of New York, Brooklyn, as an assistant professor in environmental health outcomes.

e. Trainee recruitment including diversity efforts

The majority of students are recruited through the Divisions' websites and through word-of-mouth via alumni. Other recruitment efforts include faculty and staff participation as exhibitors at annual professional meetings (e.g., AcademyHealth or the American Public Health Association). The OHSRP Program has been successful in recruiting students who are persons of color. During 2006-2007 there was student representation from African American and Korean ethnicities. One Native American student enrolled in the program for fall 2007.

E.5. Program Products

a. Publications and Presentations. Faculty and students have been very productive in terms of research output. Publications and presentations are listed in the OHSRP Appendices 2 and 3.

b. Conferences/symposia sponsored.

Dr. Dowd was invited by AcademyHealth (the national professional association for health services researchers) to offer a half-day seminar on endogenous explanatory variables at the annual meeting in Seattle (June, 2006). The seminar attracted 26 participants from across the country. Dr. Dowd also was asked to chair a panel on the same topic at the Seattle meeting. Professor McGovern collaborated with ERC faculty to combine the annual OSHRP seminar with a seminar intended for all ERC students as described above (E.4.a. Progress towards goals and objectives).

c. CE Courses Presented.

Dr. McGovern presented a CEU program with David Cossi, JD, Adjunct Assistant Professor at the AAOHN 2007 Symposium and Exposition in Orlando, Florida on "Serious Health Conditions and the Family Medical and Leave Act," April 17, 2007 to an audience of ~100 practitioners.

d. Successful Research to Practice Projects.

A new initiative with organized labor involved Professors McGovern, Brosseau, Nathan Barleen (OHSRP student), and Ms. Fredrickson (Administrative Core) to conduct a literature review of the cost-effectiveness of worksite interventions for safe patient lifting in the nursing home environment, and diabetes education in the worksite for United Transportation Union and United Food and Commercial Workers, Local 789. In spring semester 2007, Mr. Barleen, Dr. McGovern, and Ms. Fredrickson met with the union representatives for Nathan to present his research which was very favorably received.

E.6. Future Plans

Future plans are to continue to: 1) build upon the current program goals and objectives to further enhance the high quality curriculum that provides a strong foundation for occupational health services research and policy training and further strengthen visibility at the local, regional, and national levels; 2) enhance recruitment of excellent students and sustain diversity; 3) generate external research support and provide interdisciplinary training opportunities for research projects; 4) provide opportunities for students to present papers and participate at the local/national levels; and 5) support efforts of the Midwest Center CE staff to facilitate new continuing education/outreach activities.

OHSRP Appendices

Refer to: 1. Curricula; 2. Publications; 3. Presentations; 4. Outreach

F. Occupational Injury Prevention Research Training Program

F.1. Occupational Injury Prevention Research Training Program

F.2. Co-Directors: Susan Goodwin Gerberich, PhD and Bruce H. Alexander, PhD

F.3. Program Description

The purpose of this program is to prepare rigorously trained, doctoral-level academicians and researchers who will provide leadership in reducing the burden of occupational injury through teaching, research, and translation of research to practice. The Occupational Injury Prevention Research Training Program (OIPRTP) builds on extensive high quality training and research experiences dating back to 1980 that have achieved national and international recognition. This program, incorporates advanced doctoral-level training through curriculum and research opportunities that involve multidisciplinary collaborations with experts in safety, occupational injury epidemiology, engineering and human factors/ergonomics, medicine, and the social sciences, including occupational psychology. Specific opportunities involving industry, labor, and the public sector, including workers' compensation programs, are also included. It is apparent that there has been a major deficiency in trained personnel who can develop injury prevention and control programs, based on sound scientific principles, to address occupational problems adequately. The OIPRTP, designed to train highly qualified leaders, is among the few programs in the country that can provide unique training opportunities to meet the needs for academicians and other researchers who can ultimately impact this deficiency.

a. Goals and Objectives

Goals and objectives are identified and discussed in F.4.a. - Program Activities and Accomplishments.

b. Responsible Conduct of Science Training

The School of Public Health considers ethics to be one of the six core competency areas of public health. All students seeking MS or PhD degrees must take Ethics in Public Health: Research and Policy (PubH 6742). In addition, the University of Minnesota requires that all investigators and research personnel involved in research with human subjects, including students, receive instruction in protecting human subjects in one of the following ways: review online materials available through the Collaborative Institutional Review Board Training Initiative (CITI) (hosted by the University of Miami Medical School server); review the University of Minnesota's Office of Human Research Protections' CD-ROM entitled "Investigator 101;" or review the online "Human Participant Protection Education for Research Teams" from the NIH and NCI. For any doctoral research effort, or project involving human subjects, students must prepare and submit an application to the Internal Review Board, Human Subjects' Committee, University of Minnesota for approval.

c. Faculty Participation

The core faculty are Drs. Gerberich, Alexander, Church, and Maldonado and Mr. Ryan, all of whom contribute to teaching, research and student advising. The Supporting Faculty who also make significant contributions, are identified below.

Susan Goodwin Gerberich, Ph.D., Mayo Professor of Public Health, Environmental Health Sciences, Co-Director, OIPRTP and injury and violence centers, participates as a faculty member in the Interdisciplinary Human Factors/Ergonomics program, and has a national and international reputation in the area of injury epidemiology and control. Dr. Gerberich has been involved in a broad range of research investigations and has been funded through numerous RO1 grants, including a new major regional effort to identify consequences of injuries among children in the agricultural community and a state-wide effort to determine the etiology and consequences of violence against teachers, both of which serve as a basis for doctoral research.

Bruce H. Alexander, Ph.D. (Associate Professor, Environmental Health Sciences; Co-Director, OIPRTP) has expertise both in occupational injury and disease epidemiology and has published in both the national and international literature. He has been a Principal Investigator for several epidemiological studies and a Co-Investigator on major occupational injury epidemiological studies with Dr. Gerberich. In particular, he incorporates advanced injury epidemiology content into the research seminar (PubH 8120), and continues to provide training in applied research that enables students to develop research designs and analyze and interpret data pertinent to major injury and other problems using large databases that involve team projects and result in publication-quality papers. **Timothy Church, Ph.D.**, Biostatistician (Professor, Environmental Health Sciences) has unique expertise in biostatistics and application of special techniques to ascertain the potential degree of bias in research studies. Until recently, such application had been extremely rare in this field; thus, Dr. Church's involvement has provided an important opportunity to greatly enhance the quality of OIPRTP research. Dr. Church also has extensive experience as a Principal Investigator for major population-based epidemiological studies and has been collaborating with Dr. Gerberich on two major occupational injury epidemiological studies. He has also been integrally involved in advising activities with Dr. Gerberich and other program faculty.

George Maldonado, Ph.D. (Associate Professor, Environmental Health Sciences) has expertise in epidemiology methodology and has been responsible for developing course work and facilitating seminars pertinent to research methods that aid students in the design, conduct, and analysis of epidemiologic studies. His involvement, which includes advising students, is important for growth in the scientific rigor of research training. Dr. Maldonado brings a creative viewpoint and talented mind to the investigation of injuries and hazardous events among working populations and has a national reputation for his approaches to the design of studies.

Andrew Ryan, MS (Research Fellow and Research/Statistical Applications Specialist, Environmental Health Sciences) has expertise as an applications programmer and has continued to collaborate with faculty and be involved in instructing students in the

intricacies of data management, programming, and analysis relevant to the massive and complex data sets that are utilized as a basis for research training. He has extensive experience in advising students and participating on a variety of research projects, and has contributed significantly to the research seminar (PubH 8120) and in directed statistical applications for the course, Applied Analysis of Occupational Health Data (PubH 8100). This position has greatly strengthened the OIPRTP capabilities in being able to facilitate students' progress on their research efforts; his involvement receives rave reviews not only from the faculty but, also, from the students who were responsible for his 2006 School of Public Health (SPH) Academic Professional and Administrative (PandA) Excellence Award.

OIPRTP SUPPORTING FACULTY

FACULTY NAME AND TITLE	ORGANIZATIONAL AFFILIATION	EXPERTISE	T*	A*	R*
Jo-Ida Hansen, PhD, Professor	U of M - Psychology	Occupational Psychology	Yes	Yes	Yes
Patricia McGovern, Ph.D., MPH, RN	U of M - EHS	Policy; Program Evaluation	Yes	Yes	Yes
Michael McGrail, MD, MPH, Medical Director	HealthPartners Medical Group	Occupational Medicine; Workers' Compensation	Yes	No	No
Nancy Nachreiner, Ph.D., MPH, Assistant Professor	U of M - EHS	Intentional Injury Research	Yes	Yes	Yes
Gary Olmstead, PhD, CSP, CIH Adjunct Assistant Professor and Director of Global Safety	General Mills, Inc.	Occupational Safety	Yes	No	No
Debra K. Olson, MPH, DNP Candidate, Associate Dean, Director	Center for Public Health Education and Outreach	Expert in unique teaching/delivery techniques; Outreach	Yes	No	No
John Shutske, PhD, Professor	U of M – Biosystems and Agricultural Engineering	Safety engineering and risk control	Yes	Yes	Yes
Nicholas Ward, PhD, Associate Research Professor	U of M – Mechanical Engineering	Transportation research; simulation research applications	Yes	No	Yes
Elizabeth Wattenberg, PhD, Associate Professor	U of M - EHS	Toxicology	Yes	No	No
Allan Williams, PhD, MPH, Adjunct Faculty and Epidemiologist	Minnesota Department of Health	Injury Epidemiology	Yes	Yes	Yes

* T=Teaching; A=Advising; R=Research

These faculty members, with teaching and research expertise in the program area, have provided a strong and unique combination resulting in great breadth and depth pertinent to occupational injury prevention research training. They have contributed, significantly, to the continued growth, enhancement, and evaluation of the program.

d. Curricula

Refer to Appendices for required and elective courses and example of a program plan.

F.4 Progress toward goals and objectives

1. Apply the Public Health Model to occupational injury prevention

The Public Health Model is fundamental to the comprehensive OIPRTP, providing a framework for research training, in concert with the epidemiological model. This involves the need to: a) Identify and prioritize problems; b) quantify and prioritize risk factors; c) identify existing or develop new strategies to prevent injuries; d) implement and evaluate to determine the most effective injury control measures; and e) monitor the results of the intervention efforts. As part of the OIPRTP, each student develops an RO1-type proposal as a basis for their research by incorporating knowledge acquired from their coursework and relevant experiences. This includes: identifying a problem of importance; developing rigorous methods to address the problem, including a *causal model* and relevant analytical plan; conducting the analyses to identify pertinent risk/protective factors that, in turn, serve as a basis for developing/implementing relevant intervention efforts that must be monitored for efficacy. This proposal serves as the written examination, enabling the student to continue on to the oral preliminary examination, given an approval "pass" vote by reviewers.

2. Provide opportunities for student research projects and theses

The OIPRTP faculty have been funded for numerous research efforts that provide research-training opportunities for students (refer to **Student Data Tables and Publications and Presentations**). Students have participated on two of our major study research teams on a weekly basis that include the OIPRTP program and other faculty from disciplines pertinent to the respective research.

3. Disseminate research findings

Students and faculty have been actively involved in dissemination of research findings at numerous major national and international professional meetings and through peer-reviewed publications; several of these also involved awards, as noted. (Refer to **Publications and Presentations, Appendices.**)

4. Employ effective recruitment strategies

During this period, OIPRTP had eight full-time doctoral students. Recruitment of highly qualified students for the OIPRTP has involved several successful strategies: national and local advertising; dissemination of brochures at national and international injury conferences, safety meetings, and through colleagues. The OIPRTP website has also greatly enhanced inquiries and applications (<http://enhs.umn.edu/oiprtp>). New recruitment endeavors have been implemented to attract qualified students of color, accounting for 38% currently. Alumnae and current students also continue to direct highly qualified applicants to the program, as well, and are our best advocates. Important, also, is a strong emphasis on retention. It is essential for all students that faculty members interact frequently with students to determine progress as well as any potential problems that need to be addressed. Within the OIPRTP, we have found that our research seminars and informal meetings and social interactions, involving all OIPRTP students as well as those from other disciplines, are essential to the establishment and maintenance of camaraderie that will more likely ensure successful progress of the student, as well as retention.

5. Provide a high quality curriculum that provides a strong foundation for occupational injury prevention research training

Continued efforts have been made to ensure a high quality research-training program. A new course, successfully developed and implemented in 2003, involves program faculty (Alexander, Gerberich, McGovern [OEHN and OHSRP] and Ryan). This course, "Applied Analyses of Occupational Health Data," provides training in applied research that addresses NORA priorities, using large databases; students develop research questions, relevant proposals, conduct analyses, and write publication-quality papers. Manuscripts, generated from this endeavor, have resulted in presentations at professional meetings and have been published. Advanced occupational injury research content has also been incorporated into the seminars, including study design, development of causal models, pertinent to specific injury problems, application of sensitivity analyses and development of RO1-type proposals. Students also participate each year in leadership and teaching institutes that enable them to develop and apply important teaching concepts in teaching activities.

6. Enhance OIPRTP development

Faculty members continually interact with OIPRTP students to discuss various aspects of the program and obtain feedback that is utilized for ongoing changes to further enhance the program. This includes discussion of their coursework and their overall academic experience. In particular, the addition of the applied analysis course, identified above, has been extremely important in facilitating doctoral thesis progress and has provided excellent visibility through resulting presentations and publications. The OIPRTP has also been fortunate to have access to three scholarship/fellowship funds, that facilitate recruitment and/or provide awards for outstanding performance. These include: the Nancy A. Robertson Endowed Graduate Fellowship in Injury Prevention (provided by Dr. and Mrs. Leon Robertson); Susan Goodwin Gerberich Scholarship in Injury Epidemiology and Prevention; and the Mary Lauren Olson Award, provided by the Minnesota Environmental Health Association.

7. Promote job opportunities for graduates of the OIPRTP

Efforts in identifying job opportunities for graduates have been consistently positive. Dr. Gerberich and program faculty receive job opportunity notices weekly that are immediately forwarded to the students; in addition, our faculty members have major national networks among faculty and other professionals who contact us to assist in filling a variety of positions. Graduates have obtained significant positions, including academic and research positions in universities, major corporations, health agencies, and other institutions. Two new OIPRTP graduates, Muree Larson-Bright and Kathleen Ferguson Carlson, both acquired excellent positions that were identified in advance of their respective graduation dates (07/31/06 and 08/31/06). (Refer to **Student Data Tables.**)

8. Provide continuing education and outreach

Specific accomplishments and objectives for recent continuing education and outreach activities are identified in the **Appendices.** The OIPRTP has been involved in extensive activities locally, regionally, and nationally during the past year.

9. Ensure interdisciplinary research training activities

Dr. Gerberich has provided a lead role in coordinating the interdisciplinary efforts of the research-training program in concert with the Co-Director and all associated faculty. Division faculty interact with the other faculty and students from the respective departments involved in coursework, internships, research seminars, and research activities that provide the underpinnings for this program. A minimum of 74 course credits, plus the specific research projects, enables extensive opportunities for interdisciplinary interaction.

b. Trainee honors, awards, appointments and dissertations

• **Kathleen Ferguson Carlson, MS, PhD** Graduated: 08/31/06 (Research Mentor: Gerberich)

Dissertation: Environmental and Behavioral Determinants of Children's Agricultural Injury

Best Paper Award, American Public Health Association, Injury Control and Emergency Services Student Paper Competition, Boston, Massachusetts, 2006; Gerberich Scholarship in Injury Epidemiology and Control (2006); Harold R. Shipman Award for Outstanding Academic Achievement in Environmental and Occupational Health, University of Minnesota Division of Environmental Health Sciences, 2006

- Muree Larson-Bright, MPH, PhD Graduated: 07/31/06 (Research Mentors: Gerberich; Alexander)
Dissertation: Parents' Safety Beliefs, Children's Work Practices, and Childhood Agricultural Injury
 - Leslie D. Nordgren, MPH, Ph.D. Candidate (Research Mentors: Gerberich; Alexander)
Dissertation: The Etiology and Consequences of Injuries to Veterinary Technicians
- Nancy A. Robertson Endowed Graduate Fellowship in Injury Prevention 2007; Teaching Assistant, PubH 6122, Occupational Safety Seminar, Spring 2007, Division of Environmental Health Sciences
- Denise M. Feda, MPH, Ph.D. Candidate (Research Mentors: Gerberich; Alexander)
Dissertation: Impact of Written Policies and Assault Deterrents on Risk of Occupational Physical Violence
- Nancy A. Robertson Endowed Graduate Fellowship in Injury Prevention 2004-2006
President, Student Council, School of Public Health (2006-2007) and Council of Graduate Students Member, University of Minnesota (2005-2007); University of Minnesota campus liaison to the Student Assembly of the APHA. Campus liaisons advance the mission of the Student Assembly of APHA to enhance students' education and professional development (2006-2007)
- Evette Pinder, MPH, Ph.D. Candidate (Research Mentor: Gerberich)
Dissertation: Occupational Stress and Burnout: The Risk of Work-Related Violence
- Research Assistant, Violence Against Teachers study, June 2004-2006, Division of Environmental Health Sciences; Teaching Assistant, PubH 6120, Injury Prevention, Spring 2007, Division of Environmental Health Sciences; Teaching Assistant, Epidemiology introduction course, 2006, Division of Epidemiology
- Deborah Merchant Langner, MS, Ph.D. Candidate (Research Mentor: Gerberich)
Dissertation: Risk Factors of Injury Among Rural Minnesota Adolescents: Analysis of the Childhood Agricultural Evaluation Systems

Susan Goodwin Gerberich Scholarship in Injury Epidemiology and Control (2007)

- Starr Kelley Sage, MPH, Ph.D. Candidate (Research Mentor: Gerberich)
Dissertation: Impact of School Resources on Educators' Risks of Physical Assault
- Minnesota Environmental Health Association's (MEHA) Mary Lauren Olson Memorial Scholarship (2006); Nancy A. Robertson Endowed Graduate Fellowship in Injury Prevention - 2006-2007; Interdisciplinary Center for the Study of Global Change – Scholarship (2007-2008); Wright Scholarship (2007-2008); Research Assistant, Violence Against Teachers study, September 2006-present, University of Minnesota, Division of Environmental Health Sciences; Council of Graduate Students Member, University of Minnesota (2005-Present); Health Sciences Policy and Review Council Member, University of Minnesota (2005-Present); Student Diversity Action Committee Member, School of Public Health, University of Minnesota (2006-Present); American Public Health Association, Injury Control and Emergency Health Services Student Liaison
- Quintin Williams, BS, Ph.D. Student (Research Mentors: Gerberich; Alexander)

Dissertation: Analyses of Bystanding as a Risk Factor for Agricultural Injury Among Children on Family Operations
Health Research Associate April 2006 to Present, Park Nicollet Institute, St. Louis Park, Minnesota Responsible for assessing workplace sites with regard to machinery use and guarding

c. Faculty honors, award, appointments

- Andrew Ryan MS, Program Analyst and Statistical Applications Research Fellow, received the School of Public Health (SPH) Academic Professional and Administrative Excellence Award for outstanding contributions to the mission of the school (2006).
- Dr. Susan Gerberich, was appointed to Mayo Professor of Public Health, School of Public Health (SPH). This award is the school's highest recognition of its faculty members. The professorship recognizes the achievements of senior SPH faculty members who demonstrate excellence in research, teaching and outreach. Gerberich is best known for helping to found and being a major contributor to the field of injury prevention research.
- Dr. Patricia McGovern was promoted to the rank of full Professor in June 2007.
- Associate Dean Olson was inducted into the Fellows of the American Association of Occupational Health Nurses in recognition of occupational and environmental health nurses who have made significant contributions to the field of occupational and environmental health nursing in the areas of clinical practice, education, research, management, or policy (2007).
- Professor John Shutske received the "Superior Paper" award from American Society of Agricultural and Biological Engineers (ASABE), given to the top 2.5% of published journal articles in ASABE's three primary peer-reviewed journals, for the paper: Testing and Creation of a Safety System to Disengage the PTO of a Tractor. *Applied Engineering in Agriculture*. 22(1): 5-12.

• Dr. Nancy Nachreiner, Assistant Professor, received the "Faculty Excellence Award" from the graduating class of 2007 in the Division of EHS.

d. Trainee theses and dissertations

Refer to b., above.

e. New faculty positions

Not applicable

f. New courses

Dr. Gerberich, primary faculty, reorganized PubH 6122 Safety in the Workplace Seminar Series for Spring 2007 that also involved key guest faculty from the: Occupational Safety and Health Administration; Department of Labor and Industry; Carpenters' Union; Federal Aviation Agency; Private Safety Consulting Business; General Mills Corporation; and the University of Minnesota Transportation Research Laboratory.

g. Trainee recruitment, including diversity efforts

Refer to OIP RTP objective #4, above.

F.5. Program Products

a. Publications and presentations of program faculty and trainees

Refer to **Appendices**.

b. Conferences/symposia sponsored

In June 2007, the MCOHS hosted a NORA Symposium focused on the theme "Occupational Health and Safety Research to Practice." Speakers included: Laura Punnett ScD, Professor, Department of Work Environment, University of Massachusetts Lowell and Jane Lipscomb PhD, RN, FAAN, Professor and Director, University of Maryland Baltimore (UMAB) School of Nursing, Work and Health Research Center. Faculty and trainees presented research posters for advisory board members and other attendees.

c. Continuing education courses presented

Refer to **Outreach Appendix**.

d. Successful research-to-practice projects

Identification of risk factors for work-related physical assault against nurses, including working in environments with low lighting, not carrying cell phones or alarms, working in emergency and psychiatric departments and long-term care facilities, and having increased hours of patient contact, have been important to practitioners in application of relevant interventions. Providing this information through a minimum of seven peer-reviewed publications and 16 presentations to key professional groups has been integral to the development of appropriate interventions and relevant changes. (Drs. Gerberich, McGovern, and Nachreiner, their colleagues, and students) Refer, also, to **Section IV** of overall annual progress report for information on additional projects.

e. Research projects completed having significant trainee involvement

Refer to **Appendices: Publications and Presentations**.

f. Unique training courses presented

PubH 8100 course, Applied Analysis of Occupational Health Data, recently developed, provides training in applied research to enable students to develop research designs and analyze and interpret data pertinent to major injury and other problems using large databases that involve team projects and have resulted in an international award and publication-quality papers. This experience serves as a basis for strengthening individual research proposals and thesis efforts that are conducted on various NORA priorities.

F.6. Plans

Continue to: a. build upon the current program goals and objectives in order to further enhance the high quality curriculum that provides a strong foundation for occupational injury prevention research training and further strengthen visibility at the local, regional, and national levels; b. enhance recruitment of excellent students to sustain diversity; c. generate external research support and provide interdisciplinary training opportunities for research projects and theses; d. provide multiple opportunities for students to present papers and participate at the national/international levels; e. engage in new continuing education/outreach activities; f. disseminate research findings from three major research studies to facilitate r2p, with collaborative involvement of invested relevant professional groups.

Conclusions

The uniqueness of this doctoral-level research training program is evidenced not only by the highly qualified faculty, who have experience and expertise essential to this endeavor but, also, by the quality of the curriculum and distinctive student research opportunities that have been developed to provide a unique and comprehensive approach to occupational injury prevention and control. The OIP RTP has a strong research record that is recognized at national and international levels through peer-reviewed publications and presentations. Through this program, a unique, multidisciplinary approach has enabled a major contribution to the field by preparing exceptional leaders who have made and can continue to make significant contributions to occupational injury prevention.

Appendices: Refer to 1) Curriculum; 2) Publications; 3) Presentations; 4) Outreach Activities

G. Hazardous Substance Academic Training Program

G.1. Hazardous Substances Academic Training Program

G.2. Program Director: Peter Raynor, PhD

G.3. Program Description

a. Goals and objectives

The University of Minnesota Hazardous Substances Academic Training (HSAT) Program is a specialty within the existing Industrial Hygiene (IH) Master's Program of the Education and Research Center. The primary goal of the HSAT Program is to provide industrial hygiene professionals with the knowledge, skills, and attitudes required to develop and manage hazardous waste and materials programs. Professionals with this expertise work to protect the health and safety of employees and the public in a variety of settings, including hazardous waste site clean-up, emergency response, transportation, and any industry where significant amounts of hazardous chemicals are used or generated. The specific objectives for the HSAT Program during the 2006-2007 academic year included the following.

1. Better understand the role industrial hygienists can play in the area of environmental management in order to ensure the educational curriculum is well-suited to this role.
2. Assure that training received by students in the hazardous substance program is relevant to their future work as industrial hygienists and environmental specialists and that specialty courses prepare them for work in the field of environmental management.
3. Assure that the coursework pursued by the HSAT program students addresses relevant problems and issues in both occupational and environmental health.
4. Expand the awareness of hazardous substances throughout the industrial hygiene and environmental health curriculum
5. Attract the best students possible to this program and to provide full support to at least two first-year students each year. If possible, tuition support is provided to second-year students to encourage the completion of their degrees.
6. Ensure that faculty involvement in this program serves the needs of the students and supports the continued development of the program.
7. Ensure that the HSAT program remains up-to-date and responsive to students' needs.
8. Seek additional support for this program from other sources.

b. Responsible conduct of science training

The University of Minnesota School of Public Health considers ethics to be one of the six core competency areas of public health. All students in the HSAT Program seeking MPH degrees must take PubH 6741 (Ethics in Public Health: Practice and Policy). All students in the MS track must complete PubH 6742 (Ethics in Public Health: Research and Policy). In addition, the University of Minnesota requires that all investigators and personnel involved in research with human subjects, including students, receive instruction in protecting human subjects in one of the following ways: review online materials available through the Collaborative Institutional Review Board Training Initiative (CITI); review the University of Minnesota's Office of Human Research Protections' CD-ROM entitled "Investigator 101"; or review the online "Human Participant Protection Education for Research Teams" from the National Institutes of Health and the National Cancer Institute. These materials include: the definition of human subjects in research; the responsibilities of the investigator; authority, composition, and procedures of Institutional Review Boards; ethical principles; risk and benefits; the elements and process of informed consent; how to prepare an application and consent document; inclusion and recruitment of vulnerable populations; adherence to study protocol; and continuing review.

c. Faculty participation

Dr. Peter Raynor (Ph.D.) is an Assistant Professor in the Division of Environmental Health Sciences in the University of Minnesota School of Public Health. He has directed the university's HSAT program since 2004. Dr. Raynor's research and teaching interests focus on the measurement and control of environmental exposures, especially those in work settings. Recently, he has developed a research program to study the measurement and control of airborne viruses and bacteria in response to concerns regarding bioterrorism and emerging infectious diseases. He has recently collaborated with the Minnesota Pollution Control Agency and Minnesota Department of Health on ways to better assess the cleanliness of former clandestine methamphetamine laboratories. He has served as Chair of the American Industrial Hygiene Association's Aerosol Technology Committee and is also a member of that organization's Nanotechnology and Methamphetamine Working Groups. Dr. Raynor is lead instructor for required course PubH 6174 (Control of Workplace Exposure) and PubH 6175 (Industrial Hygiene Measurements Laboratory) and co-instructor in PubH 6103 (Exposure to Environmental Hazards). He also teaches relevant elective courses including PubH 6173 (Exposure to Physical Agents) and emergency preparedness classes in the annual University of Minnesota Public Health Institute. *Dr. Lisa Brosseau (Sc.D., CIH)*, an Associate Professor in the Division of Environmental Health Sciences, has considerable research expertise in respiratory protection, filtration, aerobiology, aerosol sampling, intervention effectiveness and small business health and safety. She brings to the program particular expertise in workplace problem-solving. She has been a member of the ACGIH TLV Chemical Substance Committee since 1993 and was Chair of this committee from 1998 until 2005. Dr. Brosseau was Director of the University of Minnesota HSAT Program from its inception in 1993 until 2001 and served as Co-Director from 2001 until 2004. She has also served as Director of the ERC's IH

Program and Deputy Director of the Midwest Center ERC. Dr. Brosseau teaches the primary course required of HSAT students at the University of Minnesota, PubH 6176 (Hazardous Materials and Waste Management), and PubH 6172 (Industrial Hygiene Applications), a course required for all trainees in both the IH and HSAT Programs.

d. Curriculum

The IH/HSAT Program curricula are shown as an Appendix for the IH Program. As a specialty within the IH Program, the HSAT Program shares the bulk of its requirements with the IH Program. Like the IH Program, the HSAT Program offers both the Master of Public Health (MPH) and Master of Science (MS) degrees. The differences in these degrees are in their requirements for Master's Projects and ethics coursework. Students taking the MS degree must register for PubH 6742 (Ethics in Public Health: Research and Policy), whereas those working on the MPH degree must register for PubH 6741 (Ethics in Public Health: Professional Practice and Policy). Students in the MS degree program are required to submit a research paper to satisfy the requirements of PubH 7194 (Master's Project: Environmental Health). Students in the MPH program may submit either a research paper or a comprehensive literature review on a specific topic to meet the expectations for PubH 7194. Both programs require a minimum of 48 credits for students who entered in the 2006-2007 academic year, although students frequently complete more. For a full-time student, the program is designed to be able to be finished in two academic years, from the beginning of Fall Semester in a given year to the conclusion of the Spring semester two years later. Students usually pursue a required Field Experience: Environmental Health (PubH 7196) during the summer between their first and second years and their research project or literature review during their second year. HSAT students are also required to complete a 40-hr Hazardous Waste Worker or Emergency Response Training course. This requirement is usually fulfilled by taking courses offered by the University of Minnesota Center for Public Health Education and Outreach (CPHEO) or the Minnesota Safety Council. Both the Field Experience and the Master's Project must provide training relevant to hazardous materials and waste management. HSAT students pursue coursework in four core areas (SPH, EnHS, OHS, HSAT). At the base, are the core requirements for all School of Public Health (SPH) students. These requirements include classes in biostatistics, epidemiology, ethics, behavioral science, and management. Building upon the SPH core, a core of five courses is required for all Master's students in the Division of Environmental Health Sciences (EnHS). These courses include Exposure to Environmental Hazards; Environmental Health Effects: Introduction to Toxicology; Environmental and Occupational Health Policy; the Master's Project; and the Field Experience. The third core required of all Occupational Health and Safety (OHS) students includes Introduction to Occupational Health and Safety, Occupational Medicine, and Interdisciplinary Evaluation of Occupational Health and Safety Field Problems. Finally, at least eight courses are required of students to fulfill specific requirements for the HSAT Program. These courses include Exposure Assessment for Air Contaminants, Industrial Hygiene Applications, Control of Workplace Exposures, Industrial Hygiene Measurements Laboratory, Hazardous Materials and Waste Management, either Environmental Chemistry or Solid Hazardous Wastes, an elective related to industrial hygiene, and the 40-hour Hazardous Waste Worker or Emergency Response Training course mentioned previously.

G.4. Program Activities and Accomplishments

a. Progress toward goals and objectives

1. Assure that training received in HSAT Program is relevant to their future work as IHs and environmental specialists and that specialty courses prepare them for work in the field of environmental management. The relevance of the training received by IH and HSAT Program students has been evaluated by an Alumni Survey. In 2006, MCOHS surveyed alumni for their satisfaction with and the perceived value and proficiency of their academic training in regards to discipline-specific and cross-cutting professional competencies. All alumni graduating between 1992 and 2005 were mailed a self-administered survey; 75% (46 of 61) of the IHs contacted participated. Ten of these IH graduates also identified themselves as alumni of the HSAT Program. Thus, survey responses were analyzed separately for HSAT alumni. Findings revealed that most HSAT alumni were "very satisfied" (60%) or "somewhat satisfied" (30%) with their graduate education in occupational safety and health (OSH) and 90% were currently working in occupational health and safety positions. Among those who responded, 3/10 had current certification as CIHs, 1/10 as a CSP, and 1/10 as a CHMM. The relatively low level of certification reported by HSAT alumni was due, in part, to 50% of the respondents receiving their degrees in 2003 or later. The findings on the interdisciplinary competencies addressing "recognition," "evaluation," "control," "communication," "behavior," and "management" revealed that at least 80% of HSAT alumni respondents rated each of the competencies as "very valuable" or "valuable". Interdisciplinary competencies with the most frequent ratings of "very valuable" were: writing well (100%), identifying health and safety hazards of work site processes and operations (90%), knowing health and safety laws and regulations (90%), and communicating effectively with a variety of stakeholders (90%). At least nine of the 10 HSAT alumni respondents perceived themselves as "proficient" or "very proficient" in 23 of 29 interdisciplinary competencies; 60% of respondents believed they were not proficient in managing financial resources effectively, even though 100% believed this competency was valuable or very valuable. For IH-specific competencies, all 10 HSAT alumni considered each of the competencies valuable or very valuable with the exception of one respondent who did not consider "demonstrating familiarity with and being able to use a professional code of ethics" as being valuable. All 10 of the respondents considered themselves proficient or very proficient in each of the competencies with the exception of "select the most appropriate control methods for a given situation", in which 9/10 of the respondents considered

themselves proficient or very proficient, and "manage hazardous materials and waste", in which 8/10 of the respondents considered themselves proficient or very proficient. Combined with responses from other portions of the survey, our interpretation is that the HSAT alumni not feeling proficient on hazardous materials and waste managements issues may believe they do not know enough about specific regulations governing management of hazardous substances. Regulations will be a stronger emphasis in PubH 6176, the core course for the HSAT Program, in future years. Overall, the survey results showed clearly that the vast majority of recent alumni from the HSAT Program believed that the training they received from the Midwest Center ERC provided them with the knowledge, skills, and attitudes to succeed in their careers.

2. Assure that the coursework pursued by the HSAT program students addresses relevant problems and issues in both occupational and environmental health. Before the 2006-2007 academic year, courses that fulfilled the HSAT elective requirement included PubH 6190 (Environmental Chemistry), Civil Engineering 4561 (Solid Hazardous Wastes), Civil Engineering 4562 (Remediation Technology), Civil Engineering 5591 (Environmental Law for Engineers), or another course approved by a student's academic advisor. To make sure the topics in the coursework cover knowledge and skills needed by hazardous materials and waste managers, the elective has been reduced to a choice between PubH 6190 and CE 4561. In addition, the recommended course plan for HSAT students now includes PubH 6414 (Biostatistical Methods I) in the fall semester for entering first-year students. The current suggested sequence now has HSAT students studying biostatistics a semester before taking PubH 6175 (Industrial Hygiene Measurements Laboratory) and nearly a full year before most students will perform statistical analyses on their Masters Project data. The key course in the HSAT Program is PubH 6176 (Hazardous Materials and Waste Management). The objectives of this required course are to: a) build knowledge of hazardous materials and wastes with respect to definitions, regulations, communication of health effects, prioritization and prevention of releases, response to releases, emissions to soil, air and water, transportation, treatment, disposal, storage, and minimization; b) build problem solving and communication skills for managing hazardous materials and wastes, particularly in terms of recognizing dangerous situations, prioritizing and recommending management actions, and writing and speaking clearly about problems and solutions; and c) apply knowledge and problem solving and communication skills to specific problems in order to practice the role of health and safety professionals in managing hazardous materials and wastes. Topics covered in this course include:

- Historical case studies of hazardous wastes and materials situations (Bhopal and Love Canal)
- Basics facts about laws and regulations, toxicology, epidemiology, fate and transport, exposure limits, physical and chemical properties of chemicals, definitions, and methods for identifying wastes
- Communicating hazards to a variety of audiences (e.g. workers, community)
- Hazard analysis techniques (process safety and risk management)
- Emergency planning and response (including measurement and personal protection)
- Controlling and managing air and water emissions (engineering controls, permits, etc.)
- Managing, treating, transporting, and disposing of hazardous waste; managing and transporting hazardous materials
- Pollution prevention
- Environmental management (ISO 14001)

3. Expand the awareness of hazardous substances throughout the IH and environmental health curriculum. PubH 6176, the Hazardous Materials and Waste Management course taught for this program, is attractive to students who are not in the HSAT Program. In Fall 2006, four students who were not part of the HSAT Program took the course. The University of Minnesota Public Health Institute course on Personal Protective Equipment and Respiratory Protection developed by Dr. Raynor has been taken by a total of approximately 20 students, only one of whom has been an HSAT student. This course focuses heavily on the use of personal protective equipment (PPE) for emergency response to hazardous substances.

4. Attract the best students possible to this program. One new student (Nicole Thome) entered the HSAT Program in the Fall of 2006. A second incoming student deferred admission for a second year because she remained on active duty with her Army Reserve unit.

5. Ensure that the HSAT program remains up-to-date and responsive to students' needs. The HSAT Program and its elements have been evaluated in several manners during 2006-2007. Individual courses are evaluated by students. The IH and HSAT faculty members gather feedback from IH and HSAT students at the end of each academic year on their views of the programs. Annual meetings with the HSAT Advisory Board provide the chance for specialists working with hazardous materials and waste to provide feedback on the content and structure of the program. The 2006 IH alumni survey allowed the opinions of HSAT graduates to be analyzed separately for the first time. Input is solicited from supporting faculty, guest lecturers, and field experience supervisors regarding their interactions with trainees. Finally, an annual meeting among the IH and HSAT core faculty allows for integration of data from all sources of program evaluation and provides an opportunity to make adjustments to the structure and content of the program, if necessary.

b. Faculty honors

In June 2007, Dr. Brosseau was awarded the Meritorious Achievement Award by the American Conference of Governmental Industrial Hygienists (ACGIH). The award is given to members of ACGIH who have made an outstanding, long-term contribution to the field of occupational health and industrial hygiene.

c. Trainee masters' projects

During the reporting period, one HSAT student – Beth Regan – completed her MPH degree. Ms. Regan's Masters project paper was titled "Diffusion Efficiency of Air Filter Fibers with Non-circular Cross Sections". She is presently employed as a Regional Health and Safety Manager for HDR Inc., an architectural, engineering, and consulting firm.

d. Trainee recruitment. including diversity efforts

Students are recruited primarily through alumni referrals and via the Division web site. Industrial hygiene applicants are sent information about the program as well. IH enrollees who express special interest in hazardous substances and have the best academic records are asked to join the HSAT Program. The HSAT Program Advisory Board also serves as an excellent recruitment tool, both as individual members share information about the program with others and as the members bring information about curriculum and educational needs to Advisory Board meetings. These recruitment efforts have typically allowed us to have three full-time HSAT students during each academic year. At least one new HSAT student typically enters the program during each academic year. Although the IH Program has been successful in recruiting minority students (two students enrolled during the 2006-2007 academic year), the HSAT Program has not yet accomplished this. Dr. Raynor is working to bring at least one minority student into the HSAT Program during the 2007-2012 project period. He will work with the Center Director, the School of Public Health Office of Multicultural Services, and the Division Head to obtain University, School, or Division funds to supplement funds available through the HSAT Program to entice a strong candidate to attend the University of Minnesota for an MS or MPH degree. Dr. Raynor will seek a full two years of funding in order to retain the student until the projected end of her or his studies.

G.5. Program Products

a. Publications and presentations (See Appendix also.)

- Kim SW, Ramakrishnan MA, Raynor PC, Goyal SM: [in press] Effects of Humidity and Other Factors on the Generation and Sampling of a Coronavirus Aerosol. *Aerobiologia*.
- Hovde CA, Raynor PC: [in press] Effects of Voltage and Wire Feed Speed on Weld Fume Characteristics. *Journal of Occupational and Environmental Hygiene*
- Saravia SA, Raynor PC, Streifel AJ: [2007] A Performance Assessment of Airborne Infection Isolation Rooms. *American Journal of Infection Control* 35:324-331.
- Farnsworth JE, Goyal SM, Kim SW, Kuehn TH, Raynor PC, Ramakrishnan MA, Anantharaman S, and Tang W: [2006] Development of a Method for Bacteria and Virus Recovery from Heating, Ventilation, and Air Conditioning (HVAC) Filters. *Journal of Environmental Monitoring* 8:1006-1013
- Brosseau LM: [in press] *Respiratory Protection. In: Modern Industrial Hygiene, Vol 2*, (ed. JL Perkins), American Conference of Governmental Industrial Hygienists
- Andrea Barteková, Peter Raynor, and John Adgate, "Comparison of a Novel Liquid Crystal Monitor for Organophosphate Pesticides to a Conventional Sampling Method", *2007 American Industrial Hygiene Conference and Exposition*, Philadelphia, PA, June 2007.
- Peter C. Raynor, "Approaches for Exposure Assessment and Control for Airborne Infectious Agents", presentation to the Particle Society of Minnesota St. Paul, MN, December 2006 (invited)
- Peter C. Raynor, Jo Anne Brock, and Monika Vadali, "Influences on Collection of Airborne Bacterial Spores by Charged Filter Media", Paper 15E2, *7th International Aerosol Conference*, St. Paul, MN, September 2006
- Ji Young Park, Gurumurthy Ramachandran, Peter C. Raynor, and Lynn E. Eberly, "Comparison of Two Methods for Estimating Surface Area Concentration Using Number and Mass Concentrations", Paper 10C4, *7th International Aerosol Conference*, St. Paul, MN, September 2006
- S. Anantharaman, M.A. Ramakrishnan, Sagar M. Goyal, Seung Won Kim, Peter Raynor, Nicholas J. Stanley, and Thomas H. Kuehn, "Airborne Human Viruses Captured by HVAC Filters", Paper 13D3, *7th International Aerosol Conference*, St. Paul, MN, Sept. 2006
- Seung Won Kim and Peter C. Raynor, "Design for a New Vapor Aerosol Dichotomous Sampler", Paper 6H9, *7th International Aerosol Conference*, St. Paul, MN, September 2006
- Thomas Kuehn, Nicholas Stanley, Seung Won Kim, M.A. Ramakrishnan, Senthilvelan Anantharaman, Peter Raynor, and Sagar Goyal, "Background Airborne Bacteria and Virus Populations In and Near Buildings Using Ventilation Filters as Long-Term Bioaerosol Collection Devices", Paper 8H25, *7th International Aerosol Conference*, St. Paul, MN, September 2006
- M.A. Ramakrishnan, Sagar M. Goyal, Senthilvelan Anantharaman, Seung Won Kim, Peter Raynor, Nicholas J. Stanley, and Thomas H. Kuehn, "Detection of Airborne Bacteria in HVAC Filters by Polymerase Chain Reaction", Paper 11G32, *7th International Aerosol Conference*, St. Paul, MN, September 2006
- L.M. Brosseau, How to Choose Respiratory Protection in a Pandemic Situation, ORC Worldwide Pandemic Preparedness Conference Call Series, June 2007.
- L.M. Brosseau, Evaluating the Effectiveness of Health and Safety Interventions in Small Manufacturing Businesses, Institute of Occupational Safety and Health, Taipei, Taiwan, April 2007.

- L.M. Brosseau, Evaluating the Effectiveness of Health and Safety Interventions in Small Manufacturing Businesses, Institute of Occupational Safety and Health, Taipei, Taiwan, April 2007.
- L.M. Brosseau. Threshold Limit Values for Chemical Substances: Looking Back and Moving Forward, 2007 Conference of Industrial Hygiene and Occupational Medicine, Kaohsiung, Taiwan, April 2007.
- L.M. Brosseau, Respiratory Protection for Pulmonary Therapists PALL Corporation, 2006-2007 Influenza Update CD, Dec. 2006.
- L.M. Brosseau, Filter Efficiency and Facial Fit of Surgical Masks, AIHA Upper Midwest Section Professional Development Conference on Pandemic: Pandemonium or Preparedness, November 2006.
- L.M. Brosseau, Health and Safety of Lead Paint Removal, Public Health Moment Podcast, October 2006.
- L.M. Brosseau, Filter Efficiency and Facial Fit of Surgical Masks, Working Scientific Meeting on Occupational Influenza Prevention and Control in Health Care Settings, Public Health Agency of Canada, Toronto, Ontario Canada, October 2006.

b. R2P projects

1. Dr. Raynor and IH student Tricia Carmody worked collaboratively with Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Health (MDH) personnel to develop methods to assess the impact of contaminated surfaces and materials in former clandestine methamphetamine laboratories on airborne meth exposures for remediation workers and future residents. Ms. Carmody used this work for her MS project and is working with Dr. Raynor to turn her project into a manuscript for publication. This manuscript will provide guidance to occupational health specialists on how to perform sampling for airborne methamphetamine levels
2. Former HSAT student Cathy Hovde and Dr. Raynor have written a paper titled "Effects of Voltage and Wire Feed Speed on Weld Fume Characteristics" that will be published in *Journal of Occupational and Environmental Hygiene* in December 2007. This paper provides recommendations on welder voltages that can reduce exposures to hazardous welding fumes.

c. Training courses presented

Dr. Raynor was a co-instructor of the Professional Development Course "The FUN of Aerosols: Fine, Ultrafine, and Nano Particles in Workplace Atmospheres" at the 2007 American Industrial Hygiene Conference and Exposition in Philadelphia, PA in June 2007. This course teaches practicing industrial hygienists and environmental specialists about recognition, evaluation, and control of potential hazardous nanoparticle exposures. Dr. Raynor was also an instructor of a training course on awareness of potentially hazardous materials in household waste for solid waste workers at the Leech Lake Reservation in Cass Lake, MN in August 2006.

G.6. Future Plans

The HSAT Program at the University of Minnesota is a stable program. Therefore, most of the effort by faculty in the program is to maintain its quality and standards. Specific plans for the next budget period will include:

- a. The HSAT faculty will maintain the academic courses and research opportunities available to HSAT students and try to expand research opportunities wherever possible.
- b. The HSAT Program will recruit at least two new students to the HSAT Program. In particular, efforts will be made to reach out to minority students and encourage them to consider the HSAT Program.
- c. Dr. Raynor will continue to seek out ways link the HSAT Program to emergency preparedness and response training efforts at the University of Minnesota. Because so many potential emergencies involve hazardous materials or wastes, this is a natural linkage that can be exploited to provide additional training and research opportunities for students and faculty. This effort is likely to include continuing education on hazardous materials and wastes in the context of emergency preparedness and response.

H. Agricultural Safety and Health Program

H.1. Program Title: Agricultural Safety and Health – Academic Program**H.2. Program Director: John M. Shutske PhD****H.3. Program Description:****a. Goals and Objectives:**

The Agricultural Safety and Health (ASH) program provides an academic minor option to existing academic training programs within the ERC. The Program also offers continuing education and outreach to key members of rural communities who can help influence issues of agricultural public health and rural medical and nursing practice.

The academic minor program allows students to complete coursework electives that help focus their learning on issues that are unique to agricultural and rural food-system related workplaces and environments. Students in the academic program must also complete their degree-related research project (Plan B, MS thesis, or PhD dissertation) on an agricultural safety and health related issue.

The overall goal of the program is to better prepare public health students to participate in programs, interventions, and other activities upon graduation that can help reduce the morbidity and mortality related to agricultural and food system-related injury and illness. The specific goals of this program are to: 1) Recruit high quality students into the program from a range of disciplines; 2) Cultivate relationships with key members of the agricultural and food systems industries to aid in student recruitment, internship placement, research problem identification, and placement; 3) Generate external research support and provide interdisciplinary training opportunities for research projects and theses; 4) Provide multiple opportunities for students to present papers and participate at the national/international levels; 5) Engage in new continuing education/outreach activities; 6) Disseminate research findings from funded research and continue to cultivate and facilitate R2P opportunities for students and faculty.

b. Responsible conduct of science training

For ASH students who are part of School of Public Health Programs (IH, OEHN, OEM, and others), they are covered in the responsible conduct for research information within those sections for each of the programs. The School of Public Health considers ethics to be one of the six core competency areas of public health. All students seeking MPH degrees must take one of two Public Health courses: Ethics in Public Health Practice and Policy, PubH 6741, (1 credit) or Ethics in Public Health Research and Policy, PubH 6742, (1 credit). All students seeking MS or PhD degrees must take the latter. In addition, the U of Minnesota requires that all investigators and research personnel involved in research with human subjects, including students, receive instruction in protecting human subjects in one of the following ways: review online materials available through the Collaborative Institutional Review Board Training Initiative (CITI) (hosted by the University of Miami Medical School server); review the University of Minnesota's Office of Human Research Protections' CD-ROM entitled "Investigator 101"; or review the online "Human Participant Protection Education for Research Teams" from the NIH and NCI. These materials include: the definition of human subjects in research; the responsibilities of the investigator; authority, composition, and procedures of IRBs; ethical principles; risk and benefits; the elements and process of informed consent; how to prepare an application and consent document; inclusion and recruitment of vulnerable populations; adherence to study protocol; and continuing review.

c. Faculty participation**1. Primary Faculty and Staff**

John M. Shutske, PhD (Professor, Department of Bioproducts and Biosystems Engineering and College of Food, Agricultural, and Natural Resource Sciences). Dr. Shutske has a national reputation in the area of agricultural injury and disease control and works with many groups statewide, regionally, and nationally on research, education, and outreach activities in this area. Dr. Shutske has an adjunct appointment in the School of Public Health and is a senior member of the graduate faculty in the Environmental Health Division. Dr. Shutske has been a PI or co-investigator in numerous grants and activities related to agricultural injury, exploration of cultural/ethnic issues related to agricultural safety, occupational health, and homeland security issues related to agricultural and food system workplaces. Dr. Shutske teaches in two primary courses: BAE 5212 - Safety and Environmental Health Issues in Plant and Animal Production and Processing, and IE 5513 - Engineering Safety, offered through the Mechanical Engineering Department. Dr. Shutske also provides guest lectures in public health courses as well as in courses in engineering.

Michele Schermann, MSN, RN (Program coordinator and research fellow, Department of Bioproducts and Biosystems Engineering and College of Food, Agricultural, and Natural Resource Sciences). Ms. Schermann coordinates several parts of both the ASH academic and CE programs and assists in teaching BAE 5212. Ms. Schermann has been a co-investigator in numerous projects related to agricultural safety and health. Her work is focused on developing an in-depth understanding of the cultural attributes that influence Hmong (SE Asian group) beliefs, health/safety behaviors, and effectiveness of intervention strategies. Because of this work with the Hmong and other communities, Ms. Schermann provides substantial guidance on research efforts for students focusing on the special health and safety needs of ethnic communities.

Ruth Rasmussen, MPH, MS, RN (Continuing Education Specialist with the Centers for Public Health Education and Outreach). Ms Rasmussen is the ASH CE program coordinator for the ERC (see ASH CE description). Prior to that, she worked as a Research Fellow

with Dr. Shutske for six years in Agricultural Safety and Health continuing education program development and delivery. She has extensive work experience in community education and project coordination and skills in teaching, communication, and project leadership. Within the CE portion of the ASH program, Ms. Rasmussen plans, develops and coordinates courses working closely with Dr. Shutske, other faculty, and community partners on content and determining appropriate formats and venues. Ms. Rasmussen also works collaboratively with the Digital Learning Group, the registrar, program associates and marketing and accounting personnel with the Centers for Public Health Education and Outreach and community partners involved in each course. Ms. Rasmussen reports directly to the NIOSH CE Director who reports to the PI of the ERC.

2. Supporting Faculty

Steve Kirkhorn, MD, Lecturer (Medical Director of the National Farm Medicine Center (NFMC), Marshfield, Wisconsin). Dr. Kirkhorn leads a range of agricultural occupational health research projects, and serves as the Editor of the Journal of Agromedicine. Dr Kirkhorn has an appointment as a Clinical Associate Professor within the University of Minnesota Medical School's Family Practice and Community Health unit, is a faculty member within the University of Minnesota's Rural Family Practice Residency, and an advisor in Agricultural Medicine to the University of Minnesota Family Practice and Community Medicine Residency. Dr Kirkhorn provides key lectures in BAE 5212 on issues of worker health in agricultural settings including respiratory disease, pesticide exposure, and related health effects.

Mark Purschwitz, PhD, Lecturer (Agricultural Safety Specialist, NFMC, Marshfield, Wisconsin). Dr Purschwitz serves as an Agricultural Safety Specialist, and works extensively with the National Children's Center for Rural and Agricultural Health and Safety. Dr. Purschwitz leads several projects within the NIOSH Tractor Safety Initiative, including: attitudes of farm organization leaders toward financial incentives; evaluation of rollover protective structures (ROPS) programs; and social marketing. He is also building a matrix of NIOSH agricultural centers' existing and proposed projects dealing with tractors, and is updating the NFMC's online ROPS retrofit directory. Dr Purschwitz is also PI for Safety Training for Employers and Supervisors of Adolescent Farmworkers (STESAF). He joined the NFMC in September 2003 after 10 years as the agricultural safety and health specialist for the state of Wisconsin. Dr Purschwitz provides key lectures in BAE 5212 on various tractor- and machinery-related hazards and intervention programs, including experiences in policy development activities and evaluation in Australia and the U.S.

Other ERC faculty who have been directly involved as graduate student advisors for the ASH program include faculty from the Division of Environmental Health Sciences, including Bruce H. Alexander, PhD, Timothy Church, PhD, Patricia McGovern, PhD, and Susan Gerberich, PhD. In addition, Jonathan Chaplin, PhD, of the Department of Bioproducts and Biosystems Engineering, is also involved peripherally in the program as a co-instructor in IE 5513 (Engineering Safety).

d. Curricula

Students in ASH complete their primary degree in one of the core ERC programs. ASH students in the project period have been from the OHN and IH Programs. Students from OIP RTP have also completed the ASH minor program. Please see the specific program requirements for those programs. For the ASH minor students must complete the three credit BAE 5212 course, plus they must have two elective credits which apply specifically to hazards that are common to agricultural and food system workplaces and/or environments. Students who receive the minor and ASH support must also complete a portion of their required field experience activity in an area or setting that includes agricultural and food system issues. Similarly, their final Plan B, thesis, or dissertation must focus on a related issue(s).

H.4. Program Activities and Accomplishments

a. Progress toward goals and objectives

1. Recruit high quality students into the program from a range of disciplines

Doctoral student Maggie Stedman Smith was recruited into the ASH program, following the completion of work by MPH students Peri Periakruppen and Tricia Carmody in August of 2006. Stedman-Smith's work is focused on a community-based participatory research examination of pesticide exposures among citizens in the Red River Valley of Minnesota and involves working with diverse communities including African immigrants, Native Americans, and others in that region of the state. ASH graduate Peri Periakruppen's project involved a comprehensive, quantitative analysis of Minnesota's fluid milk system from the farm through retail sale to consumers in an effort to identify critical control points and intervention strategies to protect against intentional contamination by a terrorist and to identify risks to workers from their exposure to a chemical or biological agent that could be used in a contamination event. The system was modeled to examine typical times during which milk was held on the farm, in transportation vehicles, in processing plants, and in retail stores. The results of this work also help provide data used by researchers within the National Center for Food Protection and Defense who are developing mathematical models to optimize public health response to reduce the severity of an intentional attack by working directly with consumers, retailers, regulatory officials, and health professionals. ASH graduate Tricia Carmody's work involved an assessment of exposures to rural first responders, rural residents, and others in agricultural communities to the residual airborne contaminants associated with methamphetamine laboratories. This work is significant to the field of agricultural safety and health as many of the rural "meth labs" are discovered in old farm buildings, and other abandoned farm structures and the clean up activities associated with these facilities presents a serious environmental health issue to responders and the nearby community. There is also a

direct link as many of these methamphetamine operations use anhydrous ammonia, a commonly used form of nitrogen fertilizer, posing significant risks to agricultural workers and surrounding areas.

2. Cultivate relationships with key members of the agricultural and food systems industries to aid in student recruitment, internship placement, research problem identification, and placement.

In recent years, the ASH program has expanded its depth by converting the key course BAE 5212 from a two- to three-credit offering and also by offering additional courses through "special problems" independent study offerings and courses in the Public Health Institute. The course continues to be popular and attracts 18 to 19 students per year from a range of disciplines including agriculture, public health, veterinary medicine, and engineering. The BAE 5212 course is now required of all engineers in the BAE program and the course's content is used to meet key accreditation criteria related to safety, health, and the engineer's role in safe design.

Drs Steve Kirkhorn and Mark Purschwitz now are involved in teaching portions of BAE 5212. Their role will be continued in the next project grant cycle. Ms Michele Schermann has also been active in developing teaching materials and conducting guest lectures and in helping to supervise student projects, field research, and in coordinating manuscript preparation on student projects. Many faculty previously not involved in ASH-related programs for students have also been engaged. Drs Peter Raynor and Lisa Brosseau have provided research project oversight and support for IH trainees enrolled in the program during this project period.

Considerable interest in ASH has been expressed among engineers in the Department of Biosystems and Agricultural Engineering. This includes students in the department and also others enrolled in BAE 5212. During the project cycle, materials from BAE 5212 have been extracted, modified, and adapted to fit into sections of various courses in the BAE engineering curriculum. This includes an introductory course, a sophomore-level introduction to design course, and the senior design capstone course. In addition, as was previously described, faculty Drs. Shutske and Chaplin assumed responsibilities for teaching the Industrial Engineering course IE 5513 - Safety Engineering, which has drawn more than 300 students since July 2005.

3. Generate external research support and provide interdisciplinary training opportunities for research projects and theses.

The scope of research projects available to students in the ASH minor program has expanded. Projects in this period included as examination of air contaminant issues and exposures to workers who would encounter a former "meth lab" such as what might be found in an abandoned farm building or home; documentation of risk related to a farm workers' exposure to a potential bioterrorism attack to our fluid milk system; and an evaluation of an innovative method for teaching Hmong farming families in a culturally and linguistically appropriate way. The latter project stemmed from a NIOSH-funded RO1 project, also completed during this project period. Current projects available will focus on further defining/documenting the need for public health professionals/engineers working in agricultural safety and health and there will be a continued focus on worker health and safety issues associated with agricultural and food system homeland security. This is based largely on significant funding streams available in that area plus the continued need to maintain a strong advocacy role for workers as the first to be exposed in the event of an incident, and also a business's most important (but often overlooked) asset.

4. Provide opportunities for students to present papers and participate at the national/international levels

Opportunities exist for students to travel, present, and publish. Several of the resulting products are described in the products section.

5. Engage in new continuing education/outreach activities.

Continuing education efforts for ASH are described more fully in the Agricultural Safety and Health CE Section. A significant number of community and campus collaborations were initiated and/or enhanced during this period. As mentioned in the CE program section, these include but are not limited to: Center for Animal Health and Food Safety, College of Veterinary Medicine, College of Agriculture, Food and Environmental Sciences, Department of Food Science and Nutrition, University of Minnesota; Minnesota Area Health Education Centers, Minnesota Board of Animal Health, Minnesota Department of Agriculture, Minnesota Department of Health, and the National Center for Food Protection and Defense

6. Disseminate research findings from funded research, continue to cultivate and facilitate R2P opportunities for students and faculty.

The ASH program by its nature is integrated with significant R2P opportunities. Dr. Shutske has a 75% appointment in the University of Minnesota Extension Service and works with various communities, agricultural producers, rural health professionals, first responders, and an array of food related industries on a weekly basis. Specific outcomes are described later in the listing of publications and outreach activities that include significant R2P content.

b. Tainee honors, awards, scholarships

Doctoral student, Maggie Stedman-Smith, (Advisor: Dr. McGovern) was awarded a fellowship for her dissertation research involving a needs assessment of pesticide exposures among women and children in the Red River Valley. The fellowship was awarded by the Society for Public Health Education, and the Agency for Toxic Substances and Disease Registry (ATSDR).

c. Faculty honors, awards, appointments

Dr. John Shutske, Professor, received the "Superior Paper" award from American Society of Agricultural and Biological Engineers (ASABE), given to the top 2.5% of published journal articles in ASABE's three primary peer-reviewed journals, for the paper: Testing

and Creation of a Safety System to Disengage the PTO of a Tractor. *Applied Engineering in Agriculture*. 22(1): 5-12. In addition, Dr. Shutske was appointed to the graduate faculty in Environmental Health Science in 2006.

d. Trainee theses and dissertations

Carmody T: [2006] Determination of an Air Sampling Protocol for Methamphetamine to be Used in Former Clandestine Laboratories, MPH Plan B Paper, University of Minnesota.

Periakaruppan P: [2006] Assessment of Milk Processing Worker Exposure to Potential Bioterrorism Agents in Milk Supply, MPH Plan B Paper, University of Minnesota.

e. Trainee recruitment including diversity efforts

The ASH program is discussed in several courses and flyers are disseminated to all students in EHS. Special efforts have been made to recruit a member of the Hmong or other Asian community to participate in the program. Thus far, we have successfully recruited Hmong staff to work on ASH outreach and research projects, but have not yet enrolled a Hmong student into the program.

H.5. Program Products

a. Publications and presentations of program faculty and trainees

Mongin SJ, Jensen KE, Gerberich SG, Alexander BH, Ryan AD, Masten AS, Carlson KF: [2007] Injuries among agricultural operation household members: Regional Rural Injury Study – II (RRIS-II) – 1999. *Journal of Agricultural Safety and Health* 13(3): 295-310. [NIOSH-funded research involving trainees; SGG, Advisor for KEJ, KFC; product of master's research - KEJ]

Carlson KE, Gerberich SG, Alexander BH, Masten AS, Church, TR, Shutske, JM, Ryan, AD, Renier, C: [2007] Intra-Familial Risk of Agricultural Injury in the Regional Rural Injury Study II: Beyond Behavioral and Environmental Risk Factors, *American Journal of Epidemiology*, 165(11): S127-506S. [NIOSH-funded research involving trainees; SGG, Advisor for KFC; product of doctoral research]

Carlson KE, Gerberich SG, Alexander BH, Masten AS, Church TR, Shutske JM, Ryan AD, Renier C: [2007] Children's Agricultural Injury: Associations between Behavioral Traits and High-Risk Work Exposures, *American Journal of Epidemiology*, 165(11): S127-505S. [NIOSH-funded research involving trainee; SGG, Advisor for KFC; product of doctoral research]

Paulson (Hagen) EK, Gerberich SG, Alexander BH, Ryan AD, Renier CM, Zhang X, French LR, Masten AS, Ferguson Carlson K: [2006] Fall-related injuries among agricultural household members: RRIS-II. *Journal of Occupational and Environmental Medicine* 48(9):959-968. [NIOSH-funded research involving trainees; SGG, Advisor for EKP, KFC; product of master's research]

Stedman-Smith M--, McGovern PM, Alexander B: [2006]. Listening to the tribe: Using Focus Groups To Hear The Environmental Health Concerns Of The Mdewakanton Dakota Sioux Living By A Nuclear Power Plant. Poster presentation: AAOHN 2006 Symposium and Exposition, Albuquerque, New Mexico. [MSS NIOSH Agricultural Safety and Health trainee]

Schermann M, Shutske J, Rasmussen R, Jenkins S, Vang C, Lor M: [2006] Characteristics of Children's Agricultural Tasks for Hmong Farming Communities. *Journal of Agromedicine*. 11(4):121-132. [NIOSH-funded research involving trainees; JS, Advisor for RR; product of master's research - RR]

Venem, MT, Shutske J, Gilbert W: [2006] Testing and Creation of a Safety System to Disengage the PTO of a Tractor. *Applied Engineering in Agriculture*. 22(1): 5-12. [NIOSH-funded research through National Farm Medicine Center, future trainee Tricia Carmody was assistant on research protocol].

b. Conferences/symposia sponsored

The ASH program did not sponsor any large conferences or symposia, though we did provide program planning support (as planning committee members) to the 2007 American Society of Agricultural and Biological Engineers annual conference (in Minneapolis, serving as the host institution) as well as the 2006 Extension Disaster Education Network (EDEN) annual conference in Nashville, Tennessee.

c. CE courses presented

See ASH-CE Section.

d. Successful R2P projects

Project 1. Modeling Vulnerabilities in Minnesota's Milk Production and Processing Industries. Description: Project involved a comprehensive, quantitative analysis of Minnesota's fluid milk system from the farm through retail sale to consumers in an effort to identify critical control points and intervention strategies to protect against intentional contamination by a terrorist or other individual wishing to cause harm (including economic damage or harm to public health). A secondary objective was to identify risks to workers from their exposure to a chemical or biological agent that could be used in a contamination event. The system was modeled to examine typical times during which milk was held on the farm, in transportation vehicles, in processing plants, and in retail stores. The results of this work also help provide data used by researchers within the National Center for Food Protection and Defense who are developing mathematical models to optimize public health response to reduce the severity of an intentional attack by working directly with consumers, retailers, regulatory officials, and health professionals.

Project 2. Surveillance of Farm Workplace Deaths and Injuries. Description: For the past 30+ years, a database consisting of information from news articles, death certificates, and other information sources has been built to help document the nature and trends

associated with agricultural work-related fatalities. This surveillance helps us bring important prevention information to the attention of Minnesota residents so that they will be aware of potential dangers in the farm work environment. In Minnesota, in this decade we typically see between 20 to 25 farm workplace deaths per year. This number is down from 40+ in the 1990s, but at a national level, agriculture still ranks as the country's second most dangerous industry. This surveillance work helps guide the direction and specific strategies of our Extension program in agricultural workplace safety. Tractor overturns and other types of machinery-related incidents remain the top cause of fatal injuries on farms in Minnesota. Another common category that has been documented in this research has been entanglement in rotating equipment. A 2006 article in the journal *Applied Engineering in Agriculture* documented research efforts that included the design of automatic, sensor-based systems to detect people near potentially dangerous parts of agricultural machines and shut the machine down prior to an injury.

e. Research projects completed having significant trainee involvement;

See descriptions above for milk-related project and methamphetamine-residue project by recent ASH trainee/graduates.

f. Unique training courses presented.

See description previously of courses BAE 5212 and IE 5513, both made possible via resources and capacity provided by the NIOSH-funded ERC.

H.6. Future Plans

- Maintain ASH enrollment for supported School of Public Health graduate students at two students at any given time, and support two additional BAE engineering students (one with ERC funds, one with other project funding streams). This will mean four total students in the program, three funded by the ERC.
- Continue efforts to use ASH program courseware (lecture materials and modular segments from BAE 5212) to meet ABET requirements for accreditation of the BAE undergraduate program in a range of courses and to meet the continuing education needs of ASH practitioners.
- Build course enrollment in BAE 5212 from 17-18 to 20 students per semester and increase credits from three to four for the course. Offer a parallel three-credit BAE 4212 course for undergraduate engineering and agricultural students and have a sustained enrollment of 20 students per semester (40 total in 5212/4212).
- Work with the ASH program advisory committee to promote the program and graduates to identify ASH-related positions for students, and to identify field experience opportunities and research projects to fulfill program objectives

I. Continuing Education and Outreach Programs

I.1. CE and Outreach

I.2. Program Director: Iris Staubus, MEd, RN

I.3. Program Description

The Continuing Education (CE) Program of the Midwest Center for Occupational Health and Safety (MCOHS) has provided occupational health and safety training to over 45,000 participants since 1978. A majority of students are from mid-western states, the Center's service region; however, courses have been taught as far away as China and, frequently, participants are from the entire continental US, and Canada. This past year, a total of 35 courses were delivered to 1976 participants. MCOHS continues to maintain its local and national reputation for high-quality education, significant enrollments, curriculum development, faculty commitment, unique and innovative approaches, and substantial outreach efforts. The CE Program of the MCOHS, houses both the HST and ASH CE programs. The HST CE program has conducted training in hazardous substances since 1984. In 1988, the Midwest Center was awarded a NIOSH Hazardous Substances Training grant that supports the Center's offering of mandatory and innovative hazardous substance training courses. The continuing education program in Agricultural Safety and Health (ASH) has been an integral part of the University of Minnesota's Education and Research Center for the past 14 years. ASH CE offerings target a range of health professionals including nurses, physicians, and emergency medical services personnel along with educators, rural leaders, Extension Educators, and others who work in a public health/safety setting in rural areas of the state.

As a part of the Centers for Public Health Education and Outreach (CPHEO), MCOHS has access to a full complement of educational and development delivery mechanisms and the expertise of education and digital learning specialists who assist in the creation and implementation of CE programs. CPHEO is the administrative home of six multi-disciplinary training initiatives that serve as a venue for delivery of innovative public health training and education. The co-location of these Centers, which include the NIOSH Midwest Center for Occupational Health and Safety, NIEHS Hazardous Materials Worker Training initiative, HRSA-funded Midwest Center for Life-Long-Learning in Public Health (MCLPH), ASPR funded Minnesota Emergency Readiness Education and Training Center (MERET), and CDC funded University of Minnesota Center for Public Health Preparedness (CPHP), allows for synergy of resources and diminishes the potential for development of trainings that are duplicative in nature. This structure also allows the MCOHS CE Program to benefit from a concentration of expertise in needs assessment, instructional design, web development, technology-enhanced learning, educational meeting planning, and program accreditation and evaluation, as well as providing program support for registration, record keeping, materials production, marketing, course promotion, course budgeting and financial management.

a. Goals and Objectives

The following is a list of CE program goals for 2006-2007; activities which supported the goals will be discussed in **I.4. Program Activities and Accomplishments.**

1. Expand collaboration, outreach and leadership activities with professional organizations and groups
2. Increase the use of multiple learning formats
3. Increase the availability of distance learning programming
4. Support the NORA initiatives and expand outreach of such programs
5. Expand offerings to occupational medicine physicians thus increasing the numbers reached in this discipline.

b. CE Program leadership, faculty and staffing

The MCOHS CE Program is unique in the depth and multi-disciplinary expertise of its staff. CE staff work collaboratively with the education specialist coordinators, technical directors and support staff on the complementary programs, Hazardous Substance Training (HST) and Agriculture Safety and Health (ASH). In addition, all NIOSH initiatives have access to a full complement of staff expertise and support from the MCOHS administrative home, CPHEO. The Associate Dean for Public Health Practice Education, Debra Olson, is an active member of the CE staff as executive officer of CPHEO, overseeing training and outreach activities for the SPH.

Key OSH Program staff are profiled below:

- Iris Staubus, MEd, RN, provides direction for the Continuing Education program. She has a Master's Degree in Adult Education from the University of Minnesota and Regents Certificates in both Adult Education and Human Resource Development. Ms. Staubus brings 18 years of experience in the adult education arena, three years in Occupational Health and Safety, four years in health promotion and 11 years managing and implementing human resource development programs for employees, at all levels, in a mid-size manufacturing firm.

- Kathleen Smith, MSN, Education Specialist, will provide direction for the NIOSH program 2007 – 2011. She is a Registered Nurse with over 25 years experience. In 1998 she earned a MSN with a Family Nurse Practitioner focus. Most recently, she earned a

Public Health Practice Certificate in Occupational Health and Safety from the University of Minnesota. She has worked with diverse populations including the agricultural and migrant communities. She has taught professionals and non professionals in a variety of settings, and was a part of the preparedness (hurricane) team for outpatient dialysis facilities in three large counties in Florida. Her last five years were with the College of St. Catherine in an Assistant Professor of Nursing position.

- Tamara Hink, MBA, Core Services Coordinator, is responsible for registration, mailing list functions, and financial management.
- Lois Harrison, MPH, and Ruth Rasmussen, MPH, are Continuing Education Specialists, responsible for needs assessment, curriculum development and program coordination.
- Chris Western, Assistant Education Coordinator and McKinzie McClay Woelfel, Program Associate, provide logistical support.
- Sara Hurley, MFA, Web Coordinator, supports the program with web/technology and enhanced learning skills.

I.4. Program Activities and Accomplishments

The CE Program with its many resources is looking for innovative ways in which to partner and deliver educational trainings. CE Program goals include the expansion of collaborative, outreach and leadership activities with professional organizations. The program places great emphasis on working with professional organizations to provide support for their activities, as well as providing appropriate educational opportunities.

Examples include: the TEAM Approach dinner, which is a multidisciplinary professional development activity with a 20-year history. MCOHS has been involved with the planning and delivery of this activity along with six professional organizations and the Minnesota Safety Council (MSC). In May 2007, the CE program partnered with the MSC to support them during the annual spring conference. The conference attracts over 1500 multidisciplinary participants in OSH. CE exhibited during the conference, provided planning support including topic and speaker recommendations and moderation of a panel discussion on the topic of Cultural considerations in the workplace and the effects on safety. This was a greatly expanded role for the CE Program and one we plan to continue into the future.

The Program collaborated with the American Industrial Hygiene Association-Upper Midwest Section (AIHA-UMS), to deliver their annual professional development conference. Additionally, in the fall of 2006 the CE partnered with the Iowa ERC and the Central States Occupational Medicine Association (CSOMA) to deliver their fall conference held in Rochester, Minnesota.

The CE Program provides a variety of learning formats for participants. Courses such as Spirometry and Mold Identification employ a combination of hands on experience with equipment they may use in the work place. During the Mold course, students are provided with individual microscopes to enhance the experience of identification of various types of mold. Courses utilize state of the art audio-visual equipment allowing for easy powerpoint presentations, easy connection to the internet and allow for ease of operation for interactive learning.

With the support of the Digital Learning Group (DLG) the CE Program has developed two OSH modules which are available on the web. The modules assess increase in knowledge through pre- and post-tests and award continuing education credits at no cost to the participants. Educational activities are also available via podcast, with powerpoints for optional participant download. There are two audio podcasts offered and they have been accessed well over 100 times in the past year.

The CE Program continues to support the NORA initiatives by assisting in the planning and delivery of the June 2007 R2P NORA program. This was recorded and placed with the 2004 and 2005 programs that are well received. Participation of Occupational medicine physicians in CE programming has presented a challenge; however, by partnering with other organizations the number of participants has increased. This program will continue to seek new partnership opportunities to continue to build the learning opportunities for this discipline group.

I.5. Program Products

During the past year, the CE Program delivered a total of 35 educational activities; 11 of these were considered multidisciplinary and included online or podcast programming. There were 1,012 online trainees and 614 face-to-face participants for a total of 1976 trainees for the 2006-2007 project periods. We are making significant strides in increasing the quantity and type of MCOHS online course offerings. These online course offerings in addition to face-to-face offerings conducted in our service area, has increased accessibility to educational offerings. The specialty distribution for face-to-face and blended courses is shown below in **Table 1**. All online courses were interdisciplinary and are shown separately to reflect a significant increase in online course participation.

Table 1
2006-
2007

Category	Percentage of Trainees (face-to-face and blended courses)	Number of Trainees (face-to-face blended courses)	
Industrial Hygiene	19%	119	
Occupational Health Nursing	21%	128	
Occupational Health Medicine	31%	189	
Occupational Safety	7%	40	
Multidisciplinary	22%	138	
Subtotal face-to-face and blended courses	100%	614	
	Percentage of Trainees (Online vs. Total Trainees)	Trainees Courses	Online
Multidisciplinary (online)	51%	1012	
Grand Total Participants *		1976	

* Excludes HST Trainees (242) and Agricultural Safety Trainees (108)

The CE program has increased participant numbers each year by continuing to offer important skill building courses, such as Spirometry and Hearing Conservation, adding courses with current topical interest, such as the mold identification, aging workforce, and workforce impact of a pandemic, and by expanding the number and type of distance learning opportunities offered. In terms of face-to-face programs, the center’s success in this area can be partly attributed to contract courses conducted in the following locations: Northfield, St. Cloud, Paynesville, White Bear Lake and Cass Lake in Minnesota; Fargo and East Grand Forks in North Dakota; and Shanghai, Beijing, and Guangzhou China. Open enrollment courses were held in Mankato, Brooklyn Park, Moorhead, Rochester, Willmar and Bemidji MN.

Additional CE Program outreach activities have included exhibiting at the Minnesota Pollution Control Association, Air, Water and Waste conference, with approximately 200 in attendance, The Homeland Security Emergency Management Governors conference with approximately 500 attendees, and a new outreach activity with the Roosevelt High Health Careers (HC) department; this program draws students from around the Minneapolis and St. Paul areas as an initial introduction to a variety of health careers. The HC program also partners with several other colleges and hospitals in the area. These activities give the CE Program the opportunity to educate students and teachers about careers in OHS. It is also an opportunity to provide information about academic career options, as well.

I.6. Future Plans

Building upon the commitment to serve all populations, and impact the OHS profession, CE Program members serve as course coordinators. In this role, the CE Program considers the needs and desires of potential participants in scheduling and delivery of valuable programs offered by MCOHS. Many of the CE Program activities have been discussed throughout the document; it is our intention to build upon these successful programs and relationships.

CE program members participate on advisory and planning boards to provide program support, feedback and/or direction, for programs such as the Team Approach. As the ERC develops several pilot project activities during the next grant period, the CE Program will provide logistical and technical support as required for a successful program. In an effort to inform the OHS practitioners of upcoming events, the CE Program will inform through poster presentations, and provision of training schedules throughout the year, in such venues as: MAOHN Vendor Fair, MSC annual safety conference, and the National Safety Congress.

During the 2007-2008 year, the CE Program plans on completing additional online educational modules, audio record two to four Occupational Medicine Grand Rounds sessions and, in partnership with HealthPartners, make the sessions available to their employees, along with CE and CME credits at minimal to no charge. In celebration of the local Occupational Nursing Association anniversary celebration, a presentation will be made and, possibly, the delivery of a course for OEHN’s. In support of the ASH and HST programming, the CE Program will assist in the development of both face-to-face and online programming

J. Hazardous Substances Training Program – Continuing Education

J.1. Hazardous Substances Training Continuing Education Program - July 1, 2006-June 30, 200

J.2. Program Director: Iris Staubus, Med, RN

J. 3. Program Description

The mission of the MCOHS CE Hazardous Substance Training (HST) program is to improve occupational/ environmental health and safety through transmission of relevant hazardous substance training to individuals responsible for hazardous materials identification, management and remediation in their workplace. This includes persons engaged in hazardous materials response at the local, state, county, tribal and state levels. Over 2700 students have been trained with NIOSH HST funds since the inception of the grant in 1988. During the 2006-2007 year, 23 students received NIOSH HST tuition subsidies to attend courses ranging from three hours to five days in length.

a. Program Objectives

During 2006-2007, the HST CE program addressed the following program objectives (Refer, also, to relevant **Activities and Accomplishments [J.4.]** and **Program Products [J.5.]**):

1. Respond to the needs of broad-based, diverse HST professional audiences by developing relevant courses throughout the year.
2. Maintain high-quality course offerings through continued course and instructor evaluations and participant feedback.
3. Collaborate with community groups and professional continuing education licensure boards to offer relevant continuing education for professionals and the emerging workforce.
4. Conduct program evaluation

b. Faculty Participation

The Hazardous Substance Training Program is administered through the Program in Continuing Education at the Midwest Center for Occupational Health and Safety, University of Minnesota, School of Public Health. The Lead Technical Director is *Peter C. Raynor, PhD*. Dr. Raynor is Director of the HSAT program, and a faculty member in the IH program. His areas of interest include: air filtration; air pollution control; measurement of volatile aerosols; metalworking fluids; aerosol physics; biological aerosols and exposure assessment. Dr. Raynor devotes 2% of his time to the HST grant. The Co-Technical Director is *Lisa M. Brosseau, M.S.; ScD*. Dr. Brosseau is a member of the IH and HSAT faculty and lead instructor of the academic course PubH 6176, Hazardous Materials and Wastes Management. Dr. Brosseau devotes 2% of her time to the HST grant.

Iris Staubus, MEd, RN, serves as the Interim Director for the Continuing Education program. She has a Masters Degree in Adult Education from the University of Minnesota and Regents Certificates in both Adult Education and Human Resource Development. Ms Staubus brings 18 years of experience in the adult education arena — three years in Occupational Health and Safety, four years in health promotion and 11 years managing and implementing human resource development programs for employees, at all levels, in a mid-size manufacturing firm.

Kathleen Smith, MSN, RN, Education Specialist, joined the center in May 2006. Ms. Smith is a Registered Nurse with over 25 years experience. She received her initial nursing education at Cook County School of Nursing. She continued her education at the University of Miami, earning a MSN with a Family Nurse Practitioner focus. Most recently, she earned a Public Health Practice Certificate in Occupational Health and Safety from the University of Minnesota and has been involved in the development and delivery process of courses for the Occupational Health and Safety professionals at MCOHS. She has worked with diverse populations during her career including the agricultural and migrant communities. Ms. Smith's breadth of experience with a wide range of industry, managerial experience and administrative expertise are integral to the administration of this grant.

Lois M. Harrison, MPH, is the program coordinator on the Hazardous Substance Training grant and serves as an Education Specialist within the Midwest Center. Ms. Harrison is a graduate of San Diego State University's Graduate Program in Occupational Health and has worked professionally as a safety coordinator, state health department grant manager, and injury prevention specialist. She brings to this position, expertise in the areas of adult education, occupational health and curriculum and faculty development.

Additional HST program staff includes: Christine Western, full-time Assistant Education Specialist, with responsibilities for course logistics, course outreach/promotion, compiling course materials, and publicity; Carla Nathan, Program Associate, has direct responsibilities for course administration, and assistance with student recruitment; Sue Swartz, Registrar, provides registration and course tracking expertise. As mentioned earlier, an advisory group of sixteen representatives from business, industry, governmental

agencies, academic institutions, and professional groups has provided long-range structure, leaderships and program direction guidance

The HST program has had a strong caliber of faculty and instructional staff with expertise at both the academic and community level. At the University of Minnesota School of Public Health, Dr Lisa M. Brosseau has provided program direction for the grant since its inception. Dr. Peter Raynor has provided technical expertise at both the academic and community levels. Dean Debra Olson, RN, MPH, is the Associate Dean of Public Health Practice Education and Instructor in the Division of Environmental Health Sciences. Dean Olson has provided broad oversight to the program and its connection to School of Public Health Outreach Initiatives.

Three community faculty members with backgrounds in emergency preparedness have also been involved in the program. Other community instructors that have contributed to the program and taught HST courses during the last grant period include:

David Abrams, MS, CIH, ARS Environmental. Mr. Abrams serves as a course instructor for Minnesota, New Jersey and North Carolina ERCs on topics related to work with hazardous materials.

Michael Nevala, MS, course instructor, is a Principal Environmental Scientist, Metropolitan Council Environmental Services in St. Paul, Minnesota who teaches site safety and remediation planning

Edward J. Leier, course instructor, serves as Fire Chief for the City of Vadnais Heights, Minnesota

Daryl Korpela, M.S., C.I.H., course instructor is President, Kettering and Associates, Lakeville, Minnesota.

Additional professional faculty will continue to provide course development and instruction.

c. New courses (Refer to Program Products, below.)

J.4. Program Activities and Accomplishments (based on program objectives)

a. Respond to the needs of broad-based, diverse HST professional audiences by developing relevant courses throughout the year.

During 2006-2007, face-to-face courses were marketed through a variety of new venues, including the Minnesota Fire Chief's Association, the Minnesota Police Chief's Association, the Minnesota Pollution Control Agency, the University of Minnesota's Technical Assistance Program, the Minnesota State Fire Department Association, and the Minnesota Governor's Conference on Emergency Preparedness. The addition of these new partnerships provided an opportunity to increase enrollment through students previously unfamiliar with course offerings of MCOHS. The HST-CE program also maintained strong partnerships with the, MN OSHA, the Minnesota Department of Natural Resources, the Minnesota Department of Agriculture, the Minnesota Department of Public Safety, and Minnesota Department of Health. Hazardous Substance Training courses were marketed through regional professional organizations and through MCOHS and NIOSH ERC exhibits at national and local professional meetings. Individual courses are promoted through direct mailings, electronic mailings, the MCOHS homepage, and course announcements in selected newsletters.

b. Maintain high-quality course offerings through continued course and instructor evaluations and participant feedback.

The annual HST instructor advisory meeting was held in January 2007. Several members of the business community and state agency representatives attended and provided valuable insights to improvement of our course selections, and a variety of evaluations to instructors. All instructors receive a written evaluation summary for each course. Within NIOSH HST Programs, students evaluate each course for content, format, and facilitation. (Refer to objective #4, below.)

c. Collaborate with community groups and professional continuing education licensure boards to offer relevant continuing education for professionals and the emerging workforce.

During 2006-2007, the HST coordinator sought new continuing education credit for sanitarians and firefighters. CE credit was offered and approved for Industrial Hygienists, Safety Officers, Sanitarians and Peace Officers. In addition, the HST and NIOSH CE coordinator participated in a Health Careers Festival at a local high school in May 2007 to highlight the opportunities in health and safety continuing education, reaching at least fifty students from diverse backgrounds. The HST coordinator presented HST course information to the National Association of Graduate Women in Science at their national conference in Minneapolis in June 2007.

d. Conduct program evaluation

Within NIOSH CE and HST Programs, students evaluate each course for content, format, and facilitation. Course ratings are typically in the 4.0 - 4.7 range on a scale from 1 (lowest) to 5 (highest). The Center's Continuous Quality Improvement program

mandates that a quality improvement plan be developed for any course that rates less than a 4.0 overall and 4.2 for CE organization. Participants evaluate the current course offering, make suggestions for improvement and identify additional needs. Student learning is evaluated through written exams, group activities and performance measures, pre and post-tests and faculty evaluation. The program evaluations have been uniformly strong during the past granting period. In addition, an instructor with specific expertise in disaster planning was hired in June 2007 to develop a tailored questionnaire of participants' experiences in emergency response and incident command, following course participation in emergency response and incident command courses.

J.5. Program Products

During 2006-2007, 22 face-to-face courses were offered with over 220 participants. Courses ranged from three-hour hazardous awareness trainings to 40-hour (five-day) emergency response. Courses were offered to a variety of audiences, including public health departments, tribal entities, fire departments, and city public works departments -- both at their location and at our training center. Twenty-three requests for HST tuition subsidies were provided for the courses offered.

Six new HST courses were developed during this time period:

- Four tailored three-hour hazardous materials awareness courses were presented to the City of White Bear Lake (January 23 and 24, 2007). The four courses reached over 120 participants from a variety of city sectors including police and fire departments and public works employees.
- One, three-hour Hazardous Materials/High Pressure Awareness course, was delivered in Federal Dam, Minnesota on April 4, 2007. Twenty-four fire department volunteers attended, almost all from the neighboring Leech Lake Tribal Community in Northern Minnesota. This course was the second offering of a HST hazardous materials course to the Leech Lake Tribal Community in the past two years
- One toxic awareness and identification course was offered to a diverse neighborhood group in Minneapolis for 12 individuals in August 2006, at their request.
- New to the program, was a contract 40-hour emergency response training, held in January 2006, for 11 members of the Northern Minnesota Leech Lake Reservation.

J. 6. Future Plans

During the 2007-2008 year, MCOHS-HST program will undertake the following activities:

- a. Increase training opportunities with tribal communities and other emerging workforce groups that have requested training on safe cleanup practices and emergency preparedness and response.
- b. Incorporate new hazardous substances curriculum content into on-going CE courses.
- c. Identify emerging training needs through the Advisory Group, planning committees, contact with other training centers, surveys and discussions with key informants.
- d. Plan courses with representatives of the targeted state and local agencies to assure programs meet the requirements outlined by regulatory agencies.
- e. Increase the number and breadth of University of Minnesota faculty and local/regional consultants who have served as course instructors.
- f. Employ a variety of methods to evaluate program quality and student learning.

K. Agricultural Safety and Health – Continuing Education

K.1. ASH CE Progress Report – July 1, 2006 thru June 30, 2007

K.2. Program Director – Iris Staubus, MEd, RN

K.3. Program Description

The continuing education program in Agricultural Safety and Health (ASH) has been an integral part of the University of Minnesota's Education and Research Center for the past 14 years. CE offerings target a range of health professionals including nurses, physicians, EMS personnel along with educators, rural leaders, Extension Educators, and others who work in a public health/safety setting in rural areas of the state. Agricultural safety and health is also a key part of the University of Minnesota's family practice residency program and their Community Health rotations. This past year the ASH CE program provided in-depth education on the recognition, prevention, and treatment of agricultural and food-system related occupational exposures in a total of six face-to-face courses.

a. Goals and Objectives

The ASH CE program goal is to offer responsive face-to-face training as seminars or workshops initiated by ASH CE staff or as requested by partner organizations. Program objectives include enhancing the capacity of occupational health professionals in practice to 1) recognize agricultural safety and health hazards and 2) describe appropriate control strategies to minimize morbidity of patients/clients and population groups.

b. Program faculty

Principal faculty for the ASH CE program is in the Department of Biosystems and Agricultural Engineering (BAE), the School of Public Health (SPH), and the University of Minnesota Extension Service (UMES). Faculty include the following:

John Shutske, PhD, Program Director is an Associate Professor in the Department of Biosystems and Agricultural Engineering, in the College of Agriculture, Food, and Environmental Sciences. Dr. Shutske has taught numerous courses in the ASH area in both academic and continuing education programs and, also, in safety engineering and design, and brings cutting edge expertise to the ASH CE program. His present research focus is in agricultural injury prevention, including development of prototype electronic sensors and engineering control systems to prevent entanglement of rotating farm equipment, and determination of lost production costs resulting from agricultural injuries.

Michele Schermann, RN, BSN, MS has been an Extension Educator within the Agricultural Safety and Health Program, since 1994, and is currently a Research Fellow. Using her health care background and knowledge gained from a BS degree in horticulture, Ms. Schermann has blended together her knowledge of agricultural production, strong healthcare research and program development/evaluation background, and has provided primary leadership on several research and outreach efforts, including the development of the web-based CEU offering covering the NAGCAT child safety guidelines. She is a co-investigator on a USDA grant working with the Minnesota AgrAbility Project, is on a grant from the United States Forest Service working on safety communications with Hmong farmers, and also on a grant from Cornell to promote good agricultural practices with Hmong farmers.

Ruth Rasmussen, MPH, MS, RN has been a Continuing Education Specialist with the Centers for Public Health Education and Outreach since January 2004 and is the ASH CE program coordinator for the Midwest Center. Prior to that, she worked as a Research Fellow with Dr. Shutske for six years in Agricultural Safety and Health continuing education program development and delivery. She has extensive work experience in nursing, community education and project coordination and skills in teaching, communication, project management and program leadership. Ms. Rasmussen plans, develops and coordinates courses with other faculty, community partners and appropriate venues with Dr. Shutske's direction and oversight. Ms. Rasmussen also works collaboratively with the Digital Learning Group, the registrar, program associates, marketing and accounting personnel with the Centers for Public Health Education and Outreach, and community partners involved in each course. Ms. Rasmussen reports directly to the NIOSH CE Director who reports to the Principal Investigator of the NIOSH grant.

Our ASH Program Advisory Board was instrumental in providing input for our 2006-2007 training content. Their combined input, regarding assessed needs of rural occupational health professionals in various capacities of population group health promotion, led directly to the creation of the courses that occurred in this grant year. Regional partners selected content areas, pertinent to their rural populations; presentations at the courses were conducted by faculty from other colleges and departments at the University of Minnesota and by partners from the Minnesota Departments of Agriculture and Health, Children's Hospital and Clinics of Minnesota and by local agency and industry representatives. Our regional partners conducted local and regional marketing and provided local facilities for the trainings.

K.4. Program Activities and Accomplishments

A total of 108 trainees at the six courses represented three states (Minnesota, South Dakota and Iowa) and five counties in South West Minnesota, 11 counties in South Central and South East Minnesota, and 10 counties in North Central Minnesota. As described in Table 12a, trainees included 39 physicians, 20 nurses, and 49 related professions; of those, 30 were from private industry, eight from state and local government agencies and six from other academic institutions.

A significant number of community and campus collaborations were initiated and/or enhanced during this reporting period. These include but are not limited to Center for Animal Health and Food Safety, College of Veterinary Medicine, College of Agriculture, Food and Environmental Sciences, Department of Food Science and Nutrition, University of Minnesota; Minnesota Area Health Education Centers, Minnesota Department of Agriculture, Minnesota Department of Health, Worthington Regional Hospital, Minnesota Fruit and Vegetable Growers Association. These partnerships are significant because they represent a broader reach for the ASH CE program and include representatives from regional Minnesota Area Health Education Centers and industry stakeholders.

K.5. Program Products

A topics menu was made available to a new partner, Worthington Regional Hospital, which is associated with the Sioux Valley Hospitals and Health System (now Sanford Health), and is located in the far South West corner of Rural, greater Minnesota. Worthington Regional Hospital was our onsite host partner and the location for two educational programs for rural health care professionals working with agricultural families, presented on January 29, 2007, for 22 trainees and on March 26, 2007 for nine trainees. Topics covered at the two trainings included current research, resources, and positions on infectious diseases related to animal production, animal antimicrobial resistance and its relationship to human health, effects of aging and primary disabilities on workers in production agriculture, early recognition and treatment of asthma in children living in rural agricultural areas, agricultural family issues for family physicians, and the nurses role in protecting our agricultural communities from terrorism. These sessions succeeded in meeting our objectives to enhance the capacity of these occupational health professionals in practice to: 1) recognize agricultural safety and health hazards; and 2) describe appropriate control strategies to minimize morbidity of patients/clients and population groups in rural, Southwest Minnesota. Participant evaluation summaries indicated that practice changes would include more individual patient instruction on personal and family safety on the farm and more small group instruction on farm safety as well as using the knowledge gained from these trainings.

The Interface of Rural Family Practice and Farm Families was held September 8, 2006, for 22 physicians and February 2, 2007 for 20 physicians. This course is a 1.5-hour ongoing workshop for family practice residents participating in their Community Health rotation. This workshop is a synopsis of key agricultural safety and health issues that affect agricultural workers and their families. The focus is on awareness building and presenting five specific recommendations for a health professional's involvement in recognizing, treating, and community-based interventions. One very significant impact of these seminars is that these physicians are trained to do more comprehensive patient histories that include questions on occupational and environmental health issues related to agricultural safety and health of farmers and their families. These physicians involved in the Rural Physician program at the University of Minnesota often continue their practice in those rural areas of the state.

Continuing our training activities of the previous years, to bridge a gap between food system preparedness and agricultural safety and health, led to two more successful ASH CE courses in Spring 2007; these were held in partnership with the University of Minnesota Center for Public Health Preparedness. A course, "Business Preparedness Planning for the Fruit and Vegetable Industry" with a NIOSH ASH content on "Planning for Product and Worker Safety," was held on March 20, 2007 for 20 trainees in Owatonna, Minnesota in the South Central rural region of the state and, on March 29, 2007, for 17 trainees in Staples, Minnesota in the North Central rural region of the state. Participants were given opportunities to identify control strategies for food system hazards and vulnerabilities at production, processing and distribution sites, and to describe elements of food system worker issues and employee protection strategies. Agricultural safety and health professionals who attended these trainings now have tools to use in training others to: 1) recognize agricultural safety and health hazards particularly in the fresh produce industry; and to 2) describe appropriate control strategies to minimize morbidity of patients/clients and population groups involved in the fruit and vegetable industry as workers and occupational health professionals.

Evaluation summaries from the trainings indicated increased awareness of agricultural safety and health hazards and control strategies and willingness to use knowledge gained to influence family members, co-workers and public health professionals in agricultural safety and health interventions to reduce morbidity and mortality in rural farm worker and family populations.

One new indexed and peer reviewed publication has been released under the name of our ASH CE Program Coordinator, Ruth Rasmussen. It is published in the Journal of Agromedicine with the following reference: Schermann, M., Shutske, J., Rasmussen, R.,

Jenkins, S., Vang, C., Lor, M. (2007) [Characteristics of Children's Agricultural Tasks in Hmong Farming Communities](#), Journal of Agromedicine. 11(3-4), p121-32.

K.6. Future Plans

Toward the end of this grant year, the ASH CE program became involved with the Red River Valley Education and Training Project. This project used a public health needs assessment methodology, "Photovoice," to document, through photographs, the perceived experiences of members of vulnerable populations -- in this case, pesticide exposure. Members of ASH CE plan on attending the photovoice presentations, scheduled for July 2007 and, also, plan on meeting with key project officers to review options for expanding this partnership to provide educational training. There are plans to redesign the online North American Guidelines for Children's Agricultural Tasks (NAGCAT) modules -- and in partnership with Marshfield, Wisconsin, a marketing plan will be developed to provide awareness of the training, especially in agricultural and farming areas. ASH will continue to partner with Tribal organizations to provide educational training as requested. Plans for ASH education and outreach will continue to address additional content areas requested by occupational health physicians, nurses, and safety professionals. Dr. Shutske and Ms. Schermann, and the continuing education staff at the Midwest Center, will continue to develop courses that integrate food safety, biosecurity, and regulatory compliance needs, with frameworks and methods to improve worker safety in food and agricultural industries.

IV. Report on Specific Improvements in
Occupational Safety and Health Results from ERC Programs

IV. Scientific Improvements in OSH Resulting from ERC Programs

Minnesota ERC faculty and students have been involved in many efforts to translate OSH research and learning into improved health and safety of the work places in the Region. Outreach efforts to local industries, agriculture, government agencies, and working groups have provided immediate and lasting improvements to the health and safety of workers and the public. Specific examples include the following that represent only a small proportion of the MCOHS activities. (Refer, also, to the brochure developed by current leadership: cphoe.sph.umn.edu/img/assets/9114/rtp.pdf):

- Studies among agricultural household members on both agriculture and non-agriculture-related injuries, in five upper Midwest states, identified not only incidence and consequences of these injuries for all ages – but, also risk factors for agriculture-related injury among children; results have served as a basis for development of intervention efforts and dissemination to key professionals as well as the agricultural community.
- Results from evaluation of a method for incorporating professional judgment regarding exposure assessment quantitatively into industrial hygiene decision-making indicated that targeted training dramatically improves the accuracy of exposure decisions.
- Identification of risk factors for occupational violence, in a large Midwestern health care system, provided a basis for interventions, including the redesign of a violent incident reporting surveillance system in order to target high-risk areas/situations, and development of fact sheets for managers and employees to enhance proactive activities and, thus, prevent adverse outcomes.
- Two major studies on work-related violence in populations of employees (one focusing on nurses and the other on Kindergarten-12th grade educators) enabled identification of the magnitude of the problem (physical and non-physical violence), and risk factors for physical assault. Many findings have been disseminated broadly to key decision-makers as well as the populations at-risk, and are being used as a basis for focused intervention efforts.
- Identification of worker health and safety exposures throughout the milk production and processing system and critical biosecurity control points to protect milk from intentional contamination has complemented strong educational program, outreach and research relationships with state and federal agencies to ensure safety of potentially exposed workers as well as the general public.
- A collaborative effort with two state agencies identified improved methods for assessment of methamphetamine vapor and aerosol in a former clandestine methamphetamine laboratory that enables improved safety for hazards remediation workers.
- Research, pertinent to agricultural worker and family safety of Asian immigrants, has directly led to efforts addressing the control of occupational health exposures from H5N1 Avian Influenza in Vietnam, Thailand, and in communities throughout the United States.
- Findings from a study of hospital negative-pressure isolation rooms, relevant to control of airborne bacteria or viruses exhaled by infected patients, are being used to guide improvements in isolation capabilities to protect workers and others against emerging diseases. including H5N1 Avian Influenza.
- A study of occupational medicine physicians on the importance of specific core competencies required of their specialty, provides guidance for the content of training programs, including a need for greater emphasis on career development skills.
- Based on a demonstration and evaluation project, disability prevention principles and practices were disseminated through national medical journals, a workers' compensation website, and inclusion within the formal curricula of residency programs and the ACOEM Disability Prevention Guideline.
- Based on a study that examined the association of training and organizational policies on work-related assaults against nurses, a training intervention was developed.
- A study of employed women's health after childbirth revealed vaginal (versus cesarean) delivery to be strongly associated with overall improved physical health at five weeks after childbirth, an important finding given a cesarean delivery rate in the United States at a record high of 29% in 2004. The published findings were highlighted in 2006 as important to practitioners by the editor of *The American Family Physician*, a peer-reviewed journal of the American Academy of Family Physicians that reaches more than 190,000 family physicians and other clinicians.
- Based on an evaluation of how much pesticide exposure occurs to agricultural family members when chemicals are used in real-world scenarios, pathways of exposure to the farmer, spouse, and children age 4-17, were investigated to determine how methods of exposure assessment can be improved. The results of this study have been used in developing an educational booklet produced in collaboration with the Purdue University Extension Service entitled "Family Exposure to Pesticides...a discussion with farm families," which discusses the risk of exposures and how to limit these. The metrics established will be incorporated into future efforts that will also be important to prevention.

- In the course, PubH 6150, all OSH students assess and evaluate a real work environment and present written and oral recommendations for the control of work-related problems to company personnel. Some of the sites used during 2006-2007 included: the Minneapolis Star-Tribune newspaper; Toro; Lund Food Holdings, Inc.; and the Minneapolis Police Department.

In summary, the MCOHS seeks to engage an ever-widening occupational safety and health (OSH) community to provide educational learning opportunities to promote a healthier and safer occupational environment. Based on results from the most recent survey of alumni, graduates ranked all of the 29 occupational health and safety competencies as valuable or very valuable. Communicating effectively, identifying health and safety hazards, writing well, understanding the relationship between exposures and health outcomes and functioning effectively on an interdisciplinary team were the five highest valued competencies for all respondents. Graduates reported high proficiency in the competencies they most highly valued, providing evidence of a measurable impact on the OSH practitioner environment. The ERC is committed to the continued growth of the OSH profession at both the local and national level and strives through both academic and CE offerings to impact the OSH practitioner and effect a positive change on OSH.

V. Midwest Center For Occupational Health and Safety

Annual Report Appendices

July 1, 2006 – June 30, 2007

Ian A. Greaves, B Med Sci, MBBS, Director

A. Program Curricula
Course Requirements and Sample Schedules

B. Industrial Hygiene Program
Hazardous Substance Academic Training Program
Program Curricula/Course Requirements and Sample Schedules

Industrial Hygiene Program**Appendix A: Program curriculum including general course requirements and sample curriculum****School of Public Health Core Requirements:**

(Note: Courses marked with * can be taken on-line during the summer)

PubH 6020*	Fundamentals of Social and Behavioral Science	3 cr
PubH 6320*	Fundamentals of Epidemiology	3 cr
<i>PubH 6741*</i>	<i>Ethics in Public Health: Professional Practice and Policy</i>	<i>1 cr (MPH)</i>
<i>PubH 6742*</i>	<i>Ethics in Public Health: Research and Policy</i>	<i>1 cr (MS)</i>
One of the following:		
PubH 6414*	Biostatistical Methods I	3 cr
PubH 6450	Biostatistics I	4 cr
One of the following:		
PubH 6751	Principles of Management in Health Service Organizations	2 cr
PubH 6752*	Public Health Management	3 cr

Division of Environmental Health Sciences Core Requirements:

PubH 6103	Exposure to Environmental Hazards	2 cr
PubH 6104	Environmental Health Effects: Introduction to Toxicology	2 cr
PubH 6105	Environmental and Occupational Health Policy	2 cr
PubH 7194	Master's Project: Env. Health (Lit. Review or Research Paper)	3 cr (MPH)
PubH 7194	Master's Project: Environmental Health (Research Paper)	3 cr (MS)
PubH 7196	Field Experience: Environmental Health	3 cr

Occupational Health and Safety Core Requirements:

PubH 6130	Occupational Medicine: Principles and Practice	2 cr
PubH 6150	Interdisciplinary Evaluation of OHandS Field Problems	3 cr
PubH 6170	Introduction to Occupational Health and Safety	3 cr

(Note: Unless told otherwise, IH students must take the classroom version of PubH 6170 rather than the on-line version)

Industrial Hygiene Program Requirements:

PubH 6171	Exposure Assessment for Air Contaminants	3 cr
PubH 6172	Industrial Hygiene Applications	2 cr
PubH 6174	Control of Workplace Exposures	3 cr
PubH 6175	Industrial Hygiene Measurements Laboratory	2 cr
INDUSTRIAL HYGIENE ELECTIVES		at least 6 cr

Additional Hazardous Substances Academic Training (HSAT) Program Requirements:

(Note: These courses partially fulfill the electives requirement for the IH Program)

PubH 6176	Hazardous Materials and Waste Management	2 cr
One of the following:		
PubH 6190	Environmental Chemistry	3 cr
CE 4561	Solid Hazardous Wastes	3 cr
INDUSTRIAL HYGIENE ELECTIVES		at least 1 cr

40-hour Continuing Education Class (for example, one of the following from MCOHS):

- (i) Safety and Health Training for Hazardous Waste Site Personnel 40 Hour
- (ii) Hazardous Materials Emergency Response 40 Hour Training

Industrial Hygiene Electives:

PubH 6112	Risk Analysis: Application to Risk-Based Decision Making	3 cr
PubH 6114	Foundation of Environmental and Worker Protection Law	1 cr
PubH 6115	Worker Protection Law	1 cr
PubH 6116	Environmental Law	1 cr

Midwest Center for Occupational Health and Safety

Center Director: Greaves, Ian A., MBBS

PubH 6120	Injury Prevention in the Workplace, Community, and Home	2 cr
PubH 6140	Occupational and Environmental Epidemiology	2 cr
PubH 6161	Regulatory Toxicology	2 cr
PubH 6173	Exposure to Physical Agents	2 cr
PubH 6176	Hazardous Materials and Waste Management	2 cr
PubH 6190	Environmental Chemistry	3 cr
PubH 6191	Air Pollution	3 cr
PubH 6415	Biostatistical Methods II	3 cr
PubH 6451	Biostatistics II	4 cr
PubH 7200-114	Personal Protective Equipment and Respiratory Protection	1 cr
PubH 7200-115	Safety of Building Environments	1 cr
PubH 7200-116	Workers as Partners in Emergency Response	1 cr
BAE 5212	Safety/Env. Hlth. Issues in Plant/Animal Production/Processing	3 cr
CE 4561	Solid Hazardous Wastes	3 cr
CE 5551	Environmental Microbiology Laboratory	4 cr
CE 5591	Environmental Law for Engineers	3 cr
IE 5511	Human Factors and Work Analysis	4 cr
IE 5513	Engineering Safety	4 cr
Kin 5001	Foundations of Human Factors/Ergonomics	3 cr
ME 5113	Aerosol/Particle Engineering	4 cr
ME 5133	Aerosol Measurement Lab	4 cr
NPSE 8001	Introduction to Nanoparticle Science and Engineering	3 cr
Other courses approved by your advisor		

MINIMUM TOTAL CREDITS:**48 cr**

Example IH Student Course Plan (MPH or MS student *not* in HSAT program)**Fall 1**

PubH 6103	Exposure to Environmental Hazards	2 cr	TuTh 5:45 – 7:40 (first 7 weeks)
PubH 6104	Environmental Health Effects	2 cr	TuTh 5:45 – 7:40 (last 7 weeks)
PubH 6170	Introduction to Occupational Health and Safety	3 cr	Tu 12:20 – 3:20
PubH 6171	Exposure Assessment for Air Contaminants	3 cr	W 4:40 – 7:40
PubH 6414	Biostatistical Methods I	3 cr	TuTh 9:45 – 11:00 + lab
		13 cr	

Spring 1

PubH 6105	Env. and Occup. Health Policy (even years)	2 cr	Tu 6:00 – 7:55
PubH 6130	Occupational Medicine	2 cr	M 1:25 – 4:25 (first 10 weeks)
PubH 6150	Interdisciplinary...Field Problems	3 cr	Tu 10:10 – 1:10
PubH 6172	IH Applications (odd years)	2 cr	W 9:05 – 11:00
PubH 6174	Control of Workplace Exposures (odd years)	3 cr	M 4:40 – 7:40
PubH 6175	IH Measurements Laboratory	2 cr	W 12:20 – 4:25
INDUSTRIAL HYGIENE ELECTIVE (even years)		2-4 cr	
		11-13 cr	

Summer

PubH 7196	Field Experience	3 cr	
		3 cr	

Fall 2

PubH 6320	Fundamentals of Epidemiology	3 cr	Tu 3:35 – 5:30 + lab
PubH 6741/2	Ethics in Public Health	1 cr	M 12:20 – 2:15 (half semester)
PubH 6752	Public Health Management	3 cr	TuTh 1:25 – 2:40
INDUSTRIAL HYGIENE ELECTIVE		2-4 cr	
INDUSTRIAL HYGIENE ELECTIVE		2-4 cr	
		11-15 cr	

Spring 2

PubH 6020	Fundamentals of Social and Behavioral Science	3 cr	on-line
PubH 6105	Env. and Occup. Health Policy (even years)	2 cr	Tu 6:00 – 7:55
PubH 6172	IH Applications (odd years)	2 cr	W 9:05 – 11:00
PubH 6174	Control of Workplace Exposures (odd years)	3 cr	M 4:40 – 7:40
PubH 7194	Master's Project	3 cr	
INDUSTRIAL HYGIENE ELECTIVE (even years)		2-4 cr	
		10-12 cr	

Total Credits**49 (assuming 6 elective credits)**

Example IH/HSAT Student Course Plan (MPH or MS student in HSAT program)**Fall 1**

PubH 6103	Exposure to Environmental Hazards	2 cr	TuTh 5:45 – 7:40 (first 7 weeks)
PubH 6104	Environmental Health Effects (odd years)	2 cr	TuTh 5:45 – 7:40 (last 7 weeks)
PubH 6170	Introduction to Occupational Health and Safety	3 cr	Tu 12:20 – 3:20
PubH 6171	Exposure Assessment for Air Contaminants	3 cr	W 4:40 – 7:40
PubH 6176	Haz Materials and Waste Management (even years)	2 cr	W 9:05 – 11:00
PubH 6414	Biostatistical Methods I	3 cr	TuTh 9:45 – 11:00 + lab
		<hr/>	
		13 cr	

Spring 1

PubH 6020	Fundamentals of Social and Behavioral Science	3 cr	on-line
PubH 6105	Env. and Occup. Health Policy (even years)	2 cr	Tu 6:00 – 7:55
PubH 6150	Interdisciplinary...Field Problems	3 cr	Tu 10:10 – 1:10
PubH 6172	IH Applications (odd years)	2 cr	W 9:05 – 11:00
PubH 6174	Control of Workplace Exposures (odd years)	3 cr	M 4:40 – 7:40
PubH 6175	IH Measurements Laboratory	2 cr	W 12:20 – 4:25
One of the following (even years):			
CE 4561	Solid Hazardous Wastes	3 cr	TuTh 8:15 – 9:30
INDUSTRIAL HYGIENE ELECTIVE		1-4 cr	
		<hr/>	
		11-14 cr	

Summer

PubH 7196	Field Experience	3 cr	
		<hr/>	
		3 cr	

Fall 2

PubH 6104	Environmental Health Effects (odd years)	2 cr	TuTh 5:45 – 7:40 (last 7 weeks)
PubH 6176	Haz Materials and Waste Management (even years)	2 cr	W 9:05 – 11:00
PubH 6320	Fundamentals of Epidemiology	3 cr	Tu 3:35 – 5:30 + lab
PubH 6741/2	Ethics in Public Health	1 cr	M 12:20 – 2:15 (half semester)
PubH 6751	Principles of Management	2 cr	WF 1:25 – 3:20 (half semester)
One of the following:			
PubH 6190	Environmental Chemistry	3 cr	TuTh 1:25 – 2:40
INDUSTRIAL HYGIENE ELECTIVE		1-4 cr	
		<hr/>	
		9-12 cr	

Spring 2

PubH 6105	Env. and Occup. Health Policy (even years)	2 cr	Tu 6:00 – 7:55
PubH 6130	Occupational Medicine	2 cr	M 1:25 – 4:25 (first 10 weeks)
PubH 6172	IH Applications (odd years)	2 cr	W 9:05 – 11:00
PubH 6174	Control of Workplace Exposures (odd years)	3 cr	M 4:40 – 7:40
PubH 7194	Master's Project	3 cr	
One of the following (even years):			
CE 4561	Solid Hazardous Wastes	3 cr	TuTh 8:15 – 9:30
INDUSTRIAL HYGIENE ELECTIVE		1-4 cr	
		<hr/>	
		8-11 cr	
TOTAL CREDITS (assuming 2 IH Elective credits)		49 cr	

Additional Requirement

40-hour Continuing Education Course (taken as schedule permits) Non-credit

Example IH/HSAT Student Course Plan (MPH or MS student in HSAT program)**Fall 1**

PubH 6103	Exposure to Environmental Hazards	2 cr	TuTh 5:45 – 7:40 (first 7 weeks)
PubH 6104	Environmental Health Effects	2 cr	TuTh 5:45 – 7:40 (last 7 weeks)
PubH 6170	Introduction to Occupational Health and Safety	3 cr	Tu 12:20 – 3:20
PubH 6171	Exposure Assessment for Air Contaminants	3 cr	W 4:40 – 7:40
PubH 6176	Haz Materials and Waste Management (even years)	2 cr	W 9:05 – 11:00
PubH 6414	Biostatistical Methods I (odd years)	3 cr	TuTh 9:45 – 11:00 + lab

12 or 13 cr

Spring 1

PubH 6105	Env. and Occup. Health Policy (even years)	2 cr	Tu 6:00 – 7:55
PubH 5130	Occupational Medicine	2 cr	M 1:25 – 4:25 (first 10 weeks)
PubH 5150	Interdisciplinary...Field Problems	3 cr	Tu 10:10 – 1:10
PubH 5172	IH Applications (odd years)	2 cr	W 9:05 – 11:00
PubH 6174	Control of Workplace Exposures (odd years)	3 cr	M 4:40 – 7:40
PubH 5175	IH Measurements Laboratory	2 cr	W 12:20 – 4:25
HSAT or INDUSTRIAL HYGIENE ELECTIVE (even years)		2-4 cr	

11-13 cr

Summer

PubH 7196	Field Experience	3 cr	
	Continuing Education Class		Program requirement

3 cr

Fall 2

PubH 6176	Haz Materials and Waste Management (even years)	2 cr	W 9:05 – 11:00
PubH 6320	Fundamentals of Epidemiology	3 cr	Tu 3:35 – 5:30 + lab
PubH 6414	Biostatistical Methods I (odd years)	3 cr	TuTh 9:45 – 11:00 + lab
PubH 6741/2	Ethics in Public Health	1 cr	M 12:20 – 2:15 (half semester)
PubH 6751	Principles of Management	2 cr	WF 1:25 – 3:20 (half semester)
HSAT or INDUSTRIAL HYGIENE ELECTIVE		2-4 cr	

10-13 cr

Spring 2

PubH 6020	Fundamentals of Social and Behavioral Science	3 cr	on-line
PubH 6105	Env. and Occup. Health Policy (even years)	2 cr	Tu 6:00 – 7:55
PubH 6172	IH Applications (odd years)	2 cr	W 9:05 – 11:00
PubH 6174	Control of Workplace Exposures (odd years)	3 cr	M 4:40 – 7:40
PubH 7194	EOH Master's Project	3 cr	
HSAT or INDUSTRIAL HYGIENE ELECTIVE (even years)		2-4 cr	

10-12 cr

Total Credits**49 (assuming 5 elective credits)**

C. Occupational and Environmental Health Nursing Program
Program Curricula/Course Requirements and Sample Schedules

OEHN Program, Appendix Curriculum**MPH Specialty Program 2006-2007: Occupational and Environmental Health Nursing****SPH School Requirements (minimum credits:13)**

- Administration:
PubH 6752 Public Health Management (3 cr)
- Epidemiology (3 credits needed):
PubH 6320 Fundamentals of Epidemiology (3 cr)
- Biostatistics (3 credits needed):
PubH 6414 Biostatistics Methods I (3 cr) or
PubH 6450 Biostatistics I (4 cr)
- Behavioral Sciences
PubH 6020 Fundamentals of Social and Behavioral Science (3 cr)
- Ethics
PubH 6741 Ethics in Public Health Professional Practice and Policy (1 cr) or
PubH 6742 Ethics in Public Health Research and Policy (1 cr)⁶

EHS Division Core Courses (minimum credits: 13)

- PubH 6103 Exposure to Environmental Hazards (2 cr)
- PubH 6104 Environmental Health Effects: Introduction to Toxicology (2 cr)
- PubH 6105 Environmental and Occupational Health Policy (2 cr)
- PubH 7194 Environmental and Occupational Health Masters Project (3 - 5 cr)
- PubH 7196 Field Experience in Environmental Health⁷ (4 - 5 cr)

OEHN Course Requirements: (minimum credits: 9)

- PubH 6130 Occupational Medicine: Principles and Practice (3 cr)
- PubH 6150 Interdisciplinary Evaluation of OHS Field Problems (3 cr)
- PubH 6170 Introduction to Occupational Health and Safety (3 cr)
- Xxxx xxxx Community Grand Rounds in Occupational and Environmental Medicine⁸

School of Nursing Courses: (minimum credits: 5)

- Nurs 8170 Research in Nursing (3 cr)
- Nurs 8600 Advanced Public Health Nursing (2 cr)

TOTAL CREDITS: minimally 40 required credits, plus two electives in consultation with advisor. Students must complete a minimum of 42 total credits for the MPH degree.

Potential Electives

- Nurs 8100 The Discipline of Nursing (3 cr)
- PubH 6114 Environmental and Worker Protection Law (1 cr)
- PubH 6115 Worker Protection Law (1 cr)
- PubH 6116 Environmental Law (1 cr)
- PubH 6120 Injury Prevention in the Workplace, Community or Home (2 cr)
- PubH 6863 Understanding Health-Care Quality (2 cr)

⁶ PubH 6742 will meet the research ethics training obligation for students working as Research Assistants

⁷ The field experience includes a one-credit rotation at HealthPartners' Occupational and Environmental Medicine Clinic to be arranged by Dr. McGovern in consultation with the student, and an individualized field experience that minimally entails three credits. The three credit experience will be arranged by the student's academic advisor upon consultation with the student. See <http://www.ahc.umn.edu/sphfieldexp/> for the School of Public Health's learning contract for student field experiences.

⁸ All OEHN students are required to attend a minimum of 5 sessions of Community Grand Rounds in Occupational and Environmental Medicine (OEM), subsequent to completion of PubH 6170 and PubH 6130. This seminar is arranged by the OEM Residency Program on a monthly basis. The schedule of topics by date will be e-mailed to all students in advance of the session.

Dual Degree Specialty Program 2006-07: Occupational and Environmental Health Nursing**SPH Requirements:** (minimum credits: 11)

- Administration: (2 credits needed)

PubH 6751 Principles of Management in Health Services Organizations (2 cr) or

PubH 6752 Public Health Management (3 cr)

- Epidemiology (3 credits needed):

PubH 6320 Fundamentals of Epidemiology (3 cr)

- Biostatistics (3 credits needed):

PubH 6414 Biostatistics Methods I (3 cr) or

PubH 6450 Biostatistics I (4 cr)

- Behavioral Sciences

PubH 6020 Fundamentals of Social and Behavioral Science (3 cr)

- Ethics (counted under SON classes)

Note: Dual degree OEHN students will substitute Nurs 8140 (below) for the MPH ethics requirement of PubH 6741 Ethics in Public Health Professional Practice and Policy (1 cr) or PubH 6742 Ethics in Public Health Research and Policy (1 cr)

EHS Division Core Courses: (minimum credits: 13)

PubH 6103 Exposure to Environmental Hazards (2 cr)

PubH 6104 Environmental Health Effects: Introduction to Toxicology (2 cr)

PubH 6105 Environmental and Occupational Health Policy (2 cr)

PubH 7194 Environmental and Occupational Health Masters Project (3 - 5 cr)

PubH 7196 Field Experience in Environmental Health⁹ (4 - 5 cr)

Occupational and Environmental Health Nursing Course Requirements: (minimum credits: 9)

PubH 6130 Occupational Medicine: Principles and Practice (3 cr)

PubH 6150 Interdisciplinary Evaluation of OHS Field Problems (3 cr)

PubH 6170 Introduction to Occupational Health and Safety (3 cr)

Xxxx xxxx Community Grand Rounds in Occupational and Environmental Medicine¹⁰

School of Nursing Requirements (minimum credits: 28)

Nurs 8100 The Discipline of Nursing (3 cr.)

Nurs 8140 Moral and Ethical Positions in Nursing (3 cr.)

Nurs 8170 Research in Nursing (3 cr.)

Nurs 8241 Health Care Leadership in a Changing World (2 cr.)

Nurs 8242 Population Focused Health Care Delivery Systems (2 cr.)

Nurs 8600 Advanced Public Health Nursing (2 cr.)

Nurs 8601 Interventions for Health of Populations (3 cr.)

Nurs 8603 Public Health Nursing: Leadership Practicum (3 cr.)

Nurs 8194 Problems in Nursing (3 cr.)

Nurs 5204 Population Focused Assessment and Intervention (2 cr.)

PubH6557 Health Care Finance (2 cr.)

TOTAL CREDITS and NOTES: minimally 61 required credits; a maximum of 12 credits can be double counted across schools.

Both programs will allow dual degree students to double count a maximum of 12 credits. The following courses are some of the SPH requirements, which are also required by the SON: Fundamentals of Epidemiology (PubH 6320, 3 credits or Epidemiology Methods I

⁹ The field experience includes a one-credit rotation at Healthpartners' Occupational and Environmental Medicine Clinic to be arranged by Dr. McGovern in consultation with the student, and an individualized field experience that minimally entails three credits. The three credit experience will be arranged by the student's academic advisor upon consultation with the student. See <http://www.ahc.umn.edu/sphfieldexp/> for the School of Public Health's learning contract for student field experiences.

¹⁰ All OEHN students are required to attend a minimum of 5 sessions of Community Grand Rounds in Occupational and Environmental Medicine (OEM), subsequent to completion of PubH 6170 and PubH 6130. This seminar is arranged by the OEM Residency Program on a monthly basis. The schedule of topics by date will be e-mailed to all students in advance of the session.

(PubH 6341, 3 credits), and Biostatistical Methods I (PubH 6414, 3 credits) or Biostatistics I (PubH 6450, 4 credits), and Moral and Ethical Positions in Nursing (NURS 8140, 3 credits), which is already accepted in the SPH in lieu of either Ethics in Public Health Professional Practice and Policy (PubH 6741, 1 credit) or Ethics in Public Health: Research and Policy (PubH 6742, 1 credit). Additionally, it is recommended that students double count credits related to their masters research or plan B project (PubH 7194, 3 credits NURS 8194) **OR** that students' field experience or internship (PubH 7196 (course numbers determined by SPH major), 3 credits/ NURS 8063) be double counted if the field experience meets the objectives of both programs as determined by the academic advisors. It is strongly recommended that students consult with their advisor and student coordinator in choosing which courses to double count.

Students in the School of Public Health are also allowed to transfer a maximum of 15 credits worth of graduate level coursework from previous transcripts (Nursing School or pre-admission coursework). Students are allowed to transfer a maximum of 40% of their credits from the SPH, other institutions, or pre-admission coursework into the Graduate School. To ensure students don't exceed the threshold for transferring credits from one school to another it is important for students to take the majority of courses from the school in which they are enrolled as described above.

PhD Specialty Program 2006-07: Occupational and Environmental Health Nursing

Note: The *italicized courses* are required for the MPH degree in environmental health focused in occupational and environmental health nursing.

SPH Requirements:

PubH 6341 Epidemiologic Methods I (3 cr)

PubH 6450 Biostatistics I (4 cr)

PubH 6742 Ethics in Public Health Research and Policy (1 cr)

EHS Division Core Courses:

PubH 6103 Exposure to Environmental Hazards (2 cr)

PubH 6104 Environmental Health Effects: Introduction to Toxicology (2 cr)

PubH 6105 Environmental and Occupational Health Policy (2 cr)

PubH 7196 Field Experience in Environmental Health (4 cr)

Specialty Program Course Requirements:

PubH 6130 Occupational Medicine: Principles and Practice (3 cr)

PubH 6140 Occupational and Environmental Epidemiology (2 cr)

PubH 6150 Interdisciplinary Evaluation of Occ. Health and Safety Field Problems (3 cr)

PubH 6170 Introduction to Occupational Health and Safety (3 cr)

PubH 6451 Biostatistics II (4 cr)

PubH 8120 Occupational Injury Prevention Research Training Program (OIPRTP) Research Seminar (1 cr for at least 2 semesters)

PubH 8140 Validity Concepts in Epidemiologic Research (2 cr)

Nurs 8170 Research in Nursing (3 cr.)

Nurs 8171 Qualitative Research Design and Methods (3-4 cr)

Nurs 8600 Advanced Public Health Nursing (2 cr.)

PubH 8888 Dissertation (24 cr)

TOTAL CREDITS: The total required credits for the PhD is 46, plus electives in consultation with advisor, if the student has already completed an MPH degree in occupational and environmental health nursing.

Proposed Electives:

PubH 6120 Injury Prevention in the Workplace, Community, and Home (2cr)

PubH 6112 Risk Analysis (3 cr)

PubH 6120 Injury Prevention in the Workplace, Community, and Home (2cr)

PubH 6420 Introduction to SAS Programming (1 cr)

PubH 8813 Measurement of Health-Related Factors (3 cr)

PubH 8142 Epidemiologic Uncertainty Analysis (2 cr)

Nurs 8100 The Discipline of Nursing (3 cr)

Nurs 8193 Qualitative Data Analysis for Health Care Research (3-4 cr)

Nurs 8172 Theory and Theory Development for Research (3 cr)

Grad 8101 Teaching in Higher Education (3 cr)

D. Occupational and Environmental Medicine Program
Program Curricula/Course Requirements and Sample Schedules

HealthPartners Institute for Medical Education
Occupational and Environmental Medicine Residency Program
Goals and Objectives

Introduction:

Occupational and Environmental Medicine is a vital and dynamic medical specialty encompassing both clinical medicine and public health practice. OEM is unique in its focus on issues of both individual and population health.

The HealthPartners Residency in Occupational and Environmental Medicine (OEM) has a distinguished tradition of excellence in training OEM physician specialists. The program has been in existence since 1977 when the Midwest Center for Occupational Health and Safety (MCOHS) was formed as a consortium of St. Paul Ramsey Medical Center (now HealthPartners-Regions Hospital) and the University of Minnesota School of Public Health.

The Occupational Medicine Residency/Fellowship Training Program is based at HealthPartners St. Paul Clinic and remains a core program of the MCOHS which is an Educational Resource Center (ERC) sponsored by the National Institute for Occupational Safety and Health. The Midwest Center provides training in occupational medicine, occupational health nursing, industrial hygiene and injury prevention, as well as providing an extensive continuing education program in occupational safety and health for both professionals and workers.

The HealthPartners OEM Residency Program is accredited by the ACGME--most recently in October of 2003 with full five year accreditation until 2009. Our residents receive individual and comprehensive training in clinical occupational medicine, epidemiology, research methods, toxicology, public health, industrial hygiene as well as injury prevention and management. Completion of the residency leads to board eligibility in Occupational Medicine through the American Board of Preventive Medicine.

Goal:

Our goal as an occupational and environmental medicine residency training program is to prepare our graduates for leadership positions which improve the health and safety of workers with an ability to practice in a wide range of venues including clinical practice, government and public health agencies, academia, industry and corporate health departments.

Objectives: The objectives of the training program are designed to meet our program goal by providing our residents with diverse, enriching educational opportunities to achieve proficiency in the General and Occupational and Environmental Specialty Competencies as follows :

1. Ensure that residents obtain a strong foundation in relevant academic disciplines of Occupational and Public Health Practice, including:
 - a. Epidemiology
 - b. Biostatistics
 - c. Toxicology
 - d. Industrial Hygiene
 - e. Occupational Safety and Injury Prevention
 - f. Public Health Services Policy and Administration
2. Provide an extensive experience in both primary and specialty occupational and environmental medical clinical practice, as well as additional clinical experience as required or desired by the resident based upon their prior experience and interests. Clinical practice experience will be complemented by weekly participation and presentations in clinically oriented case conference and monthly grand round activities.
3. Provide opportunities for experience and practice in a broad range of practicum experiences, including corporate, governmental, and public health organizations which are selected, as appropriate, on the basis of resident experience or specific interests.

4. Provide a rich opportunity to gain familiarity with investigative activities and critical appraisal of the scientific literature through the promotion of individual research activities and monthly journal clubs.
5. Introduce and review key topics related to occupational and environmental medicine, toxicology, and preventive medicine and public health practice through weekly formal didactic presentations.
6. Provide both formal and informal opportunities to achieve familiarity, and eventual proficiency in the general competencies of patient care, professionalism, medical knowledge, practice based learning and improvement, interpersonal skills and communication, professionalism, and systems based practice.
- 7.

Core Course and Required Course Descriptions

Public Health 6020 – Fundamentals of Social and Behavioral Science

Instructors: John Finnegan, Ph.D.

Credits: 3

Course Description: Four major approaches to public health problems: psychosocial, economic, community, policy. Lectures provide overview of theory/implementation. Small groups provide opportunity to practice skills.

Course Objectives:

- describe how behavioral sciences can be used to understand and intervene upon current public health problems
- articulate how psychosocial and community theories are used to design, implement, and evaluate public health programs
- understand the application of economic theory to public health
- describe the policy making process and how health and social policy impact and respond to public health issues
- communicate how public and private institutions create change in public health behaviors or the environment in which individual behavior responds
- acquire skills in the application of behavioral science to current public health problems

PubH 6170 - Introduction to Occupational Health and Safety

Instructor: Nancy Nachreiner, PhD MPH RN COHN-S

Credits: 3

Course Description: This course is an introduction to major concepts and issues in occupational health and safety. Students identify a conceptual framework for working with populations of workers as an industrial hygienist, safety professional, occupational physician, or occupational health nurse. The application of public health principles and decision-making processes will be discussed in relation to the prevention of injury and disease, health promotion and protection of worker populations from environmental hazards. This course relies on the synthesis of knowledge in the behavioral sciences, industrial hygiene, injury epidemiology, safety, nursing theory, toxicology and epidemiology while applying these within a program development and management framework. Students will participate in at least one observational visit to a work place.

Learning Objectives

At the completion of the course, the student will:

1. Recognize the interrelatedness of public health, management, employees, and the government to the goals of occupational health and safety.
2. Demonstrate a base of knowledge in the recognition and assessment of health and safety hazards in the workplace.
3. Identify a conceptual framework for the practice of occupational health and safety.
4. Relate health promotion/prevention/protection concepts to the occupational health and safety program.
5. Discuss the roles and functions of the occupational health and safety professional in the application of the conceptual framework.
6. Apply theories and concepts of occupational health and safety to the development and management of programs.
7. Identify education, engineering, and enforcement controls for the prevention of occupational health and safety problems.
8. Demonstrate ability to access occupational health and safety information resources, hard copy and on-line.

Public Health 6173 - Hazard-Related Exposure to Physical Agents in the Environment

Instructor: Raynor

Credits: 3 (prereq grad stu or EH major, IH specialty or equiv preparation)

Course Description: Nature, health effects, monitoring and control of physical agents in working and living environments, ionizing/non-ionizing radiations (including lasers and ultraviolet, visible and infrared light), noise and vibration, and heat and cold stress; dose, response and engineering interventions.

Public Health 6320 – Fundamentals of Epidemiology**Instructor:** DeAnn Lazovich, Ph.D.**Credits:** 3**Course Description:** Basic concepts and knowledge of epidemiology, a methodology used to study the etiology, distribution, and control of diseases in human populations.**Course Objectives:**

- understand basic methods and tools used by epidemiologists to study the health of populations

Public Health 6414 - Biostatistical Methods I

Descriptive statistics, graphical methods. Use of Excel. Proportions, relative risk, odds ratios. Random sampling. Estimates of mean, medians, measures of variability. Normal distribution, t-/chi-square tests.

Confidence intervals. Correlation/regression. Inference/causality.

Public Health 6741 – Ethics in Public Health: Professional Practice and Policy**Instructor:** Debra DeBruin, Ph.D.**Credits:** 1**Course Description:** Introduction to ethical issues in public health practice/policy, designed to train students in the basic skills of ethical analysis and increase competency in recognizing and analyzing such moral issues.**Course Objectives:**

- develop basic skills in ethical analysis
- be able to recognize and analyze ethical issues arising in the context of public health and health services
- increase the competence with which students make ethical decisions as issues arise in their practice and professional training

OR

Public Health 6742 – Ethics in Public Health: Research and Policy**Instructor:** Debra DeBruin, Ph.D.**Credits:** 1**Course Description:** Introduction to ethical issues in public health research/policy, designed to train students in the basic skills of ethical analysis and increase competency in recognizing and analyzing such moral issues.**Course Objectives:**

- develop basic skills in ethical analysis
- be able to recognize and analyze ethical issues arising in the context of public health and health services
- increase the competence with which students make ethical decisions as issues arise in their practice and professional training

Public Health 6751 – Principles of Management in Health Services Organizations**Instructor:** Robert L. Veninga, Ph.D.**Credits:** 2**Course Description:** Lectures, case studies on the role of health-care services administrators, principles of management and the administrative process.**Course Objectives:**

- be able to identify selected principles of management and demonstrate how to implement them in health organizations
- be able to identify strategies through which you can be a more effective leader
- be able to identify some of the major reasons for conflict in health care organizations
- be able to diagnose the health of an organization and delineate management strategies

OR

Public Health 6752 - Public Health Management**Instructor:** William Riley**Credits:** 3**Course Description:** Managing projects/organizations in public health. Skills/knowledge necessary to determine mission of an organization, structure it to support individuals in their work, and motivate/manage to achieve goals.**Public Health 6103 – Exposure to Environmental Hazards****Instructors:** Gurumurthy Ramachandran, Ph.D**Credits:** 2**Course Description:** Nature, effects, and regulation of exposure to biological, physical, and chemical hazards in the environment,

placing them in context of inter- and multi-disciplinary scientific field of environmental health as an essential component of wider field of public health.

Course Objectives:

- develop knowledge about sources and nature of exposure to potentially harmful agents
- integrate knowledge about agents into larger context of environmental health and public health
- identify options for intervention strategies
- apply knowledge-based conceptual skills developed to understanding of practical, real-world problems
- demonstrate ability to express what has been learned in a quantitative manner
- appreciate similarities and differences in exposure concepts across disciplinary boundaries
- articulate what has been learned through effective oral and written communication

Public Health 6104 – Environmental Health Effects: Introduction to Toxicology

Instructors: Elizabeth Wattenberg, Ph.D

Credits: 2

Course Description: Identification of mechanisms and effects on human health of environmental agents, including chemical, biological, physical, and psychological agents.

Course Objectives:

- learn how biochemical, physiological, and environmental factors affect toxicity
- learn how toxicology studies can be used to investigate the effects of environmental contaminants on human health

Public Health 6105 – Environmental and Occupational Health Policy

Instructors: Pat McGovern, Ph.D

Credits: 2

Course Description: Students develop an understanding of environmental and occupational policies, laws, key concepts and principles, proposals and approaches for regulatory reform, approaches to policy analysis, and overall phases and issues in the policy-making process.

Course Objectives:

- describe current environmental and occupational health policies and how they have evolved over time
- identify key policy issues and different perspectives driving the national debate about reform of environmental and occupational health regulations
- discuss the public policy process that exists in the United States
- identify different approaches for public policy analysis and describe when they might be applied
- discuss the role of science and scientists in the decision-making process
- identify the difficulties in making public policy decisions that are informed, credible, well-reasoned, reasonable, and effective
- describe trade-offs among conflicting goals, objectives, interests, and approaches to various policy decisions
- critique important new approaches and directions for environmental and occupational health policy (e.g., sustainability, partnerships, decentralization)
- apply the knowledge, skills, and understanding obtained in the course to enhance the practice of environmental and occupational health

Public Health 6130 – Occupational Medicine: Principles and Practice

Instructors: Ian Greaves, M.D., Beth Baker, M.D.

Credits: 3

Course Description: Pathogenesis of diseases caused by occupational hazards; evaluating work-related illnesses; overall regulatory framework governing occupational health and safety.

Course Objectives:

- develop understanding of nature and pathogenesis of diseases caused by exposures to toxic chemicals and physical hazards in workplace
- become familiar with metabolism and fate of toxic agents relevant to performance of biological monitoring for exposed individuals
- develop understanding of common physical hazards that pose health problems for workers
- become familiar with common presentations of occupational diseases caused by toxic agents and physical hazards, techniques for diagnosing these disorders, and approaches to medical management involved in treating affected workers
- develop understanding of basics of medical care for occupational illness and injuries in context of workers' compensation and regulatory issues

Public Health 6150 – Interdisciplinary Evaluation of Occupational Health and Safety Field Problems

Instructors: Nancy Nachreiner, Ph.D

Credits: 3

Course Description: Guided evaluation of potential health and safety problems at the work site, recommendations and design criteria for correction, and evaluation of occupational health and safety programs.

Course Objectives and functions of occupational health and safety professionals as members of interdisciplinary team:

- develop understanding of roles
- identify team approach to planned assessment and evaluation of specific worker population and workplace
- relate working conditions to health and safety of workers
- discuss concepts of hazard recognition, evaluation and control
- identify trends in health care costs and implications for employers and employees
- discuss integrated models of occupational health, safety and benefit programs
- apply evaluation principles to specific occupational health and safety program
- identify real and potential health and safety hazards utilizing pre-site preparation and walk-through survey (IH)
- evaluate existing industrial hygiene programs (IH)
- assess labor-management relations as they impact health and safety (IH)

Ergonomics course offered during the Summer Public Health Institute

Infectious Disease Epidemiology offered during the Summer Public Health Institute

PubH 6387 - Cancer Epidemiology

Epidemiologic aspects of cancer. Theories of carcinogenesis, patterns of incidence/mortality, site-specific risk factors. Issues of cancer control/prevention.

Public Health 7194 Environmental and Occupational Health: Masters Project

This division requires all students with an environmental health major to complete a research paper or project. There is a plan A (thesis) option for MS students and a plan B option for MPH students which requires completion of either two literature reviews or one data-based, applied study. Through this endeavor students demonstrate familiarity with the tools of research or scholarship in the field, the ability to work independently and to present the results of their investigation effectively. The student and their research advisor together decide between the Plan B options, the format of the research product, based upon the students' learning needs and career objectives. The final product in all options is a formal, written scholarly report that is evaluated by the research advisor and a final oral examining committee involving two other faculty (at least one of which is external to the EOH Division, primarily SON faculty have served in this capacity). In the case of a Research Paper, students must select a theme relevant to the key principles of occupational health nursing. They must carry out a review of the original literature and address a specific problem, completing the steps necessary to solving that problem. The project may be field-based and should involve some aspect of data gathering followed by a statistical or descriptive analysis. Students must prepare a paper that includes an Abstract, Introduction (statement of the problem, review of literature, statement of research questions or hypotheses, purpose of study), Methodology (study design, sample selection, data description, analytic methods used), Results (presentation and analysis of data), Discussion (limitations, biases, consistency with prior research), and References, Tables, Figure, Appendices. In the case of a Literature Review, students must prepare a written report that includes an Abstract, Introduction (statement of problem, significance, focused research questions), Conceptual Framework, Methodology (how literature search conducted), Comprehensive Literature Review (data sources, type of study, target population, analytic techniques, limitations, etc.), Conclusions and Recommendations (significance to field), References.

Public Health 7196 Field Experience in Environmental Health

EnHS Faculty

Directed practicum in environmental and occupational health

Fall, Spring, May session, Summer -Time and place to be arranged

Clinical Rotations

Northwest Airlines/Park Nicollet Rotation

1. Preceptor: David Zanick, M.D., MPH

Park Nicollet Airport Clinic

7550 34th Avenue South

Minneapolis, MN 55450

952-993-9757

2. Duration: Two months (One day per weeks - See schedule)

3. Site: Northwest Airlines; Minneapolis, MN

Minneapolis is the corporate headquarters and a major hub for Northwest Airlines, including overhaul and training facilities as well as ground and flight operations. Northwest Airlines has approximately 18,000 employees in the Twin City area.

The corporate medical staff includes a physician board certified in preventive medicine (occupational medicine) and appropriately credentialed specialists in industrial hygiene, nursing, and safety.

Northwest Airlines also utilizes the staff and facilities of an occupational medicine specialty clinic (Park Nicollet Airport Clinic), situated on the perimeter of the Twin City airport, for contract medical services. Park Nicollet Airport Clinic has a staff of six board certified occupational medicine physicians, along with occupational health nurses and other allied health providers. The clinic provides primary and specialty care to injured and ill NWA workers and performs medical screening and fitness for duty evaluations of NWA employees.

4. Educational Goals and Objectives:

- a. To become familiar with safety and health operations in the airline industry.
- b. To observe a urine drug testing program mandated by Department of Transportation rules.
- c. To develop familiarity in the assessment of fitness for duty in flight crews and other airline employees.
- d. To participate in safety and industrial hygiene evaluations of hazards, in airplane maintenance and flight operations.

Health Partners Worksite Health Managed Care Plan Rotation

1. Preceptor: Kirsten McGrail, M.D., M.P.H.

Medical Director

HealthPartners Worksite Health

Mail stop: 21106A

P.O. Box 1309

Minneapolis, MN 55440-1309

Tel: 952-883-7542

Email: Kirsten.m.mcgrail@healthpartners.com

2. Duration: 1 month - Two days per week 8:15-2:15 pm. (see schedule)

3. Site: HealthPartners

8100 34th Avenue South

Bloomington, MN 55425

4. Educational Goals and Objectives:

- a. Gain insights and general understanding of issues related to assessment of appropriate disability management principles and strategies, the assessment of appropriate optimal use of medical resources for individuals and populations, gain experience in the applicability of best practices guidelines within the context of a managed care environment.
- b. To experience common issues encountered in the application of managed care practices including clarification of preferred practice standards, with communication of information to medical care providers with established provider-patient relationships, gain experience in the use of existing evidence based information relating to appropriate medical care as part of a decision making process, and understand the role of expert medical consultation in the context of a managed care or health plan environment.

Public Health and Preventive Medicine Rotation

1. Preceptor: Neal Holtan, M.D., MPH

St. Paul-Ramsey County

Department of Public Health

555 Cedar Street

St. Paul, MN 55101

(651)-266-1222

Fax: (651)-266-1201

2. Duration: 2 month (2 days/week (See schedule)

3. Sites:

Site 1. Saint Paul-Ramsey County

Site 2. Minnesota Institute of

Department of Public Health Public Health

555 Cedar Street 2720 Highway 10

St. Paul, MN 55101 Mounds View, MN

Neal Holtan, M.D., MPH 55112

(651)-266-1222 (763)-427-5310

Email: holta002@umn.edu Fax: (612)-317-0713

Site 3. Institute for Environmental Assessment/Environmental Resources Council

9201 West Broadway, Suite 600

Brooklyn Park, MN 55445

Joan Nephew

(763) 315-7900

This is a community-based rotation where the residents will work at the Saint Paul-Ramsey County Department of Public Health, the Minnesota Institute of Public Health, and other selected organizations on individually designed experiences that included combinations of patient care, special projects, meetings, and activities that provide exposure to the broad practice of preventive medicine. Every attempt will be made to tailor the experience to the interests and career plans of the residents.

4. Educational Goals and Objectives:

- a. To become familiar with the preventive services, disease surveillance, disease control, and public health policy.
- b. To develop skills in proposal designs for preventive and public health strategies.
- c. To become familiar with the diagnosis and management of Tuberculosis by spending time in the tuberculosis clinic
- d. To provide the resident with as many experiences toward the elements of competency for preventive medicine as defined by the American College of Preventive Medicine in its guidelines for residents.

3M Occupational Medicine Rotation

1. Preceptor: Betsy Buehrer, D.O., M.P.H.

3M Company

3M Center, Building 220-3W-05

St. Paul, MN 55144-1000

651-736-5347 (Abby Ward (temp) 651-736-1006)

2. Duration: 2 months (2 days per week - See Schedule)

3. Site: 3M Corporate Headquarters; St. Paul, MN

3M is a diversified manufacturer with approximately 70,000 employees. St. Paul is the home of the corporate headquarters and the major research and development facility. In addition, there are several manufacturing operations in the Twin City area.

The corporate medical staff includes five physicians who are board certified in preventive medicine (occupational medicine) and appropriately credentialed specialists in industrial hygiene, occupational health nursing, safety, toxicology, and health physics.

4. Educational Goals and Objectives:

- a. To obtain general insights into the health and safety operations at 3M facilities in the Twin Cities area (including but not limited to abrasives manufacture, chemical manufacture, and research laboratories).
- b. To see how the occupational medicine physician participates in occupational health activities of the company. This includes attending health meetings and interacting with other safety and health functions within the company such as safety engineering, industrial hygiene, and toxicology.
- c. To participate in occupational surveillance programs (protocol development, implementation, evaluation, and computerization).

General Mills Rotation**1. Preceptor:** Julia Halberg, M.D., M.P.H.

General Mills

1 General Mills Blvd.

Minneapolis, MN 55440

763-764-3952

2. Duration: 2 months (Two days/week - See Schedule)**3. Site:** General Mills Corporate Headquarters; Minneapolis, MN

General Mills is a multinational food products manufacturer with 18,000 employees worldwide. Corporate headquarters, research and development, and production facilities are located in the Twin City area.

The corporate medical staff includes one physician board certified in preventive medicine (occupational medicine), one physician board certified in emergency medicine, and appropriately credentialed specialists in industrial hygiene, nursing, and safety.

4. Educational Goals and Objectives:

- a. To obtain general insights into the administration of health care services in the company.
- b. To see how the occupational medicine physician participates in the occupational health activities of the company. This includes attending health and safety meetings and interacting with other departments within the company while working on projects.
- c. To assist in the provision of consultative corporate medical services to the company, including health surveillance and health promotion activities.
- d. To assist with specific occupational medicine needs at specific plant locations, including the evaluation of employees with potential occupational illnesses or injuries.
- e. To be involved with industrial hygiene, safety, and training specialists in ongoing safety and health activities, including the evaluation of the worksites of patients seen in clinic.

Minnesota OSHA Rotation**1. Preceptors:** Alden Hoffman, P.E., CIH

OSHA

Minnesota Department of Labor and Industry

443 Lafayette Road

St. Paul, MN 55155

651-284-5158

Beth Baker, M.D., MPH

Program Director

2. Duration: 1 month (2 days/week – Tuesdays and Thursdays (May also be Mon and Thursday - See schedule))**3. Site:** Minnesota OSHA

Minnesota Department of Labor and Industry

St. Paul, MN

Minnesota has a state plan for implementation of OSHA and has a staff of 40 safety inspectors and 19 industrial hygienists who perform both consultative and compliance investigations. Minnesota OSHA performs 3000 investigations and consultations per year.

4. Educational Goals and Objectives:

- a. To obtain general insight into the administrative functions of an occupational safety and health regulatory agency.
- b. To work with Minnesota state OSHA in assessing workplace health hazards. This will involve going on site visits with OSHA inspectors, becoming familiar with industrial hygiene and safety practice in this setting, understanding the legal operations of the OSHA office, and understanding OSHA's role in the administration of worker's health complaints.

Travel Clinic**1. Preceptors:** Travel Clinic

Pat Walker, M.D.

Scheduling: Karen Cox (254-7419)

2. Duration: One week during the Occupational Medicine Clinic rotation**3. Site:** Travel Clinic, HealthPartners Specialty Center

Residents will gain experience in travel medicine in the Travel Clinic.

4. Educational Goals and Objectives:

- a. To evaluate and appropriately treat international travelers in the Travel Clinic

5. Resident Duties: Attendance at assigned clinic

- a. Perform travel evaluations
- b. Competencies

Residents may be expected to demonstrate the following competencies during an industrial rotation, depending on the actual tasks assigned by the Preceptor:

1. Communicate to health professionals and patients in a clear and effective manner, both orally and in writing, the levels of risk from potential hazards and the rationale for selected interventions.
2. Interpret legal and regulatory authority relating to protection and promotion of the public's health and employee's health.
3. Identify and coordinate the integrated use of necessary and sufficient resources to improve employee's and traveler's health.

Employee Health Service**1. Preceptors:** Employee Health Service

Beth Baker, M.D., MPH

Regions: 651-254-5180

Beeper 651-629-1699

2. Duration: 1 Month (1/2 day a week - see schedule)**3. Sites:** Employee Health Services, Regions Hospital

Wednesday 7am-12pm

640 Jackson Street

St. Paul, MN 55101

EHS is responsible for preplacement screening, monitoring of immunization status (Measles, Mumps, Rubella, Varicella, and Hepatitis B), surveillance of exposures (Blood Borne Pathogen Exposures, TB, asbestos), and fitness for duty assessment for the employees of Regions Hospital.

4. Educational Goals and Objectives:

- a. To understand the administration and operations of an employee health unit, including interaction with the employee health nurse, infection control and safety departments.
- b. To evaluate and manage the occupational medical problems of health care workers.
- c. To assess and treat blood and body fluid exposures, and TB exposures.

5. Resident Duties:

- a. Perform fitness for duty examination, preplacement examination, work injury evaluation
- b. Complete educational packets
- c. Understand follow-up and treatment of blood and body fluid exposures
- d. Understand tuberculosis surveillance program
- e. Attendance at relevant meetings

Respiratory Medicine Rotation**1. Coordinator:** Beth Baker, M.D., MPH

Occupational and Environmental Medicine

Regions Hospital

651-254-5180 (Beeper 651-629-1699)

2. Duration: 5 days (During July/August of 1st Year)**3. Sites:**

PULMONARY

HealthPartners Parkway Clinic
 3366 Oakdale Avenue North
 Oakdale Med. Building near North Mem.
 Medical Center
 Robbinsdale, MN 55422
 James Mickman, MD
 763-287-5000 (Carol)
 Regions Pulmonary Medicine Department
 Mary Stone
 651-254-3907

This rotation combines outpatient clinic experiences in a variety of venues including: pulmonary medicine and otolaryngology. It provides the resident with a broad range of complementary experiences in the examination, diagnosis, and treatment of ambulatory respiratory system disorders.

4. Educational Goals and Objectives:

- A. To become familiar with the clinical and laboratory assessment of respiratory system.
- B. To develop skills in the inpatient and outpatient treatment of respiratory system.

Musculoskeletal Medicine Rotation

1. Coordinator: Beth Baker, MD, MPH
 Occupational and Environmental Medicine
 Regions Hospital
 651-254-5180 (Beeper 651-629-1699)

2. Duration: 1 month

3. Site: Orthopedic Clinic, HealthPartners Specialty Center
 Dr. Ralph Bovard (Schedule through Kathy 254-1513).

This rotation combines outpatient clinic experiences in a variety of venues including: orthopedics, rheumatology, physiatry, and sports medicine. It provides the resident with a broad range of complementary experiences in the examination, diagnosis, and treatment of ambulatory musculoskeletal disorders.

4. Educational Goals and Objectives:

- a. To become familiar with musculoskeletal assessment techniques and appropriate use of radiology, especially in regards to hand injuries and back injuries.
- b. To develop skills in diagnosis and outpatient treatment of common musculoskeletal disorders, especially of the hands and back.
- c. To develop skill in casting and splinting, and other outpatient musculoskeletal therapeutic techniques.

Physical Rehabilitation Rotation

1. Preceptor: Beth Baker, M.D., MPH
 Occupational and Environmental Medicine
 Regions Hospital
 254-5180 (Beeper 651-629-1699)

2. Duration: 8 sessions

3. Site: *various*

Physical rehabilitation techniques are critical to the successful treatment of workers with occupational injuries and occupational musculoskeletal disorders. This rotation is intended to give residents an overview of these techniques through practical demonstrations of their application.

4. Educational Goals and Objectives:

- a. To become familiar with physical therapy practice
- b. To become familiar with chiropractic therapy
- c. To become familiar with rehabilitation modalities

6. Resident Duties:

Residents will commit 8 half days beginning in July of the academic year. It is expected that residents will:

- a. Attend two (2) sessions of chiropractic therapy with **Dr. Jeffrey Bonsell, Preferred Chiropractic** (651-481-1488)
- b. Complete clinic visits of selected specialized rehabilitation services:
Hand Therapy, HealthPartners Specialty Center (Lynn Wilbur, 651-254-7737)
Saunders Physical Therapy (651-645-8083) *work hardening, FCE's*
Physician's Neck and Back Clinic /Dr. Joseph Wegner (651-639-9150)
- E. Review recommended readings.

Dermatology Rotation

1. Preceptor: Steve Praver, M.D.
Associated Skin Care Specialists
7205 University Avenue NE
Fridley, MN 55432
763-571-4000

2. Duration: 4-5 sessions during July/August of 1st Year

3. Site: Associated Skin Care Specialists

Associated Skin Care Specialists is an outpatient specialty clinic staffed by board certified dermatologists which accepts patients on self-referral or by physician referral.

4. Educational Goals and Objectives:

- a. To become familiar with the assessment of skin disease.
- b. To develop skills in the outpatient treatment and prevention of skin disease.

Occupational and Environmental Medicine Clinic/Service*

1. Preceptor: Beth Baker, M.D., MPH
Occupational and Environmental Medicine
Regions Hospital
640 Jackson Street
St. Paul, MN 55101
651-254-5180 (Beeper 651-629-1699)

2. Duration: 9 months (2 days/week)

3. Site: Occupational and Environmental Medicine Clinic

Regions Hospital and Riverside Clinic

OEM Clinic is an outpatient specialty clinic staffed by board certified occupational medicine physicians; the clinic accepts patients referred by employers, other physicians, and lawyers as well as self referrals and averages 450 patient encounters/month.

4. Educational Goals and Objectives:

- a. To develop a comprehensive primary care approach to common occupational and environmental injuries and illnesses:
 - *understand the significant causes of illness / injury and risk factors in each workgroup*
 - *diagnose and manage common illnesses and injuries*
 - *practice continuity of care*
 - *assess effectiveness of care*
- b. To become familiar with Workers' Compensation administrative policies and procedures.
- c. To acquire skill in communicating with employers, insurers, lawyers, and rehabilitation professionals involved in cases of occupational injury and illness.
- d. To acquire skill in reviewing medical and environmental exposure records, researching the relevant occupational health literature, and synthesizing a report which communicates with employers, insurers, and lawyers involved with cases of occupational and environmental illness (See attachment for Specialty Evaluations).
- e. To develop a comprehensive primary care approach to medical screening and surveillance of exposed workers.
 - *employ appropriate health maintenance strategies*
- f. To develop skill in assessing fitness for duty and defining appropriate accommodations for prospective employees within the context of the ADA.
- g. To develop a workplace-oriented approach which relates the individual to the workgroup and identifies opportunities for primary prevention.
- h. To develop skills in the assessment and management of acute and chronic occupational and environmental toxicologic exposures
- i. Develop skills in presentation development and delivery (2 month rotation)

Conferences**Community Rounds in Occupational Medicine**

Conference Coordinator: Program Director, Occupational Medicine

Duration: Academic and Practicum Phases

Schedule: monthly third Wednesday 7:00 AM

Site: variable: See Grand Rounds schedule for location

Participants: OEM staff physicians and OHN's

Occupational Medicine residents

OHN faculty and students from the School of Public Health

OM physicians and OHN's from Twin Cities community

Conference Description: A "grand rounds" format is used to present topics of current

interest in occupational and environmental health. Presenters are drawn from the

community as well as from the training programs in Occupational Medicine and

Occupational Health Nursing. This forum is also used to present research being done by

residents and faculty. Presentations are followed by a general discussion moderated by the conference coordinator. Whenever

appropriate, bibliographies and other written materials are prepared and distributed. Presentations are supported by suitable audio-visual aids.

Resident Responsibility: (1) Attend and participate (2) Prepare and give one community rounds in the practicum year, which will be a formal presentation of the resident's research project. Presentations must be reviewed and approved by the conference coordinator.

Didactics/OEM Lecture Series

Conference Coordinator: Program Director, Occupational Medicine

Duration: Academic and Practicum Phase

Schedule: 4-5 times per month

Site: Schedule to be distributed each month with location

Participants: OEM staff physicians

Occupational Medicine residents

Conference Description: OEM faculty present formal lectures on selected topics in occupational and environmental medicine (see attached listing). All lectures are supported by audiovisual aids and written materials including lecture outlines, selected reprints, and bibliographies. Residents are given ample opportunity to ask questions. Faculty presenters are chosen by the conference coordinator for their expertise in the subject area. Most presentations are made by OEM staff physicians.

Resident Responsibility: (1) Attend and participate (2) Evaluate presentations

Journal Club

Conference Coordinator: Kristen McGrail, MD, MPH

Duration: Academic and Practicum Phase

Schedule: Third Wednesday of each month

Site: Regions Hospital, Resident Office

Participants: OEM staff physicians

Occupational Medicine residents

Conference Description: OEM residents present formal analyses of selected articles from the current occupational and environmental medicine literature (see attached listing of journals). Articles for discussion are chosen by the residents but must be approved by the conference coordinator in advance. All participants are encouraged to use standardized methods for evaluating articles (see attached list of references) and are expected to examine the implications of the article for current occupational safety and health practice. All participants will provide written annotations of their article for distribution at the journal club meeting. Each resident will prepare one article for each meeting.

Resident Responsibility: (1) Attend and participate; (2) Prepare and present selected articles; (3) Prepare and submit a Journal Club Review Form

OEM Case Conference

Conference Coordinator: Program Director, Occupational Medicine

Duration: Academic and Practicum Phase

Schedule: 2-3 times/month - Wednesdays, 7:00 AM

Site: See monthly schedule for location

Participants: OEM staff physicians and residents

Conference Description: OEM residents present cases evaluated in the OEM clinic or topics illustrated by cases from other rotations. Presentations include a history of present illness, complete occupational and environmental history, review of treatment to date, physical / laboratory / medical imaging findings. Group discussion is moderated by the program director or other OEM faculty and considers issues of differential diagnosis, management, and implications for preventive action at the worksite. Cases from the OEM clinic are chosen to illustrate common problems in occupational medicine as well as diagnostic and therapeutic challenges. Cases from other rotations are chosen as specified in the rotation description. An effort is made to devote at least one conference per month to cases of acute or chronic toxicity.

Resident Responsibility: (1) Attend and participate; (2) Select and prepare cases for presentation as scheduled; (3) Develop supporting materials (e.g., reprints, bibliographies, handouts); (4) Complete and submit a "Case Conference Report" for each conference

Target Clinical Topics: In order to assure that common and important clinical problems are discussed, residents are encouraged (but not required) to select cases from the OEM clinic that illustrate one or more of the following topics. Residents should avoid duplicating previous presentations within their group.

<p><u>LOW BACK PAIN</u> writing work restrictions efficacy of selected physical medicine modalities efficacy of chiropractic indications for surgery use of electrodiagnostic tsting use of medical imaging choosing a rehabilitation program approving a job offer</p> <p><u>CUMULATIVE TRAUMA DISORDERS</u> efficacy of selected physical medicine modalities efficacy of injections evaluating peripheral neuropathy chronic wrist pain thoracic outlet syndrome shoulder instability reflex sympathetic dystrophy</p> <p><u>DELAYED RECOVERY SYNDROME</u></p>	<p><u>OCCUPATIONAL LUNG DISEASE</u> use of pulmonary function testing in diagnosing occ asthma methacholine challenge testing assessing severity of occupational asthma diagnosis of asbestosis RADS</p> <p><u>SICK BUILDING SYNDROME</u></p> <p><u>SOLVENT TOXICITY</u></p> <p><u>METAL TOXICITY</u></p> <p><u>DIAGNOSING HEARING LOSS</u></p> <p><u>DERMATITIS</u> differentiating irritant vs. allergic latex allergy</p> <p><u>OCCUPATIONAL INFECTION</u> evaluating blood exposure prophylaxis of HIV exposure diagnosis of hepatitis C prophylaxis of Tb exposure</p>
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Occupational and Environmental Toxicology Grand Rounds

When: Fourth Wednesday of each month, 7:00 a.m.

Location: See Conference Schedule for location

Co-sponsored with Regions Hospital Toxicology Service

Occupational and Environmental Medicine residents will share case presentation responsibilities with residents and Pharm D fellows from the Toxicology Service.

Attending Staff: Occupational and Environmental Medicine Staff

Carson Harris, M.D., Toxicology Service/Emergency Medicine

Kristin Engebretsen, Pharm D, Toxicology Service/Emergency Medicine

Monthly Resident Meeting

When: The third Wednesday of each month

Location: See Conference Schedule for location

The purpose of this meeting is to:

1. Discuss residency related issues
2. Discuss Institute for Medical Education issues
3. Review Core Competencies

Allow residents to give feedback on resident experience

OEM Appendix: Sample Schedules

SAMPLE BLOCK DIAGRAM OF RESIDENCY

First and Second Years

Ongoing throughout the year:

1. Community Grand Rounds
2. Case Conferences
3. Colloquia/Didactics
4. Journal Club
5. Monthly Resident Meeting

Academic Phase

Courses required by the OM Program (to complete the MPH requirements):

Core Courses

- PubH 6103 Exposure to Environmental Hazards
- PubH 6414 Biostatistical Methods I
- PubH 6751 Principles of Management in Health Service Organizations
- OR
- PubH 6752 Public Health Management
- PubH 6741 Ethics in Public Health: Professional Practice and Policy
- OR
- PubH 6742 Ethics in Public Health: Research and Policy

Required Courses

- PubH 7194 Environmental and Occupational Health Master's Project
- PubH 7196 Field Experience in Environmental Health
- PubH 6104 Environmental Health Effects: Intro to Toxicology
- PubH 6105 Environmental and Occupational Health Policy
- PubH 6150 Interdisciplinary Evaluation of Occupational Health and Safety Field Problems
- PubH 6170 Introduction to Occupational Health and Safety
- PubH 6320 Fundamentals of Epidemiology
- PubH 6130 Occupational Medicine: Principles and Practices
- PubH 6020 Fundamentals of Social and Behavioral Science
- PubH 7200-113 Ergonomics
- PubH 7200 Principles of Infectious Disease Epidemiology (Section 108)
- PubH 6387 Cancer Epidemiology
- PubH 6173 Exposure to Physical Agents (Industrial Hygiene)

Residents enroll in PubH 7194 "Environmental and Occupational Health Masters Project" (3 cr.) and PubH 7196 "Field Experience in Environmental Health" (3 cr.) during the Spring Semester; but these courses are completed by the Research Project and the Practicum Year, respectively.

Sample Block Schedule				
Industrial or Clinical Rotation	MPH Classes		Conferences	Electives/ Research
Year 1: July	Musculo-skeletal	PubH 6320 Fundamentals of Epi Online PubH 6741 Ethics in PH Online	Case Conference(3/month) Community Rds (1/month) OM Lecture Colloquia/Didactics Journal Club	(1 d/wk)

Year 1: August	Pulmonary/ Derm (2 days/wk)	PubH 6320 Fundamentals of Epi Online PubH 6741 Ethics in PH Online	Case Conference(3/month) Community Rds (1/month) OM Lecture Colloquia/Didactics Journal Club	(1d/wk)
Year 1: September	MN OSHA (2 days/wk)	PubH 6170 Intro Occ Health and Safety PubH 6414 Biostats Online	Case Conference(3/month) Community Rds (1/month) OM Lecture , Journal Club Colloquia/Didactics	(1d/wk)
Year 1: October	OEM Clinic (2 days/wk)	PubH 6170 Intro Occ Health and Safety PubH 6414 Biostats Online	Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club Colloquia/Didactics	(1d/wk)
Year 1: November	OEM Clinic (2 days/wk)	PubH 6170 Intro Occ Health and Safety PubH 6414 Biostats Online	Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club Colloquia/Didactics	(1d/wk)
Year 1: December	PH and Prev. Med (2 days/wk)	PubH 6170 Intro Occ Health and Safety PubH 6414 Biostats Online	Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club Colloquia/Didactics	(1d/wk)
Year 1: January	PHand Prev. Med (2 days/wk)	PubH 6130 OEM PubH 6105 Env Occ Health Policy PubH 6150 OH and Field Problems	Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club Colloquia/Didactics	(2 d/wk)
Year 1: February	OEM Clinic (2 days/wk)	PubH 6130 OEM PubH 6105 Env Occ Health Policy PubH 6150 OH and Field Problems	Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club Colloquia/Didactics	(2 d/wk)
Year 1: March	Elective	PubH 6130 OEM PubH 6105 Env Occ Health Policy PubH 6150 OH and Field Problems	Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal	(1 d/wk)

			Club Colloquia/Didactics	
Year 1: April	OEM Clinic (2 days/wk)	PubH 6130 OEM PubH 6105 Env Occ Health Policy PubH 6150 OH and Field Problems	Case Conference(3/month) Community Rds (1/month) OM Lecture Colloquia/Didactics	(1 d/wk)
Year 1: May	OEM Clinic (2 days/wk)	PubH 6130 OEM PubH 6105 Env Occ Health Policy PubH 6150 OH and Field Problems Institute – Infectious Dis. Epi	Case Conference(3/month) Community Rds Colloquia/Didactics OM Lecture, Journal Club	(1 d/wk)
Year 1: June	General Mills (2 days/wk)		Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club	(1 d/wk)

Colloquia/Didactics				
Year 2: July	Gen. Mills (2 days/wk)	PubH 6752 PubH Management Online PubH 6020 Fund Soc Behav. Sci Online	Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club Colloquia/Didactics	(1 d/wk)
Year 2: August	HP Managed Care/EHS (2 days/wk)	PubH 6752 PubH Management Online PubH 6020 Fund Soc Behav. Sci Online	Case Conference(3/month) Community Rds (1/month) OM Lecture Colloquia/Didactics	(1 d/wk)
Year 2: September	HP Managed Care/EHS (2 days/wk)	PubH 6103, 6104 Env. Hazards, Toxicology	Case Conference(3/month) Community Rds Colloquia/Didactics OM Lecture, Journal Club	(1 d/wk)
Year 2: October	OEM Clinic (2 days/wk)	PubH 6103, 6104 Env. Hazards, Toxicology	Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club Colloquia/Didactics	(1 d/wk)
Year 2: November	3M (2 days/wk)	PubH 6103, 6104 Env. Hazards, Toxicology	Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club Colloquia/Didactics	(1 d/wk)
Year 2: December	3M (2 days/wk)	PubH 6103, 6104 Env. Hazards, Toxicology	Case Conference(3/month) Community Rds (1/month) OM Lecture Colloquia/Didactics	(1 d/wk)
Year 2: January	OEM Clinic (2 days/wk)	PubH 6387 Cancer Epi PubH 6173 Exp. To Physical Agents	Case Conference(3/month) Community Rds Colloquia/Didactics OM Lecture, Journal Club	(1 d/wk)
Year 2: February	OEM Clinic (2 days/wk)	PubH 6387 Cancer Epi PubH 6173 Exp. To Physical Agents	Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club	(1 d/wk)

			Colloquia/Didactics	
Year 2: March	NWA (2 days/wk)	PubH 6387 Cancer Epi PubH 6173 Exp. To Physical Agents	Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club Colloquia/Didactics	(1 d/wk)
Year 2: April	NWA (2 days/wk)	PubH 6387 Cancer Epi PubH 6173 Exp. To Physical Agents	Case Conference(3/month) Community Rds (1/month) OM Lecture Colloquia/Didactics	(1 d/wk)
Year 2: May	OEM Clinic (2 days/wk)	PubH 6387 Cancer Epi PubH 6173 Exp. To Physical Agents	Case Conference(3/month) Community Rds Colloquia/Didactics OM Lecture, Journal Club	(1 d/wk)
Year 2: June	OEM Clinic (2 days/wk)	Institute - Ergonomics	Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club Colloquia/Didactics	(1 d/wk)

**Occupational Health Services Research and Policy Program
Program Curricula/Course Requirements and Sample Schedules**

OHSRP Program, Appendix 1
Table A
PhD Curriculum
FOR STUDENTS ADMITTED TO EHS

Core Subject Areas	# of Courses	# of Credits	Course Title
Statistics	2	8	PubH 6450 Biostatistics I (4) PubH 6452 Biostatistics II (4)
Epidemiology	3	7	PubH 6341 Epidemiologic Methods I (3) PubH 8140 Validity Concepts in Epidemiological Research (2) PubH 8142 Epidemiology and Uncertainty Analysis (2)
Research Methods	1 (ongoing)	2 (minimum)	PubH 8120 Occupational Injury Prevention Research Training Program Research Seminar (to be renamed Occupational Health and Safety Research Seminar)(1)
Environmental Health Sciences	3	6 (minimum)	PubH 6103 Exposure to Environmental Hazards (2) PubH 6104 Environmental Health Effects: Introduction to Toxicology (2) PubH 6105 Environmental and Occupational Policy (2)
Occupational Health and Safety	2	6	PubH 6170 Introduction to Occupational Health and Safety (3) PubH xxxx Occupational Health and Safety Electives (1, 2-3 credits)
Ethics	1	1	PubH 6742, Ethics in Public Health: Research and Policy (1)
TOTAL	12	30	
Additional Requirements	# of Courses	# of Credits	Comments
<u>Supporting Program in Health Policy and Management</u>	Variable	14 -16	Supporting Program is developed by the student with the assistance of their advisor.
Economics	1	2-3	PubH 6862 Cost Effectiveness in Health Care (2) OR PubH 6832 Economics of the Health Care System (3) PubH 8805 Sociological Theory in Health Services Research (3) OR PubH 6855 Medical Sociology (3)
Social/Psychological Theories to Health	1	3	PubH 8801 Health Services Policy Analysis: Theory (3)
Health Care Policy	1	3	Student choice in concert with advisor's recommendations

Core Subject Areas	# of Courses	# of Credits	Course Title
Electives	2 (minimum)	6	
Dissertation	None	24 Thesis Credits	Student writes dissertation on topic selected by student and approved by faculty.
TOTAL CREDITS		68 - 73	

Table B
PhD Curriculum
FOR STUDENTS ADMITTED TO HPM
MULTIDISCIPLINARY SOCIAL SCIENCES AREA OF EMPHASIS

Core Subject Areas	# of Courses	# of Credits	Course Title
Statistics	2	8	PubH 7400 Fundamentals of Biostatistical Inference (4) PubH 7400-2 Biostatistical Modeling and Methods (4)
Health Services Research Methods	4	10	PubH 8810 Research Studies in Health Care (3) PubH 8811 Seminar: Health Services Research Methods (3) PubH 8830 Research Project in Health Care (1) PubH 8831 Research Project in Health Care (1)
Economics of Health Care	2	6	PubH 6832 Economics of the Health Care System (3) APEC 5151 - Applied Microeconomics: Firm and Household
Social/Psychological Theories to Health	2	3	PubH 6855 Medical Sociology (3)
Health Care Policy	2	3	PubH 8801 Health Policy Analysis
Political Theory	1	3	POL 8301 - American Politics
Ethics	1	1	PubH 6742, Ethics in Public Health: Research and Policy (1)
Additional requirement	1	3	One additional theory course of the student's choosing
TOTAL for Core Coursework	13	37	
Additional Requirements	# of Courses	# of Credits	Comments
<u>Supporting Program in Occupational Health and Safety</u> Environmental Health Sciences	3	6	PubH 6103 Exposure to Environmental Hazards (2) PubH 6104 Environmental Health Effects: Introduction to Toxicology (2) PubH 6105 Environmental and Occupational Policy (2)

Core Subject Areas	# of Courses	# of Credits	Course Title
Occupational Health and Safety	2 (minimum)	6 -10	PubH 6170 Introduction to Occupational Health and Safety (3) PubH xxxx Occupational Health and Safety Electives (2-3 each)
Dissertation	None	24 Thesis Credits	Student writes dissertation on topic selected by student and approved by faculty.
TOTAL CREDITS		73 -77	

Examples of potential elective courses, dependent on student's interest, dissertation topic, and career goals include those listed below.

PubH 6120 Injury Prevention in the Workplace, Community and Home
 PubH 6130 Occupational Medicine: Principles and Practice
 PubH 6140 Occupational and Environmental Epidemiology
 PubH 6420 Introduction to SAS Programming
 PubH 6864 Conducting Health Outcomes Research
 PubH 8100 Applied Analyses of Occupational Health Data
 PubH 8813 Measurement of Health-Related Social Factors
 PubH 8142 Epidemiology and Uncertainty Analysis.

Occupational Injury Prevention Research Training Program
DOCTOR OF PHILOSOPHY (Ph.D.) DEGREE IN ENVIRONMENTAL HEALTH
Program Curricula/Course Requirements and Sample Schedules

**DOCTOR OF PHILOSOPHY (Ph.D.) DEGREE IN ENVIRONMENTAL HEALTH
Occupational Injury Prevention Research Training Program (OIPRTP)**

School of Public Health Requirements:

Epidemiology (3 credits needed):

PubH 6341 Epidemiology I: Epidemiologic Methods I (3 credits)*
Refer, also, to additional courses required for OIPRTP

Biostatistics (2 credits, minimum, needed):

PubH 6450 Biostatistics I (4 credits)*
Refer, also, to additional courses required for OIPRTP

Ethics:

PubH 6742 Ethics in Public Health: Research and Policy (or equivalent) (1 credit)

Division of Environmental Health Sciences Core Course Requirements:

PubH 6103 Exposure to Environmental Hazards (2 credits)
PubH 6104 Environmental Health Effects: Introduction to Toxicology (2 credits)
PubH 6105 Environmental and Occupational Health Policy (2 credits)
PubH 8888 Thesis Credit: Doctoral Dissertation (24 credits)

OIPRTP Course Requirements:

PubH 6120 Injury Prevention in the Workplace, Community, and Home (2 credits)
PubH 6121 Topics: Injury Prevention in the Workplace, Community, and Home (1-2 credits)
PubH 6122 Seminar: Safety in the Workplace (1 credit)
PubH 6140 Occupational and Environmental Epidemiology (2 credits)
PubH 6150 Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3 credits)
PubH 6170 Introduction to Occupational Health and Safety (3 credits)
PubH 6325 Data Processing with PC-SAS (1 credit)
PubH 6342 Epidemiology II: Epidemiologic Methods (3 credits)
PubH 6343 Epidemiology III: Epidemiologic Methods (3 credits)
PubH 6451 Biostatistics II (4 credits)
PubH 8100 Topics: Environmental and Occupational Health Research (1-8 credits)
PubH 8100 (002) Applied Analysis of Occupational Health Data (3 credits)
PubH 8120 Occupational Health and Safety Research Seminar (Occupational Injury Research Seminar) (1 credit every semester)
PubH 8140 Validity Concepts in Epidemiologic Research (2 credits)
PubH 8141 Doctoral Seminar in Observational Inference (2 credits per semester; at least 2 semesters)
GRAD 8101 Teaching in Higher Education (3 credits)
IE 5511 Human Factors and Work Analysis (4 credits) or HumF 5001 Foundations of Human Factors/Ergonomics (3 credits)
IE 5513 Engineering Safety (4 credits)
Psy 5501 Vocational and Occupational Health Psychology (3 credits)
Grant Writers' Seminars and Workshops, L.L.C: Write Winning Grants (2 days)
ERC Interdisciplinary Seminar Series (minimum attendance: 5 of 9 per year)

TOTAL CREDITS: 74 (plus 24 Dissertation Credits) required, plus electives in consultation with advisor

* OIPRT Program Requirement

Minor in Human Factors/Ergonomics:

- HumF 5001/Kin 5001 Foundations of Human Factors/Ergonomics (3 credits)
 {Note: this course is also identified as an alternative for required courses}
- HumF 8001 Special Topics: Human Factors/Ergonomics (2-3 credits)
- HumF 8002 Proseminar in Human Factors/Ergonomics (1 credit per semester)
- Research Credits – Arranged

Proposed Electives:*Highly Recommended*

- PubH 6348 Writing Research Grants (2 credits)
- PubH 7405 Biostatistics: Regression (4 credits)
- PubH 7406 Biostatistics: ANOVA and Design (4 credits)
- PubH 7407 Analysis of Categorical Data (3 credits)
- PubH 7430 Statistical Methods for Correlated Data (3 credits)
- PubH 7435 Latent Variable Models (3 credits)
- PubH 7450 Survival Analysis (3 credits)
- PubH 8142 Epidemiologic Uncertainty Analysis (2 credits)
- PubH 8422 Modern Nonparametrics (2 credits)
- PubH 8813 Measurement of Health-Related Social Factors (3 credits)

- GRAD 8102 Practicum for Future Faculty (3 credits)
- GRAD 8200 Teaching/Learning Topics in Higher Education (3 credits)

Preparing Future Faculty home page:

<http://www1.umn.edu/ohr/teachlearn/pff/index.html>

Complementary According to Focus and Needs

- PubH 6114 Foundation of Environmental and Worker Protection Law (1 credit)
- PubH 6115 Worker Protection Law (1 credit)
- PubH 6123 Violence Prevention: Theory, Research, and Application (2 credits)
- PubH 6130 Occupational Medicine: Principles and Practice (2-3 credits)
- PubH 6173 Exposure to Physical Agents (2 credits)
- PubH 6344 Epidemiology IV: Epidemiologic Methods (3 credits)
- PubH 6355 Pathophysiology of Human Disease (4 credits)
- PubH 6540 Health Care Organizational Behavior (2 credits)
- PubH 6806 Principles of Public Health Research (2 credits)
- PubH 6852 Program Evaluation in Health and Mental Health Settings (3 credits)
- PubH 7400 (001) Fundamentals of Biostatistical Inference (4 credits)
- PubH 7400 (002) Biostatistical Modeling and Methods (4 credits)
- PubH 7420 Clinical Trials: Design, Implementation, and Analysis (3 credits)
- BAE 5212 Safety and Environmental Health Issues in Agricultural Work Environments (3 credits)
- Kin 5122 Applied Exercise Physiology (3 credits)
- Kin 5723 Psychology of Sports Injury (3 credits)

**Occupational Injury Prevention Research Training Program (OIPRTP)
PROGRAM PLAN EXAMPLE - DOCTORAL DEGREE**

The following represents only an example of a student's academic program. All programs must meet the requirements of the respective departments and Graduate School, as appropriate, as well as approval by the program director and associated advisor(s). Some of the courses identified in Year One may be deferred to Year Two, if necessary; similarly, some of the courses identified in Year Two may be deferred to year three, etc., as appropriate. Review the course bulletin for current course schedules.

PROGRAM PLAN FOR REQUIRED COURSES-EXAMPLE

Fall Year One (13 Credits)	Spring Year One (13 Credits)	Summer Year One (3-11 Credits)
‡ <u>PubH 6103</u> Exposure to Environmental Hazards (2 cr.) ‡ <u>PubH 6104</u> Environmental Health Effects: Introduction to toxicology (2 cr.) § <u>PubH 6341</u> Epidemiology I (3 cr.) § <u>PubH 6450</u> Biostatistics I (4 cr.) § <u>PubH 6742</u> Ethics in Public Health: Research and Policy (1 cr.) * <u>PubH 8120</u> Occupational Injury Research Seminar (1 cr.)	‡ <u>PubH 6105</u> Environmental and Occupational Health Policy (2 cr.) * <u>PubH 6120</u> Injury Prevention in the Workplace, Community, and Home (2 cr.) * <u>PubH 6122</u> Seminar: Safety in the Workplace (1 cr.) * <u>PubH 6342</u> Epidemiology II (3 cr.) * <u>PubH 6451</u> Biostatistics II (4 cr.) * <u>PubH 8120</u> Occupational Injury Research Seminar (1 cr.)	* <u>PubH 6121</u> Topics: Injury Prevention in the Workplace, Community, and Home (1-2 cr.) * <u>PubH 8100</u> Topics: Environmental and Occupational Health Research (1-8 cr.) * <u>PubH 8120</u> Occupational Injury Research Seminar (1 cr.)
Fall Year Two (14-15 Credits)	Spring Year Two (14 Credits)	Summer Year Two (3-11 Credits)
* <u>IE 5511</u> : Human Factors and Work Analysis (4 cr.) or * <u>HumF 5001</u> Foundations of Human Factors/Ergonomics (3 cr.) * <u>PubH 6170</u> Introduction to Occupational Health and Safety (3 cr.) * <u>PubH 6343</u> Epidemiology III (3 cr.) * <u>PubH 8120</u> Occupational Injury Research Seminar (1 cr.) * <u>PubH 8140</u> Validity Concepts in Epidemiological Research (2 cr.) <u>PubH 6325</u> Data Processing with PC-SAS (1 cr.)	* <u>Psy 5501</u> Vocational and Occupational Health Psychology (3 cr.) * <u>PubH 6140</u> Environmental and Occupational Epidemiology (2 cr.) * <u>PubH 6150</u> Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3 cr.) * <u>PubH 8120</u> Occupational Injury Research Seminar (1 cr.) * <u>PubH 8141</u> Doctoral Seminar (2 cr.) * <u>GRAD 8101</u> Teaching in Higher Education (3 cr.) *Grant Writers' Seminars and Workshops, L.L.C.: Write Winning Grants (2 days)	* <u>PubH 6121</u> Topics: Injury Prevention in the Workplace, Community, and Home (1-2 cr.) * <u>PubH 8100</u> Topics: Environmental and Occupational Health Research (1-8 cr.) * <u>PubH 8120</u> Occupational Injury Research Seminar (1 cr.)

Fall Year Three (10 Credits)	<i>Spring Year Three (8 Credits)</i>	Summer Year Three (8 Credits)
* <u>PubH 8100(002)</u> Applied Analysis of Occupational Health Data (3 cr.) * <u>PubH 8120</u> Occupational Injury Research Seminar (1 cr.) * <u>PubH 8141</u> Doctoral Seminar (2 cr.) * <u>IE 5513</u> : Engineering Safety (4 cr.)	* <u>PubH 8120</u> Occupational Injury Research Seminar (1 cr.) * <u>PubH 8141</u> Doctoral Seminar (2 cr.) ‡ <u>PubH 8888</u> Dissertation Credits (5 cr.)	* <u>PubH 8120</u> Occupational Injury Research Seminar (1 cr.) * <u>PubH 8141</u> Doctoral Seminar (2 cr.) ‡ <u>PubH 8888</u> Dissertation Credits (5 cr.)

Fall Year Four (8 Credits)	<i>Spring Year Four (8 Credits)</i>	Summer Year Four (7 Credits)
* <u>PubH 8120</u> Occupational Injury Research Seminar (1 cr.) * <u>PubH 8141</u> Doctoral Seminar (2 cr.) ‡ <u>PubH 8888</u> Dissertation Credits (5 cr.)	* <u>PubH 8120</u> Occupational Injury Research Seminar (1 cr.) * <u>PubH 8141</u> Doctoral Seminar (2 cr.) ‡ <u>PubH 8888</u> Dissertation Credits (5 cr.)	* <u>PubH 8120</u> Occupational Injury Research Seminar (1 cr.) * <u>PubH 8141</u> Doctoral Seminar (2 cr.) ‡ <u>PubH 8888</u> Dissertation Credits (4 cr.)

§ School of Public Health Requirement

‡ Division of Environmental and Occupational Health Core Course Requirement

*OIPRT Program Requirement

Elective Minor in Human Factors/Ergonomics (Partial Listing)

Fall (5-6 Credits)	<i>Spring (1 credit)</i>	Summer (Credits arranged)
<u>HumF 5001</u> Foundations of Human Factors/Ergonomics (Refer, also, to <u>IE 5511</u>) (3 cr.) <u>HumF 8001</u> Special Topics: Human Factors/Ergonomics (2-3 cr.)	<u>HumF 8002</u> Proseminar in Human Factors/Ergonomics (1 credit per semester)	Research Credits: arranged

Fall	<i>Spring</i>	Summer
<p><u>PubH 6114</u> Foundation of Environmental Worker Protection Law (1 cr.)</p> <p><u>PubH 6173</u> Exposure to Physical Agents (2 cr.)</p> <p><u>PubH 6348</u> Writing Research Grants (2 cr.)</p> <p><u>PubH 6355</u> Pathophysiology of Human Disease (3 cr.)</p> <p><u>PubH 6806</u> Principles of Public Health Research (2 cr.)</p> <p><u>PubH 7400(001)</u> Fundamentals of Biostatistical Inference (4 cr.)</p> <p><u>PubH 7405</u> Biostatistics: Regression (4 cr.)</p> <p><u>PubH 7407</u> Analysis of Categorical Data (3 cr.)</p> <p><u>PubH 7430</u> Statistical Methods for Correlated Data (3 cr.)</p> <p><u>PubH 7435</u> Latent Variable Models (3 cr.)</p> <p><u>PubH 7450</u> Survival Analysis (3 cr.)</p> <p><u>GRAD 8102</u> Practicum for Future Faculty (3 cr.)</p> <p><u>Kin 5122</u> Applied Exercise Physiology (3 cr.)</p> <p><u>Kin 5723</u> Psychology of Sports Injury (3 cr.)</p>	<p><u>PubH 6115</u> Worker Protection Law (1 cr.)</p> <p><u>PubH 6123</u> Violence Prevention: Theory, Research, and Application (2 cr.)</p> <p><u>PubH 6130</u> Occupational Medicine: Principles and Practice (2-3 cr.)</p> <p><u>PubH 6344</u> Epidemiology IV (3 cr.)</p> <p><u>PubH 6540</u> Health Care Organizational Behavior (2 cr.)</p> <p><u>PubH 6852</u> Program Evaluation in Health and Mental Health Settings (3 cr.)</p> <p><u>PubH 7400(002)</u> Biostatistical Modeling and Methods (4 cr.)</p> <p><u>PubH 7406</u> Biostatistics: ANOVA and Design (4 cr.)</p> <p><u>PubH 7420</u> Clinical Trials: Design, Implementation, and Analysis (3 cr.)</p> <p><u>PubH 8142</u> Epidemiologic Uncertainty Analysis (2 cr.)</p> <p><u>PubH 8422</u> Modern Nonparametrics (2 cr.)</p> <p><u>PubH 8813</u> Measurement of Health-Related Social Factors (3 cr.)</p>	<p><u>BAE 5212</u> Safety and Environmental Health Issues in Agricultural Work Environments (3 cr.)</p> <p><u>GRAD 8200</u> Teaching/Learning Topics in Higher Education (3 cr.)</p>

Hazardous Substance Academic Training Program
(Industrial Hygiene Program)
Program Curricula/Course Requirements and Sample Schedules

Industrial Hygiene Program**Appendix A: Program curriculum including general course requirements and sample curriculum****School of Public Health Core Requirements:**

(Note: Courses marked with * can be taken on-line during the summer)

PubH 6020*	Fundamentals of Social and Behavioral Science	3 cr
PubH 6320*	Fundamentals of Epidemiology	3 cr
PubH 6741*	<i>Ethics in Public Health: Professional Practice and Policy</i>	1 cr (MPH)
PubH 6742*	<i>Ethics in Public Health: Research and Policy</i>	1 cr (MS)
One of the following:		
PubH 6414*	Biostatistical Methods I	3 cr
PubH 6450	Biostatistics I	4 cr
One of the following:		
PubH 6751	Principles of Management in Health Service Organizations	2 cr
PubH 6752*	Public Health Management	3 cr

Division of Environmental Health Sciences Core Requirements:

PubH 6103	Exposure to Environmental Hazards	2 cr
PubH 6104	Environmental Health Effects: Introduction to Toxicology	2 cr
PubH 6105	Environmental and Occupational Health Policy	2 cr
PubH 7194	Master's Project: Env. Health (Lit. Review or Research Paper)	3 cr (MPH)
PubH 7194	Master's Project: Environmental Health (Research Paper)	3 cr (MS)
PubH 7196	Field Experience: Environmental Health	3 cr

Occupational Health and Safety Core Requirements:

PubH 6130	Occupational Medicine: Principles and Practice	2 cr
PubH 6150	Interdisciplinary Evaluation of OHandS Field Problems	3 cr
PubH 6170	Introduction to Occupational Health and Safety	3 cr

(Note: Unless told otherwise, IH students must take the classroom version of PubH 6170 rather than the on-line version)

Industrial Hygiene Program Requirements:

PubH 6171	Exposure Assessment for Air Contaminants	3 cr
PubH 6172	<i>Industrial Hygiene Applications</i>	2 cr
PubH 6174	Control of Workplace Exposures	3 cr
PubH 6175	Industrial Hygiene Measurements Laboratory	2 cr
INDUSTRIAL HYGIENE ELECTIVES		at least 6 cr

Additional Hazardous Substances Academic Training (HSAT) Program Requirements:

(Note: These courses partially fulfill the electives requirement for the IH Program)

PubH 6176	Hazardous Materials and Waste Management	2 cr
One of the following:		
PubH 6190	Environmental Chemistry	3 cr
CE 4561	Solid Hazardous Wastes	3 cr
INDUSTRIAL HYGIENE ELECTIVES		at least 1 cr
40-hour Continuing Education Class (for example, one of the following from MCOHS):		
(i)	Safety and Health Training for Hazardous Waste Site Personnel 40 Hour	
(ii)	Hazardous Materials Emergency Response 40 Hour Training	

Industrial Hygiene Electives:

PubH 6112	Risk Analysis: Application to Risk-Based Decision Making	3 cr
PubH 6114	Foundation of Environmental and Worker Protection Law	1 cr
PubH 6115	Worker Protection Law	1 cr
PubH 6116	Environmental Law	1 cr
PubH 6120	Injury Prevention in the Workplace, Community, and Home	2 cr
PubH 6140	Occupational and Environmental Epidemiology	2 cr

PubH 6161	Regulatory Toxicology	2 cr
PubH 6173	Exposure to Physical Agents	2 cr
PubH 6176	Hazardous Materials and Waste Management	2 cr
PubH 6190	Environmental Chemistry	3 cr
PubH 6191	Air Pollution	3 cr
PubH 6415	Biostatistical Methods II	3 cr
PubH 6451	Biostatistics II	4 cr
PubH 7200-114	Personal Protective Equipment and Respiratory Protection	1 cr
PubH 7200-115	Safety of Building Environments	1 cr
PubH 7200-116	Workers as Partners in Emergency Response	1 cr
BAE 5212	Safety/Env. Hlth. Issues in Plant/Animal Production/Processing	3 cr
CE 4561	Solid Hazardous Wastes	3 cr
CE 5551	Environmental Microbiology Laboratory	4 cr
CE 5591	Environmental Law for Engineers	3 cr
IE 5511	Human Factors and Work Analysis	4 cr
IE 5513	Engineering Safety	4 cr
Kin 5001	Foundations of Human Factors/Ergonomics	3 cr
ME 5113	Aerosol/Particle Engineering	4 cr
ME 5133	Aerosol Measurement Lab	4 cr
NPSE 8001	Introduction to Nanoparticle Science and Engineering	3 cr
Other courses approved by your advisor		

MINIMUM TOTAL CREDITS:**48 cr**

Example IH Student Course Plan (MPH or MS student *not* in HSAT program)**Fall 1**

PubH 6103	Exposure to Environmental Hazards	2 cr	TuTh 5:45 – 7:40 (first 7 weeks)
PubH 6104	Environmental Health Effects	2 cr	TuTh 5:45 – 7:40 (last 7 weeks)
PubH 6170	Introduction to Occupational Health and Safety	3 cr	Tu 12:20 – 3:20
PubH 6171	Exposure Assessment for Air Contaminants	3 cr	W 4:40 – 7:40
PubH 6414	Biostatistical Methods	3 cr	TuTh 9:45 – 11:00 + lab
		13 cr	

Spring 1

PubH 6105	Env. and Occup. Health Policy (even years)	2 cr	Tu 6:00 – 7:55
PubH 6130	Occupational Medicine	2 cr	M 1:25 – 4:25 (first 10 weeks)
PubH 6150	Interdisciplinary...Field Problems	3 cr	Tu 10:10 – 1:10
PubH 6172	IH Applications (odd years)	2 cr	W 9:05 – 11:00
PubH 6174	Control of Workplace Exposures (odd years)	3 cr	M 4:40 – 7:40
PubH 6175	IH Measurements Laboratory	2 cr	W 12:20 – 4:25
INDUSTRIAL HYGIENE ELECTIVE (even years)		2-4 cr	
		11-13 cr	

Summer

PubH 7196	Field Experience	3 cr	
		3 cr	

Fall 2

PubH 6320	Fundamentals of Epidemiology	3 cr	Tu 3:35 – 5:30 + lab
PubH 6741/2	Ethics in Public Health	1 cr	M 12:20 – 2:15 (half semester)
PubH 6752	Public Health Management	3 cr	TuTh 1:25 – 2:40
INDUSTRIAL HYGIENE ELECTIVE		2-4 cr	
INDUSTRIAL HYGIENE ELECTIVE		2-4 cr	
		11-15 cr	

Spring 2

PubH 6020	Fundamentals of Social and Behavioral Science	3 cr	on-line
PubH 6105	Env. and Occup. Health Policy (even years)	2 cr	Tu 6:00 – 7:55
PubH 6172	IH Applications (odd years)	2 cr	W 9:05 – 11:00
PubH 6174	Control of Workplace Exposures (odd years)	3 cr	M 4:40 – 7:40
PubH 7194	Master's Project	3 cr	
INDUSTRIAL HYGIENE ELECTIVE (even years)		2-4 cr	
		10-12 cr	

Total Credits**49 (assuming 6 elective credits)**

Example IH/HSAT Student Course Plan (MPH or MS student in HSAT program)**Fall 1**

PubH 6103	Exposure to Environmental Hazards	2 cr	TuTh 5:45 – 7:40 (first 7 weeks)
PubH 6104	Environmental Health Effects (odd years)	2 cr	TuTh 5:45 – 7:40 (last 7 weeks)
PubH 6170	Introduction to Occupational Health and Safety	3 cr	Tu 12:20 – 3:20
PubH 6171	Exposure Assessment for Air Contaminants	3 cr	W 4:40 – 7:40
PubH 6176	Haz Materials and Waste Management (even years)	2 cr	W 9:05 – 11:00
PubH 6414	Biostatistical Methods I	3 cr	TuTh 9:45 – 11:00 + lab
		<hr/>	
		13 cr	

Spring 1

PubH 6020	Fundamentals of Social and Behavioral Science	3 cr	on-line
PubH 6105	Env. and Occup. Health Policy (even years)	2 cr	Tu 6:00 – 7:55
PubH 6150	Interdisciplinary...Field Problems	3 cr	Tu 10:10 – 1:10
PubH 6172	IH Applications (odd years)	2 cr	W 9:05 – 11:00
PubH 6174	Control of Workplace Exposures (odd years)	3 cr	M 4:40 – 7:40
PubH 6175	IH Measurements Laboratory	2 cr	W 12:20 – 4:25
One of the following (even years):			
CE 4561	Solid Hazardous Wastes	3 cr	TuTh 8:15 – 9:30
INDUSTRIAL HYGIENE ELECTIVE		1-4 cr	
		<hr/>	
		11-14 cr	

Summer

PubH 7196	Field Experience	3 cr	
		<hr/>	
		3 cr	

Fall 2

PubH 6104	Environmental Health Effects (odd years)	2 cr	TuTh 5:45 – 7:40 (last 7 weeks)
PubH 6176	Haz Materials and Waste Management (even years)	2 cr	W 9:05 – 11:00
PubH 6320	Fundamentals of Epidemiology	3 cr	Tu 3:35 – 5:30 + lab
PubH 6741/2	Ethics in Public Health	1 cr	M 12:20 – 2:15 (half semester)
PubH 6751	Principles of Management	2 cr	WF 1:25 – 3:20 (half semester)
One of the following:			
PubH 6190	Environmental Chemistry	3 cr	TuTh 1:25 – 2:40
INDUSTRIAL HYGIENE ELECTIVE		1-4 cr	
		<hr/>	
		9-12 cr	

Spring 2

PubH 6105	Env. and Occup. Health Policy (even years)	2 cr	Tu 6:00 – 7:55
PubH 6130	Occupational Medicine	2 cr	M 1:25 – 4:25 (first 10 weeks)
PubH 6172	IH Applications (odd years)	2 cr	W 9:05 – 11:00
PubH 6174	Control of Workplace Exposures (odd years)	3 cr	M 4:40 – 7:40
PubH 7194	Master's Project	3 cr	
One of the following (even years):			
CE 4561	Solid Hazardous Wastes	3 cr	TuTh 8:15 – 9:30
INDUSTRIAL HYGIENE ELECTIVE		1-4 cr	
		<hr/>	
		8-11 cr	

TOTAL CREDITS (assuming 2 IH Elective credits) 49 cr

Additional Requirement

40-hour Continuing Education Course (taken as schedule permits) Non-credit

Example IH/HSAT Student Course Plan (MPH or MS student in HSAT program)**Fall 1**

PubH 6103	Exposure to Environmental Hazards	2 cr	TuTh 5:45 – 7:40 (first 7 weeks)
PubH 6104	Environmental Health Effects	2 cr	TuTh 5:45 – 7:40 (last 7 weeks)
PubH 6170	Introduction to Occupational Health and Safety	3 cr	Tu 12:20 – 3:20
PubH 6171	Exposure Assessment for Air Contaminants	3 cr	W 4:40 – 7:40
PubH 6176	Haz Materials and Waste Management (even years)	2 cr	W 9:05 – 11:00
PubH 6414	Biostatistical Methods I (odd years)	3 cr	TuTh 9:45 – 11:00 + lab

12 or 13 cr

Spring 1

PubH 6105	Env. and Occup. Health Policy (even years)	2 cr	Tu 6:00 – 7:55
PubH 5130	Occupational Medicine	2 cr	M 1:25 – 4:25 (first 10 weeks)
PubH 5150	Interdisciplinary...Field Problems	3 cr	Tu 10:10 – 1:10
PubH 5172	IH Applications (odd years)	2 cr	W 9:05 – 11:00
PubH 6174	Control of Workplace Exposures (odd years)	3 cr	M 4:40 – 7:40
PubH 5175	IH Measurements Laboratory	2 cr	W 12:20 – 4:25
HSAT or INDUSTRIAL HYGIENE ELECTIVE (even years)		2-4 cr	

11-13 cr

Summer

PubH 7196	Field Experience	3 cr	
	Continuing Education Class		Program requirement

3 cr

Fall 2

PubH 6176	Haz Materials and Waste Management (even years)	2 cr	W 9:05 – 11:00
PubH 6320	Fundamentals of Epidemiology	3 cr	Tu 3:35 – 5:30 + lab
PubH 6414	Biostatistical Methods I (odd years)	3 cr	TuTh 9:45 – 11:00 + lab
PubH 6741/2	Ethics in Public Health	1 cr	M 12:20 – 2:15 (half semester)
PubH 6751	Principles of Management	2 cr	WF 1:25 – 3:20 (half semester)
HSAT or INDUSTRIAL HYGIENE ELECTIVE		2-4 cr	

10-13 cr

Spring 2

PubH 6020	Fundamentals of Social and Behavioral Science	3 cr	on-line
PubH 6105	Env. and Occup. Health Policy (even years)	2 cr	Tu 6:00 – 7:55
PubH 6172	IH Applications (odd years)	2 cr	W 9:05 – 11:00
PubH 6174	Control of Workplace Exposures (odd years)	3 cr	M 4:40 – 7:40
PubH 7194	EOH Master's Project	3 cr	
HSAT or INDUSTRIAL HYGIENE ELECTIVE (even years)		2-4 cr	
		10-12 cr	

Total Credits***49 (assuming 5 elective credits)***

Agricultural Safety and Health Program
Program Curricula/Course Requirements and Sample Schedules

ASH Student Curriculum: ASH is a minor program. All students fulfill requirements of their major program, e.g., IH, OHN, or OIPRTP, as well as the following ASH-related requirements. The ASH-related courses partially fulfill the electives requirement for the major program.

BAE 5212	Safety and Environmental Health Issues in Plant and Animal Production and Processing	3 cr
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ASH ELECTIVE		2 cr
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Example of ASH Electives: *Replace HSAT courses below with ASH courses*

PubH 6190	Environmental Chemistry	3 cr
CE 4561	Solid Hazardous Wastes	3 cr
CE 5591	Environmental Law for Engineers	3 cr

B. Faculty and Trainee Publications

Faculty and Trainee Publications
Industrial Hygiene Program

Publications by faculty and trainees during the reporting period that have resulted, in whole or part, from ERC training grant support.

1. Zhang, Y., Banerjee, S., **Ramachandran, G.**, Yang, R. Bayesian modeling of air pattern for two-zone fields. Submitted to Biometrics, 2006.
2. Kandlikar, M., **Ramachandran, G.**, Maynard, A.D., Murdock, B., Toscano, W.A., Health risk assessment for nanoparticles: A case for using expert judgment. *Journal of Nanoparticle Research*, January 2007. DOI 10.1007/s11051-006-9154-x.
3. Hewett, P., Logan, P., Mulhausen, J., **Ramachandran, G.**, Banerjee, S. Rating exposure control using Bayesian decision analysis. *Journal of Occupational and Environmental Hygiene*. *Journal of Occupational and Environmental Hygiene*, 3: 568–581, 2006.
4. Krishnamoorthy, K., Mathew, T., **Ramachandran, G.** "Generalized p-values and confidence intervals: A novel approach for analyzing lognormally distributed exposure data". *Journal of Occupational and Environmental Hygiene*. 3(11): 642-650 2006.
5. Krishnamoorthy, K., Mathew, T., **Ramachandran, G.** Upper Limits for Exceedance Probabilities Under the One-Way Random Effects Model. *Annals of Occupational Hygiene*, 51(4):397-406, 2007.
6. James E. Farnsworth, Sagar M. Goyal, Seung Won Kim, Thomas H. Kuehn, **Peter C. Raynor**, M. A. Ramakrishnan, Senthilvelan Anantharaman, and Weihua Tang, "Development of a Method for Bacteria and Virus Recovery from Heating, Ventilation, and Air Conditioning (HVAC) Filters", *Journal of Environmental Monitoring*, 8:1006-1013 (2006).
7. Yogindra Samant, David Parker, **Lisa Brosseau**, Wei Pan, Min Xi, Dave Haugan, and The Study Advisory Board, "Profile of Machine Safety in Small Metal Fabrication Businesses", *American Journal of Industrial Medicine*, 49(5):352-359 (2006)
8. **Raynor, P.C.**, Kim, B.G., **Ramachandran, G.**, Strommen, M.R., Horns, J.H., and Streifel, A.J. "Collection of Biological and Non-Biological Particles by New and Used Filters Made From Glass and Electrostatically-Charged Synthetic Fibers", Accepted for publication in *Indoor Air*, 2007.
9. Adgate, J.L., Cho, S.J., Ryan, A.D., Grengs, J., and **Ramachandran, G.** Allergen Levels in Inner City Homes: Baseline Concentrations and Evaluation of Intervention Effectiveness. Accepted for publication in *Journal Of Exposure Science And Environmental Epidemiology*, 2007.
10. Cho, S.J., **Ramachandran, G.**, Grengs, J., Ryan, A.D., Eberly, L.E. and Adgate, J.L. Longitudinal Evaluation of Allergen and fungal concentrations in Inner-City Households, Accepted for publication in *Journal Of Occupational and Environmental Hygiene*, 2007.
11. **L.M. Brosseau**, D. Parker, Y. Samant, W. Pan, "Mapping Safety Interventions in Metalworking Shops," *Journal of Occupational and Environmental Medicine* 49:338-345 (2007).
12. B.A. Baker, K. Dodd, **I.A. Greaves**, C.J. Zheng, **L.M. Brosseau**, T. Guidotti, "Occupational Medicine Physicians in the United States: Demographics and Core Competencies," *Journal of Occupational and Environmental Medicine*, 49:388-400 (2007).
13. **L.M. Brosseau**, **A.L. Fredrickson**, M. Casey, "Small Business Owners' Opinions about Health and Safety Information," *Industrial Health*, 45:209-216 (2007).
14. Y. Samant, D. Parker, **L.M. Brosseau**, W. Pan, M. Xi, D. Haugan, Q. Williams, "A Comparative Study of Organizational Characteristics of Small Metal Fabricating Businesses in Minnesota," *International Journal of Occupational and Environmental Health*, 13(2):[in press] (2007).
15. **L.M. Brosseau** and K. Harriman, "Commentary on 'In Vivo Protective Performance of N95 Respirator and Surgical Facemask,'" *American Journal of Industrial Medicine*, in press.
16. D. Parker, Y. Samant, **L.M. Brosseau**, M. Xi, "Baseline Assessments of Machine Safety Knowledge and Behavior in Small Metal Fabrication Shops," *American Journal of Industrial Medicine*, in press.
17. D. Parker, Y. Samant, **L. Brosseau**, W. Pan, M. Xi, D. Haugan, "Relationship Between Perceptions and Beliefs of Workers and Owners With Regard to Workplace Safety in Small Metal Fabrication Businesses," *American Journal of Industrial Medicine*, in press.
18. T. Oberg, **L.M. Brosseau**, "Health Care Mask Evaluation for Filter Efficiency and Facial Fit," *American Journal of Infection Control*, in press.

Book Chapters and Other Publications

1. Adgate, J.L. and **Ramachandran, G.**, "Probabilistic Models for characterizing aggregate and cumulative risk". Chapter 6 in *Environmental Health Risk Assessment*. Eds. Robson, M.G., Toscano, W.A., Association of Schools of Public Health, 2007.
2. Logan, P.W. and **Ramachandran, G.**, "Bayesian Decision Analysis for Industrial Hygiene". A Strategy for Assessing and Managing Occupational Exposures, 3rd Edition. American Industrial Hygiene Association, 2007.
3. Brosseau LM: [in press] **Respiratory Protection**. In: **Modern Industrial Hygiene, Vol 2**, (ed. JL Perkins), American Conference

Faculty and Trainee Publications
Occupational and Environmental Health Nursing Program

OEHN Program, Appendix 2**Selected Publications, Forthcoming Papers and Dissertations/Thesis**

[Note: faculty and staff names are in bold font and student names are underscored]

McGovern, PM, Dowd BE, Gjerdingen DG, Dagher R, Ukestad, LK, McCaffrey, D., Lundberg, U: [2007] Mothers' Health and Work-Related Factors at Eleven Weeks Postpartum. *Annals of Family Medicine*, in press.
[NIOSH funded research involving a student who was a non-trainee, but took many ERC courses]

Nachreiner, N. Workplace violence: Too often unreported. (2006). Employee Benefits Planner: Minnesota's Journal of Human Resource Management. 13(3): 8, 26. Invited article, product of ERC faculty].

Nachreiner, N.M., Dagher, R., **McGovern, P.M.**, Baker, B., Alexander, B. and Gerberich, S.G. 2007. Successful return to work for cancer survivors. AAOHN Journal. 55(7): 290-295. [NIOSH funded research]

Wyman, J.F., Croghan, C.F., **Nachreiner, N.M.**, Gross, C.R., Stock, H.H., Talley, K., and Monigold, M. 2007. Effectiveness of education and individualized counseling in reducing environmental hazards in the homes of community-dwelling older women. Journal of the American Geriatrics Society. 55: 1548-1556. [Product of ERC faculty]

Nachreiner NM, Gerberich SG, Ryan AR, McGovern PM. Minnesota Nurses' Study: Perceptions of Violence and the Work Environment. *Industrial Health*, in press
[NIOSH funded research]

Nachreiner NM, Hansen HE, Okano A, **Gerberich SG**, Ryan AJ, **McGovern PM**, **Church TR** and Watt GD. [2007] Difference in Work-Related Violence Related to Nurse License Type. *Journal of Professional Nursing*, 23(5): 290-300.
[NIOSH funded research]

Grice MM, Feda DM, McGovern PM, Alexander BH, McCaffrey D, Ukestad LK: [2007] Giving birth and returning to work: The Impact of work-family conflict on women's health after Childbirth. *Annals of Epidemiology* 17: 791-798. [NIOSH funded research and a product of a ERC course for doctoral students]

Hart PA, Olson DK, Fredrickson AL, **McGovern PM**: [2006] Competencies most valued by employers: Implications for master's prepared OHNs. *AAOHN Journal* 54:327-335.
[Trainee's plan B paper]

McGovern, PM, Dowd BE, Gjerdingen DG, Gross CR, Kenney SJ, Ukestad, LK, McCaffrey, D., Lundberg, U: [2006] The Postpartum Health of Employed Mothers. *Annals of Family Medicine* 4: 159-167.
[NIOSH funded research that provided a data set for two trainee dissertations]

Schult TM, McGovern PM, Dowd BE, Pronk N. [2006] The Future of health promotion/disease prevention programs: the challenges and opportunities faced by stakeholders. *Journal of Occupational and Environmental Medicine* 48: 541-548.
[Product of a trainee's research and a NORA 2004 Seminar sponsored by the MCOHS]

Faculty and Trainee Publications
Occupational and Environmental Medicine Program

Occupational and Environmental Medicine Program

[Note: **faculty and staff names** are in bold font and student names are underscored]

Publications

Nabeel J, **Baker BA**, **Zheng CJ**, **McGrail M**, Marshall P, Flottemetsch T. Physical fitness and self-reported injuries in police (Submitted to Minnesota Medicine). [Product of a trainee's research]

Hirschhorn N, **Greaves IA**: [2007] Louisa May Alcott: Her mysterious illness unmasked. *Perspect Biol Med* 50(2):243-259. [ERC faculty research]

Baker B, **RoeberRice H**, Bartels M. Phenoxyacetic Acid Herbicides in: Hoffman H and Phillips S (eds). *Clinical practice of biological monitoring*. Submitted for publication, OEM Press. [ERC faculty research]

Baker BA, Dodd K, **Greaves I**, **Zheng CJ**, Brosseau, L, Guidotti T: [2007] Occupational medicine physicians in the United States: demographic and core competencies. *JOEM* 49(4):388-400. [ERC-supported evaluation of training programs and product of a trainee's research]

Alexander BH, Mandel JS, **Baker BA**, Burns C, Bartles M, Acquavella JF, Gustin C: [2007] Biomonitoring of 2,4-D exposure and dose in farm families. *Environmental Health Perspectives* 115:370-376. [ERC faculty research; external funding]

Baker BA, Katyal S, **Greaves IA**, He W, **Roeber Rice H**, Emmett EA, Meyer JD: [2007] Occupational medicine residency graduate survey: assessment of training programs and core competencies In press, *JOEM*. [ERC-supported evaluation of training programs and product of a trainee's research]

Nachreiner NM, **Dagher R**, **McGovern PM**, **Baker BA**, **Alexander BH**, and **Gerberich SG**: [2007] Successful Return to Work in Cancer Survivors. *AAOHN* 55(7):290-295. [ERC-funded research]

Greaves IA, Sexton K, Adgate JL, **Church TR**, Blumenthal M, **Ramachandran G**, Fredrickson AL, Geisser MS, Ryan AD: [2007] Asthma, atopy and lung function among racially diverse, poor inner-urban Minneapolis school children. *Environmental Research* 103(2):257-266. [ERC faculty research]

Baker BA, **McGrail M**: [2006] Metals: Arsenic, Lead, Mercury and Metal Fume Fever. In: *The Toxicology Handbook for Clinicians*. Elsevier. [ERC faculty research]

Hirschhorn N, Feldman RG, **Greaves IA**: [2006] Lincoln's gait. *Perspectives Biol Med* 49(4):631-632. [ERC faculty research]

Lee DH, Lee IK, Song K, Steffes M, Toscano W, **Baker BA**, Jacobs DR Jr: [2006] A strong dose-response relation between serum concentration of persistent organic pollutants and diabetes: results from the National Health and Examination Survey 1999-2002. *Diabetes Care* 29 (7): 1638-1644. [ERC faculty research; external funding]

Hroschikoski MC, Solberg LI, Sperl-Hillen JM, Harper PG, **McGrail MP**, Crabtree BF: [2006] Challenges of change: a qualitative study of chronic care model implementation. *Annals Family Medicine* 4(4):317-326. [ERC faculty research; external funding]

Faculty and Trainee Publications
Occupational Health Services Research and Policy Program

OHSRP Program, Appendix 2
Selected Publications and Papers Forthcoming

[Note: faculty names are in bold font and students' names are underscored]

Suying L, iannong L, Gilbertson D, McBean MI, **Dowd BE**, Collins A: [2007] An Instrumental Variable Analysis of the Impact of Practice Guidelines on Improving Quality of Care and Diabetes-Related Outcomes in the Elderly Medicare Population. American Journal of Managed Care, in press.
[Research involving OHSRP faculty]

McGovern, PM, Dowd BE, Gjerdingen DG, Dagher R, Ukestad, LK, McCaffrey, D., Lundberg, U: [2007] Mothers' Health and Work-Related Factors at Eleven Weeks Postpartum. Annals of Family Medicine, in press.
[NIOSH funded research involving a student who was a non-trainee, but took many ERC courses]

Tuttle TM, Habermann EB, Grund EH, Morris TJ, **Virnig BA**. [2007] Increasing use of contralateral prophylactic mastectomy for breast cancer patients: a trend toward more aggressive surgical treatment. Journal of Clinical Oncology, in press.
[Research involving a trainee as a research assistant and her OHSRP advisor]

Grice MM, Feda DM, McGovern PM, Alexander BH, McCaffrey D, Ukestad LK: [2007] Giving birth and returning to work: The Impact of work-family conflict on women's health after Childbirth. Annals of Epidemiology 17: 791-798.
[NIOSH funded research and a product of a ERC course involving two doctoral students]

Habermann EB, Virnig BA, Riley GF, Baxter NN. [2007] The impact of a change in Medicare reimbursement policy and HEDIS measures on stage at diagnosis among Medicare HMO and fee-for-service female breast cancer patients. Medical Care 45:761-766.
[Research involving a trainee as a research assistant and her OHSRP advisor]

Judson PL, Habermann EB, Baxter NN, Durham SB, **Virnig BA**: [2007] Trends in the Incidence of Invasive and In Situ Vulvar Carcinoma. Obstetrics and Gynecology 107:1018-1022.
[Research involving a trainee as a research assistant and her OHSRP advisor]

Kaissi A, Kralewski J, **Dowd BE**, Heaton AH : [2007] The Effect of Culture-Structure Fit on Prescription Drug Errors in Medical Group Practices. Health Care Management Review 32:12-21.
[Research involving OHSRP faculty]

Nachreiner NM, Hansen HE, Okano A, **Gerberich SG**, Ryan AJ, **McGovern PM**, **Church TR** and Watt GD: [2007] Difference in Work-Related Violence Related to Nurse License Type. Journal of Professional Nursing, in press
[NIOSH funded research involving ERC faculty]

Nyman JA, Barleen NA, **Dowd BE**, Russell DW, Coons SJ, Sullivan PW: [2007] Quality-of-life weights for the U.S. population: self-reported health status and priority health conditions by demographic characteristics, in press Medical Care.
[Research involving OHSRP faculty and trainee's research assistant position]

Tuttle T, Habermann E, Abraham A, Emory T, **Virnig B**. [2007] Contralateral prophylactic mastectomy for patients with unilateral breast cancer. Expert Review of Anticancer Therapy 7:1117-1122.
[Research involving a trainee as a research assistant and her OHSRP advisor]

Nyman JA, Barleen NA: [2006] The Effect of supplemental private health insurance on health care purchases, health and welfare in Brazil" Available at SSRN: <http://ssrn.com/abstract=894443>.
[Related to trainee's research assistant position]

Schult TM, **McGovern PM**, **Dowd BE**, Pronk N: [2006] The Future of health promotion/disease prevention programs: the challenges and opportunities faced by stakeholders. Journal of Occupational and Environmental Medicine 48: 541-548.
[Product of a trainee's research and a NORA 2004 Seminar sponsored by the MCOHS]

Faculty and Trainee Publications
Occupational Injury Prevention Research Training Program

Occupational Injury Prevention Research Training Program[Note: **faculty and staff names** are in bold font and student names are underscored]**Publications (Partial Listing)**

Larson-Bright M, **Gerberich SG**, **Alexander BH**, **Gurney JG**, Masten AS, **Church TR**, **Ryan AD**, Renier CM: [2007] Work practices, safety beliefs, and childhood agricultural Injury: Regional Rural Injury Study - II (RRIS - II). *Injury Prevention*, in press. [NIOSH-funded research involving a trainee; SGG, BHA – PhD Advisors – product of dissertation]

Nachreiner NM, Hansen HE, Okano A, **Gerberich SG**, **McGovern PM**, **Church TC**, and **Ryan A**: [2007] Work-related violence: Impact of license type. *Journal of Professional Nursing*, in press. [NIOSH-funded research]

Nachreiner NM, **Gerberich SG**, **Ryan AR**, **McGovern PM**. Minnesota nurses' study: Perceptions of violence and the work environment. *Industrial Health*, in press. [NIOSH-funded research]

Jurek AM, **Maldonado G**, Greenland S, **Church TR**. Uncertainty analysis: an example of its application to estimating a survey proportion. *Journal of Epidemiology and Community Health*, In press. [Former trainee; data integral to training program]

Grice MM, **Alexander BH**, Hoffbeck R, Kampa DM. Self-Reported medical conditions in perfluorooctanesulfonyl fluoride manufacturing workers. *Journal of Occupational and Environmental Medicine*. In Press. [Funded research; BHA and PMcG: PhD Thesis Advisors]

Grice MM, Feda D, **McGovern PM**, **Alexander BH**, McCaffery D, Ukestad, L. Giving birth and returning to work: The impact of work-family conflict on women's health after childbirth. *Annals of Epidemiology*, In Press. [Funded research; BHA and PMcG: PhD Thesis Advisors for Grice; BHA and SGG thesis advisors for Feda]

Mongin SJ, Jensen KE, **Gerberich SG**, **Alexander BH**, **Ryan AD**, Masten AS, Carlson KF: [2007] Injuries among agricultural operation household members: Regional Rural Injury Study – II (RRIS-II) – 1999. *Journal of Agricultural Safety and Health*. 13(3):295-310. [NIOSH-funded research involving trainees; SGG, Advisor for KEJ, KFC]

Carlson KF, **Gerberich SG**, **Alexander BH**, Masten AS, **Church TR**, **Ryan AD**, Renier CM: [2007] Children's agricultural injury: Potential behavior-related risk factors. *American Journal of Epidemiology*, 163(11, Suppl 1):536S. [NIOSH-funded research involving a trainee; SGG, PhD Advisor – product of dissertation]

Carlson CE, **Gerberich SG**, **Alexander BH**, Masten AS, **Church TR**, **Shutske JM**, **Ryan AD**, Renier C: [2007] Intra-Familial risk of agricultural injury in the Regional Rural Injury Study II: Beyond behavioral and environmental risk factors. *American Journal of Epidemiology* 165(11): S127-506S. [NIOSH-funded research involving a trainee; SGG, PhD Advisor – product of dissertation]

Carlson CE, **Gerberich SG**, **Alexander BH**, Masten AS, **Church TR**, **Shutske JM**, **Ryan AD**, Renier C: [2007] Children's agricultural injury: Associations between behavioral traits and high-risk work exposures. *American Journal of Epidemiology* 165(11): S127-505S. [NIOSH-funded research involving a trainee; SGG, PhD Advisor – product of dissertation]

Nachreiner NM, Dagher R, **McGovern PM**, **Baker B**, **Alexander BH**, **Gerberich SG**: [2007] Successful return to work for cancer survivors. *AAOHN* 55(7):290-295. [ERC NORA-funded research]

Jurek AM, **Maldonado G**, **Church TR**, Greenland S: [2006] Exposure-measurement error is frequently ignored when interpreting epidemiologic study results. *European Journal of Epidemiology*, 21:871-876. [Former trainee; data integral to training program]

Paulson (Hagen) EK, **Gerberich SG**, **Alexander BH**, **Ryan AD**, Renier CM, Zhang X, French LR, Masten AS, Ferguson Carlson K: [2006] Fall-related injuries among agricultural household members: RRIS-II. *Journal of Occupational and Environmental Medicine* 48(9):959-968. [NIOSH-funded research involving trainees; SGG, Advisor for EKP, KFC]

Larson-Bright M: [2006] Parents Safety Beliefs, Children's Work Practices, and Childhood Agricultural Injury. Minneapolis, Minnesota: University of Minnesota, PhD Dissertation. [NIOSH-funded research involving trainee; SGG, BHA - Advisors]

Carlson KF: [2006] Environmental and Behavioral Determinants of Children's Agricultural Injury. Minneapolis, Minnesota: University of Minnesota, PhD Dissertation. [NIOSH-funded research involving trainee; SGG, Advisor]

Carlson KF, Langner DM, **Alexander BH**, **Gurney J**, **Gerberich SG**, **Ryan AD**, Renier CM, Mongin SJ: [2006] Do parents' agriculture-related injuries influence their children's risk of injury? Analyses from the Regional Rural Injury Study-II. *Archives of Pediatrics and Adolescent Medicine* (11):1137-1142. *Best Poster Award, 7th World Conference on Injury Prevention and Safety Promotion in Vienna, June 6-9 2004. Selected from over 2,000 posters submitted by all participants*. [NIOSH-funded research involving trainees; SGG, PhD Advisor for DML, KFC – product of KFC dissertation research]

(Kurszewski LS), **Gerberich SG**, Serfass RC, **Ryan AD**, Renier CM, **Alexander BH**, Carlson KF, Masten AS: [2006] Sports and recreational Injuries: Regional Rural Injury Study-II. Impact on agricultural households and operations. *British Journal of Sports Medicine*, Published Online First: 17 March 2006. *British Journal of Sports Medicine* 40(6):527-535. *Best Paper Award, Student Paper Competition, American Public Health Association, Injury Control and Emergency Health Services, 2004*. [NIOSH-funded research involving trainee – KFC; SGG: Thesis Advisor, LSK and KFC]

Dissertations:

Muree Larson-Bright: [July 2006] Parents' Safety Beliefs, Children's Work Practices, and Childhood Agricultural Injury. Minneapolis, Minnesota: University of Minnesota.

Kathleen Ferguson Carlson: [August 2006] Environmental and Behavioral Determinants of Children's Agricultural Injury. Minneapolis, Minnesota: University of Minnesota.

Faculty and Trainee Publications
Hazardous Substance Academic Training Program

Hazardous Substances Academic Training Program

[Note: **faculty and staff names** are in bold font and student names are underscored]

Journal Articles

Kim SW, Ramakrishnan MA, **Raynor PC**, Goyal SM: [in press] Effects of Humidity and Other Factors on the Generation and Sampling of a Coronavirus Aerosol. *Aerobiologia*. {Product of student research funded by ERC-sponsored Pilot Projects Research Training Program, Minnesota Medical Foundation, and 3M Company}

Hovde CA, **Raynor PC**: [in press] Effects of Voltage and Wire Feed Speed on Weld Fume Characteristics. *Journal of Occupational and Environmental Hygiene* {Product of student research funded by ERC-sponsored Pilot Projects Research Training Program}

Saravia SA, **Raynor PC**, Streifel AJ: [2007] A Performance Assessment of Airborne Infection Isolation Rooms. *American Journal of Infection Control* 35:324-331. {Product of student research funded by HRSA}

Farnsworth JE, Goyal SM, Kim SW, Kuehn TH, **Raynor PC**, Ramakrishnan MA, Anantharaman S, and Tang W: [2006] Development of a Method for Bacteria and Virus Recovery from Heating, Ventilation, and Air Conditioning (HVAC) Filters. *Journal of Environmental Monitoring* 8:1006-1013 {U.S. Department of Homeland Security-funded research}

Books

Brosseau LM: [in press] Respiratory Protection. In: *Modern Industrial Hygiene, Vol 2*, (ed. JL Perkins), American Conference of Governmental Industrial Hygienists

Faculty and Trainee Publications
Agricultural Safety and Health Program

Agricultural Safety and Health Program

[Note: **faculty and staff names** are in bold font and student names are underscored]

Theses:

Carmody T: [2006] Determination of an Air Sampling Protocol for Methamphetamine to be Used in Former Clandestine Laboratories, MPH Plan B Paper, University of Minnesota.

Periakaruppan P: [2006] Assessment fo Milk Processing Worker Exposure to Potential Bioterrorism Agents in Milk Supply, MPH Plan B Paper, University of Minnesota.

Articles:

Mongin SJ, Jensen KE, **Gerberich SG**, **Alexander BH**, **Ryan AD**, Masten AS, Carlson KF: [2007] Injuries among agricultural operation household members: Regional Rural Injury Study – II (RRIS-II) – 1999. Journal of Agricultural Safety and Health, in press. [NIOSH-funded research involving trainees; SGG, Advisor for KEJ, KFC; product of master's research - KEJ]

Carlson KE, **Gerberich SG**, **Alexander BH**, Masten AS, Church, TR, Shutske, JM, **Ryan, AD**, Renier, C: [2007] Intra-Familial Risk of Agricultural Injury in the Regional Rural Injury Study II: Beyond Behavioral and Environmental Risk Factors, American Journal of Epidemiology, 165(11): S127-506S. [NIOSH-funded research involving trainees; SGG, Advisor for KFC; product of doctoral research]

Carlson KE, **Gerberich SG**, **Alexander BH**, **Masten AS**, **Church TR**, **Shutske JM**, **Ryan AD**, Renier C: [2007] Children's Agricultural Injury: Associations between Behavioral Traits and High-Risk Work Exposures, American Journal of Epidemiology, 165(11): S127-505S. [NIOSH-funded research involving trainee; SGG, Advisor for KFC; product of doctoral research]

Paulson (Hagen) EK, **Gerberich SG**, **Alexander BH**, **Ryan AD**, Renier CM, Zhang X, French LR, Masten AS, Ferguson Carlson K: [2006] Fall-related injuries among agricultural household members: RRIS-II. Journal of Occupational and Environmental Medicine 48(9):959-968. [NIOSH-funded research involving trainees; SGG, Advisor for EKP, KFC; product of master's research]

Stedman-Smith M--, McGovern PM, **Alexander B**: [2006]. Listening to the tribe: Using Focus Groups To Hear The Environmental Health Concerns Of The Mdewakanton Dakota Sioux Living By A Nuclear Power Plant. Poster presentation: AAOHN 2006 Symposium and Expo, Albuquerque, New Mexico. [MSS NIOSH Agricultural Safety and Health trainee]

Schermann M, **Shutske J**, Rasmussen R, Jenkins S, Vang C, Lor M: [2006] Characteristics of Children's Agricultural Tasks for Hmong Farming Communities. Journal of Agromedicine. 11(4):121-132. [NIOSH-funded research involving trainees; JS, Advisor for RR; product of master's research - RR]

Venem, MT, **Shutske J**, Gilbert W: [2006] Testing and Creation of a Safety System to Disengage the PTO of a Tractor. Applied Engineering in Agriculture. 22(1): 5-12. [NIOSH-funded research through National Farm Medicine Center, future trainee Tricia Carmody was assistant on research protocol].

C. Faculty and Trainee Presentations

Faculty and Trainee Presentations
Industrial Hygiene Program

Presentations

1. Professional Judgment, Models, and Bayesian Methods in Exposure Assessment and Control, University of Utrecht, The Netherlands, April 2007.
2. Professional Judgment in Exposure Assessment and Control, Occupational Hygiene 2007, British Occupational Hygiene Society, April 2007.
3. Professional Judgment, Models, and Bayesian Methods in Exposure Assessment and Control, University of Michigan, Ann Arbor, March 2007.
4. Professional Judgment, Models, and Bayesian Methods in Exposure Assessment and Control, University of Cincinnati, Cincinnati, October, 2006.
5. Particulate Emissions in Urban India: Exposure and Health Consequences, The World Bank, June 2006.
6. Improving accuracy of professional judgments in exposure assessment, American Industrial Hygiene Conference and Exposition (AIHCE) in Chicago, IL, June 2006.
7. Health relevance of airborne nanoparticle concentration measurements, American Industrial Hygiene Conference and Exposition (AIHCE) in Chicago, IL, June 2006.
8. Nanotechnology and occupational health. Presentation to the Wisconsin section of the American Industrial Hygiene Association, Wisconsin Dells, WI, October, 2006.
9. Nanotechnology and occupational health. Presentation to the Twin Cities section of the American Industrial Hygiene Association, February, 2007.
10. Professional judgment and Bayesian methods in exposure assessment and control, Minnesota Indoor Air Association, September, 2006.
11. Andrea Barteková, Peter Raynor, and John Adgate, "Comparison of a Novel Liquid Crystal Monitor for Organophosphate Pesticides to a Conventional Sampling Method", *2007 American Industrial Hygiene Conference and Exposition*, Philadelphia, PA, June 2007
12. Peter C. Raynor, "Approaches for Exposure Assessment and Control for Airborne Infectious Agents", presentation to the Particle Society of Minnesota St. Paul, MN, December 2006 (invited)
13. Peter C. Raynor, Jo Anne Brock, and Monika Vadali, "Influences on Collection of Airborne Bacterial Spores by Charged Filter Media", Paper 15E2, *7th International Aerosol Conference*, St. Paul, MN, September 2006
14. Ji Young Park, Gurumurthy Ramachandran, Peter C. Raynor, and Lynn E. Eberly, "Comparison of Two Methods for Estimating Surface Area Concentration Using Number and Mass Concentrations", Paper 10C4, *7th International Aerosol Conference*, St. Paul, MN, September 2006
15. Senthilvelan Anantharaman, M.A. Ramakrishnan, Sagar M. Goyal, Seung Won Kim, Peter Raynor, Nicholas J. Stanley, and Thomas H. Kuehn, "Airborne Human Viruses Captured by HVAC Filters", Paper 13D3, *7th International Aerosol Conference*, St. Paul, MN, September 2006
16. Seung Won Kim and Peter C. Raynor, "Design for a New Vapor Aerosol Dichotomous Sampler", Paper 6H9, *7th International Aerosol Conference*, St. Paul, MN, September 2006
17. Thomas Kuehn, Nicholas Stanley, Seung Won Kim, M.A. Ramakrishnan, Senthilvelan Anantharaman, Peter Raynor, and Sagar Goyal, "Background Airborne Bacteria and Virus Populations In and Near Buildings Using Ventilation Filters as Long-Term Bioaerosol Collection Devices", Paper 8H25, *7th International Aerosol Conference*, St. Paul, MN, September 2006
18. M.A. Ramakrishnan, Sagar M. Goyal, Senthilvelan Anantharaman, Seung Won Kim, Peter Raynor, Nicholas J. Stanley, and Thomas H. Kuehn, "Detection of Airborne Bacteria in HVAC Filters by Polymerase Chain Reaction", Paper 11G32, *7th International Aerosol Conference*, St. Paul, MN, September 2006
19. Peter C. Raynor, "Use of HVAC Systems to Limit the Spread of Airborne Microorganisms", presentation to the Minnesota Indoor Air Association, St. Paul, MN, June 2006 (invited)

20. Lisa Brosseau, "Choosing Respiratory Protection in a Pandemic Situation," ORC Inc., Washington D.C., June 2006.
21. Lisa Brosseau, "Filter Efficiency and Facial Fit of Surgical Masks," Working Scientific Meeting on Occupational Influenza Prevention and Control in Health Care Settings, Public Health Agency of Canada, Toronto, Ontario, Canada, October 2006.
22. Lisa Brosseau, "Filter Efficiency and Facial Fit of Surgical Masks," Pandemic: Pandemonium or Preparedness, AIHA-UMS Professional Development Conference, St Paul, MN, November 2006.
23. Lisa Brosseau, "Respiratory Protection for Pulmonary Therapists," PALL Corporation, 2006-2007 Influenza Update CD, December 2006.
24. Lisa Brosseau, "Occupational Exposure Limits: Looking Back and Moving Forward," Conference of Industrial Hygiene and Occupational Medicine, Kaohsiung, Taiwan, April 2007.
25. Lisa Brosseau, "Evaluating the Effectiveness of Health and Safety Interventions in Small Manufacturing Businesses," Institute of Occupational Safety and Health, Taipei, Taiwan, April 2007.

Faculty and Trainee Presentations
Occupational and Environmental Health Nursing Program

**OEHN Program, Appendix 3
Selected Presentations**

Brosseau L, Frederickson A, Nachreiner N. Alumni Perceptions of the Value and Proficiency of Occupational Health and Safety Competencies. Midwest Center for Occupational Health and Safety Advisory Board Meeting, Minneapolis, Minnesota, June 2007 (Presenter: Nachreiner)

Gerberich SG, Nachreiner NM, Ryan AD, Church TR, McGovern PM, Geisser MS, Watt GD, Fedra DM, Pinder E, Sage SK. Violence in the schools: Teachers at risk. Midwest Center for Occupational Health and Safety Advisory Board Meeting, Minneapolis, Minnesota, June 2007. (Presenter: Nachreiner)

Johansen K, **McGovern PM.** Adding Interactivity to Breeze: Developing and Testing Three Levels of Interactivity Classrooms of the Future: Teaching, Learning and Technology, Hamline University, St. Paul, Minnesota, May 2007

McGovern PM. Ingenix Health Care Technology Conference, Benefits of a Results Only Work Environment (ROWE): Best Buy, San Francisco, California, May 2007.

McGovern PM. Childbirth and the Family and Medical Leave Act: Issues of Incapacity, Serious Health Conditions and Intermittent Leave, 2007 AAOHN Symposium and Expo, Orlando, Florida, April 2007.

McGovern PM, Olson DK, Nachreiner NM, Fredrickson AL, Weiss R, Kerr M. Occupational and Environmental Health Nursing Alumni Survey: Preliminary Findings on the Value and Proficiency with Core Competencies. Midwest Center for Occupational Health and Safety Advisory Board Meeting, Minneapolis, Minnesota, June 2007 (Presenters: Nachreiner, McGovern, Olson)

Nachreiner NM, Gerberich SG, McGovern PM, Church TR, Hansen HE, Geisser MS, Ryan AD. Work-Related Assault: Impact of Training. Midwest Center for Occupational Health and Safety Advisory Board Meeting, Minneapolis, Minnesota, June 2007. (Presenter: Nachreiner)

Nachreiner NM, Hansen HE, Okano A, Gerberich SG, Ryan AD, McGovern PM, Church TR. Minnesota Nurses' Study: Relation Between Nurse License Type and Violence. Midwest Center for Occupational Health and Safety Advisory Board Meeting, Minneapolis, Minnesota, June 2007. (Presenter: Nachreiner)

Olson DK, Scheller A, Piland N, Beedasy J, Ramloll R, Monahan C. Playing Along: Computer Games and Simulations for Emergency Preparedness Training" Public Health Preparedness Summit. February 2007. Washington DC.

Olson DK. Education Innovations, The 21st Century Technology for the University of Minnesota: A Preview Technology Showcase for the Academic Health Center. Minneapolis, Minnesota. January 2007.

Olson DK. Playing Along: Developing Computer Games to Create Awareness of Public Health Practice, Beyond Boundaries. Grand Forks, North Dakota. September 2007.

Gerberich SG, Nachreiner NM, Ryan AD, Church TR, McGovern PM, Geisser MS, Watt GD, Fedra DM, Pinder E, Sage SK. Violence Against Teachers: Magnitude and Etiology. Society for Epidemiologic Research, Seattle, Washington, June 2006. (Presenter: Church)

Gerberich SG, Nachreiner NM, Ryan AD, Church TR, McGovern PM, Geisser MS, Watt GD, Fedra DM, Pinder E, Sage SK. Violence against teachers: Magnitude, consequences, and causes. International Society for Research on Aggression Meeting, Minneapolis, Minnesota, July 2006. (Presenter: Gerberich)

Gerberich SG, Nachreiner NM, Ryan AD, Church TR, McGovern PM, Geisser MS, Watt GD, Fedra DM, Pinder E, Sage SK. Violence in the schools: Teachers at risk. American Public Health Association (APHA) Conference, Boston, Massachusetts, November 2006. (Presenter: Nachreiner)

McGovern PM, Johansen K. Adding Interactivity to Breeze, Improving MacroMedia Breeze Learning Activities, TEL Seminar Series, University of Minnesota, St. Paul, Minnesota, November 2006. (Panel presentation).

McGovern PM. After Birth: Women, Work and Health. Division of Epidemiology, School of Public Health, University of Minnesota, Minneapolis, Minnesota, October, 2006.

McGovern PM, Dowd BE, Gjerdingen DG, Dagher R, Ukestad LK, McCaffrey D, Lundberg U. Twelve Weeks After Birth: Women, Work and Health. AcademyHealth Annual Research Meeting, Seattle, Washington, June 2006. (Presenter: McGovern)

McGovern PM, Dowd BE, Gjerdingen DG, Dagher R, Ukestad LK, McCaffrey D, Lundberg U. Work Organization and Postpartum Health in Employed Mothers after Childbirth. National Occupational Research Agenda (NORA) Symposium 2006, Washington DC, April 2006. (Presenter: McGovern)

McGovern, PM, Dowd BE, Gjerdingen DG, Kenney SJ, Ukestad, LK, McCaffrey, D., Lundberg, U. After Birth: Policies that Promote Healthy Women and Workplaces. Work, Stress and Health, the National Institute for Occupational Safety and Health (NIOSH) and the American Public Health Association (APA), Miami, Florida, March 2006. (Presenter: McGovern)

Nachreiner NM, Hansen HE, Okano A, Gerberich SG, Ryan AD, McGovern PM, Church TR. Minnesota Nurses' Study: Relation Between Nurse License Type and Violence. Women's Health Research Conference, Minneapolis, Minnesota, September 2006. (Presenter: Nachreiner)

Olson DK, Brosseau L, Staubus I, Vegoe S. 3M Technical Forum for the EH Product Stewards. Lifelong Learning with the Midwest Center for Occupational Health and Safety, St. Paul, Minnesota, March 2006,.

Olson DK, Thompson J, Atchison C, Collins D, Moon R, Reid M, Turnock B. NACCHO Public Health Preparedness Summit, Making the Link: Roundtable Discussion on How Academic Centers and Health Department Partnerships are Building Public Health Capacity, Washington DC, February 2006.

Stedman-Smith M, McGovern PM, Alexander B. Listening to the tribe: Using focus groups to hear the environmental health concerns of the Mdewakanton Dakota Sioux living by a nuclear power plant. Poster presentation: AAOHN 2006 Symposium and Expo, Albuquerque, New Mexico, May 2006. (Presenter: Stedman-Smith).

Faculty and Trainee Presentations
Occupational and Environmental Medicine Program

Occupational and Environmental Medicine Program[Note: **faculty and staff names** are in bold font]**Presentations**

Greaves IA. Silicon Carbide: An "inert" substance with toxic properties. Monash University School of Medicine, Department of Preventive Medicine and Community Health, Melbourne, Australia, July 12, 2006.

Greaves IA. Heavy Metal and Pesticides. Global Health CME Series, Minneapolis, July 20, 2006.

Greaves IA. Air Pollution and Asthma in Developing Countries. Global Health CME Series, Minneapolis, July 20, 2006.

Baker BA. Workers Compensation. Environmental Exposures. Sports/Occupational Medicine Course. University of Minnesota. Department of Family Practice and Community Health, Maplewood, Minnesota. August 2006.

Roeber Rice HK. DOT Updates for the Commercial Driver Medical Examiner. HealthPartners Occupational Medicine Community Grand Rounds. August 2007.

Roeber Rice HK. Disability and Self-Perception, St. Mary's/Duluth Clinic Conference: Disability Management. Duluth, Minnesota. April 2007.

Roeber Rice HK. Employment Services Examinations. University of Minnesota School of Medicine Family Medicine Conference: Occupational Medicine. January 2007.

Roeber Rice HK. Focus on Function: Prevention of Iatrogenic Disability. HealthPartners Occupational Medicine Community Grand Rounds. December 2006.

Roeber Rice H, Baker B, Madden J, Zabel E, Falken M. Prenatal Lead Screening: A Pilot Study. Poster presentation. University of Minnesota School of Public Health NORA Symposium, Minneapolis, Minnesota. June 2007.

Abrar FA. The Effect of Somali Health Beliefs on the Provider-Patient Relationship: Grand Rounds to the Psychiatric residents, University of Minnesota and Hennepin County Medical Center. Minneapolis, Minnesota. July 2006.

Abrar FA. Global Health Pathway: University of Minnesota, School of Public Health: Faculty Member: Environmental Degradation and Health. Minneapolis, Minnesota. July 2006.

Abrar FA. Cross cultural health: Barriers to care: Somali profile. Minneapolis, Minnesota. July 2006.

Abrar FA. Prevention of depression, the benefits of preventative care, and preventing chronic disease like Diabetes and Hypertension. Presented at the Somali Women's Night celebration sponsored by Mayo Clinic. September 2006.

Zheng CJ. Care of Work Comp Patients in USA, China NIOSH, Beijing. June 2006.

Zheng CJ. Biologically-Based Modeling of Smoking Effect on Down Syndrome, poster presentation, HealthPartners Celebration of Research 2006, St Paul, Minnesota September 2006.

Faculty and Trainee Presentations
Occupational Health Services Research and Policy Program

OHSRP Program, Appendix 3 Selected Presentations

Al-Refaie WB, **Habermann EB**, Jensen E, Tuttle TM, Pisters WT, **Virnig BA**. Outcomes of surgery alone in patients with AJCC T1 extremity soft tissue sarcoma: a population-based analysis. Accepted for podium presentation at the Western Surgical Association's Annual Meeting, November 2007. (Presenter: Al-Refaie)

Dowd BE. Should Healthy Medicare Beneficiaries Buy Part D Drug Coverage? AcademyHealth annual meeting. Orlando, Florida, June 2007.

Dowd BE Endogenous Explanatory Variables. (A six-hour class taught to participants in the AcademyHealth annual meeting). Orlando, Florida, June 2007.

Dowd BE. Should Healthy Medicare Beneficiaries Buy Part D Drug Coverage? Division of Health Policy and Management, School of Public Health, University of Minnesota, Minneapolis, Minnesota, February 2007.

Habermann EB, **Virnig BA**, Durham SB, Baxter NN. Effects of health care use on the diagnosis, treatment and survival of disabled women with breast cancer. Poster Presentation. AcademyHealth Annual Research Meeting, Orlando Florida, June 2007. (Presenter: Habermann)

Johansen K, **McGovern PM**. Adding Interactivity to Breeze: Developing and Testing Three Levels of Interactivity Classrooms of the Future: Teaching, Learning and Technology, Hamline University, St. Paul, Minnesota, May 2007 (Presenter: Johansen)

McGovern PM. Ingenix Health Care Technology Conference, Benefits of a Results Only Work Environment (ROWE): Best Buy, San Francisco, California, May 2007.

McGovern PM. Childbirth and the Family and Medical Leave Act: Issues of Incapacity, Serious Health Conditions and Intermittent Leave, 2007 AAOHN Symposium and Expo, Orlando, Florida, April 2007.

Nyman JA, **Barleen NA**, **Dowd BE**, Russell D, Coons S, Sullivan P. Nationally Representative Health Related Quality of Life Weights for Self-reported Health Status and Priority Health Conditions. Poster Presentation: Academy Health Research Meeting, Poster session B, Orlando, Florida, June 2007. (Presenter: Barleen)

Barleen N, **McGovern P**, **Brosseau L**, Fredrickson A. Conducting a Literature Review and Cost-Benefit Analysis of Worksite Interventions for Diabetes and Back Injuries. Poster Presentation: Midwest Center for Occupational Safety and Health Advisory Board Meeting, NORA Poster Exhibit, Minneapolis, Minnesota, April

Dowd BE. Endogenous Explanatory Variables.(A six-hour class taught to participants in the AcademyHealth annual meeting) Seattle, Washington, June 2006.

Habermann EB, **Virnig BA**, Riley G, Baxter NN. The Impact of a change in Medicare reimbursement policy and HEDIS measures on stage at diagnosis among Medicare HMO and FFS female breast cancer patients. Poster Presentation. Third Annual Women's Health Research Conference, Powell Center for Women's Health, University of Minnesota, Minneapolis, Minnesota, September 2006. (Presenter: Habermann)

McGovern PM, Johansen K. Adding Interactivity to Breeze, Improving MacroMedia Breeze Learning Activities, TEL Seminar Series, University of Minnesota, St. Paul, Minnesota, November 2006. (Panel presentation).

McGovern PM. After Birth: Women, Work and Health. Division of Epidemiology, School of Public Health, University of Minnesota, Minneapolis, Minnesota, October, 2006.

Faculty and Trainee Presentations
Occupational Injury Prevention Research Training Program

Occupational Injury Prevention Research Training Program[Note: **faculty and staff names** are in bold font and student names are underscored]**Presentations**

Carlson KE, **Gerberich SG**, **Alexander BH**, Masten AS, **Church TR**, **Shutske JM**, **Ryan AD**, Renier CM. Children's Agricultural Injury: Associations between Behavioral Traits and High-Risk Work Exposures, Society for Epidemiologic Research, Boston, Massachusetts, June 2007.

Carlson KE, **Gerberich SG**, **Alexander BH**, Masten AS, **Church TR**, **Shutske JM**, **Ryan AD**, Renier CM. Intra-familial Risk of Agricultural Injury in the Regional Rural Injury Study-II: Beyond Behavioral and Environmental Risk Factors, Society for Epidemiologic Research, Boston, Massachusetts, June 2007.

Carlson KE, **Gerberich SG**, **Alexander BH**, Masten AS, **Church TR**, **Ryan AD**, Renier CM: [2007] Children's agricultural injury: Potential behavior-related risk factors, Society for Epidemiologic Research, Boston, Massachusetts, June 2007.

Gerberich SG, Research: The Burden of Injury, Alaska Tribal Injury Directors Annual Meeting, Anchorage, Alaska, May 30, 2007.

Gerberich SG, Injury Prevention Research, Universities of Minnesota and Iceland, Scientific Symposium: Discovery to Impact: The Next Generation, University of Minnesota, Minneapolis, Minnesota, April 13, 2007.

Gerberich SG, Minnesota Educators' Study: Overview and Case-Control Study, Minnesota Educators' Study Symposium, University of Minnesota, Minneapolis, Minnesota, April 10, 2007.

Gerberich SG, Violence Prevention Overview, PubH 6123, Violence Prevention and Control: Theory, Research, and Application, University of Minnesota, Minneapolis, Minnesota, January 29, 2007.

Gerberich SG, PubH 3001 (Personal and Community Health), Injuries and Occupational Health and Safety, Minneapolis: University of Minnesota, December 2006.

Larson-Bright M, **Gerberich SG**, **Alexander BH**, **Gurney JG**, Masten AS, **Church TR**, **Ryan AD**, Renier CM: Work Practices, Safety Beliefs, and Childhood Agricultural Injury: Regional Rural Injury Study - II (RRIS - II). Approved for oral presentation, Injury Control and Emergency Health Services, American Public Health Association, Boston, November 2006.

Gerberich SG, **Nachreiner NM**, **Ryan AD**, **Church TR**, **McGovern PM**, Geisser MS, Watt, GD, Feda DM, Pinder E, Sage SK. Violence in the schools: Teachers at Risk, American Public Health Association, Boston, Massachusetts, 2006.

Carlson KE, **Gerberich SG**, **Alexander BH**, Masten AS, **Church TR**, **Shutske JM**, **Ryan AD**, Renier CM. Work Practices, Safety Beliefs, and Childhood Agricultural Injury, American Public Health Association, Boston, Massachusetts, 2006. *Best Paper - Student Paper Competition, Injury Control and Emergency Health Services section*

Gerberich SG, **Nachreiner NM**, **Ryan AD**, **Church AD**, **McGovern PM**, Geisser M, Watt GD, Feda DM, Pinder K, Sage S: Violence against teachers: Magnitude, consequences, and causes, International Society for Research on Aggression, Minneapolis, Minnesota, July 2006.

Gerberich SG, **Nachreiner NM**, **Ryan AD**, **Church AD**, **McGovern PM**, Geisser M, Watt GD, Feda DM, Pinder K, Sage S: Violence Against Teachers: Magnitude and Etiology, Congress of Epidemiology, Seattle, Washington, 2006. (Church: Presenter)

Carlson KE, **Gerberich SG**, **Alexander BH**, Masten A, **Church TR**, **Ryan AD**, Renier CM: Children's Agricultural Injury: Potential Behavior-Related Risk Factors, Congress of Epidemiology, Seattle, Washington, 2006.

Faculty and Trainee Presentations
Hazardous Substance Academic Training Program

Hazardous Substances Academic Training Program[Note: student names are underscored where applicable]**Presentations****Dr. Raynor**

- Andrea Barteková, Peter Raynor, and John Adgate, "Comparison of a Novel Liquid Crystal Monitor for Organophosphate Pesticides to a Conventional Sampling Method", *2007 American Industrial Hygiene Conference and Exposition*, Philadelphia, PA, June 2007.
- Peter C. Raynor, "Approaches for Exposure Assessment and Control for Airborne Infectious Agents", presentation to the Particle Society of Minnesota St. Paul, MN, December 2006 (invited)
- Peter C. Raynor, Jo Anne Brock, and Monika Vadali, "Influences on Collection of Airborne Bacterial Spores by Charged Filter Media", Paper 15E2, *7th International Aerosol Conference*, St. Paul, MN, September 2006
- Ji Young Park, Gurumurthy Ramachandran, Peter C. Raynor, and Lynn E. Eberly, "Comparison of Two Methods for Estimating Surface Area Concentration Using Number and Mass Concentrations", Paper 10C4, *7th International Aerosol Conference*, St. Paul, MN, September 2006
- Senthilvelan Anantharaman, M.A. Ramakrishnan, Sagar M. Goyal, Seung Won Kim, Peter Raynor, Nicholas J. Stanley, and Thomas H. Kuehn, "Airborne Human Viruses Captured by HVAC Filters", Paper 13D3, *7th International Aerosol Conference*, St. Paul, MN, September 2006
- Seung Won Kim and Peter C. Raynor, "Design for a New Vapor Aerosol Dichotomous Sampler", Paper 6H9, *7th International Aerosol Conference*, St. Paul, MN, September 2006
- Thomas Kuehn, Nicholas Stanley, Seung Won Kim, M.A. Ramakrishnan, Senthilvelan Anantharaman, Peter Raynor, and Sagar Goyal, "Background Airborne Bacteria and Virus Populations In and Near Buildings Using Ventilation Filters as Long-Term Bioaerosol Collection Devices", Paper 8H25, *7th International Aerosol Conference*, St. Paul, MN, September 2006
- M.A. Ramakrishnan, Sagar M. Goyal, Senthilvelan Anantharaman, Seung Won Kim, Peter Raynor, Nicholas J. Stanley, and Thomas H. Kuehn, "Detection of Airborne Bacteria in HVAC Filters by Polymerase Chain Reaction", Paper 11G32, *7th International Aerosol Conference*, St. Paul, MN, September 2006

Dr. Brosseau

- L.M. Brosseau, How to Choose Respiratory Protection in a Pandemic Situation, ORC Worldwide Pandemic Preparedness Conference Call Series, June 2007.
- L.M. Brosseau, Evaluating the Effectiveness of Health and Safety Interventions in Small Manufacturing Businesses, Institute of Occupational Safety and Health, Taipei, Taiwan, April 2007.
- L.M. Brosseau, Evaluating the Effectiveness of Health and Safety Interventions in Small Manufacturing Businesses, Institute of Occupational Safety and Health, Taipei, Taiwan, April 2007.
- L.M. Brosseau, Threshold Limit Values for Chemical Substances: Looking Back and Moving Forward, 2007 Conference of Industrial Hygiene and Occupational Medicine, Kaohsiung, Taiwan, April 2007.
- L.M. Brosseau, Respiratory Protection for Pulmonary Therapists PALL Corporation, 2006-2007 Influenza Update CD, December 2006.
- L.M. Brosseau, Filter Efficiency and Facial Fit of Surgical Masks, AIHA Upper Midwest Section Professional Development Conference on Pandemic: Pandemonium or Preparedness, November 2006.
- L.M. Brosseau, Health and Safety of Lead Paint Removal, Public Health Moment Podcast, October 2006.
- L.M. Brosseau, Filter Efficiency and Facial Fit of Surgical Masks, Working Scientific Meeting on Occupational Influenza Prevention and Control in Health Care Settings, Public Health Agency of Canada, Toronto, Ontario Canada, October 2006.

Faculty and Trainee Presentations
Agricultural Safety and Health Program

Agricultural Safety and Health Program

[Note: **faculty and staff names** are in bold font and student names are underscored]

Presentations

Carlson KE, **Gerberich SG**, **Alexander BH**, **Masten AS**, **Church TR**, **Shutske JM**, **Ryan AD**, Renier C. Children's Agricultural Injury: Associations between Behavioral Traits and High-Risk Work Exposures, Society for Epidemiologic Research, Boston, Massachusetts, June 2007.

Carlson KE, **Gerberich SG**, **Alexander BH**, **Masten AS**, **Church TR**, **Shutske JM**, **Ryan AD**, Renier, C. Intra-Familial Risk of Agricultural Injury in the Regional Rural Injury Study - II: Beyond Behavioral and Environmental Risk Factors, Society for Epidemiologic Research, Boston, Massachusetts, June 2007.

Shutske, J., **Schermann, M.**, Wagstrom, L., Bender, J., **Kirkhorn, S.** and Powell, T. A Conceptual Model of Bundled Risk Communication and Education to Improve Agricultural Worker Health and Safety. Annual Meeting of the American Public Health Association, Boston, MA. November 2006.

Schermann, M., Bartz, P., Moua, M., **Shutske, J.**, Vue, P., and Lee, T.T. Evaluation of Storytelling in Hmong to Deliver Agricultural Safety and Health Information. Annual Meeting of the American Public Health Association, Boston, MA. November 2006.

Shutske, J., Powell, T, Stelzner, J, and Randall, J. Food and Agricultural Supply Chain Interruptions from a Pandemic Event. Extension Disaster Education Network annual conference, Nashville, Tennessee, November 2006.

Shutske, J. and Koch, B. EDEN's Food Security and National Response Plan Courses. Extension Disaster Education Network annual conference, Nashville, Tennessee, November 2006.

D. Outreach

Outreach
Industrial Hygiene Program

1. Educational Development

Dr. Ramachandran

- Developed and taught Professional Development Course (PDC) at the American Industrial Hygiene Conference and Exposition (AIHCE) titled "Mathematical Models for Assessing Exposure to Air Contaminants".
- Taught a CIH Review course for professionals at the Midwest Center continuing education program in 2006. Lectured on aerosol science and exposure statistics.
- Developed an *Exposure Science* curriculum in the Division of Environmental Health Sciences, SPH, University of Minnesota, 2006-2007.
- Instructor for Professional Development Course on Bayesian Statistics: Overview and applications in industrial hygiene Data interpretation and exposure risk assessment. American Industrial Hygiene Association Conference and Exposition, May 2006; Professional Conference of Industrial Hygienists, September 2006.

Dr. Brosseau

- Lecturer, Continuing Education Course, Review of Industrial Hygiene, Midwest Center (2006)
- Gas and Vapor Sampling, CIH Review Course, Midwest Center for Occupational Health and Safety

Dr. Raynor

- Co-Instructor, "The FUN of Aerosols: Fine, Ultrafine, and Nano Particles in Workplace Atmospheres", Professional Development Course #425, *2007 American Industrial Hygiene Conference and Exposition*, Philadelphia, PA, June 2007
- Arranger, "Nanoparticle Exposure Assessment", Roundtable arranged for *2006 American Industrial Hygiene Conference and Exposition*, Chicago, IL, May 2006
- Instructor in University of Minnesota Public Health Institute; Developed courses on "Personal Protective Equipment and Respiratory Protection", "Preparedness for Buildings", and "Workers as Partners in Emergency Preparedness and Response" for June 2006
- Instructor, Hazard Awareness Training for Solid Waste Workers, Leech Lake Reservation, Cass Lake, MN, August 2006

2. Presentations/Awareness Seminars (Refer to Appendix: Presentations.)

3. Consultations

Dr. Ramachandran

- Consulted with 3M Corporation on a study on using expert judgment for occupational exposure assessment.
- Consulted with 3M Corporation on a study on using expert judgment for occupational exposure assessment.
- Consulted on NIOSH-funded RO1 grant on "Statistical Methodologies for Exposure Assessment" (PI: Professor Thomas Mathew, Department of Mathematics and Statistics, University of Maryland)

Dr. Brosseau

- University of Minnesota, Department of Environmental Health and Safety, Mercury Task Force
- Member, Advisory Board, Regions Hospital, Occupational Medicine Residency Program
- Consultant, National Institutes for Health, EPA Superfund Grant Review Panel, NIEHS Conference Grant Review Panel
- Member, National Institute for Occupational Safety and Health, Safety and Occupational Health Study Section
- Member, Institute of Medicine, Committee for the Assessment of the NIOSH Head-and-Face Anthropometric Survey of U.S. Respirator Users

- Member, Institute of Medicine, Committee on the Development of Reusable Facemasks for Protection During Pandemic Influenza
- Member, Minnesota Department of Health, Work-Related Asthma Advisory Committee
- Consultant, Minnesota Department of Health, Pandemic Influenza Clinical Advisory Group
- Consultant, NIOSH, NORA Town Hall Meeting, Chicago IL
- Co-Chair, Task Force on ERCs in the 21st Century, Association of University Programs in Occupational Health and Safety
- Member, Task Force on ERC Resource Allocation, Association of University Programs in Occupational Health and Safety
- Member, ACGIH, TLVs for Chemical Substances Committee

Dr. Raynor

- Consulted with Mr. Chris Chita, M.E. Mortenson, on concerns with methane contaminating a facility being constructed on an existing oil field
- Consulted with Mr. Daniel Peña, Minnesota Department of Health, regarding emissions from ethanol plant
- Provided equipment to Ms. Susie Johnson, Minnesota Brewing Company, to evaluate emissions from ethanol facility
- Consulted with Mr. Chris Chita, M.E. Mortenson, regarding "mothball" odors noted inside a metal ventilation stack
- Consulted with law firm on metalworking fluid mist exposure assessment and control issues.

4. Other

Dr. Ramachandran

- Chair, Admissions Committee, Division of Environmental and Occupational Health
- Member, Exposure Assessment Strategies Committee, American Industrial Hygiene Association, 1998-present.
- Grant Reviewer, NIH Center for Scientific Review Special Emphasis Panel on Bioengineering Applications (ZRG1 SSS-3 02 S), 2001.
- Member, American Industrial Hygiene Association
- *Ad-Hoc* Reviewer for articles submitted to *Journal of Aerosol Science*, *Aerosol Science and Technology*, *American Industrial Hygiene Association Journal*, *Review of Scientific Instruments*, *Journal of the Optical Society of America*, *Annals of Occupational Hygiene*.
- Editorial Board Member, *Journal of Occupational and Environmental Hygiene*, 2004 - present.
- Grant Reviewer, NIOSH/CDC Study Section (SOH-1). 2004-present.
- CDC Study Section Member, Special Review Panel on World Trade Center Responder Health Consortium (ZOH1 SPC 04 R), 2004.
- Grant Reviewer, NIH Center for Scientific Review Special Emphasis Panel on Bioengineering Applications (ZRG1 SSS-3 02 S), 2001-2003.
- Member, NIOSH Board of Scientific Counselors, 2007-2010.
- Institute of Medicine, Board on Military and Veterans Health, Committee on Making Best Use of the Agent Orange Exposure Reconstruction Model, 2007.

Dr. Brosseau

- Member, Hazardous Substances Worker Training Advisory Board, Midwest Center Continuing Education Program
- Member, Advisory Board, Regions Hospital, Occupational Health Program

Dr. Raynor

- Member, American Filtration and Separations Society

- Member, American Industrial Hygiene Association
- Member, American Conference of Governmental Industrial Hygienists
- Participant in Center for Filtration Research operated by the University of Minnesota Department of Mechanical Engineering
- Member, AAAR Control Technology Working Group, 1998-present
- Editorial Advisory Board, *Aerosol Science and Technology*, 2001-present
- Ad-hoc manuscript reviewer for *Applied Occupational and Environmental Hygiene*, *Aerosol Science and Technology*, *The Annals of Occupational Hygiene*, *American Industrial Hygiene Association Journal*, *Industrial and Engineering Chemistry Research*, *Journal of Porous Media*, and *Journal of Aerosol Science*.

Adjunct Faculty Outreach

John Mulhausen, Ph.D., CIH

Educational Development

- Member, Midwest Center for Occupational Health and Safety Advisory Board

Other

- Fellow of the American Industrial Hygiene Association
- Friends of the Press Award – American Industrial Hygiene Association
- Director, American Industrial Hygiene Association
- Journal article reviewer – *American Industrial Hygiene Journal* and *Annals of Occupational Hygiene*
- Member American Industrial Hygiene Association
- Member American Conference of Governmental Industrial Hygienists
- Member, Delta Omega Honorary Public Health Society

Outreach

Occupational and Environmental Health Nursing Program

OEHN Program, Appendix 4**Selected Outreach****1. Educational Development**

Professor McGovern has collaborated with UMN School of Nursing faculty to implement a dual degree option (MPH-MS). Four OEHN students graduated from this degree program plan during the period of interest, and two additional dual degree students are completing their plan B masters research paper fall, 2007. School of Public Health Dean Finnegan asked Dr. McGovern to formalize this program by developing a Memorandum of Agreement between the schools, which was signed July 2006. This agreement facilitated collaborative efforts between schools in program development, promotion and administration, and student recruitment.

Dean Olson will continue to offer courses with community faculty, Dr Paul Allwood, that introduce participants to the field of occupational health and safety, such as "Issues in Environmental and Occupational Health, PubH 6102 (2 credits), which is offered to students in nursing, public health and health care administration. She also co-teaches "Issues in Environmental and Occupational Health," PubH 3102 (3 credits), an undergraduate option that meets the requirements of the Council on Liberal Education to help inform pre-nursing and liberal arts students of the possible career options in environmental and occupational health. Offered on the Internet, it allows for regional access to potential candidates and attracts over 130 students annually. Thirteen online modules will be completed for the introduction of occupational health concepts from theory and practice to women in the trades. Marketing of these opportunities to labor unions, undergraduate programs and other organizations will promote OSH integration into curricula and workforce training.

Professor McGovern has collaborated with technical consultant, Krista Johansen, to develop online modules for the division-required class, Occupational and Environmental Policy (PubH 6105, 2 credits). In 2006-2007 students had the option to take the course in-person, online or a combination of the two formats. Forty-three students were enrolled and student evaluations of satisfaction were very favorable as was student performance.

Kaia Sjogren (MPH student) is completing the ASH program; she completed an internship with Dr. Shutske and **Dean Olson** developing online modules in disaster preparedness for the agricultural public health community.

Dean Olson's educational development activities include serving on the editorial review board for the AAOHN Journal and chair of the Public Health Practice Council at the Association of Schools of Public Health.

Dr. Nachreiner teaches the "Introduction to Occupational Health and Safety" classes (in person and on-line) and the "Interdisciplinary Evaluation of Occupational Health and Safety Field Problems" (in person). During the 2005-2006 academic year, 13 students participated for academic credit.

2. Presentations/Lectures/Awareness Seminars

Over the past several years **Professors McGovern, Gerberich, and Brosseau** collaborated with **Dean Olson** and the CPHEO to host innovative seminars and symposium that promote the translation of "Research to Practice" (r2p) on the priorities of the National Occupational Research Agenda (NORA). The CPHEO have provided C.E. or academic credit for these efforts, and adapted the live programs to an online format (<http://cpheo.sph.umn.edu/cpheo/events/NORA.html>) as follows.

- June 13, 2007 the MCOHS hosted two seminars focused on the theme "Occupational Health and Safety Research to Practice." Speakers and topics included: Laura Punnett Sc.D, Professor, Department of Work Environment, University of Massachusetts Lowell and Jane Lipscomb PhD, RN, FAAN, Professor and Director, University of Maryland Baltimore (UMAB) School of Nursing, Work and Health Research Center. Professor Punnett presented: "Socioeconomic Disparities in Health and in Occupational Exposures: Relevance for Workplace Health Promotion and Protection Programs," and Professor Lipscomb presented: "Evaluation of Workplace Violence Prevention Interventions."
- July 18, 2006 Dr. Jim Collins from the NIOSH Division of Safety Research presented his NORA award winning studies "Research on Safe Patient Lifting and Slip, Trip, and Fall Prevention in Health Care Workers," and his colleague, Dr. Harlan Amandus, presented, "Directions for Future Workplace Violence Research."
- Over the period of interest **Professor McGovern** provided an introductory lecture to 40 undergraduate BSN and 12 continuing RN to BSN students at Bethel University, St. Paul, Minnesota, December 6, 2006 and May 10, 2007, respectively.

Faculty from the OEHN Program will continue to engage in opportunities for providing guest introductory lectures at regional undergraduate schools of nursing. Additionally, the faculty will continue to provide outreach to practicing professionals using oral and poster presentations. For example, OEHN faculty and students routinely work with AAOHN to present research and continuing education at annual meetings. For example, **Dr. McGovern** presented a CEU program with **David Cossi, JD, Adjunct Assistant Professor** at the AAOHN 2007 Symposium and Expo in Orlando, Florida on "Serious Health Conditions and the Family Medical and Leave Act," which has implications for OEHN practice.

In June and July 2007 **Professors McGovern and Alexander** and doctoral student, Maggie Stedman-Smith, implemented a research project "Reducing Children's Exposure to Pesticides in the Red River Valley." As part of the project, Professor McGovern designed and implemented an educational session with Ms. Stedman-Smith and Dr. Alexander to create awareness of pesticide exposure pathways and prevention strategies for mothers and caregivers of young children including residents of the White Earth Reservation, mothers in Hallock, Minnesota who were recipients of the federal Women, Infant and Children (WIC) nutrition program and mothers who were participating in the Immigrant Development Center in Fargo, North Dakota.

3. Consultations/Other

Dean Olson served on the Medical Services Review Board, Minnesota's Department of Labor and Industry, St. Paul, MN (appointment by Commissioner as first RN position created on MSRB), 2002-2006 Dean Olson has served on AAOHN Journal's editorial board since 1994.

Dean Olsons' other key outreach activity included:

- Iceland Research Symposium (C Delaney, J Finnegan, D Olson, D Bliss, J Garrard) hosted two-day research symposium to initiate faculty collaborations for public health research between Iceland and UMN. Minneapolis and Rochester, April 13-14, 2007
- Global health collaboration group (C Delaney, R Lindquist, S Edwardson, D Bliss, D Olson, J Finnegan) charged to develop public health education and research collaborations in Iceland. September 23-27, 2006
- Minnesota Department of Health, State Community Health Services Advisory Committee member: Public Health Goals Update Review Group charged to develop a framework for the update and reorganization of the 'Healthy Minnesotans: Public Health Improvement Goals', and identify additional issues and/or indicators that should be included in the update of the goals for the state of Minnesota
- Emerging Leaders Network. Strategic Planning Committee in partnership with MDH, MPHA and School of Public Health. St. Paul, MN.

Dr. McGovern has served on Minnesota's Advisory Council since 2002 (ongoing). She has served as a reviewer for the following journals: Health Services Research, Annals of Family Medicine, International Journal of Behavioral Medicine, Journal of Agromedicine, Journal of Epidemiology and Community Health, American Journal of Public Health, Scandinavian Journal of Psychology, Social Science and Medicine, and Medical Care.

Dr. Nachreiner serves as a reviewer for Research in Nursing and Health, the International Journal of Nursing Studies, and General Hospital Psychiatry and is the Membership Chair for the Injury Control and Emergency Health section of the American Public Health Association. She was also sought as a consultant on training related to work-related violence against nurses for an NIH SBIR grant proposal from the Life Crisis Institute. Dr. Nachreiner is an adjunct faculty in the School of Nursing, where she collaborates on several papers currently in press and in progress, and assists in advising School of Nursing students.

Outreach

Occupational and Environmental Medicine Program

Occupational and Environmental Medicine Program Outreach Activities

1. Educational Development

Medical Toxicology continues as an area of focus for development within the OEM program, and the first graduate completed training with the Regions/HealthPartners Medical Toxicology (MT) fellowship program in June 2007. This training program is a joint venture between the Emergency Medicine and Occupational and Environmental Medicine Departments at Regions/HealthPartners and the Minnesota Regional Poison Center. Medical Toxicology Fellows complete clinical rotations in the OEM clinic with Dr. Beth Baker and Dr. Michael Mcgrail, developing expertise in complex clinical consultations related to Occupational and Environmental exposure to toxicants. Approximately 150 cases yearly are evaluated in the OEM clinic by OEM residents and MT fellows—cases which require the application of skills and knowledge of medical toxicology as well as principles of industrial hygiene and risk assessment. Additionally as a part of this collaboration, the OEM residency program sponsors an Occupational and Environmental Toxicology Conference each month. Faculty and residents from the OEM and Emergency Departments as well as PharmD trainees and medical students from the University of Minnesota attend these conferences, which highlight toxicology and environmental issues.

Further outreach efforts in toxicology include a jointly sponsored Environmental Exposure grand rounds which commenced in 2007—a joint venture between the HealthPartners OEM program, the SPH at the University of Minnesota and Minnesota Department of Health.

As a fellow of the American College of Medical Toxicology (ACMT), Dr. Baker has been involved in the educational outreach effort in her position as the co-Director of the ACMT spring medical toxicology conferences for 2006 and 2007—a course which provides an opportunity for medical toxicologists such as PharmDs, poison center staff and physicians in multiple specialties from around the country to develop awareness about issues of toxicology related to occupational and environmental exposures

During the last five years the OEM Program has increased its focus on research training as part of the residency experience, with methodical collaboration between academic institutions and various private and government agencies. All residents must complete an independent research project as a requirement for completing the residency. The faculty works with residents in the development and design of research projects. With a doctorate in epidemiology, Dr. C.J. Zheng's biostatistics background and past research experience continues to be utilized in development of new research areas. He has begun the process of establishing occupational/environmental health ties internationally, specifically with the People's Republic of China, where he has an existing network in the science community. As advisor to trainee Dr. Eileen Greenwald, her research entitled; "Curvilinearity in an expiratory flow-volume curve and the severity of chronic obstructive pulmonary disease (COPD)" received the ACOEM Residents Research Presentation Award at the American Occupational Health Conference in New Orleans, LA, on May 7, 2007.

2. Presentations/Lectures/Awareness Seminars

Baker BA. Workers Compensation. Environmental Exposures. Sports/Occupational Medicine Course. University of Minnesota. Department of Family Practice and Community Health, Maplewood, Minnesota. August 2006

Roeber Rice HK. Disability and Self-Perception, St. Mary's/Duluth Clinic Conference: Disability Management. Duluth, Minnesota. April 2007

Roeber Rice HK. Employment Services Examinations. University of Minnesota School of Medicine Family Medicine Conference: Occupational Medicine. January 2007

Roeber Rice HK. Focus on Function: Prevention of Iatrogenic Disability. HealthPartners Occupational Medicine Community Grand Rounds. December 2006

Greaves IA. Silicon Carbide: An "inert" substance with toxic properties. Monash University School of Medicine, Department of Preventive Medicine and Community Health, Melbourne, Australia, July 12, 2006.

Greaves IA. Heavy Metal and Pesticides. Global Health CME Series, Minneapolis, July 20, 2006.

Greaves IA. Air Pollution and Asthma in Developing Countries. Global Health CME Series, Minneapolis, July 20, 2006.

Abrar FA. The Effect of Somali Health Beliefs on the Provider-Patient Relationship: Grand Rounds to the Psychiatric residents, University of Minnesota and Hennepin County Medical Center. Minneapolis, Minnesota. July 2006

Abrar FA. Global Health Pathway: University of Minnesota, School of Public Health: Faculty Member: Environmental Degradation and Health. Minneapolis, Minnesota. July 2006

Abrar FA. Cross cultural health: Barriers to care: Somali profile. Minneapolis, Minnesota. July 2006

Abrar FA. Prevention of depression, the benefits of preventative care, and preventing chronic disease like Diabetes and Hypertension. Presented at the Somali Women's Night celebration sponsored by Mayo Clinic. September 2006

Poster Presentations:

Zheng CJ. Biologically-Based Modeling of Smoking Effect on Down Syndrome, HealthPartners Celebration of Research 2006, St Paul, Minnesota September 2006

Roeber Rice H, Baker B, Madden J, Zabel E, Falken M. Prenatal Lead Screening: A Pilot Study. University of Minnesota School of Public Health NORA Symposium, Minneapolis, Minnesota. June 2007

3. Selected Consultations/Other

Greaves IA.

Minnesota Department of Health

Medicolegal consulting for various legal firms involving compensation for workers' illnesses resulting from exposures to metalworking fluids, heavy metals, pesticides (1990-present)

NIH/CDC/NIOSH Review Committees

NIOSH Agricultural Safety and Health Centers (2002-2006)

NIEHS Environmental Health Centers (2002-2006)

Development of MOU with UP-Manila College of Public Health for student and faculty exchanges (1998-present)

Kasturba Medical College/Manipal Academy of Higher Education, Manipal/Mangalore, India (2004-present)

St John's Medical College, Bangalore, India (2004-present)

BP Koirala Institute of Health Sciences, Dharan, Nepal (2004-present)

Public Health Foundation of India

American Lung Association of Minnesota

American Refugee Committee

Minnesota International Health Volunteers

Local chapters of the AMA, ACOEM, AIHA

Baker BA.

Vice Chair of the Academic Section of the American College of Occupational and Environmental Medicine

Chair of the Medical Services Review Board for the Minnesota Department of Labor and Industry

Board of Trustees of the Minnesota Medical Association

Outreach

Occupational Health Services Research and Policy Program

Occupational Health Services Research and Policy (OHSRP) Program Appendix**Outreach History**

(Selected activities from July 1, 2006 - June 30, 2007)

1. Educational Development

Dr. McGovern worked with technical consultants to create one to two online modules per year relevant to occupational health services research and policy, from "Environmental and Occupational Health Policy" (PubH 6150) as a web-based alternative to the in-person class for those students who require distance learning. In 2006-2007 modules were created on "Bioterrorism, Public Health Preparedness and Risk Communications" (Dr. Richard Danila, Adjunct Professor, Section Chief, Acute Disease Investigation and Control, Minnesota Department of Health and Dr. Pat McGovern), and "Institutionalized Violence: When Does Care Giving Become Submission to Violence?" (Dr. McGovern and Mr. David Cossi, J.D, Adjunct Assistant Professor).

Dr. Dowd was invited by AcademyHealth (the national professional association for health services researchers) to offer a half-day seminar on endogenous explanatory variables at the annual meeting in Seattle (June, 2006). The seminar attracted twenty-six participants from around the country. Dr. Dowd also was asked to chair a panel on the same topic at the Seattle meeting. He also presented a lecture on endogenous explanatory variables in a class taught by Dr. Gerberich during spring semester, 2006.

Dr. Dowd also was asked to chair the first health services research Methods Council, organized by AcademyHealth. The Council's first meeting was in Washington, D.C. in October, 2006. The Council will assess and provide resources to health services research professionals and training programs that are seeking to improve their analytic skills.

2. Presentations/Lectures/Awareness Seminars

Professors McGovern and Dowd have worked with the Centers for Public Health Education and Outreach (CPHEO) to organize an annual seminar that has featured a national expert in OHSRP, and has been jointly sponsored by the Divisions of Environmental Health Sciences and Health Policy and Management. Beginning in 2005 Professor McGovern collaborated with other ERC faculty to open the seminars appropriate to all ERC students. The most recent seminars featured the following experts:

Laura Punnett Sc.D, Professor, Department of Work Environment, University of Massachusetts Lowell and Jane Lipscomb PhD, RN, FAAN, Professor and Director, University of Maryland Baltimore (UMAB) School of Nursing, Work and Health Research Center. Professor Punnett presented: "Socioeconomic Disparities in Health and in Occupational Exposures: Relevance for Workplace Health Promotion and Protection Programs," and Professor Lipscomb presented: "Evaluation of Workplace Violence Prevention Interventions." June 13, 2007.

Dr. Jim Collins presented his NORA award winning studies "Research on Safe Patient Lifting and Slip, Trip, and Fall Prevention in Health Care Workers," and Dr. Harlan Amandus presented, "Directions for Future Workplace Violence Research" July 18, 2006.

3. Selected Consultations/Other

Dr. McGovern served on Minnesota OSHA's advisory board member (ongoing).

Dr. Dowd provided informal consultation on economic perspectives on the regulation of the nanoparticle industry for Professor Ramachandran's research on the project "Evaluating Oversight Mechanisms for Active Nanostructures and Nanosystems" funding by the National Science Foundation.

Outreach

Occupational Injury Prevention Research Training Program

Occupational Injury Prevention Research Training Program Selected Outreach Activities (July 1, 2006 – June 30, 2007)

1. Educational Development/Outreach

Dr. Alexander developed the Global Health Seminar (PubH 6100, n=14), that is designed to explore issues in global public health with emphasis on current problems, using cross-disciplinary approaches to solve relevant problems. Injury Prevention... (PubH 6120 - 2 credits, n=10) **Dr. Gerberich** (includes **Drs. Parker and Olmstead**) provides a conceptual basis in injury prevention to a variety of disciplines. **Drs. Gerberich, Alexander with Drs. Church, Maldonado, McGovern, Hansen, and Ward** work with students in **PubH 8120 OIPRTP** research seminar, to critique various research efforts involving many disciplines/other institutions (n=10/semester). **Drs. Church and Alexander** participated in teaching of PubH 6140, Environmental Occupational Epidemiology (2 credits, n=11), involving multiple disciplines. **Dr. Alexander**, with **Drs. Gerberich and McGovern** and **Mr. Ryan**, have continued to conduct the recently developed course: "Applied Analyses of Occupational and Environmental Health Data," which has resulted in papers for publication and presentations to numerous audiences. **Dr. Maldonado** offers courses, critical to research, involving many programs: PubH 8140, Validity Concepts in Epidemiologic Research (n=14); and PubH 8142, Epidemiologic Uncertainty Analysis (n=6). **Dr. Gerberich** also participates in presenting a lecture on occupational injury to students (n = ~200) in an undergraduate public health course (PubH 3001). **Dr. Nachreiner** is primary instructor for PubH 6150, "Interdisciplinary Evaluation of Occupational Health and Safety Field Problems," for the ERC (~16 students, multiple disciplines) with **several MCOHS faculty**. **Dr. Hansen** teaches Psy 8554: Career and Occupational Health Psychology Assessment and Psy 8544: Vocational and Occupational Health Psychology Research -- relevant to the role of psychology in occupational health; she supervises instruction of Psy 5501: Vocational and Occupational Health Psychology, involving 50 to 75 students from many disciplines. **Dr. Olmstead** collaborates with **Dean Olson and Dr. Nachreiner** in the course, PubH 6170 (n=12), Theory and Practice of Occupational Health and Safety, participates in PubH 6120 with **Dr. Gerberich**, and presents a 3-credit course "Safety, Health and Environmental Considerations in Manufacturing," at the University of St. Thomas.

Associate Dean Olson developed and teaches the first public health course offered on the Internet, "Issues in Environmental and Occupational Health" (PubH 3102, 3 credits and 6102, 2 credits) for multidisciplinary students. The instructional design developed for this effort has been employed by all core public health courses now available online and for online modules in occupational health and safety. She also offered eight online modules in "Environmental Health and Nursing" (3 CEUs per module) under a Health Resources and Services Administration funded initiative as the primary faculty that included colleagues from Johns Hopkins, UNC, and OHN students. Nursing faculty at the University of N.D., University of WI, Green Bay, and Metro State University, Minneapolis have adopted course content.

Associate Dean Olson taught specially developed courses with **Dr. Shutske** presented locally and through interactive television to multiple campuses. **Dean Olson** and **Dr. McGovern** have collaborated with **Dr. John Shutske** (Biosystems/ Agricultural Engineering) to provide a supporting program in Agricultural Safety and Health (ASH) for OEHN and other students. **Penny Bartz**, MPH graduate, completed the ASH program, and conducted an innovative plan B, "Storytelling as a Delivery Method of Farming Safety Education for Hmong Farmers" (Research Advisor: **Dr. Shutske**), and an OEHN internship at the National Farm Medicine Center, Marshfield WI. **Kaia Sjogren** (MPH student) is also completing the ASH program; she completed an internship with **Dr. Shutske** and **Dean Olson** developing online modules in disaster preparedness for the agricultural public health community.

2. Presentations - Lectures - Awareness Seminars

Faculty and students gave numerous presentations to national and international audiences (**Appendix**). **Peer-reviewed publications, involving students and faculty are identified in the OIPRTP table of publications (Appendix)**.

In 2007, faculty, students, and staff, participated in a one-day NORA Symposium, "Translation of Research to Practice." This involved two key national speakers, **Dr. Jane Lipscomb**, "A Model For Implementing, Evaluating And Translating Violence Prevention Intervention Research In The Health Care And Social Service Workplace" and **Dr. Laura Punnett**, "Socioeconomic Disparities in Health and in Occupational Exposures: Relevance for Workplace Health Promotion and Protection Programs." A research poster session of student and faculty research, was also included.

Drs. McGovern, Gerberich and the continuing education staff hosted scientists from the NIOSH Division of Safety Research. **Dr. Jim Collins** presented his NORA award winning studies, "Research on Safe Patient Lifting" and "Slip, Trip, and Fall Prevention in Health Care Workers." **Dr. Harlan Amandus** presented, "Directions for Future Workplace Violence Research" July 18, 2006.

3. Consultations (Identified for faculty)

Faculty are involved in numerous consultation activities, primarily unpaid efforts:

Gerberich NIOSH; Centers for Disease Control and Prevention (CDCP); United States Department of Agriculture; Minnesota Department of Health; Multiple law firms relevant to product/equipment-related injuries, occupational injuries; Minnesota Occupational Safety and Health Administration; Continuing Education; **Alexander**: Minnesota Department of Health; NIOSH; Princeton Reimbursement Group; **Church**: Chair, Data and Safety Monitoring Board, ev3, Inc. (2005-); State of Pennsylvania, Department of Health Lung Disorders Panel (2005) **Maldonado**: CDCP; **McGovern/Dowd**: 3M Corporation Occupational Health Medicine Department; Leech Lake Band of Ojibwe and Minnesota Department of Health, Environmental Health Unit; **McGovern**: Midwest Center for Occupational Safety and Health, Occupational Medicine Residency Advisory Committee; Federal Occupational Health and Safety Administration's (OSHA) Violence Prevention Program; Minnesota State OSHA's advisory board; **Shutske**: legal cases: machinery fires, caustic cleaner ingestions, and machinery injuries; **Ward**: Technical advisor, project (IMMORTAL) on driver impairment; Nissan; BBC; Ford, UK; Renault; BAPTIE, UK; Jaguar, UK; Rail Track, UK; University of Leeds; **Hansen**: Center for Career and Community Research

Associate Dean Olson served on the Medical Services Review Board, Minnesota's Department of Labor and Industry, St. Paul, MN (appointment by Commissioner as first RN position created on MSRB), 2002-2006

Dr. Nachreiner serves as a reviewer for Research in Nursing and Health, and is the Membership Chair for the Injury Control and Emergency Health section of the American Public Health Association. She was also sought as a consultant on training related to work-related violence against nurses for an NIH SBIR grant proposal from the Life Crisis Institute. Dr. Nachreiner is an adjunct faculty in the School of Nursing, where she collaborates on several papers currently in press and in progress, and assists in advising School of Nursing students.

4. Other

Gerberich: **Reviewer**: Editorial Board, Journal of Agromedicine (2004-); Injury Prevention; Journal of Accident Analysis and Prevention (1997-); Epidemiology (1996-); Journal of Agricultural Safety and Health (1991-) American Journal of Industrial Medicine; Annals of Epidemiology; American Journal of Epidemiology (1990-); American Journal of Public Health (1989-); Journal of the American Medical Association; Journal of Occupational and Environmental Medicine; Preventive Medicine (1985-); Faculty, Interdisciplinary Human Factors/Ergonomics program; University of Minnesota; Director, Center for Violence Prevention and Control (1994-); Developer/Chair, Student Paper Competition, Injury Control and Emergency Health Services Section, American Public Health Association Annual Meeting (1991-); Director, Regional Injury Prevention Research Center (1986-) **Alexander**: **Reviewer**: Science of the Total Environment; Journal of Agricultural Medicine (2005-) Journal of Exposure Assessment and Environmental Epidemiology (2000-); Bulletin of Environmental Contamination and Toxicology; Injury Prevention; Archives of Pediatrics and Adolescent Medicine (1999-) Environmental Health Perspectives; Annals of Epidemiology; Journal of Agricultural Safety and Health; Scandinavian Journal of Work, Environment, and Health; Epidemiology; Injury Prevention; Occupational and Environmental Medicine; American Journal of Industrial Medicine; American Journal of Epidemiology (1998-); **Church**: (2004-) Advisory Board, H.H. Humphrey Cancer Center at North Memorial Medical Center (2003-) Co-Chair of Publications, Presentations and Associated Studies Committee, Prostate, Lung, Colorectal, and Ovarian Cancer Screening Trial Epidemiology Committee, Colorectal Cancer Family Registry; Consultant to Cardiovascular Systems, Inc. Advisory Board, The Virginia Piper Cancer Institute at Abbott-Northwestern Hospital; (2000-) Executive Committee, Minnesota Colorectal Cancer Consortium; Epidemiology Committee; European Randomized Study of Screening for Prostate Cancer; Epidemiology Committee, International Prostate Screening Trial Evaluation Group (1999-) Chair, Risk Factor Questionnaire Committee, Prostate, Lung, Colorectal, and Ovarian Cancer Screening Trial; Journal of the National Cancer Institute, Editorial Board; **Maldonado**: **Reviewer**: Epidemiology (1997-); American Chemical Society Press; J Suicide and Life-Threatening Behavior (1994-); International Journal of Epidemiology; American Journal of Industrial Medicine; American Journal of Epidemiology (1993-); Journal of Occupational and Environmental Medicine (1986-); **Hansen** Editor, Journal of Counseling Psychology (2000-); **Reviewer**: Journal of Personality and Social Psychology (2005-); Personnel Psychology (1998-); Psychology of Women Quarterly (1990-); Journal of Applied Psychology (1980-); **Member**: Board of Scientific Affairs, American Psychological Association (2003-); Occupational Health Psychology Forum (2001-); Science Leadership Council, American Psychological Association (1997-); **Director**: Vocational Assessment Clinic; Center for Interest Measurement Research (1974-); Editor, Measurement and Evaluation in Counseling Psychology (1993-); **Ward N**: Editorial Board, Accident Analysis and Prevention; Guest editor, International Journal of Vehicle Design, Special issue on car phones; ORACLE consortium, Human Factors Board on transportation telematics; IMMORTAL consortium on Driver Impairment; CERTIFIED consortium on Driver Impairment; Committee: Department of the Environment, Transport, and the Regions (DETR); Committee: Engineering and Physical Sciences Research Council (EPSRC); Safety and Human Factors Committee (ITSA); Biobehavioral and Behavioral Processes IRG – Study Section 2, National Institutes for Health (2002-); **Reviewer**: International Journal of Human-Computer Studies; Journal of Engineering Design and Automation; International Journal of Vehicle Design Perception; Journal of Adolescence; (2001-) Ergonomics (2000-); **Olson**: Medical Services Review Board, Minnesota Department of Labor and Industry, St. Paul, MN (appointment by Commissioner as first RN position created on MSRB) (2002-); AAOHN: Editorial Review Board); Board of Directors (1989-); **Olmstead**: (2001-) American Industrial Hygiene Foundation – President; Scientific Advisory Committee, Industrial Hygiene and Hazardous Materials, University of Minnesota; **Nachreiner** (2005-) Environmental Health Sciences

Awards Committee, U of M (2004-) Membership Committee Chair, Injury Control and Emergency Health Services Section, American Public Health Association (2003-); Public Health Practice Major, Public Health Certificate in Core Concepts affiliated faculty; Reviewer, Student Paper Competition, American Public Health Association; Admissions Committee for Public Health Certificate Program in Occupational Health and Safety, University of Minnesota (2002-) Member, American Public Health Association (1998-) Member, American Association of Occupational Health Nurses (AAOHN); **Shutske**: Reviewer: Journal of Agricultural Safety and Health (1994-); Applied Engineering in Agriculture (1993-); ASAE: Program Planning (1993-)

Outreach

Hazardous Substance Academic Training Program

Hazardous Substances Academic Training Program Outreach Activities

1. Educational Development

Dr. Raynor

- Co-Instructor, "The FUN of Aerosols: Fine, Ultrafine, and Nano Particles in Workplace Atmospheres", Professional Development Course #425, *2007 American Industrial Hygiene Conference and Exposition*, Philadelphia, PA, June 2007
- Instructor, Hazard Awareness Training for Solid Waste Workers, Leech Lake Reservation, Cass Lake, MN, August 2006

Dr. Brosseau

- Technical Advisor, University of Minnesota, Midwest Center Continuing Education: Development of environment, health and safety certificate programs and curriculum

2. Consultations

Dr. Raynor

- Consulted with law firm on metalworking fluid mist exposure assessment and control issues.

Dr. Brosseau

- University of Minnesota, Department of Environmental Health and Safety, Mercury Task Force
- Consultant, National Institutes for Health, EPA Superfund Grant Review Panel, NIEHS Conference Grant Review Panel
- Consultant, Minnesota Department of Health, Pandemic Influenza Clinical Advisory Group
- Consultant, NIOSH, NORA Town Hall Meeting, Chicago IL

3. Other

Dr. Raynor

- Member, American Association for Aerosol Research (AAAR), 1994-present
- Member, American Industrial Hygiene Association (AIHA), 1998-present
- Member, AIHA Aerosol Technology Committee, 2001-present
- Member, AIHA Nanotechnology Working Group, 2006-present
- Member, AIHA Methamphetamine Working Group, 2006-present
- Member, AAAR Control Technology Working Group, 1998-present
- Member, AAAR Indoor Air Working Group, 2006-present
- Editorial Advisory Board, *Aerosol Science and Technology*, 2001-present
- Proposal Reviewer, U.S. Department of Agriculture Small Business Innovation Research Program, 2003-2006
- Participant in Center for Filtration Research operated by the University of Minnesota Department of Mechanical Engineering
- Ad-hoc manuscript reviewer for *Applied Occupational and Environmental Hygiene*, *Aerosol Science and Technology*, *The Annals of Occupational Hygiene*, *American Industrial Hygiene Association Journal*, *Industrial and Engineering Chemistry Research*, *Journal of Porous Media*, and *Journal of Aerosol Science*.

Dr. Brosseau

- Member, Hazardous Substances Worker Training Advisory Board, Midwest Center Continuing Education Program
- Member, Advisory Board, Regions Hospital, Occupational Medicine Residency Program
- University of Minnesota, Office for Women, School of Public Health Representative
- Member, Study Section, Intervention Effectiveness Research Applications, National Institute for Occupational Safety and Health
- Peer Reviewer for *American Industrial Hygiene Association Journal*, *Applied Occupational and Environmental Hygiene*, *Journal of Aerosol Science*, *Aerosol Science and Technology*, *ASHRAE Transactions*, and *Annals of Occupational Hygiene*
- Member, University of Minnesota, Biomedical Research Advisory Committee
- Member, National Institute for Occupational Safety and Health, Safety and Occupational Health Study Section
- Member, Institute of Medicine, Committee for the Assessment of the NIOSH Head-and-Face Anthropometric Survey of U.S. Respirator Users

- Member, Institute of Medicine, Committee on the Development of Reusable Facemasks for Protection During Pandemic Influenza
- Member, Minnesota Department of Health, Work-Related Asthma Advisory Committee
- Co-Chair, Task Force on ERCs in the 21st Century, Association of University Programs in Occupational Health and Safety
- Member, Task Force on ERC Resource Allocation, Association of University Programs in Occupational Health and Safety

Outreach
Agricultural Safety and Health Program

Agricultural Safety and Health Program Outreach Activities

1. Educational Initiatives to Unique Audiences

The Agricultural Safety and Health Academic Program leadership has been provided by Dr. John Shutske who has an Extension-Service faculty appointment, which is largely focused on out reach education with significant components of community-based participatory, applied research. Thus, many outreach activities have been conducted under the ASH umbrella and will be summarized here with a few specific highlights and citations.

- a. Throughout the project period, the ASH program director also served as the PI of the USDA-funded Minnesota AgrAbility project. This outreach and education project assists farmers and family members with disabilities.
- b. During portions of the project cycle, ASH program faculty Shutske and Schermann (and graduate students) led projects related to projects to adapt, field test and deliver the NAGCAT child safety guidelines for Hmong parents and other ethnic groups. Project includes extensive outreach component. Projects provided some form of outreach to approximately 65 Hmong families with children.
- c. From 2006-2007, project faculty and staff Shutske and Schermann provided outreach educational sessions on agricultural injury control, health promotion, and related rural public health issues to many groups (averaging 40-50 presentations per year in community-based settings with farmers, agricultural service providers, health professionals, and various community leader/multiplier audiences).
- d. Web-based information is provided to rural communities and agricultural audiences through the agricultural safety and health information clearinghouse. Information includes injury and fatality data, and intervention related information focused around people, agent, and environmental issue. The website is also used to disseminate PDF copies of select educational presentations. These are made available to Extension educators (nationwide) upon request. The website draws 30,000 hits per year and can be accessed through: <http://safety.cfans.umn.edu>

2. Presentations and Educational Meetings

Specific highlights of outreach presentations are also included in the publications section, but are repeated below:

Shutske, J., Schermann, M., Wagstrom, L., Bender, J., Kirkhorn, S. and Powell, T. 2006. A Conceptual Model of Bundled Risk Communication and Education to Improve Agricultural Worker Health and Safety. Reviewed abstract presented at 2006 Annual Meeting of the American Public Health Association, Boston, MA. Available at: apha.confex.com/apha/134am/techprogram/paper_140861.htm

Schermann, M., Bartz, P., Moua, M., Shutske, J., Vue, P., and Lee, T.T. 2006. Evaluation of Storytelling in Hmong to Deliver Agricultural Safety and Health Information. Reviewed abstract presented at 2006 Annual Meeting of the American Public Health Association, Boston, MA. Available at: apha.confex.com/apha/134am/techprogram/paper_130609.htm

Shutske, J., Powell, T., Stelzner, J, and Randall, J. Food and Agricultural Supply Chain Interruptions from a Pandemic Event. Presented at 2006 Extension Disaster Education Network annual conference, Nashville, Tennessee, November 2006.

Shutske, J. and Koch, B. EDEN's Food Security and National Response Plan Courses. Presented at 2006 Extension Disaster Education Network annual conference, Nashville, Tennessee, November 2006.

3. Consultations

Program staff/faculty respond to approximately 20-25 telephone calls and emailed technical questions each week directly from Extension educators (who are responding to a client's agricultural safety or health question); farmers; community leaders; regulators; agricultural businesses; etc. A typical question would be: "I am working with a farmer and his/her physician in Wright County Minnesota. After entering a silo last week with severely molded forage, he/she is now dealing with a severe case of hypersensitivity pneumonitis. Can you please point us to: information on controlling the hazard through production practices; sources and recommendations for appropriate PPE, and; guidelines for safe usage of respiratory PPE?"

In addition, we have provided consultation to numerous groups including the National Farm Medicine Center; the National Pork Board; numerous Minnesota-based agricultural commodity groups (in both the livestock and crop areas); multiple state agencies (agriculture, health, board of animal health, and public safety).

4. Other

ASH Program staff provide statewide and regional leadership for extension agricultural and food system safety, health, and food safety/protection through educational programs and research activities. This includes efforts to produce, evaluate, and disseminate instructional materials, audiovisual aids, and other educational products for use in workshops, seminars, and training activities.

Interact with media to educate industry about agricultural workplace and food system hazards and disseminate research-based knowledge. This results in 50-100 news articles in daily/weekly newspaper articles in the region and approximately 30-45 radio interviews.

Advise graduate students in Biosystems and Agricultural Engineering and Veterinary Medicine on issues of agricultural and occupational safety and health..

Member of and provide committee-based consultation and input through participation in: American Society of Safety Engineers (ASSE); Society for Engineering in Agricultural, Food and Biological Systems (ASAE); American Public Health Association (APHA); Service on review Boards for Journal of Agromedicine; Journal of Agricultural Safety and Health; and Applied Engineering in Agriculture.