University of Minnesota Education and Research Center:
Midwest Center for Occupational Health and Safety

Annual Report
July 1, 2005 – June 30, 2006

Ian A. Greaves, MBBS, FRACP, FAAAS

Director

Submitted November 1, 2006

Table of Contents for Annual Report 7/1/05 – 6/30/06

II. Introduction and Executive Summary

Introduction

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 in areas of workplace health and safety, and to 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 (NIOSH).

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.

The region served by the Minnesota ERC includes the states of Minnesota, Wisconsin, and North and South Dakota. Within that region are two NIOSH Training Program Grants (TPGs), one at the University of Wisconsin–Stout and the other at the University of Minnesota (Duluth). The Minnesota ERC has interactions with these TPGs, and also cosponsors programs and collaborates with neighboring ERCs at the University of Iowa and the University of Illinois–Chicago.

Executive Summary

During the reporting period July 1, 2005 to June 30, 2006 the Minnesota ERC graduated 20 masters' students; enrolled 35 new masters' students and 19 doctoral students; was involved with the training of 8 postdoctoral fellows and with two students taking a certificate program in occupational health and safety. During the same period, the Minnesota ERC's faculty and trainees produced a total of 103 peer-reviewed publications and reports, and made 111 presentations concerning their work or related occupational safety and health issues.

Continuing education (CE) offerings to occupational safety and health professionals, managers, organized labor representatives, workers, and members of the general public totaled 68 courses with 694 registered attendees who received CE units for completing the respective courses. In addition, a further 1,105 people viewed or downloaded from our web sites various online offerings in occupational health and safety.

The Minnesota ERC is responsible for preparing and maintaining the NIOSH Catalog of CE Courses offered by all ERCs. During the reporting period, the paper catalog was converted to an online catalog. This catalog is updated regularly to reflect changes in CE course offerings, and provides relevant links to various ERC CE Programs.

Further products of the Minnesota ERC in the past year included completion of the first step in development of an Economic Toolkit for the use of labor groups and management to identify savings in costs attributable to prevention of occupational injuries and illnesses. This effort was coordinated by the Occupational Health Services Research and Policy Program.

Surveys of several professional groups, alumni, and stakeholders were conducted in the last year. Alumni groups included occupational medicine (OM) graduates, industrial hygiene (IH) graduates, occupational health nursing (OHN) graduates, and occupational injury prevention research training (OIPRT) graduates. Additional surveys of OM graduates from nine ERC residency programs and of employers of OM residency graduates were conducted. Findings are being analyzed and publications prepared for these surveys.

Responsible conduct of research training has been provided for all NIOSH-supported trainees and others participating in the occupational health and safety program.

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.

An external Center Advisory Board meets annually to advise the Minnesota ERC about current and future needs and the direction of occupational safety and health in the region. This meeting was held on April 13, 2006 and focused on the research priorities of the National Occupational Health Research Agenda coordinated by NIOSH.

A. Major Accomplishments

Major Accomplishments

The main accomplishments of the ERC in the last year included the following:

- Graduation of 20 masters' students
- Enrollment of 35 masters', 19 doctoral students, 8 post-doctoral and 2 certificate students
- A total of 103 publications by ERC faculty and trainees
- A total of 111 presentations by ERC faculty and trainees
- A total of 68 CE courses with 694 attendees and a further 1,105 people who took on line offerings
- On line publication of the NIOSH ERC Catalog

Specific highlights included:

a. New program development: Funds were identified within the NORA budget to support two research projects that addressed NORA priorities (see NORA Research Support Program).

b. Meeting national and regional needs in OM: The ERC completed two OM needs assessments in the last year. Dr Beth Baker (OM Core Director) worked with the American College of Occupational and Environmental Medicine (ACOEM) to survey ~1500 members who employ OM physicians, concerning the core competencies and proficiencies they expect of residents graduating from OM programs. A second survey assessed OM residents' satisfaction with their residency training and areas for program improvement. Two OM residents coordinated these surveys. The results of the first survey have been submitted for publication and a second paper is in preparation.

c. Measures of effectiveness and evaluation of impact of programs: In addition to the output-based performance measures of effectiveness requested by NIOSH that appear annually in the non-competing continuation applications (*viz*, numbers of students admitted and graduating, CE courses and course participants, publications, consultations), the ERC has conducted several outcome-based measures of effectiveness, including several of those recommended in the recent report of the Performance Measures Workgroup. Surveys of stakeholder groups and alumni are key to understanding how our educational programs are meeting the needs of OSH practitioners, the specialty professions, and employers, and where changes can be made to improve the content and relevance of our educational programs.

(i) The Center conducted four focus group meetings with employers of industrial hygienists and other safety professionals in three industry sectors (manufacturing, consulting, and government). Results are discussed in the IH Academic Training Program section. Another survey targeted employers concerning OHN-specific competencies and those valuable for all OSH professionals. Results are discussed in the OHN Academic Training Program section and will inform OHN programs about future training needs.

(ii) Since July, 2005 the OM, IH, OHN, and OIPRT programs have updated prior surveys of Minnesota ERC alumni, asking them to rate the value and personal proficiency in core competencies for their respective disciplines. Similar surveys were conducted in 2001. The surveys are discussed in the program-specific reports.

d. Working with Labor Groups: Using carry forward funds from the previous year, we are in the process of developing a kit of "economic tools" suitable for use by workers and labor groups to identify cost savings to a particular company associated with health and safety prevention efforts. One of the OHSRP students has taken the lead on this project and is assisted by Drs McGovern and Dowd. The economic tool kit is designed for use by lay persons to identify the direct and indirect cost savings that can accrue from investing in measures that prevent injuries and illnesses caused by workplace hazards. The idea arose from discussions in June, 2005 with various Labor Unions in the Twin Cities.

e. Collaboration with NIOSH-funded Training Program Grants (TPG) in the region: One TPG program is located at the University of Wisconsin (Stout) and is headed by Dr Gene Ruenger who works with the ERC's industrial hygiene faculty and serves as a member of the IH Advisory Board. The second is a safety training program at the University of Minnesota (Duluth). Dr John Shutske (ASH Director) works with this group, mainly on areas related to farm safety.

2. Training in Responsible Conduct of Science

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 & 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: 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's Office of Human Research Protections' CD-ROM entitled *Investigator 101*, or 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 /reseth/mod/data.html). The University also requires personnel with access to human subject data to take HIPAA training.

3. Input to NIOSH on ERC Funding and Future Directions

Dr Greaves and Dr Brosseau worked with NIOSH Staff and other ERC Directors to help the Agency revise its RFA for ERC grants, restructure its funding of ERCs, and consider the future role of ERCs and their relevance to NIOSH's mission. Four Task Forces were created with membership from NIOSH and the ERC Directors. Dr Greaves chaired Task Force I that looked at the funding structure of ERCs and how this could be adjusted to better reflect the functions of the ERCs, as defined by NIOSH. Dr Brosseau co-chaired Task Force III that considered strategic planning issues for the NIOSH ERCs in the 21st Century. Numerous meetings and conference calls were involved with the final outcome being reports from Task Force 1 and Task Force III, the writing of which were coordinated by Dr Greaves and Dr Brosseau respectively.

B. Significant Changes in July 1, 2005–June 30, 2006

Significant Changes in July 1, 2005–June 30, 2006

The OM Program was reviewed in late 2004 and was judged not to have received a fundable score, although funding was continued at a reduced level through the remaining two years of the ERC's current funding cycle. Several criticisms relating to the academic base of the OM Program and research output were addressed during the reporting period and will continue in the coming year: we are adding a second, part-time OM physician in the Minnesota School of Public Health, have appointed an Assistant Residency Director for Research at HealthPartners/Regions Hospital, and have developed a new plan for future OM research involving faculty at the University of Minnesota and HealthPartners/Regions Hospital. Publications of the OM faculty and trainees during the last year totaled nine peer-reviewed publications, with another six in press. These are substantially increased from previous years.

Two new exploratory, interdisciplinary research projects were funded from the NORA Program allocation. Each was completed in the required time frame and data from each project has been included in further grant submissions. The two projects supported were:

- *Influence of Nanoparticle Exposures on Development of Chronic Obstructive Pulmonary Disease (Raynor: IH, OM)*
- *Successful Return to Work for Traumatic Work Injury and Cancer Survivors (Nachreiner: OIPRTP, OHN, OM)*

Planning for a competitive renewal application submitted on September 13, 2006 was conducted extensively during the reporting period. Interdisciplinary approaches were emphasized in the planning process.

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
OHN:	http://enhs.umn.edu/files/ohn.html
OM:	http://ime.healthpartners.com/IME/Menu/0,1637,1925,00.html
HSAT:	http://enhs.umn.edu/files/hazsub.html
ASH:	http://safety.coafes.umn.edu/
OHSRP:	http://enhs.umn.edu/ohsrp/index.html
OIPRTP:	http://enhs.umn.edu/oiprtp/index.html
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. Center Wide Programs

A. Center Administration

B. Ian Greaves

C. 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 are two NIOSH Training Program Grants (TPGs), one at the University of Wisconsin-Stout and the other at the University of Minnesota (Duluth). The Minnesota ERC has interactions with these TPGs and also cosponsors programs and collaborates with neighboring ERCs at the University of Iowa and the University of Illinois–Chicago.

1. Program Administration

The Minnesota ERC is a consortium of efforts involving various departments at the University of Minnesota and at HealthPartners/Regions Hospital (Table 1).

Table 1. Core/Supplementary Programs and Participating Sites

Program	Primary Location(s)	Other Locations
Occupational Medicine Residency	DM/SPH	CR
Industrial Hygiene	SPH	ME/BAE
Occupational Health Nursing	SPH	DM/BAE
Continuing Education/Outreach	SPH	
Agricultural Safety & 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
CR = Clinical rotations
BAE = Dept of Biosystems and Agricultural Engineering
SPH = School of Public Health
MES = Minnesota Extension Service
ME = Dept of Mechanical Engineering

Dr Ian Greaves, Center Director, oversees the administration and budget of the grant, including the day-to-day administration and overall direction of the ERC. He interacts 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, performs much of the day to day administration in consultation with Dr Greaves, and has responsibility for monitoring the various budgets and spending within the ERC. She supervises the grant Coordinator in her tasks, and interacts with the accounting and support staff to facilitate the ERC's functions.

Ms Ann Fredrickson, Coordinator, works 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 coordinates 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 provide financial planning, budgeting and accounting assistance. Ms Waldemar is also the Office Manager in the Division of Environmental Health Sciences and assigns tasks to secretarial and other support staff as needed. Ms Karen Brademeyer provides word processing and secretarial support.

The ERC's Executive Committee (Table 2) is 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 meet at 4-6 week intervals to discuss EC administration and emerging issues, including reports and grant renewals. The meetings are 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	Ian Greaves
ERC Deputy Director	Lisa Brosseau
Director, Occupational Medicine Residency	Beth Baker
Director, Industrial Hygiene	Gurumurthy Ramachandran
Director, Occupational Health Nursing	Pat McGovern
Director, Continuing Education/Outreach	Iris Staubus
Director, Agricultural Safety & Health	John Shutske
Director, Hazardous Substance Academic Training	Peter Raynor
Director, Hazardous Substance Training	Iris Staubus
Director, NORA	Ian Greaves, Lisa Brosseau
Director, Occupational Health Services Research and Policy	Pat McGovern, Bryan Dowd
Director, Occupational Injury Prevention Research Training	Sue Gerberich, Bruce Alexander

The Center Advisory Board comprises 14 practitioners and community leaders in occupational health and safety who provide advice on OSH issues pertaining to the activities of the ERC. Members are drawn from government, industry and labor groups. The Annual Advisory Board meeting occurred on April 13, 2006. Attending that meeting were 10 members of the Advisory Board (with regrets from the other four members), and Sid Soderholm as an invited speaker from NIOSH. The emphasis was on NORA and how the ERC could better address NORA priorities. Sixteen NIOSH-supported trainees presented posters of their work for to the Advisory Board members. The presentations illustrated the breadth of research conducted by our trainees, and were very well received by the members. The members provided some useful insights that the ERC will include in its research and educational programs over the next few years.

2. Program Faculty

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. Program Activities and Accomplishments

1. Program Accomplishments

a. New program development: Funds were identified within the NORA budget to support two research projects that addressed NORA priorities (see NORA Research Support Program).

b. Meeting national and regional needs in OM: The ERC completed two OM needs assessments in the last year. Dr Beth Baker (OM Core Director) worked with the American College of Occupational and Environmental Medicine (ACOEM) to survey a random sample of 1500 members who employ OM physicians, concerning the core competencies and proficiencies they expect of residents graduating from OM programs. A second survey assessed OM residents' satisfaction with their residency training and areas for program improvement. Two OM residents coordinated these surveys. The results of the first survey have been submitted for publication and a second paper is in preparation.

c. Measures of effectiveness and evaluation of impact of programs: In addition to the output-based performance measures of effectiveness requested by NIOSH that appear annually in the non-competing continuation applications (*viz*, numbers of students admitted and graduating, CE courses and course participants, publications, consultations), the ERC has conducted several outcome-based measures of effectiveness, including several of those recommended in the recent report of the Performance Measures Workgroup. Surveys of stakeholder groups and alumni are key to understanding how our educational programs are meeting the needs of OSH practitioners, the specialty professions, and employers, and where changes can be made to improve the content and relevance of our educational programs.

(i) The Center conducted four focus group meetings with employers of industrial hygienists and other safety professionals in three industry sectors (manufacturing, consulting, and government). Results are discussed in the IH Academic Training Program section. Another survey targeted employers concerning OHN-specific competencies and those valuable for all OSH professionals. Results are discussed in the OHN Academic Training Program section and will inform OHN programs about future training needs.

(ii) Since July, 2005 the OM, IH, OHN, and OIPRT programs have updated prior surveys of Minnesota ERC alumni, asking them to rate the value and personal proficiency in core competencies for their respective disciplines. Similar surveys were conducted in 2001. The surveys are discussed in the program-specific reports.

d. Working with Labor Groups: Using carry forward funds from the previous year, we have begun a process of research and development to assemble a kit of "economic tools" suitable for use by workers and labor groups to identify cost savings associated with specific health and safety prevention efforts (e.g., prevention of musculoskeletal injuries associated with patient handling in the nursing home environment. Nathan Barleen, a OHSRP student, has taken the lead on this project and is assisted by Drs. McGovern and Brosseau, and Ms. Fredrickson. The economic tool kit is designed for use by lay persons to communicate to management the the direct and indirect cost savings that can accrue from investing in specific programs that prevent injuries and illnesses caused by workplace hazards and chronic disease. The idea arose from discussions in June, 2005 with various labor unions in the Twin Cities.

e. Collaboration with NIOSH-funded Training Program Grants (TPG) in the region: One TPG program is located at the University of Wisconsin (Stout) and is headed by Dr Gene Ruenger who works with the ERC's industrial hygiene faculty and serves as a member of the ERC Advisory Board. The second is a safety training program at the University of Minnesota (Duluth). Dr John Shutske (ASH Director) works with this group, mainly on areas related to farm safety.

2. Training in Responsible Conduct of Science

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 & 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: 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's Office of Human Research Protections' CD-ROM entitled *Investigator 101*, or 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 /reseth/mod/data.html). The University also requires personnel with access to human subject data to take HIPAA training.

3. Input to NIOSH on ERC Funding and Future Directions

Dr Greaves and Dr Brosseau worked with NIOSH Staff and other ERC Directors to help the Agency revise its RFA for ERC grants, restructure its funding of ERCs, and consider the future role of ERCs and their relevance to NIOSH's mission. Four Task Forces were created with membership from NIOSH and the ERC Directors. Dr Greaves chaired Task Force I that looked at the funding structure of ERCs and how this could be adjusted to better reflect the functions of the ERCs, as defined by NIOSH. Dr Brosseau co-chaired Task Force III that considered strategic planning issues for the NIOSH ERCs in the 21st Century. Numerous meetings and conference calls were involved with the final outcome being reports from Task Force 1 and Task Force III, the writing of which were coordinated by Dr Greaves and Dr Brosseau respectively.

E. Program Products

The main products of the ERC in the last year included the following:

- Graduation of 20 masters' students
- Enrollment of 35 masters', 19 doctoral students, 8 post-doctoral and 2 certificate students
- A total of 103 publications by ERC faculty and trainees
- A total of 111 presentations by ERC faculty and trainees

- A total of 68 CE courses with 694 attendees and a further 1,105 people who took on line offerings
- On line publication of the NIOSH ERC Catalog

Two research projects were funded with NORA support and completed (see NORA Training). One of these projects was the basis for an R01 style application in the competing renewal for the ERC in the coming year. The second led also to a grant application.

Substantial outreach activities were provided by each of the Core and Allied Programs (see respective program reports)

F. Future Plans

a. Prepare and submit to NIOSH a competing renewal application for the ERC: The competing renewal application was submitted September 13, 2006. Efforts started in late 2005 to survey alumni and key stakeholders in several OHS disciplines and to compile statistics necessary for the submission.

b. Publish survey data obtained during 2005-2006: Several surveys have been conducted in 2005-2006 (see above). These data are in various stages of analysis and write up. It is planned to submit all survey findings for publication in the peer-reviewed literature. A manuscript for one of the OM surveys involving a collaboration with ACOEM will be submitted in Fall and a second OM paper surveying employers of OM graduates will be submitted in Spring. Papers on various alumni surveys will be prepared also.

c. Fund another 1-2 research projects from NORA funds: Based on the success of the two small research projects funded from NORA Training last year, we will set aside $20,000 in the coming year for another small research project that has a strong chance of leading to more substantial support later. These seed grants have generated a lot of interest among ERC faculty and offer a simple way to kick start research that would otherwise languish for lack of preliminary data. By providing such preliminary data, these seed grants have led to more substantial grants being submitted external funding, and therefore are important to the NORA effort.

d. Finalize written products on the cost effectiveness of injury and disease prevention programs for labor unions. In the next reporting period Dr. McGovern and Nathan Barleen (OHSRP student), Ms. Fredrickson, and others will meet with labor representatives to review and finalize draft written documents for presentation by labor to management. Results of these meetings will establish if this process could be the basis for developing an “economic tool kit” on a variety of injury and disease prevention programs.

A. Outreach Program

B. Ian Greaves

C. Program Description

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

The faculty and staff of each Program are expected to contribute to the improvement of workplace health and safety 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.

There are no specific goals or objectives for the number or type of outreach activities undertaken by Center Programs. This past year the Center made a concerted effort to expand its outreach to certain groups, including labor unions and professional associations.

The Center Director is responsible for encouraging and supporting outreach efforts by individual programs. The Center Director may also initiate, develop or support Center-wide outreach activities.

D. Program Activities and Accomplishments

1. Economic Toolkit

Dr McGovern worked with an OHSRP trainee, Nathan Barleen, Dr Brosseau (IH), and Ann 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. These papers will help to inform discussions with labor representatives about the usefulness of such research efforts in assisting communications with management on the value of prevention.

2. CE Program

Cooperative working relationships are on-going with the Great Lakes OSHA Training Institute Regional Education Center, the Leech Lake Band of Ojibwe, Medi-Sota Inc. - a consortium of west central MN health care providers, the St. Cloud Fire Department, American Crystal Sugar in Moorhead MN and the Minnesota Safety Council.
Relationships are also on-going with the Team Approach to OH&S, co-sponsored by the American Society of Safety Engineers–Northwest chapter, American Industrial Hygiene Association-Upper Midwest section, Minnesota Association of Occupational Health Nurses, North Central Occupational and Environmental Medicine Association, North Star Chapter of the Academy of Certified Hazardous Materials Managers and the Minnesota Safety Council. *The Team Approach* website (http://www.teamapproach.org) lists interdisciplinary activities and provides links to each organization.

The CE Program participated in exhibits at the annual Minnesota Safety Council Conference and other local and national conferences, and exhibited at the Minnesota Department of Health Community Health Services Conference in September 2005.

The CE Program continued to provide access to occupational health and safety information via its website. The website also includes free access to speaker presentations and on-line education.

In collaboration with other ERC CE Programs and with NIOSH staff, the CE Program created a new web site for the NIOSH Catalog of CE Courses. This web site is updated regularly to reflect current CE course offerings at each ERC, and provides prospective students with a single point of information for all ERC CE courses. Links to individual CE Programs offer further information and opportunities to enroll on line.

3. Academic Programs

Faculty in the OM, IH, OHN, 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.

- OM faculty lecture twice a year in the University of Minnesota's Occupational Medicine/Sports Medicine course for family practice residents.
- Dr John Shutske (ASH) gives 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.
- Dr John Shutske (ASH) participated in a FarmFest Meth Information and Education Panel, and presented information to 500 members of the general public, including ASH professionals.
- Dr John Shutske (ASH) gave a session for Minneapolis Farmers Market on a range of safety and preparedness issues (approximately 35 people).
- Dr Ramachandran (IH) taught professional development courses on *Mathematical Modeling of Occupational Exposures* and *Bayesian Decision Making in Exposure Assessment* at the annual American Industrial Hygiene Conference and Exposition (AIHCE).
- Dr Raynor (IH, HSAT) taught a professional development course, *The FUN of Aerosols: Fine, Ultrafine, and Nano Particles in the Workplace Atmospheres* at the AIHCE Meeting.
- Led by Dr Nachreiner (OHN) all students in PubH 6150, *Interdisciplinary Evaluation of Occupational Health and Safety Field Problems*, evaluated a work environment and presented written and oral recommendations for the control of work-related problems to company personnel. Participating sites included the Minneapolis Star Tribune, Caterpillar Inc., Fairview-University Medical Center, Lloyd's Barbeque, Viking Tool and Drill, Nordic Ware, and Prospect Foundry. Final reports and presentations are shared with local site contacts.
- Dr Brosseau (IH, HSAT) participated in Minnesota Department of Health task forces on the prevention of occupational asthma and development of pandemic influenza response guidelines for healthcare settings.
- Dr Brosseau (IH, HSAT) delivered talks on respiratory protection and surgical masks to public health nurses attending a tuberculosis training conference.

E. Program Products

Outreach efforts are described in the respective Program reports. A significant innovation and highlight was the prototype for an Economic Toolkit developed by Dr McGovern and Nathan Barleen with Dr Brosseau, and Ms Fredrickson, in collaboration with representatives of two labor unions.

Using carry forward funds from the previous year, a research assistant in OHSRP, Nathan Barleen, was supported to work with Drs McGovern and Brosseau, Ann Fredrickson, and representatives of the regional labor groups (United Transportation Union, and United Food and Commercial Workers, Local 789). A literature review was prepared on the cost-effectiveness of selected workplace interventions that reduce the health burden of back injuries and diabetes. The approaches developed can be adapted to other illnesses and injuries in relation to work place interventions.

The findings were presented at the Annual ERC Advisory Board Meeting and drew many favorable and encouraging comments from the Board members. [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 & Health Advisory Board Meeting, NORA Poster Exhibit, Minneapolis, Minnesota, April 13, 2006.]

The findings are being prepared as a manuscript for publication in the coming year.

F. Future Plans

The 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 seminar on *The Evolution of Work: Impacts on Health and Safety* which will address the social, demographic and economic trends shaping the experience of work and influencing worker health and safety. Plans include a plenary speaker, student research posters and a call for research presentations. Podcasts of presentations will be placed on the Center website.

- 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

- The CE Program will expand its delivery of health and safety courses during the University of Minnesota's Public Health Institute in spring 2007

- The OM faculty will work with the University's Department of Family Practice to develop an online module on occupational medicine

- The CE Program will participate in on-going efforts to expand occupational health and safety curricula and training in India

- The CE Program, along with Dr McGovern (OHN, OHSRP), will explore the development of multimedia training modules for Minnesota OSHA consultation division

The Center will continue its efforts to partner with representative labor groups to provide consultation on working with management in selected industries on occupational injury and disease prevention and control efforts. Findings from the literature review will be shared with labor representatives for their feedback, and then published.

A. Interdisciplinary Coordination

B. Ian Greaves

C. 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. 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 a broad perspective is offered.

The Center Director is responsible for encouraging and supporting interdisciplinary activities among individual programs. The Center Director has also initiated, developed and supported Center-wide interdisciplinary efforts by assigning discretionary or carry forward funds, in addition to those identified by NIOSH for interdisciplinary purposes, to facilitate interdisciplinary teaching and research.

This past year the Center has made a concerted effort to encourage interdisciplinary activities in the areas of research, outreach, and continuing and academic education.

D. Program Activities and Accomplishments

1. Interdisciplinary Graduate Education

Students from all of the academic programs must take three core occupational health and safety courses PubH 6130, *Occupational Medicine* (Greaves/Baker); PubH 6150 *Interdisciplinary Evaluation of Occupational Health and Safety Field Problems* (Nachreiner and other ERC faculty); PubH 6170 Introduction to Occupational Health and Safety (Nachreiner). Course assignments and in-class activities ensure interactions across all disciplines. Faculty from the core academic programs (IH, OHN and OM) serve as lead and supporting instructors in these courses, to ensure that information and perspectives from all disciplines are included.

We give particular attention to interdisciplinary interactions among graduate students in the PubH 6150, *Field Problems,* course. Students work in cross-disciplinary teams on various health and safety problems at industrial sites. As part of this exercise, they must develop and conduct class tours, develop written reports and deliver oral presentations. Students rate these interdisciplinary activities very highly in evaluations of the course.

2. Interdisciplinary Research Projects

We conducted an in-house competition for small research grants to encourage and support interdisciplinary interactions among all of the Center's programs. Two awards were made for projects that supported interactions among faculty and students in the OM, IH, OHN and OIPRT programs:

- *Influence of Nanoparticle Exposures on Development of Chronic Obstructive Pulmonary Disease*
- *Successful Return to Work for Traumatic Work Injury and Cancer Survivors*

These research projects have led to the submission of an R01 style grant application with the competing renewal application for the ERC, submitted in September 2006, and to an application for support from a

research program within the University of Minnesota. Each application includes faculty from more than one Core or Allied Program.

3. Input to NIOSH Occupational Research Agenda

The Deputy Director (Lisa Brosseau) participated in the design and implementation of a one-day meeting in Chicago, at which comments were presented to NIOSH on directions for the next decade of research project. Three ERCs (Michigan, Illinois and Minnesota) participated in the planning for this meeting. The Deputy Director, OHN Director/OHSRP Co-director (Patricia McGovern) and two private sector OHS practitioners from Minnesota (one from 3M Company and one from St Paul Insurance Companies) made presentations at the Chicago meeting.

The Director of the NIOSH research agenda update (Dr Sidney Soderholm) was invited to participate in a Center Advisory Board meeting, during which further input and comments were offered by participants (faculty, staff and advisory board members). The results will be useful when developing new outreach and interdisciplinary efforts with local communities.

4. Input to NIOSH on ERC Funding and Future Directions

Both Dr Greaves and Dr Brosseau worked with NIOSH Staff and other ERC Directors to help the Agency revise its RFA for ERC grants, restructure its funding of ERCs, and consider the future role of ERCs and their relevance to NIOSH's mission. Four Task Forces were created with membership from NIOSH and the ERC Directors.

Dr Greaves chaired Task Force I that looked at the funding structure of ERCs and how this could be adjusted to better reflect the functions of the ERCs, as defined by NIOSH. Dr Brosseau co-chaired Task Force III that considered strategic planning issues for the NIOSH ERCs in the 21st Century. Numerous meetings and conference calls were involved with the final outcome being reports from Task Force 1 and Task Force III, the writing of which were coordinated by Dr Greaves and Dr Brosseau respectively.

5. Interdisciplinary CE Program Activities

Each CE course has an advisory committee made up of professionals from a wide range of disciplines, as appropriate to the course content and intended audience, who provide an integrated perspective to the course.

E. Program Products

1. Interdisciplinary Graduate Education

The written report 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. The following sites hosted student teams in the past year:

- Caterpillar Paving Products – effectiveness of personal protective training programs
- NordicWare – ergonomic re-design of jobs and production lines
- Viking Drill and Tool, Inc. – evaluate causes of contact dermatitis from metalworking oil exposures

These reports include specific recommendations and a comparison of costs among alternative solutions.

2. Interdisciplinary Research Projects

One of the research projects mentioned in Section C above resulted in the development of an R01 application, submitted with the Center renewal application. Results from the second research project were incorporated into a research application to a University-based NIH-funded Career Advancement Program for Clinical Research Scholars. Manuscripts are being prepared for both projects.

3. Input to NIOSH Occupational Research Agenda

All comments from the Advisory Board meeting on NORA priorities were summarized and submitted via the NIOSH NORA website.

4. CE Program

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

F. Future Plans

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

a. Center Newsletter: A new Center Newsletter is planned for publication in Spring 2007. The Newsletter will include articles describing interdisciplinary interactions, especially as they relate to research to practice.

b. New NORA Research Projects: At least one new interdisciplinary research project will be awarded in the coming year.

c. Academic and CE Education and Outreach: The Director will continue to encourage these programs to include interdisciplinary efforts in their education and outreach activities.

A. NORA Research

B. Ian Greaves, Lisa Brosseau

C. Program Description

The primary goals of the NORA Research Program are (i) 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 (ii) to support interdisciplinary research projects that include faculty and students from two or more Core or Allied Programs and that demonstrate a high chance of leading to an R01 application.

Program success is gauged by the number of 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.

D. Program Activities and Accomplishments

1. Doctoral student support

In this reporting period, two doctoral students in the OIPRT Program received tuition and stipend support, and one OIPRT doctoral student received a travel reward to present a paper at a scientific meeting.

2. Interdisciplinary research grants

A call for applications was distributed in September, 2005. Two applications were received. Peer reviewers from external institutions were asked for their opinion of these applications. Some revisions were made to each application as the result of reviewers' comments, and the amended applications were approved for funding pending human subjects approval where required. Appropriate human subjects' approval was obtained from the Institutional Review Board. The two projects supported were:

- *Influence of Nanoparticle Exposures on Development of Chronic Obstructive Pulmonary Disease (Raynor: IH, OM)*
- *Successful Return to Work for Traumatic Work Injury and Cancer Survivors (Nachreiner: OIPRTP, OHN, OHSRP, OM)*

The first project related to the emerging concerns about nanoparticles and their potential health risks. Considerable problems were encountered in gaining access to a study population of exposed workers, and in the end this project related more to exposure assessment than to assessing human health effects. Nonetheless, work sites were identified where significant exposures to nanoparticles occurred, and data from this survey has led to a more detailed R01 application.

The second project 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. Dr. Nachreiner led this effort, with cooperation from Dr. McGovern, with 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.

E. Program Products

1. Doctoral student support

The two doctoral trainees supported from the NORA funds have made satisfactory progress on their courses and dissertations, and continue to work on their doctoral programs.

2. Interdisciplinary research grants

Data collection and analysis of the two funded research grants were completed in the reporting period. One project, *Influence of Nanoparticle Exposures on Development of Chronic Obstructive Pulmonary Disease*, resulted in an R01 application included with the ERC renewal application submitted in October, 2006.

Results of the second project, *Successful Return to Work for Traumatic Work Injury and Cancer Survivors,* were included in an application to an NIH Career Advancement Program for Clinical Research Scholars administered at the University of Minnesota.

Final reports and manuscripts are being prepared for both projects.

3. Faculty and student publications

The publications of faculty and students are included in Appendix C.

F. Future Plans

1. Doctoral student support

We will continue to use the NORA training funds to recruit and support doctoral students in approved academic programs. Doctoral trainees are presently found in the IH, OHN, OIPRTP, and OHSRP, and each of these programs may request additional support for doctoral students from the NORA funds allocated for doctoral trainees.

2. Interdisciplinary research grants

We plan to fund 1-2 further interdisciplinary research projects in the upcoming year. Calls for applications will be sent to all ERC faculty in October, 2006 with a plan to commence funding in January, 2007.

Again, a requirement will be that the proposed research includes faculty and students from at least two of the Core or Allied Programs in the ERC. Applications are particularly encouraged from faculty who have not received this funding previously.

3. Research Conference/Seminar Series

We will explore the demand for a Research Conference or Seminar Series relating to research conducted by the ERC and possible themes for such a conference or series, which would be conducted in Spring, 2007. In the past, the ERC has conducted various research conferences and seminars supported by NORA funds. These have been a way of disseminating local research findings and of bringing international and national experts to speak on current issues in workplace health and safety.

We are still searching for the best format for these presentations. Working with local stakeholders, we will review past efforts and pursue offerings that will best address the needs of our intended audiences. Appropriate uses of online technologies will be explored also.

B. Core Academic Programs

1. Industrial Hygiene Program

A. Industrial Hygiene Program

B. Gurumurthy Ramachandran

C. Program Description

1. Goals and Objectives

The overarching goal of the Industrial Hygiene (IH) Program is to develop 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 IH program are the following:

- 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
- Provide opportunities for field experience and Master's project (research) work that enable students to develop their practical professional and investigative skills
- Maintain an active Advisory Board that includes representation from stakeholders
- Maintain adequate levels of student enrollment and degree completion
- Support the ERC's continuing education mission by providing training sessions and course content to persons outside the Center interested in industrial hygiene.
- Maintain ABET accreditation of the MPH and MS degrees
- Faculty participation and membership in scientific and professional organizations

2. 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. All of them serve as academic and research advisors for students in the IH Program.

Dr. Gurumurthy Ramachandran (PhD, CIH), a Professor in the Division of Environmental Health Sciences, 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*). He also co-instructs in PUBH 6175 (*Industrial Hygiene Measurements Laboratory*).

Dr. Lisa Brosseau (ScD, CIH), an Associate Professor in the Division of Environmental Health Sciences, was Director of the Industrial Hygiene Program from 1998 to 2004. She has considerable research expertise in respiratory protection, filtration, aerobiology, aerosol sampling, intervention effectiveness and small business health and safety. Dr. Brosseau teaches a core course required of IH and HSAT students, PubH 6172 (*Industrial Hygiene Applications*). She also teaches a course taken as an elective by industrial hygiene students and required of HSAT students: PubH 6176 (*Hazardous Materials and Wastes Management*).

Dr. Peter Raynor (PhD) is an Assistant Professor in the Division of Environmental Health Sciences. 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 an industrial hygiene elective course: PubH 6173 (Exposure to Physical Agents).

The Program is supported by adjunct and participating faculty from local industries such as 3M and General Mills, consulting companies and regulatory agencies. The Program is also supported by faculty from the Institute of Technology and elsewhere in the University of Minnesota.

3. Curriculum

Students take courses in four core areas - Public Health (SPH), Environmental Health Sciences (EnHS), Occupational Health and Safety (OHS), and Industrial Hygiene (IH). Students are also required to take relevant elective courses for at least 6 credits, for a minimum total of 48 credits.

D. Program Activities and Accomplishments

a. Provide an academic curriculum that emphasizes multi-disciplinary elements while maintaining emphasis on practical applications and relevance to issues in occupational and environmental health: Surveys of graduates and employers are conducted on a regular basis (at least every 5 years). Trainees complete evaluation forms, which include both quantitative measures and qualitative remarks, at the end of each course. 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. A survey of recent graduates also evaluates how well educational objectives are being met by the Program.

In 2006 all 1992-2005 graduates were asked to complete a survey about their satisfaction with the program, the value of educational competencies to their employment and the degree of competency they had obtained from the program. Responses were received from 46 (75%) graduates. Graduates were "highly satisfied" (72%) or "satisfied" (24%) with their graduate education in occupational health and safety and 89% were working in the field. Seventy-nine percent had current certification as CIHs and 37% as CSPs. The most valuable discipline-specific competencies gained in the Program 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%), gathering, managing and evaluating 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%). Respondents said they were "proficient" or "very proficient" in all of these competencies.

In November 2005, we conducted four focus groups with individuals responsible for IH and OSH professionals in the manufacturing, government, and consulting sectors. In general, individuals representing these employment sectors foresaw 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 emphasized the importance of good communication skills, both verbal and written. They also agreed that basic science knowledge and technical skills were a prerequisite to hiring.

b. 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. In the reporting period, student worked at manufacturing companies (e.g., 3M Company, and Honeywell Corp), consulting companies, the Minnesota Department of Health, Minnesota Pollution Control Agency, and county departments of health. 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.

c. 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).

d. Maintain student enrollment and degree completion: The IH Program attracts 4-6 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 2005-2006, 20 master's-level students enrolled (10 MPH, and 10 MS). Of these, 4 were part-time trainees. There are currently 6 doctoral students enrolled.

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. The IH Program has been successful in recruiting students from minority communities, including a Latino doctoral student from Puerto Rico and a Hmong student from Minnesota.

Eight industrial hygiene students completed their degree during this reporting period. Each of these graduates are currently employed as industrial hygienists. Student projects completed in this period included the following:

- *VOC Exposure Assessment in Economically-Disadvantaged Urban Elementary Schools*
- *Occupational Exposures During Utilization of Municipal Waste Combustion ASH in Hot-mix Asphalt*
- *The Effect of Occupational Safety and Health Management Systems and Safety Audits on Employee Injury Rates*
- *An Assessment of Airborne Infections in Isolation Rooms*
- *Assessment of Milk Processing Worker Exposure to Potential Bioterrorism Agents in Milk Supply (ASH minor student)*
- *Assigned Protection Factor Development for Engineered Workplace Control Solutions*
- *Efficienty of Filter Media with Biological and Non-Biological Agents (HSAT program student)*
- *The Effect of Voltage on Welding Fume Characteristics (HSAT program student)*

e. Support the ERC's continuing education mission: Working with staff of the ERC's CE Program, IH core faculty have many 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, indoor mold and carpet allergens and respiratory protection during pandemic influenza. All three core faculty teach regularly in the Prep Course for the CIH exam that is offered by the ERC's CE Program. 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, Bayesian decision analysis, pollution prevention, and respiratory protection.

f. Maintain ABET accreditation: The master's (MPH, MS) programs are accredited (2002 to 2008) by the American Board of Engineering and Technology (ABET). The Program faculty conduct numerous assessment activities to ensure accreditation is maintained throughout this period.

g. Faculty participation and membership in scientific and professional organizations: Drs Ramachandran and Brosseau are editorial board members of the *Journal of Occupational and Environmental Hygien*e. 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 has served on an *ad hoc* basis for this study section. Dr Brosseau has been a member of the ACGIH Threshold Limit Values for Chemical Substances Committee since 1993; she chaired this Committee from 1998-2004. Drs Raynor and Ramachandran participate in several AIHA Committees.

E. Program Products

a. Publications and Presentations: Faculty and students publications and presentations are listed in Appendix C.

b. Continuing Education Courses: Dr Raynor offered three courses in the May 2005 Public Health Institute: PubH 7200, (*Personal Protective Equipment and Respiratory Protection*), PubH 7200, (*Preparedness for Buildings*), and PubH 7200, (*Workers as Partners in Emergency Preparedness and Response*). Dr. Ramachandran has offered a new course PubH 7200 (*Nanoparticle exposures and hazards: What should the occupational health and safety professional do?*).

c. Outreach: Examples of outreach efforts conducted in the reporting period included:

- Consulted with 3M Corporation on a study on using expert judgment for occupational exposure assessment (Ramachandran)
- Consulted with law firm on metalworking fluid mist exposure assessment and control issues (Raynor)
- Member, Exposure Assessment Strategies Committee, American Industrial Hygiene Association (Ramachandran)
- Member, NIOSH/CDC Study Section (SOH-1) (Brosseau)
- Grant Reviewer, NIOSH/CDC Study Section (SOH-1) (Ramachandran)
- Editorial Board Member, *Journal of Occupational and Environmental Hygiene* (Brosseau, Ramachandran)
- Editorial Advisory Board, *Aerosol Science and Technology* (Raynor)
- Member, TLV-CS Committee, ACGIH (Brosseau)

F. Future Plans

- Enhance recruitment of excellent students to sustain diversity

- Generate external research support for research training opportunities for doctoral and masters students

- Provide multiple opportunities for students to present papers and participate at the local/ national/international levels

- Engage in new continuing education/outreach activities, including the development of an 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.

2. Occupational Health Nursing Program

A. Occupational Health Nursing Program

B. Patricia M. McGovern

C. Program Description

1. Overview

The Occupational Health Nursing (OHN) Program has a 30-year history of providing interdisciplinary education in occupational health and safety for nurses. The OHN Program offers a Master of Public Health (MPH) degree, a dual degree (MPH-MS, with a major in Nursing), and a Doctor of Philosophy (PhD) in Environmental Health, and a Public Health Certificate in Occupational Health and Safety (PHCert-OHS).

2. Program Faculty

Patricia McGovern, PhD, MPH, RN (Associate Professor) has directed the OHN program since 1985. Her research expertise addresses policy and program evaluation in occupation and environmental health, including the postpartum health of employed women; the effects of flexible work arrangements on health, and work-related violence prevention. She teaches *Occupational and Environmental Policy* (PubH 6105), arranges field experiences (PubH 7196) and supervises masters' and doctoral research projects.

Ms. Debra Olson, MPH, COHN-S (Associate Dean for Public Health Practice Education), has expanded her role to include public health preparedness, and distance learning, as well as research on professional competencies in relation to curriculum development and program evaluation. Ms. Olson's courses include *Issues in Environmental and Occupational Health* (PubH 6102) offered to students in nursing, public health and health care administration, and Issues in Environmental and Occupational Health (PubH 3012) offered online to undergraduates.

Nancy Nachreiner, PhD, MPH, COHN-S (Assistant Professor) graduated in June 2002 and was hired as a non-tenure track faculty member in 2005. She teaches two courses required for occupational health and safety students: *Interdisciplinary Evaluation of Occupational Safety and Health Field Problems* (PubH 6150) and *Introduction to Occupational Health and Safety* (PubH 6170). She conducts injury prevention research in work-related violence and return-to-work issues for survivors of cancer and traumatic injuries.

Additional faculty participating in the OHN program are associated with the University of Minnesota School of Public Health, School of Nursing, and Biosystems and Agricultural Engineering.

3. Curricula

The OHN Program offers a Master of Public Health (MPH) degree, a dual degree (MPH-MS, with a major in Nursing), and a Doctor of Philosophy (PhD) in Environmental Health. It also offers a 13 credit Public Health Certificate in Occupational Health and Safety (OHS) in collaboration with the Centers for Public Health Education and Outreach (16 credits for students new to occupational health and safety). Traineeship funds are used for minority students interested in an introduction to OHS.

The MPH curriculum minimally involves 42 required credits, including two elective courses, and takes approximately two years of full-time study to complete. The dual degree (MS-MPH) program requires at least

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. All students also complete a research paper or project.

The PhD degree curriculum builds upon the existing doctoral training program within the Environmental Health Sciences Division. Having completed all the MPH requirements in Environmental Health, Occupational Health and Safety, and public health nursing courses (described above), students complete additional courses (noted below) for a total of 46 required credits. The 46 credits include dissertation credits and electives to support student research. Additional classes, beyond the MPH requirements include:
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 & Methods, Nurs 8171.

Doctoral students must produce a scholarly thesis that makes an original contribution to the body of knowledge in environmental and occupational health. Students are required to complete a written and oral examination upon completion of their coursework, and an oral defense of their dissertation. All students work with their advisors to organize a dissertation committee minimally composed of four faculty, two of which must be from outside of this department. The doctoral 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.

D. Program Activities and Accomplishments

During the current reporting period, 10 OHNs were enrolled full-time for at least one semester and two were enrolled part-time in MPH programs (including two students with an Agricultural Safety and Health concentration), and two students were enrolled full-time in dual degree programs (MPH-MS). Additionally one student progressed on a PhD program plan. Five students graduated (4 MPH and 1 MS-MPH).

The masters' projects of those graduating included the following:

- *Intervention to Prevent Construction Worker's Hearing Loss: Differential Effects by Gender*
- *Delivery Type and (Employed) Women's Postpartum Health*
- *Marital Status & (Employed) Women's Postpartum Health*
- *Storytelling as an Intervention for Safety Education of Non-literate Audiences*
- *Results of a Local Emphasis Inspection Program Conducted by the Minnesota OSHA in the Auto Body Repair Industry*

The following goals and objectives of the OHN Program were addressed during 2005-2006:

a. Evaluate and refine the learning experience of OHNs: The Program evaluates graduates' learning experiences through the use of periodic alumna surveys, tracking employment and through informal interactions with graduates.

In 2006, the ERC surveyed alumna for perceived satisfaction, value and proficiency of their academic training in regards to discipline specific and cross-cutting professional competencies. Alumna graduating in 1992-2005 were mailed a self-administered survey and 24 (73%) responded. Findings revealed that OHN alumna were highly satisfied (92%) or satisfied (8%) with their graduate education in occupational health and safety, and 63% were working in OHS. Among those whose primary role was not in OHS, the majority (88%) reported

using the knowledge and skills learned in the graduate program in their current job. Almost all OHN alumni rated most OHN competencies as "very valuable" or "valuable." Less proficiency was noted in: negotiating vendor contracts (50%), developing/ managing a case management program (58%), and developing/coordinating a corporate health and disability management programs (51%).

b. Facilitate development of innovative, interdisciplinary graduate and CE offerings: The OHN faculty continually work to improve the interdisciplinary nature of graduate and CE courses and will work to increase the use of distance-based learning options. Courses already online include *Introduction to Occupational Health and Safety* (PubH 6170, 3 credits; Dr Nachreiner), and *Environmental Health and Nursing* (eight 3-hour modules, Ms Olson).

c. Maintain student enrollment into the masters' and doctoral degree programs and increase enrollment by students of color: Recruitment is focused on maintaining a minimum of five full-time equivalent students and one PhD student. Strategies include continuous updating of the program web page (http://enhs.umn.edu/), providing guest lectures to area undergraduate students, informal promotion at professional presentations, publications in the AAOHN Journal, and collaborative recruitment with the School of Nursing.

d. Maintain an active advisory board with representation from industry, labor, and agencies: Advisory board meetings are held annually. During the last reporting period a meeting was held June 30, 2006 and attended by seven advisory members

e. Development of interdisciplinary Research to Practice seminars and short courses

E. Program Products

- Dr. McGovern facilitated a CE program, Fundamentals of NIH Peer Review, featuring Dr. Michael Micklin, Chief, Risk, Prevention, and Health Behavior Integrated Review Group, Center for Scientific Review, National Institutes of Health, for educators/researchers at the AAOHN Symposium and Expo in Albuquerque, May 2006.

- A doctoral student presentation was made at the May 2006 AAOHN 2006 Symposium and Expo: 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.*

- Publications involving trainees and faculty are shown in Appendix C.

F. Future Plans

- OHN faculty will submit a competing continuing application for the next five years and prepare for a site visit by agency officials and peer reviewers.

- Ms Olson conducted an employer survey to identify how employers value the competencies of master's prepared OHNs. The study findings were published in the AAOHN Journal as noted in Appendix C.

- Dr McGovern formalized the dual degree program between the School of Public Health and the School of Nursing through a Memorandum of Agreement, June 2006.

- OHN faculty will strengthen the curriculum in relation to selected OHN professional competencies addressing aspects of management and case management.

- Ms Olson will work with the CE Program to develop new online modules introducing occupational health and safety concepts.
- Dr McGovern is developing an online version of Occupational and Environmental Health Policy (PubH 6105).
- Drs McGovern, Gerberich and staff of the Continuing Education Program will collaborate in hosting scientists from the NIOSH Division of Safety Research in July 2006. The presentations will be posted online.

3. Occupational Medicine Program

A. Occupational Medicine Residency Program

B. Beth Baker

C. Program Description

The Occupational Medicine Residency Program (OMR Program) is a collaborative effort between the HealthPartners Institute of Medical Education, HealthPartners Medical Group Department of Occupational and Environmental Medicine, and the Division of Environmental Health Sciences, University of Minnesota School of Public Health. In existence since 1977, the OMR Program pursues the education and training of health care professionals by delivering state-of-the-art occupational health services. The most recent ACGME review in October, 2003 approved the Residency for five years.

Our goal is to train physicians for practice in a wide range of settings, including government agencies, corporate health departments, clinical practice, and academia with a focus on improving workers' health and safety. A strong emphasis on both occupational medicine clinical practice and the associated occupational and public health disciplines is central to our philosophy that acumen in both clinical and academic discipline provide an optimal foundation for our residents future practice in the recognition and mitigation of workplace hazards, and the prevention and treatment of work related health conditions and the potential associated disability.

We also provide regional and community occupational health education and training for practicing physicians, nurses, and other health professionals, as well as providing elective clinical rotations for medical students, family medicine and internal medicine residents and medical toxicology fellows in addition to our occupational medicine residents and graduate occupational health nurses.

1. Program Administration

The OMR Program is located within the Department of Occupational and Environmental Medicine in HealthPartners Medical Group. It is overseen by the HealthPartners Institute of Medical Education, and is affiliated with the University of Minnesota School of Public Health and the School of Medicine. The academic training in the residency program is provided through the School of Public Health's Division of Environmental Health Sciences. Funding to support the Occupational Medicine Residency Program comes as a sub-contract via the University of Minnesota's Education and Research Center (ERC). Resident supervision, teaching and research activity is provided jointly through the OM residency and ERC staff.

2. Program Faculty

a. Core Faculty: Beth Baker MD, MPH, FACOEM, FACMT assumed the position of Residency Director in September, 2004 and will be resigning that position at the end of 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 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 and Director of the MCOHS, 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 2005-2006 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. In 2005-2006 he served on CDC/NIOSH and NIH study sections, reviewing agricultural safety and health centers and environmental health research centers. 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 joined the OM 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 will assume the role of Program Director after Dr Baker resigns from that position in December, 2006. She will work closely with Dr Baker to transfer program leadership responsibilities by the end of this year. Dr Roeber Rice will work also with Drs Michael McGrail and Jeffrey Mandel, both of whom directed the program previously, and with Dr Ian Greaves, who oversees residents' didactic training. For the initial year of Dr Roeber Rice's involvement, regularly scheduled meetings covering all aspects of program function will take place with these four occupational physicians to assure a smooth transition. Already Dr Roeber Rice has been actively contributing to many aspects of the residency, including clinical preceptorships, clinical rounds, journal clubs, and grand rounds.

Jeffrey Mandel, MD, MPH joined the School of Public Health faculty in Fall, 2006. Dr Mandel, a prior Residency Director of the OM 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. Currently, an independent consultant in occupational medicine and epidemiology, 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.

b. 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 OMR 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 June 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 OM residency's journal club. Dr Kirsten McGrail is a 2001 alumnus of the OMR Program.

D. Program Activities and Accomplishments

As the result of an interim NIOSH review conducted in 2004, the ERC's funding from NIOSH for the OMR Program decreased from $205,776 in 2004-2005 to $125,000 in 2005-2006. The latter figure was supplemented with $30,000 from the ERC Director's Discretionary Fund, for a total level of funding of $155,000 in 2005-2006. The cut in funding means that a greater fraction of the residents' financial support came from HealthPartners Institute for Medical Education, but such support cannot be relied upon beyond 2006-2007.

Criticisms of the OMR Program contained in the interim report included a need for more research opportunities for residents; increased research involvement of the faculty; and lack of support for faculty scholarly activities. These concerns have been addressed in several ways: the creation of an Assistant Residency Director for Research (Dr Zheng); the part-time appointment of a second OM physician faculty member in the School of Public Health (Dr Mandel); and identification of further research opportunities and projects with several School of Public Health Faculty (Drs Alexander, Gerberich, Greaves, Mandel, McGovern).

Other changes include the addition of a specific ergonomics course and expansion of the Ramsey County Health Department rotation to two months, each of which address further issues raised in the interim NIOSH review concerning ergonomics and clinical experience with local government agencies.

Greater interdisciplinary emphasis for OM residents has been implemented with an industrial hygienist working more regularly with the OM Clinic at Regions Hospital, and OHN students having increased involvement with the Clinic.

1. Residents' Accomplishments

The progress and performance of all residents in the program is monitored by the Residency Advisory Committee.

Three residents completed their OM Residency Program in July, 2005. One is now Medical Director, Employee Health & Wellness, St. Mary's/Duluth Clinic and Section Head, Occupational Medicine Clinic, St. Mary's/Duluth Clinic. Another is a Staff Physician with Boston Neurobehavioral Associates, New Bedford, MA. And the third is now Director of Employee Health, Fairview Riverside Hospital, Minneapolis, MN; her research project on Hazardous Child Labor was published with Dr David Parker in *Public Health Reports*.

Three further residents completed the program in June, 2006. One was the principal investigator of a study supported by HealthPartners Institute for Medical Education assessing the validity of a screening questionnaire in predicting elevated levels of blood lead in pregnant women presenting for prenatal care. The other two conducted separate training satisfaction and needs surveys of (i) national OM residency graduates and (ii) practicing OM physicians under the supervision of OM faculty (Drs Baker, Greaves, Brosseau and Ms Fredrickson). The survey results will help refine our OM curriculum.

Three continuing residents (PGY-2) are also making excellent academic progress. One is undertaking an elective rotation in the Peoples Republic of China (in collaboration with Dr Zheng) at the Beijing University Hospital. Two new residents started the program as full time residents in September, 2006. Recruiting for 2007-2008 is not yet completed. A third resident is currently completing online courses through the School of Public Health and will start as a 60% FTE in January, 2007. Sadly, one of our second year residents withdrew from the program in October, 2005 for personal reasons.

2. Program sponsored events

The MCOHS co-sponsored the Central States Occupational Medicine/North Central Occupational and Environmental Medicine meeting in Rochester, MN in 2006 co-chaired by Dr Beth Baker. The ERC will also co-sponsor the monthly OEM Grand Rounds, currently sponsored by the OMR Program. Dr Baker was also co-Director of the American College of Medical Toxicology (ACMT) 2006 course in medical toxicology and is planning the spring 2007 ACMT course as co-Director.

E. Program Products

(See Appendix C)

F. Future Plans

a. Expand occupational and environmental toxicology activities: In addition to continuing teaching activities with the joint Emergency Medicine and Occupational and Environmental Medicine Toxicology Fellowship program, we hope to apply for a combined ACGME accredited 3-year Occupational Medicine/Medical Toxicology (OM/MT) residency next year. The planned program will be the first joint OM/MT residency in the United States, and will provide eligibility for joint certification in Preventive Medicine (Occupational Medicine) and Medical Toxicology.

b. Expand and develop additional research opportunities and doctoral program collaborations: The OM Residency Program will continue to focus on research training as part of the residency experience through collaboration between academic institutions and various private and government agencies. Our objective is to improve the number and quality of faculty and resident research projects that: (1) result in manuscripts submitted for publication within the next reporting period, and (2) contribute to the basic fund of knowledge in

occupational and environmental medicine. In order to accomplish this goal, CJ Zheng, MD, PhD, the recently appointed Assistant Residency Director for Research. will expand and develop the research program for residents. In addition, Dr Mandel has been recruited to develop a strategic plan to strengthen the research capacity of the OM program and enrich the academic and research opportunities for both residents and staff. The strategic plan will identify research priorities, potential institutional and individual collaborators, and possible funding sources. The program will strive to recruit candidates, and encourage residents to pursue related doctoral programs. Development and submission of grants are planned as an outcome of these efforts.

c. Review and update curriculum based on recent resident surveys of recent graduates and current occupational medicine physicians: Further refinements of the OM curriculum is anticipated following analysis of the results obtained from surveys performed by two OM residents (see above). This helps ensure optimal coverage of general and specific core competencies and knowledge areas necessary for occupational medicine practice.

d. Conduct outreach to family medicine residency programs: A major component of occupational medical practice continues to be conducted within both family medicine and internal medicine. As a result, the OMR faculty will continue to concentrate on training of adult medicine primary care physicians. This includes continuing clinical rotations, twice-yearly participation in the University of Minnesota's Occupational Medicine/Sports Medicine course for family practice residents, and a new collaboration with the University of Minnesota's Department of Family Medicine to develop an online occupational medicine module with expanded offerings to urban and rural participants.

In summary, the OMR Program continues to provide community, regional, and national educational and research in occupational medicine. Our clinical training of occupational medicine remains the primary strength of this Program, while research efforts are expanding with the School of Public Health faculty. The program has been strengthened in the last year with the addition of junior and senior faculty, and will continue to explore and develop further national and international efforts to promote the practice of occupational medicine and research.

C. Allied Occupational Safety and Health Academic Programs

1. Hazardous Substance Academic Training Program

A. Hazardous Substances Academic Training Program

B. Peter C. Raynor

C. Program Description

1. Goals and Objectives

The University of Minnesota HSAT Program is a specialty within the ERC's Industrial Hygiene (IH) Master's Program. 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 include the following.

- Assure that coursework pursued by the HSAT Program students prepares them to address relevant problems and issues in both occupational and environmental health.
- Assure that research training received by students in the HSAT Program is relevant to their future work as industrial hygienists and environmental specialists.
- Attract the best students possible to the program by providing tuition and stipend support to at least 3 students each year, including at least 1 new, incoming student each year.
- Expand the awareness of hazardous substances throughout the industrial hygiene and environmental health curriculum.
- Ensure that faculty involvement in the program serves the needs of the students and supports the continued development of the program.
- Support the Midwest Center's continuing education mission by providing training sessions and course content to persons outside the Center interested in hazardous materials and waste.

2. Curriculum

As a specialty within the IH Program, the HSAT Program shares the bulk of its course 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, 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. They usually pursue 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.

3. Responsible Conduct of Research Training

See Center Administration section.

4. Faculty Participation

Peter Raynor, PhD, is an Assistant Professor in the Division of Environmental Health Sciences and has directed the 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 is also working 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, Vice-Chair, and Secretary of the American Industrial Hygiene Association's Aerosol Technology Committee and is also a member of that organization's Nanotechnology and Methamphetamine Working Groups.

Lisa Brosseau ScD, CIH, an Associate Professor in the Division of Environmental Health Sciences, has research expertise in respiratory protection, filtration, aerobiology, aerosol sampling, intervention effectiveness, and small business health and safety. She has been a member of the ACGIH TLV Chemical Substance Committee since 1993 and was Chair of this committee from 1998 until 2005.

D. Program Activities and Accomplishments

a. Coursework prepares students to address relevant problems and issues: We seek to ensure that research projects and field experiences address aspects of hazardous substances.

During the reporting period, two HSAT students completed the MS degree. Masters projects included:

- *The Effect of Voltage on Welding Fume Characteristics*
- *Efficiency of Filter Media with Biological and Non-biological Agents*

Both of these two graduates are employed in occupational health and safety positions at 3M Company.

b. Assure that research training received by students in the HSAT Program is relevant to their future work as industrial hygienists and environmental specialists: In 2005, graduates of the IH and HSAT Programs during 1992-2004 were surveyed for their satisfaction with the program and perceptions about the value of educational objectives. Industrial hygiene graduates had a response rate of 75% (46 of 61). Ten of the IH graduates also identified themselves as alumni of the HSAT Program, and their 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 health and safety 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 is due, in part, to half of the respondents receiving their degrees in 2003 or later.

The findings on the interdisciplinary competencies addressing “recognition,” “evaluation,” “control,” “communication,” “behavior,” and “management” reveal 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 9 out 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.

These survey results show that the majority of recent alumni from the HSAT Program believe that their training has provided them with the knowledge, skills, and attitudes to succeed in their careers.

c. Attract the best students possible to the program by providing tuition and stipend support to at least 3 students each year, including at least 1 new, incoming student each year: One new student entered the Program in September 2005. A second incoming student has deferred admission until the Spring 2007 because she was called to active duty with her Army Reserve unit.

d. Expand the awareness of hazardous substances throughout the industrial hygiene and environmental health curriculum.

e. Ensure that faculty involvement in the program serves the needs of the students and supports the continued development of the program: Dr. Raynor is working 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 methamphetamine exposures for remediation workers and future residents. To date, this work has been performed with money originally provided by the U.S. Environmental Protection Agency to MPCA. Dr. Raynor is working with MPCA and MDH to leverage these funds into a larger project providing more research support for HSAT students.

f. Support the Midwest Center's continuing education mission by providing training sessions and course content to persons outside the Center interested in hazardous materials and waste:
Dr. Raynor has developed two new courses for the Public Health Institute, *Personal Protective Equipment and Respiratory Protection* and *Workers as Partners in Emergency Preparedness and Response*. These courses can be taken for CE credit or for 1 academic credit during the May intersession. Both courses deal in part with protection of workers from hazardous materials and wastes.

Dr Raynor has revived the course PubH 6173, *Exposure to Physical Agents*. Students in the course spend three out of 14 sessions discussing recognition, evaluation, and control of ionizing radiation sources.

E. Program Products

a. Publications: A total of 14 publications and conference reports were published by faculty and trainees associated with the HSAT program in 2005-2006 (see Appendix C).

b. Trainees: Two students completed an MS degree.

F. 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 include:

- Maintain the academic courses and research opportunities available to HSAT students and to expand research opportunities where possible.
- Recruit 1-2 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. Dr Raynor will work with the School of

Public Health Office of Multicultural Services and the Division Head over the next several years 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 continue to seek ways to 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.

2. Agricultural Safety and Health Program

A. Agricultural Safety and Health Program (ASH)

B. Dr John M. Shutske

C. Program Description

1. Program Goals and Objectives

The Agricultural Safety and Health (ASH) program provides an academic minor option to existing academic training programs. 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 take 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.

2. Faculty Participation

a. 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 with a pending appointment as senior member of 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 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. In addition, she is a co-

investigator on a large School of Public Health grant that includes work on H5N1 avian influenza with villagers and government officials in Vietnam.

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.

b. Supporting Faculty

Steve Kirkhorn, MD, Lecturer (Medical Director of the National Farm Medicine Center, 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, National Farm Medicine Center, 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.

3. Curriculum

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 OIPRTP 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 expe-

rience 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).

4. Responsible Conduct of Science Training

See the Center Administration section for a description of this training.

D. Activities and Accomplishments

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

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

Drs Steve Kirkhorn and Mark Purschwitz now are involved in teaching portions of BAE 5212. Their role will be continued in the pending 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 an IH trainee enrolled in the program during this project period. Dr. Raynor served as primary advisor to another IH trainee (also an ASH enrollee) in research focusing on worker exposure to bioterrorism agents given various possible scenarios in which a dairy farm or dairy processing facility could become the target of an intentional terrorist attack to our fluid milk supply.

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. These three courses alone have attracted 81, 51, and 44 students in total respectively in the current project cycle to the end of 2005. This is in addition to BAE 5212, which has had 69 students since fall 2002 and is now a required course for all BAE students. 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 198 students since July 2005.

c. 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 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.

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

e. Engage in new continuing education/outreach activities: Continuing education efforts for ASH are described more fully in the CE Core.

The ASH CE program continues to compete for audience share with health care systems that generate their own staff trainings and with the current plethora of online units of continuing education available at no charge to many licensed physicians, nurses and allied health personnel, including occupational health and safety professionals. ASH certification or licensure is required in very few organizations and with limited industry and health service safety and health training budgets, potential CE participants have not selected agricultural health and safety trainings over those that will be supported financially by their employers or that will lead to wage or salary increases. Listening to our audiences, who have indicated that a variety of educational program offerings including face-to-face and web based would be preferred, we will attempt to continue to enhance both venues for our ASH CE program.

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 & Food Safety, College of Veterinary Medicine, College of Agriculture, Food and Environmental Sciences, Department of Food Science & Nutrition, University of Minnesota; Coastal Seafoods, Cub Foods, Dean Foods, HMS Host, Minneapolis-St. Paul Airport, J&J Distributing, LaLoma Tamales, Minnesota West Community and Technical College, Minnesota Area Health Education Centers, Minnesota Board of Animal Health, Minnesota Department of Agriculture, Minnesota Department of Health, National Center for Food Protection & Defense, Seward Coop, and SuperValu, Inc.

The Interface of Rural Family Practice and Farm Families was held in September of 2005 and February 2006. 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.

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

E. Program Products

ASH faculty Shutske and Schermann have directly contributed to more than 30 journal articles, technical papers, abstracts, and technical presentations during the project period for a range of both scientific and industry-based audiences.

a. Honors and awards: The following awards were received by faculty and staff.

- John Shutske, University of Minnesota: Star Faculty Award, 2006
- Michelle Schermann, Outstanding Professional and Academic Achievement Award – Scientific Research category.

b. Outreach efforts of Dr Shutske:

- Workshop for Public Health Professionals and local industry leaders - Protecting our Food system From Intentional Attack - July 12 West St. Paul (35 attendees)

- Department of Health Food System Tabletop Exercise - Aug 3, St. Paul (100)
- FarmFest Meth Informational and education panel - Aug 4th (500)
- Workshop for Public Health Professionals and local industry leaders - Protecting our Food system from Intentional Attack - Aug 18, Bismarck, ND (30)
- Southern Research and Outreach Center Open House -- Farm Biosecurity - Waseca, MN Sept. 15 (450)
- OnGuard - Protecting America,s Food System - Educational workshop - Kasson - Aug 27. (105)
- NEHA in North Dakota (Fargo) - Workshop Protecting our Food system from Intentional Attack - Fargo, ND Oct 13. (45)
- Health Professionals Role in Agricultural Safety and Health - Session for Family Practice Residents, scheduled through Anita Eich, Sept 9 (30)
- EDEN - Fargo Oct 18-20 (86)
- Seward School -- Nov 18th -- Outreach with Hmong book and Michele's readings
- Lots of work in November with Milk Project and Peri with Keith and inspectors
- October through December -- much work on development of Minnesota EDEN plan and concepts
- Michigan State Planning meeting, National Center for Food Protection and Defense, Feb 1 -3
- Health Professionals Role in Agricultural Safety and Health - Session for Family Practice Residents, scheduled through Anita Eich, Feb 10th, 30 students
- CIDRAP -- Pandemic Planning for business -- Feb 14 and 15, represented ag and food industries and provided input and expertise on worker issues.
- Outreach to LaLoma - February 28, for various programs and seminars including FSI Minnesota and PHI
- Session for Minneapolis Farmers Market -- approximately 35 people, range of safety and preparedness issues. March 11
- Development of MDA and other state agency Food Emergency Response Plan processes.
- Presentation for Minnesota Association of Family and Consumer Sciences (MAFCS) - March 31, 40 people.
- FSI Minnesota -- 3 sessions, March and April (75)
- Minnesota Meth Task Force participant
- Coordinated Extension Ag, Food, Environment Educators, Staff development on safety and preparedness issues (50)
- Taught full week of Public Health Institute -- Food Biosecurity Action Planning -- with LaLoma June 5 - 9 (24)
- Outreach to Inventor,s Congress (presentation and consultation for inventors)
- Creation of National Food Emergency Response Plan - Consultation provided.

Further information is included in Appendix C.

F. Future Plans

a. Recruit high quality students into the program from a range of disciplines: Recruitment of students enrolled in other Core and Allied Programs to undertake a minor in ASH will continue ion the coming year. In the past, OHN, IH and HSAT students have been most interested in working with the ASH program, as well as collaborations with students and faculty in OIPRTP.

b. Cultivate relationships with key members of the agricultural and food systems industries to aid in student recruitment, internship placement, research problem identification, and placement: Dr Shutske will continue to explore relationships with agribusinesses, farming groups, cooperatives, and other key stakeholders in agricultural safety and health. He has a wide regional network already and is always seeking new collaborators.

c. 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 is expanding (see

above). The additional of Dr Jeffrey Mandel to the OM Program in Fall 2006 will add to the strength of collaborators and provides a new avenue of research potential with the OM Program.

d. Provide multiple opportunities for students to present papers and participate at the national/international levels: Increased participation of trainees in regional and national meetings of ASH professionals will be encouraged and supported with travel funds, as appropriate.

e. Engage in revised and new continuing education/outreach activities: Existing CE offerings will be evaluated and modified as needed. Several new offerings were developed in the previous reporting period

f. Disseminate research findings from funded research, continue to cultivate and facilitate R2P opportunities for students and faculty: Working in collaboration with other ERC faculty and staff of the CE Program, research findings will be conveyed to OHS professionals and other interested parties through seminars, workshops, and on line offerings.

3. Occupational Health Services Research and Policy Program

A. Occupational Health Services Research and Policy Training Program

B. Dr Patricia McGovern and Dr Bryan Dowd

C. Program Description

1. Goals and Objectives

The Divisions of Environmental Health Sciences and Health Policy and Management at the University of Minnesota's School of Public Health collaborate on this joint doctoral-level program in Occupational Health Services Research and Policy. The program prepares graduates for OHSRP positions in academic institutions, and public and private agencies. 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.

The aim 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.

The specific goals of this program are to:

Maintain enrollment of a minimum of three full-time equivalent students in the program and admit one new student each year

- Introduce all students to the principles of occupational safety and health disciplines through *Introduction to Occupational Health and Safety* (PubH 6170)
- Maintain an advisory board that meets at least one time per year, and includes representation of industry, labor, state agencies, and health insurance plans.
- Collaborate with the CE Program to develop and implement one OHSRP seminar per year
- Continue students and faculty involvement in the distance-based OHSR Journal Club
- Develop web-based modules relevant to OHSRP

2. Faculty Participation

The core faculty include Bryan Dowd, Professor, and Patricia McGovern, Associate Professor, both of whom teach, conduct occupational health and safety (OHS) research, and advise students.

Bryan Dowd, PhD, is a tenured professor in Health Policy and Management (HPM), and the Director of Graduate Studies for the doctoral program in Health Services Research, Administration and Policy. He currently chairs the School's Appointments, Promotions and Tenure (APT) committee. He teaches advanced health services research methods at the masters and doctoral level (PubH 8811, Seminar: Health Services Research Methods). He focuses his research on 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 insurance theory, causal modeling, health plan choice, enrollment and disenrollment in Medicare HMOs, Medicare reform, and the cost-impact of a disability prevention program. He has published over 80

articles in peer-reviewed journals. He served for four years on the health services research grant review panel of the Agency for Healthcare Research and Quality (AHRQ), regularly reviews research proposals for AHRQ, Centers for Medicaid and Medicare Services and the Robert Wood Johnson Foundation, and is a referee for all of the major health services journals.

Patricia McGovern, PhD, is a tenured associate professor in Environmental Health Sciences with an adjunct appointment in the School of Nursing. She is also the Program Director of the Occupational Health Nursing (OHN) Program. She also serves as the Director of the School's Interdisciplinary Concentration in Public Health Policy, and the Director of Graduate Studies for the School's minor in public health. She teaches a required EnHS course (Environmental and Occupational Health Policy, PubH 6105). Dr. McGovern focuses her research in health services research and policy as applied to occupational health and safety issues. Her work includes studies of employed women's postpartum health, work-related violence prevention, and evaluation of professional competencies in occupational health and safety education. She has served as a peer reviewer for ERC site visits, and recently served on a NIOSH special emphasis panel for Centers of Excellence to Promote a Healthier Workforce.

3. Curriculum

Academic program plans vary for students based on their division of enrollment and dissertation research. Each plan must include a minimum of 21 interdisciplinary course credits with content in occupational health and safety, environmental health sciences, statistics and bioethics. See Appendix A for academic program plans/course outlines, sample schedules and curricula.

The program plan for students entering the program from the Division of EnHS entails the following requirements: 2 courses (8 credits) in statistics, 3 courses and 7 credits in epidemiology, minimally 1 course for 2 semesters (1 credit/semester) of a doctoral research seminar and research methods, 3 courses (6 credits) in environmental health sciences, 2 courses (6 credits) in occupational health and safety, and 1 course (1 credit) in ethics for a total of 12 core courses (30 credits). Additionally, students are required to complete 14 to 16 credits in their supporting program in HPM, which must be developed by the student with the assistance of an advisor. The supporting program includes 1 course from a list of specified options in economics, sociology, and health care policy and 2 electives. Students complete a grand total of 68 to 73 credits, which includes 24 dissertation credits.

The program plan for students entering the program from the Division of HPM entails the following requirements: 2 courses (8 credits) in statistics, 4 courses (10 credits) in research methods including a doctoral research seminar, 2 courses (6 credits) in economics, 2 courses (6 credits) in social/psychological theories to health, 2 courses (5 credits) in health care policy and 1 course (1 credit) in ethics. Additionally, students are required to complete 12 to 16 credits in their supporting program in EnHS, which must be developed by the student with the assistance of an advisor. The supporting program requirements include 3 courses (6 credits) in environmental health sciences, and a minimum of 2 courses (6 to 10 credits) in occupational health and safety. Students complete a grand total of 72 to 76 credits, which includes 24 dissertation credits.

Each Division has its own set of qualifying exams before students can progress to their dissertation. In HPM students must pass three qualifying written exams in research methods, health policy, and either economics or sociology. In EnHS students must complete a written examination upon completion of their dissertation proposal. All students undergo formal evaluation of their research plan and findings by passing preliminary and final oral examinations with their department of enrollment. All students work with their advisors to organize a dissertation committee, minimally composed of four faculty, of which two must be from outside of the division 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 policy, and earn a Doctorate of Philosophy. This OHSRP program generally requires a minimum of two full-time years of coursework, and

two additional years for examinations and dissertation research. Selection of students' dissertation topics are a function of ongoing faculty research projects, student interest and funding. The students worked with key faculty from either division, and the OHSRP co-directors, to develop their research questions, study design, and dissertation committees. Key faculty work with students to obtain additional funding for dissertation research, such as the external research grants and contracts.

4. Responsible Conduct of Science Training

See the Administrative Core section for information.

D. Program Activities and Accomplishments

a. Maintain enrollment of a minimum of three full-time equivalent students in the program:
Four students enrolled in the OHSRP Program during the reporting period.

b. Admit one new student each year: One new student enrolled in the program in the reporting period.

c. Introduce all students to the principles of occupational safety and health disciplines through "Introduction to Occupational Health and Safety" (PubH 6170, 3 credits): All current students have successfully completed this course.

d. Maintain an advisory board that meets at least one time per year, and includes representation of industry, labor, state agencies, and health insurance plans. The advisory board met July 18, 2006 and provided insights on trends in occupational health services research and policy, program planning, and students' dissertation projects.

e. *Continue students and faculty involvement in the distance-based OHSR Journal Club.* Dr McGovern organized one session in 2005-2006, which involved a PhD student dissertation proposal, *The Impact of Work-Family Conflict on Maternal Health One Year After Childbirth: A Longitudinal Analysis.*

f. Develop one to two web-based modules relevant to OHSRP. Dr McGovern worked with technical consultants to develop *The Americans with Disabilities Act (ADA) and Policy Evaluation* (Dr McGovern and Mr David Cossi, J.D, MS, Adjunct Assistant Professor).

g. Introduce selected principles of health services research into "Applied Analysis of Occupational and Environmental Data" (PubH 8100): Student manuscripts currently in review from the class include:

- Grice MM, Feda D, McGovern, PM, Alexander B et al. Giving birth and returning to work: The Impact of work-family conflict on women's health after childbirth.
- Dagher R, McGovern PM, Alexander BH, Dowd B, et. al. The Psychosocial Work Environment and Maternal Postpartum Depression.

h. Other Accomplishments

Trainee recruitment and diversity efforts: The OHSRP Program has one African American student enrolled who has successfully matriculated through the program and plans to complete her dissertation research June 2007. Dr. McGovern collaborated with Dr. Ramachandran to recruit a student in OSHRP in 2006, with funding from Dr. Ramachandran's National Science Foundation grant, *Evaluating Oversight Models for Active Nanostructures and Nanostystems*. The research will involve identifying key issues in developing policies for nanotechnology by assessing historical oversight models for chemicals in the workplace. An OHSRP trainee, Mira Grice, 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 will be presenting their research at the Annual American Public Health Association Meeting in November, 2006. She also received the School's Community Partner Star Award at an annual ceremony, October 3, 2006.

E. Program Products

a. Publications: Publications involving trainees and faculty are listed in Appendix C.

b. Selected Trainee and Faculty Presentations

- McGovern P, Dowd B, Gjerdingen D, et. al. After Birth: Policies that Promote Healthy Women and Workplaces, Presentation: Work, Stress & Health, NIOSH & APA, Miami, Florida, March 2, 2006.

- 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 & Health Advisory Board Meeting, NORA Poster Exhibit, Minneapolis, Minnesota, April 13, 2006.

- Schult TM, McGovern PM, Dowd B, Pronk, NP. The Future of Health Promotion/Disease Prevention Programs: The Incentives and Barriers Faced by Stakeholders. Poster Presentation. Midwest Center for Occupational Safety & Health Advisory Board Meeting, Poster Presentation. Minneapolis, Minnesota, April 13, 2006.

- McGovern P, Gjerdingen D, Dowd B, et. al. Work Organization & Postpartum Health In Employed Mothers. Oral and Poster Presentation, NORA Symposium 2006, Washington DC, April 19, 2006.

- Dowd B. Endogenous Explanatory Variables in Health Services Research. Presentation: AcademyHealth Meeting, Seattle, Washington, June 27, 2006.

- McGovern P, Gjerdingen D, Dowd B, et.al. Twelve Weeks After Birth:Women Work and Health. Presentation: AcademyHealth Meeting, Seattle, Washington, June 25, 2006.

F. Future Plans

- The OHSRP faculty will provide an annual seminar and work with staff from the CE Program to make it accessible though distance learning.

- Dr Dowd joined a working group involving the University of Minnesota and the University of Wisconsin on the effects of the “built environment” on public health and patient safety. In addition to his credentials in policy analysis, Dr. Dowd is a licensed architect and works with other researchers to develop a research program on broad issues relating design to health.

- Dr Dowd also was asked to chair the first health services research Methods Council, organized by AcademyHealth. The Council’s first meeting is in Washington, DC 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.

- Dr McGovern will continue to develop modules for an online version of “Occupational and Environmental Health Policy” (PubH 6105) funded, in part, through a Technology Enhance Learning (TEL) award from the University’s Digital Learning Center

4. Occupational Injury Prevention Research and Training Program

A. Occupational Injury Prevention Research Training Program

B. Susan Goodwin Gerberich, Bruce H. Alexander

C. Program Description

1. Program Goals and Objectives

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. It builds on extensive high quality training and research experiences dating back to 1980 that have achieved national and international recognition. Specific goals include:

- Apply the Public Health Model to occupational injury prevention
- Provide opportunities for student research projects and theses
- Disseminate research findings
- Employ effective recruitment and retention strategies
- Provide a high quality curriculum that provides a strong foundation for occupational injury prevention research training
- Enhance OIPRTP development
- Promote job opportunities for graduates of the OIPRTP
- Provide continuing education and outreach
- Ensure interdisciplinary research training activities

2. Faculty Participation

a. Primary Faculty

Susan Goodwin Gerberich, PhD (Professor, Environmental Health Sciences; Director, OIPRTP and injury and violence centers) and Faculty, Human Factors, has a national and international reputation in the area of injury epidemiology and control, and has consulted for local and national agencies, including the Centers for Disease Control and Prevention (CDC), NIOSH, and National Institutes of Health. She has been funded through numerous RO1 grants, and has published extensively and presented papers in the national and international arenas. She teaches in injury/occupational injury and safety courses (PubH 6120, PubH 6121, PubH 6122), leads the weekly research seminar (PubH 8120), and collaborates with Drs. Alexander and McGovern in the course PubH 8100, “Applied Analyses of Occupational Health Data.” Dr. Gerberich also continues to teach in PubH 5123, “Violence: Theory, Research, and Application.”

Bruce Alexander, PhD, (Associate Professor, Environmental Health Sciences; Co-Director, OIPRTP) has expertise in occupational epidemiology, with national and international recognition, and teaches in the: Doctoral Research Seminar, PubH 8120; Global Health Seminar, PubH 6100; Occupational and Environmental Epidemiology, PubH 6140; Applied Analysis of Occupational Health Data, PubH 8100; Environmental Health, PubH 6101.

Timothy Church, PhD, Biostatistician (Professor, Environmental Health Sciences) has expertise in biostatistics and application of special techniques to ascertain the potential degree of bias in research studies and is highly recognized, nationally and internationally. He teaches PubH 6140, Occupational and Environmental Epidemiology and the Doctoral Research Seminar (PubH 8141), and contributes to the OIPRTP research seminar (PubH 8120).

George Maldonado, PhD, (Associate Professor, Environmental Health Sciences) has a national reputation for his expertise in epidemiology methodology and has developed courses and facilitates seminars pertinent to research methods that aid students in the design, conduct, and analysis of epidemiologic studies: Validity

Concepts in Epidemiologic Research (PubH 8140); Epidemiologic Uncertainty Analysis (PubH 8142); Doctoral Research Seminar (PubH 8141 and OIPRTP Research Seminar (PubH 8120).

b. Other personnel

Andrew Ryan, MS, **(**Research Fellow and Research/Statistical Applications Specialist, Environmental Health Sciences) has expertise as an applications programmer and collaborates with faculty in instructing students in the intricacies of data management, programming, and analysis relevant to the massive and complex data sets, utilized as a basis for research training. He contributes to PubH 8120 and in directed statistical applications for the course, Applied Analysis of Occupational Health Data (PubH 8100). He received the 2006 School of Public Health (SPH) Academic Professional and Administrative (P&A) Excellence Award.

Other Key Supporting personnel include ten University of Minnesota faculty from the School of Public Health and the Departments of Psychology, Mechanical Engineering and Biosystems and Agricultural Engineering and adjunct faculty from Health Partners, General Mills and the Minnesota Department of Health.

3. Curricula

Required program coursework includes the following, supplemented with relevant elective courses, according to the needs of the respective students:

a. School of Public Health requirements: Training in courses related to epidemiology, biostatistics, and ethics (8 credits)

b. Division of Environmental Health Sciences course requirements: Training in courses related to exposure assessment, environmental health effects and toxicology and environmental health policy (6 credits).

c. 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 (4 credits); PubH 6451 Biostatistics II (4 credits); PubH 8100Topics: Environmental and Occupational Health Research (1-8 credits); PubH 8100 (002) Applied Analyses of Occupational Health Data (3 credits); PubH 8120 Occupational Injury Prevention 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, LLC: Write Winning Grants (1-2 days).

Total minimum course credits required are 74, plus 24 Dissertation Credits (PubH 8888), plus electives in consultation with advisor.

4. Responsible Conduct of Science Training
See Administrative Core section for a description of this training.

D. Activities and Accomplishments

a. Apply the Public Health Model to occupational injury prevention: The Public Health Model provides a framework for research training in concert with the epidemiological model. Each student must develop an R01-type proposal as a basis for their research which must include: identifying a problem of importance; developing rigorous methods to address the problem, including a causal model and relevant analytical plan; and

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 a review committee of faculty; three students completed proposals.

b. Provide opportunities for student research projects and theses: The OIPRTP faculty offer on-going research training opportunities for students through their 17 funded research projects. Students participate on two major study research teams on a weekly basis.

c. Disseminate research findings: Students and faculty are expected to participate in nationaland international professional meetings and publish peer-reviewed publications (see listing).

d. Employ effective recruitment and retention strategies: 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; OIPRTP website (http://enhs.umn.edu/oiprtp). New recruitment endeavors have been implemented to attract qualified minority students, accounting for 38% currently. Research seminars and informal meetings and social interactions, involving all OIPRTP students as well as those from other disciplines, are essential to camaraderie that facilitates successful progress and retention of the students.

e. Provide a high quality curriculum: A multidisciplinary course, *Applied Analyses of Occupational Health Data,* provides training in applied research that addresses NORA priorities. Using large databases students develop research questions, prepare proposals, conduct analyses, and write publication-quality papers. Manuscripts generated from this endeavor have resulted in presentations at professional meetings as well as publications. Advanced occupational injury research content has also been incorporated into a research seminar course (PubH 8120), 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 concepts in teaching activities.

f. 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. In particular, the addition of the applied analysis course has been important in facilitating doctoral thesis progress and has provided excellent visibility through resulting presentations and publications (Appendix C). Students in the OIPRTP have access to three scholarship/fellowship funds, managed through the Minnesota Medical Foundation (MMF), that facilitate recruitment and/or provide awards for outstanding performance and are matched by the Graduate School.

g. Promote job opportunities for graduates of the OIPRTP: Dr. Gerberich and program faculty receive job opportunity notices weekly that are immediately forwarded to the students. Faculty members have major national networks among faculty and other professionals who contact us to assist in filling a variety of positions.

h. Provide continuing education and outreach: Faculty are involved in numerous continuing education and outreach activities

i. Ensure interdisciplinary research training activities: Division faculty interact with the other faculty and students from the respective departments involved in coursework (74 credits), internships, research seminars, and research activities that provide the underpinnings for this program.

E. Program Products (Refer also to Appendix C)

a. *Apply the Public Health Model to occupational injury prevention:* 3 students completed proposals.

b. *Provide opportunities for student research projects and theses:* Eight students participated in faculty-led research projects.Current student research projects include:

- Environmental and Behavioral Determinants of Children's Agricultural Injury
- Parents' Safety Beliefs, Children's Work Practices, and Childhood Agricultural Injury
- Risk Factors of Injury Among Rural Minnesota Adolescents: Analysis of the Childhood Agricultural Evaluation Systems
- The Etiology and Consequences of Injuries to Veterinary Technicians
- Impact of Written Policies and Assault Deterrents on Risk of Occupational Physical Violence
- Occupational Stress and Burnout: The Risk of Work-Related Violence
- Impact of School Resources on Educators' Risks of Physical Assault

Numerous research studies, in which students participate on a regular basis, provided the basis for these efforts (Minnesota Educators' Study (MES); Violence Against Nurses (VAN); Regional Rural Injury Study-II (RRIS-II); Others)**;** OIPRTP faculty currently have at least 17 RO1 and other externally-funded studies that enhance this training program.

c. Disseminate research findings: Among the OIPRTP faculty and students, 67 publications were submitted or published (14 involved students) and 72 presentations (19 involved students) were delivered (see Appendix C).

d. Employ effective recruitment and retention strategies: During this reporting period, eight full-time doctoral students were enrolled in the OIPRTP program, including one new student who was a minority.

e. Provide a high quality curriculum that provides a strong foundation for occupational injury prevention research training: More advanced occupational injury research and general research content has been incorporated into the courses, PubH 8120, OIPRTP *Research Seminar*, PubH 8141, *Doctoral Seminar in Observational Inference* and PubH 8100, *Applied Analyses of Occupational Health Data*, including: study design; development of causal models, pertinent to specific injury problems; application of sensitivity analyses and development of R01-type proposals.

f. Enhance OIPRTP development–Awards received
   - Student Awards
     - *Harold R. Shipman Award for Outstanding Academic Achievement in Environmental and Occupational Health*, Environmental Health Sciences, 2006;
     - *Community Partner Star Award*, University of Minnesota School of Public Health, 2005;
     - *Nancy A. Robertson Endowed Graduate Fellowship in Injury Prevention,* 2004-2006
     - *Gerberich Scholarship in Injury Epidemiology and Control,* 2003-2005
     - *Hearst Foundation Fellowship*, 2004-2006
     - *Captain Derek Dunn Memorial Award*, 2005
     - *McMicken College of Arts and Sciences Alumni Association; Diversity of Views and Experiences Fellowship,* 2005-2006
   - Facuty awards
     - Susan Gerberich, *Faculty Excellence Award*, Environmental Health Sciences, University of Minnesota, 2006; *Honorary Scientist*, Rural Development Administration, Republic of Korea - based on leadership and excellence in population-based agricultural activity-related injury research 2004-2006
     - Andrew Ryan, School of Public Health (SPH) Academic Professional and Administrative (P&A) Excellence Award, 2006

g. *Promote job opportunities for graduates of the OIPRTP:* One graduate has taken a position as State Program Administrative Principal, DHS Data Warehouse, Performance, Minnesota Department of Human Services, St. Paul, Minnesota. Another is a Post-Doctoral Fellow, Veteran's Administration Hospital, Minneapolis, Minnesota: Research on Traumatic Brain Injury/Polytrauma and Blast Injuries Among Veterans

h. *Provide continuing education and outreach:* During the last reporting period Dr Alexander developed a new multidisciplinary *Global Health Seminar* (1 credit) (see ce/outreach activities)

i. *Ensure interdisciplinary research training activities:* The course, *Applied Analyses of Occupational Health Data*, conducted by various faculty inn different discilpines 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 will be published

F. Future Plans

We will continue with the same basic framework that has been developed, to date, with the same set of goals and objectives.

a. Apply the Public Health Model to occupational injury prevention

b. Provide opportunities for student research projects and theses

c. Disseminate research findings; provide multiple opportunities for students and faculty to present papers and participate at the national/international levels

d. Employ effective recruitment and retention strategies and sustain diversity

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

f. Enhance OIPRTP development

g. Promote job opportunities for graduates of the OIPRTP

h. Provide continuing education and outreach; disseminate research findings from three major research studies (RRIS-II; MES; VAN) to facilitate R2P, with collaborative involvement of invested relevant professional groups

i. Ensure interdisciplinary research training activities

D. Continuing Education Programs

A. Continuing Education Program

B. Iris Staubus

C. Program Description

The mission of the Continuing Education (CE) Program is to conduct OSH continuing education for occupational safety and health professionals, policy makers, government employees, members of the private sector, labor unions and the general public.

1. Program Administration

Since 1978, over 44,764 students have enrolled in CE courses with the Minnesota ERC. In the current reporting period (2005-2006), the CE Program conducted 68 courses with a total enrollment of 1,799 participants, including 1,105 participants via online offerings.

The Program in Continuing Education is located within the Center for Public Health Education and Outreach (CPHEO) of the University of Minnesota School of Public Health. CPHEO is the administrative home of six multi-disciplinary training initiatives, which encourages a synergy of resources and helps prevent duplication of effort. It also allows the ERC's CE Program to benefit from a concentration of expertise in needs assessment, instructional design, web development, technology-enhanced learning, educational meeting planning, program accreditation, and evaluation, as well as providing coordinated support for registration, record keeping, materials production, marketing, course promotion, course budgeting and financial management. The CPHEO umbrella includes a Digital Learning Group (DLG) of ten technology professionals who design and create interactive online learning products. CPHEO provides continuing education units and/or contact hours for participants in each ERC course. In addition, discipline-specific accreditation is provided. Courses offered through the Public Health Institute also allow participants a choice of academic credit or CE credit. Course venues include campus classrooms, private conference facilities and hotels. Programs are also brought on-site by audience request.

2. Program Faculty and Staff

The Directors of the Primary Core and the Supplementary Core Programs work with the CE Director and other CE staff to plan and develop CE courses in their respective disciplines, and to coordinate interdisciplinary efforts in those courses. Education specialist coordinators, technical directors and support staff within CPHEO contribute varying levels of support and effort to these courses.

Key CE Program staff: The following provide regular contributions to the CE efforts.

- Iris Staubus, MEd, RN, directs the ERC's 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.
- Kathleen Smith, MSN, RN, Education Specialist, assists Ms Staubus and will become the Director of the CE Program in 2007. She has worked with diverse populations including the agricultural and migrant communities. She has taught professionals and non professionals in a variety of settings, was a part of the preparedness (hurricane) team for outpatient dialysis facilities in three large counties in Florida.
- 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.

D. Program Activities and Accomplishments

Because the needs of OHS professionals are not static, the CE Programs solicit feedback from course participants, other OHS professionals, instructors, and community practitioners on an ongoing basis, using that feedback to develop new programming and update courses. As the OHS community has matured and diversified so has the ERC's long-standing commitment to training in the core disciplines as well as multidisciplinary training, and now online training. Programs cover a wide spectrum of interests and levels, including introductory, advanced, interdisciplinary, hazard-specific, industry specific, review and update courses. Course lengths vary from 1-3-week courses during the Public Health Institute (PHI) to one-hour updates. Formal and informal needs assessment feedback shows that many individuals are looking for learning opportunities that minimize cost and time away from work while providing information on emerging issues and other topics with direct relevance and application to the workplace.

Currently the primary MCOHS audience is located in the upper Midwestern states, however most programs are marketed regionally and nationally using a variety of communication formats, including brochures, postcards, newsletters, websites (our own and others), professional organizations, and catalogs. The trend seems to be for individuals to seek short courses from a local provider or in a distance learning format. The CE Program has sought to increase participant numbers and the number of online course offerings. MCOHS 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 aging workforce, and workforce impact of a pandemic, and by expanding the number and type of distance learning opportunities offered.

Table 1. Course Attendees by Discipline and Types of Courses

Category	Percentage of Trainees In Traditional Face-to-Face or Blended Courses	Number of Trainees In Traditional Face-to-Face or Blended Courses
Industrial Hygiene	4%	20
Occupational Health Nursing	32%	156
Occupational Health Medicine	5%	25
Occupational Safety	36%	175
Multidisciplinary	23%	115
Total	**100%**	**488**
		Number of Trainees In Online Courses
Multidisciplinary (online courses)		1,105
Total Participants*		**1,593**

* Excludes HST Trainees (N=97) and ASH Trainees (N=109)

Correspondingly, we are making significant strides in increasing the quantity and type of ERC online CE course offerings. These online offerings in addition to face-to-face courses conducted in our service area, have increased accessibility to educational offerings. The specialty distribution for face-to-face and blended courses is shown (Table 1). All online courses were interdisciplinary and are shown separately to reflect a significant increase in online course participation. 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 and Cass Lake, MN; Fargo and East Grand Forks, ND; and Shanghai, Beijing, and Guangzhou, China. Open enrollment courses were held in Mankato, Brooklyn Park, Moorhead, Rochester, Willmar, and Bemidji, MN.

Note that RN's and safety professionals show larger course participation rates. In part this may reflect licensure requirements for RNs and federal/state safety requirements.

In partnership with the Occupational Medicine Residency Program and Regions Hospital, a monthly Occupational Medicine Community Grand Rounds (CGR) seminar is offered to OHS professionals.

Lastly, in collaboration with the CPHEO marketing team and Digital Learning Group (DLG) the NIOSH brochure was developed and maintained as an online web site. This was a collaborative effort among all 16 ERCs and with the assistance of NIOSH staff.

Other CE Programs

In addition to training in its Primary Core Programs, the CE Program also conducts Hazardous Substance Training (HST) and Agricultural Safety and Health (ASH) CE programs.

a. HST CE Program: The mission of the HST program is to improve occupational health and safety through hazardous substance training of individuals responsible for hazardous materials identification, management and remediation. This includes persons engaged in hazardous materials response at the local, county, tribal and state levels.

HST Program Faculty and Staff:

- Lisa M. Brosseau, ScD, CIH, is Technical Director for the HST CE program. Dr. Brosseau serves also as co-director of the Hazardous Substance Academic Training program and Industrial Hygiene program and lead instructor of the required course in Hazardous Materials and Wastes Management.
- Lois Harrison, MPH, Continuing Education Specialist, coordinates the program. She is responsible for curriculum and faculty development, implementation of educational offerings, and is the primary contact for HST activities.
- David Abrams, MS, CIH, ARS Environmental, serves as a course instructor for Minnesota, New Jersey and North Carolina ERCs on topics related to work with hazardous materials.
- Michael Nevala, MS, is a Principal Environmental Scientist, Metropolitan Council Environmental Services in St. Paul, Minnesota.
- Edward J. Leier is Fire Chief for the City of Vadnais Heights, Minnesota
- Daryl Korpela, MS, CIH, is President, Kettering and Associates, Lakeville, Minnesota.

HST CE program had the following program objectives and products:

- To respond to the needs of broad-based HST professional audiences by developing/offering relevant courses throughout the year: Several courses ranging from a three hour Hazwoper Awareness to 40 hour Emergency Response were offered during this period to a variety of audiences, including public health departments, tribal entities, fire departments and city public works departments. 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. Additionally, to meet the needs of participants, the HST coordinator sought new continuing education credit for sanitarians and firefighters.
- To maintain high-quality course offerings through continued course and instructor evaluations. The average rating for courses is 4.2, with 5 being the highest rating. The annual HST instructor advisory meeting was held in February 2006. Members of the business community and state agency representatives attended

and provided valuable insights to improving our course selections, and providing a variety of evaluation to instructors. All instructors receive a written evaluation summary for each course.

b. ASH CE Program: The continuing education program in Agricultural Safety and Health (ASH) provides in-depth education on the recognition, prevention, and treatment of agricultural and food-system related occupational exposures. 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. 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.

ASH CE Program Faculty and Staff:

- John Shutske, PhD, ASH Program Director, is a Professor in the Department of Biosystems and Agricultural Engineering, in the College of Agriculture, Food, and Environmental Sciences. He is responsible for the overall management of the ASH Program. As the ASH Program Director, Dr Shutske is responsible for selected program content and teaching.
- Ruth Rasmussen, MPH, MS, RN, coordinates the ASH CE Program for the ERC. She plans, develops and coordinates courses with other faculty, community partners and they are delivered in appropriate venues.
- Michele Schermann, RN, BSN, MS, has blended together her knowledge of agricultural production with strong healthcare research and program development/evaluation background, and has led the web-based offering covering the NAGCAT child safety guidelines. She is co-investigator on a USDA grant working with the Minnesota AgrAbility Project looking at safety communications with Hmong farmers and works on another grant from Cornell to promote good agricultural practices with Hmong farmers.

ASH CE Program Activities and Accomplishments:
ASH CE courses offered last year reflected requests from students and others, as shown by course evaluation data. Evaluation scores for continuing education events such as the family practice residency workshop on agricultural/rural health and safety consistently rank near the top for “amount learned” as measured by pre- and post-tests during sessions.

ASH CE courses are targeted to meet the needs of occupational medicine physicians, family practice physicians, other primary care physicians, occupational health nurses, industrial hygienists, safety professionals, local, state and federal health and safety personnel, labor and management personnel. New connections have been developed with the Leech Lake Band of Ojibwe (resource relationship), Medi-Sota Inc., a consortium of west central MN health care providers (ASH program needs), St. Cloud Fire Department (40-hr emergency response), and American Crystal Sugar in Moorhead MN (onsite OSH programs). In addition, MCOHS collaborates with the Minnesota Safety Council (MSC) to collaborate on workforce development programs.

The ASH CE program developed and /or enhanced a significant number of community and campus collaborations during this period: Center for Animal Health & Food Safety, College of Veterinary Medicine, College of Agriculture, Food and Environmental Sciences, Department of Food Science & Nutrition, University of Minnesota; Coastal Seafoods, HMS Host, Minneapolis-St. Paul Airport, J&J Distributing, LaLoma Tamales, Minnesota West Community and Technical College, Minnesota Area Health Education Centers, Minnesota Board of Animal Health, Minnesota Department of Agriculture, Minnesota Department of Health, National Center for Food Protection & Defense, Seward Coop, and SuperValu, Inc.

E. Products

Many CE Program offerings contain both an outreach and continuing education component. The CE Program strives to assist OHS professionals in obtaining and maintaining specialty licensing and certification by offering continuing education credit. The program has sought to increase accessibility to education by providing online program options. During the past year the CE program has partnered with seven organizations to plan and deliver the 27th TEAM Approach titled “Pandemic: Are You Prepared”. This event was attended by 110 OHS professionals. To offer this experience to all professionals the event was recorded for online delivery. During the period from April to June 2006 the site has been accessed by 221 participants. In collaboration with the Academic core, the NORA seminar sessions were also presented and recorded. These sessions have had over 800 visitors to the online sessions. The program continues to participate in planning with the Public Health Institute (PHI) at the Centers for Public Health Education and Outreach (CPHEO) to offer courses to OHS professionals during the Institute’s one- to three-week course schedules. Courses this year included nanotechnology, PPE, and ergonomics. New this year will be case management; the plan is to format this course for online delivery also. See Tables 12a & 12b for a complete list of CE courses and outreach offered in this period.

F. Future Plans

- Investigate the option of offering Occupational Medicine’s Community Grand Rounds in a distant learning format.
- Collaborate with Central States Occupational Medical Association and a newly merged organization for OM physicians in the Upper Midwest to offer programming for this newly formed organization.
- Complete the “Introduction to Occupational Health and Safety” online module and convert of the present PubH 6170 online course modules to stand-alone modules.
- In collaboration with Industrial Hygiene faculty, review and revise the Certification in Industrial Hygiene review course for offering if appropriate.
- Partner with each of the Primary and Supplementary Core Programs to offer an ERC-wide seminar series on occupational health and safety research and practice.
- Increase the number of courses that have evaluations 6 and 12 month after delivery, to better assess the application of those courses to individuals’ practice of OSH.
- ASH CE development of a web-based CEU module dealing with the North American Guidelines for Children’s Agricultural Tasks (NAGCAT). Continue to provide support and updates for the existing Agricultural Safety and Health Information Clearinghouse web page at http://safety.coafes.umn.edu/.
- Development of an online distant learning course for HST.
- During 2006-2007 apply for CE credit for Emergency Medical Technicians.
- Collaborate further with the marketing staff to increase awareness of CE course offerings.
- The CE Program will expand its delivery of health and safety courses during the PHI in spring 2007 by offering breakfast series.
- The CE Program, in partnership with Occupational Medicine CORE, will investigate the opportunity of delivering the Community Grand rounds in a distant learning format.

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

Scientific Improvements in OS&H Resulting from ERC Programs

Minnesota ERC faculty 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.

- Dr Peter Raynor and an IH student (as part of her master's project) worked with staff of the Minnesota Department of Health to conduct hazard evaluations and on site monitoring of illegal methamphetamine laboratories that were being dismantled by State authorities. These highly contaminated and dangerous toxic environments were made safer, and decontamination workers were protected, through the expertise and measurements provided by Dr Raynor and the student.

- Dr Raynor and another IH student performed sampling of ultrafine particles associated with welding operations at Caterpillar, Inc. These measurements were used to design better ventilation systems at the facility. The student subsequently took a job with Caterpillar to pursue this work further.

- A third IH student worked with the Minnesota Department of Health to conduct air sampling for microbial contaminants in every hospital isolation room in the State of Minnesota. These data were used to improve the level of cleanliness in those rooms and to protect patients and staff from infections in those facilities.

- An OHN trainee was involved in a project that measured hearing among construction workers and preventing noise-induced hearing loss.

- Another OHN trainee worked with MN-OSHA in conducting local inspection of auto body shops, with assistance in risk identification and prevention.

- Each OM resident participated in the diagnosis and treatment of workers attending clinics at HealthPartners/Regions Hospital. This work was supervised by Dr Beth Baker and other OM faculty at HealthPartners/Regions. In addition, OM residents worked in the following rotation sites where they also provided patient care and preventive services: Northwest Airlines; Park Nicollet Hospital; Ramsey County Health Department; Minnesota Department of Health; 3M Company; General Mills Corporation; MN-OSHA

- Led by Dr Nancy Nachreiner and other ERC faculty, all students in PubH 6150, *Interdisciplinary Evaluation of Occupational Health and Safety Field Problems*, evaluated a work environment and presented written and oral recommendations for the control of work-related problems to company personnel. Participating sites included the Minneapolis Star Tribune, Caterpillar Inc., Fairview-University Medical Center, Lloyd's Barbeque, Viking Tool and Drill, Nordic Ware, and Prospect Foundry. Final reports and presentations were shared with local site contacts, with specific changes recommended for the management and workers.

V. Midwest Center For Occupational Health and Safety

Annual Report Appendices

July 1, 2005 – June 30, 2006

Ian A. Greaves, MBBS, FRACP

Director

A. Program Curricula/

Course Requirements and Sample Schedules

Industrial Hygiene Program

Hazardous Substance Academic Training Program

Program Curricula/Course Requirements and Sample Schedules

IH Student 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*	***Ethics in Public Health: Professional Practice and Policy***	***1 cr (MPH)***
PubH 6742*	***Ethics in Public Health: Research and Policy***	***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 OH&S Field Problems	3 cr
PubH 6170	Introduction to Occupational Health and Safety	3 cr

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
HAZARDOUS SUBSTANCES ELECTIVE		3 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

IH Student Curriculum (continued)

Hazardous Substances Electives:

PubH 6190	Environmental Chemistry	3 cr
CE 4561	Solid Hazardous Wastes	3 cr
CE 5591	Environmental Law for Engineers	3 cr

Other courses approved by your advisor

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 & 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	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)***

Occupational Health Nursing Program

Program Curricula/Course Requirements and Sample Schedules

Occupational Health Nursing Sample Academic Program Plans

MPH Specialty Program 2006-07: Occupational Health Nursing

Faculty: Patricia McGovern, Ph.D., M.P.H., R.N., Debra Olson, M.P.H., R.N., COHN-S Nancy Nachreiner, PhD, MPH, RN, COHN-S

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)[1]

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 Health[2] (4 - 5 cr)

Occupational 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 Medicine[3]

[1] PubH 6742 will meet the research ethics training obligation for students working as Research Assistants

[2] The field experience includes a one-credit rotation at Region's Occupational & 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.

[3] All OHN students are required to attend a minimum of 5 sessions of Community Grand Rounds in Occupational Medicine (OM), subsequent to completion of PubH 6170 and PubH 6130. This seminar is arranged by the OM Residency Program on a monthly basis at Region's Hospital. The schedule of topics by date will be e-mailed to all students in advance of the session.

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)

Dual Degree Specialty Program 2006-07: Occupational 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 OHN 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 Health[4] (4 - 5 cr)

Occupational 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 Medicine[5]

[4] The field experience includes a one-credit rotation at Region's Occupational & 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.

[5] All OHN students are required to attend a minimum of 5 sessions of Community Grand Rounds in Occupational Medicine (OM), subsequent to completion of PubH 6170 and PubH 6130. This seminar is arranged by the OM Residency Program on a monthly basis at Region's Hospital. The schedule of topics by date will be e-mailed to all students in advance of the session.

School of Nursing Requirements (minimum credits: 28)

Nurs 8100	The Discipline of Nursing (3 cr.)
Nurs 8140	Moral & 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 & Intervention (2 cr.)
PubH6557	Health Care Finance (2 cr.)

TOTAL CREDITS & 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 (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 Health Nursing

Faculty: Patricia McGovern, Ph.D., M.P.H., R.N., Debra Olson, M.P.H.,R.N, COHN-S, and Nancy Nachreiner, PhD, MPH, RN, COHN-S

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

Proposed Electives: (Please see next page)

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 & Theory Development for Research (3 cr)
Grad 8101 Teaching in Higher Education (3 cr)

Occupational Health Nursing (OHN) Sample Schedules

I. MPH Program Plan Coursework Sample Schedule

(Semester credits are shown in parentheses.)

	Fall	*Spring*	*Summer*
Year I	PubH 6414: Biostatistical methods I (3 cr.) PubH 6170 Introduction to Occupational Health & Safety (3 cr.) PubH 6103 Exposure to Environmental Hazards (2 cr.) PubH 6104 Environmental Health Effects: Introduction to Toxicology (2 cr.)	PubH 6320: Fundamental of Epidemiology (3 cr.) PubH 6105 Environmental & Occupational Policy (2 cr.) PubH 6150: Interdisciplinary Evaluation of Occupational Health & Safety Field Problems (3 cr.) PubH 6130: Occupational Medicine (3 cr.) Elective (2-3 cr.)	Nurs 8170 Research in Nursing (3 cr.) PubH 7194: Environmental & Occupational Health Masters Project (1 cr.) PubH 6752: Public Health Management (3 cr.) online course
Year II	Nurs 8600: Advanced Public Health Nursing (2 cr.) PubH 6741: Ethics in Public Health Practice & Policy (1 cr.) PubH 6020: Fundamental of Social & Behavioral Sciences (3 cr.) PubH 7194: Environmental & Occupational Health Masters Project (1 cr.) Elective (2-3 cr.)	PubH 7194: Environmental & Occupational Health Masters Project (1 cr.) PubH 7196: Field Experience in Environmental & Occupational Health [Regions Clinic Rotation] (1 cr.) PubH 7196: Field Experience in Environmental & Occupational Health [Individualized Experience] (3 cr.)	

Note: Community Grand Rounds in Occupational Medicine (OM) can be taken any semester concurrent with or after completing PubH 6130 Occupational Medicine

II. Dual Degree (MPH-MS) Program Plan Sample Coursework Schedule

	Fall	***Spring***	***Summer***
Year I	PubH 6414: Biostatistical Methods I (3 cr.) PubH 6170 Introduction to Occupational Health & Safety (3 cr.) PubH 6103 Exposure to Environmental Hazards (2 cr.) PubH 6104 Environmental Health Effects: Introduction to Toxicology (2 cr.) PubH 6020: Fundamental of Social & Behavioral Sciences (3 cr.)	PubH 6320: Fundamentals of Epidemiology (3 cr.) PubH 6105 Environmental & Occupational Policy (2 cr.) PubH 6150: Interdisciplinary Evaluation of Occupational Health & Safety Field Problems (3 cr.) PubH 6130: Occupational Medicine (3 cr.)	Nurs 8170 Research in Nursing (3 cr.) PubH 7194: Environmental & Occupational Health Masters Project (1 cr.)
Year II	Nurs 8100: Discipline of Nursing (3 cr.) Nurs 5204: Population Focused Assessment & Intervention (2 cr.) Nurs 8600: Advanced Public Health Nursing (2 cr.) PubH 6752: Public Health Management (3 cr.) PubH 7194: Environmental & Occupational Health Masters Project (1 cr.) PubH 7196: Field Experience in Environmental & Occupational Health [Regions Clinic Rotation] (1 cr.)	Nurs 8242 population-Focused Health Care Delivery Systems (2 cr.) Nurs 8601 Interventions for Health of Populations (3 cr.) PubH 6557 Healthcare Finance (2 cr.) PubH 7194: Environmental & Occupational Health Masters Project (1 cr.) PubH 7196: Field Experience in Environmental & Occupational Health [Individualized Experience] (3 cr.)	PubH 6742, Ethics in Public Health: Professional Practice and Policy (1) online course Nurs 8140 Moral & Ethical Positions in Nursing (3 cr.)
YEAR III	Nurs 8241: Health Care Leadership for a Changing World (2 cr.) Nurs 8603: PHN Leadership Practicum (clinical) (3 cr.) Nurs 8194: Special Topics in Nursing (3 cr.)	**Note:** Community Grand Rounds in Occupational Medicine (OM) can be taken any semester concurrent with or after completing PubH 6130 Occupational Medicine	

III. Doctoral Degree (PhD) Program Plan Sample Coursework Schedule

(Note: This plan assumes the student has already completed an MPH degree focused in OHN)

	Fall	***Spring***	***Summer***
Year I	PubH 6341: Epidemiologic Methods I (3 cr.) PubH 6450: Biostatistics I (4 cr.) *Elective*: PubH 6420: Intro to SAS Programming (1 cr.)	PubH 6451: Biostatistics II (4 cr.) PubH 6140: Occupational & Environmental Epidemiology (2 cr.) Elective: PubH 8813: Measurement of Social-Related Factors (3 cr.)	*Elective:* Grad 8101: Teaching in Higher Education (3 cr.) PubH 6742, Ethics in Public Health: Research & Policy (1) online course
Year II	PubH 8140: Validity Concepts in Epidemiology (2 cr.) PubH 7193: Directed Study, Environmental Health (1-4 cr.) *Elective:* Nurs 8172: Theory & Theory Development for Research (3 cr.)	Nurs 8171: Qualitative Research Design & Methods (3-4 cr.) *Elective:* PubH 8142 Epidemiologic Uncertainty Analysis (2 cr.) *Elective:* PubH 6120 Injury Prevention in the Workplace, Community & Home (2 cr.)	PubH 7193: Directed Study: Environmental Health (1-4 cr.) Elective: Nurs8193: Qualitative Data Analysis for Health Care Research (4 cr.)
YEAR III	PubH 8120: Occupational Injury Prevention Research Training Program (OIRPT) Research Seminar (1 cr.) PubH 7193: Directed Study: Environmental Health (1-5 cr.); Prepare for preliminary examinations	PubH 8120: Occupational Injury Prevention Research Training Program (OIRPT) Research Seminar (1 cr.) PubH 8888 Dissertation Credits (6 cr.)	PubH 8888 Dissertation Credits (6 cr.) **CONTINUED ON NEXT PAGE**
Year IV	PubH 8888 Dissertation Credits (6 cr.)	PubH 8888 Dissertation Credits (6 cr.)	

Public Health Certificate in Occupational Health and Safety
A University of Minnesota Regents' Certificate
Curriculum Sheet

PROGRAM CURRICULUM

The Public Health Certificate in Occupational Health and Safety (PHCert-OHS), a program in the Public Health Practice Major, will be awarded upon successful completion of a minimum of 13 credits (16 credit minimum for students new to the field of occupational health and safety). Most students complete the curriculum by attending at least two Public Health Institutes, held in May/June of each year (some courses may be available online or during the academic year). For course descriptions and information on the Public Health Institute, go to www.sph.umn.edu/publichealthplanet.org

Curriculum Credits are listed in ( ).

PubH 6170 Introduction to Occupational Health and Safety (3) *Required of all students new to the field of OHS*

PubH 72xx Global Studies in Infectious Disease (1) or
PubH 6104 Environmental Health Effects: Introduction to Toxicology (2)

PubH 72xx Personal Protective Equipment and Respiratory Protection (1) or
PubH 72xx Preparedness for Buildings (1) or
PubH 72xx Ergonomics and the Prevention of Workplace Injuries (1)

PubH 7214 Principles of Risk Communication (1) or
PubH 72xx Communication and Information Technology Tools for Public Health Emergency Response (1) or
PubH 72xx Workers as Partners in Emergency Response (1)

PubH 6711 Public Health Law (2)

PubH 72xx Holistic Approaches to Emergency Preparedness (1) or
PubH 72xx Behavioral Health in Preparedness Response and Recovery (1)

PubH 72xx Environmental Health and Preparedness (1)

PubH 6103 Exposure to Environmental Hazards (2)

PubH 72xx Incident Management System (1) or
PubH 6727 Health Leadership and Effecting Change (2) or
PubH 6760 Healthcare Financial Management: Public Sector (2)

PubH 7200 Nanoparticle Exposure & Hazards: What Should the Occupational and Safety Professional Do? (1)

PubH 6130 Occupational Medicine: Principles and Practice (2) or
PubH 72xx Clinical Management of Occupational Health (1) and
PubH 72xx Toxic Agents in the Workplace (1)

PubH 72xx Pandemic Influenza Planning: Key Issues in Preparedness for the Next Pandemic (0.5) or
PubH 72xx Water and Wastewater Treatment: What Happens Before you Turn on the Tap and After you Flush? (0.5)

Note: Substitution with other courses may only be taken with prior approval. Check with a Major Coordinator for selection and approval process.

CERTIFICATE PROGRAM REQUIREMENTS

To be awarded the Public Health Certificate in Occupational Health and Safety, admitted students must:

take and complete the above listed courses (or approved substitutions) for graduate credit;

achieve a cumulative grade point average of at least a B level (3.0 on a 4.0 scale) or above; and

complete the certificate within four years of matriculation.

UNIVERSITY OF MINNESOTA
School of Public Health

APPLYING TO A UNIVERSITY OF MINNESOTA DEGREE PROGRAM

Students enrolled in the Public Health Certificate in Occupational Health and Safety may apply for admission to a University of Minnesota degree program. The application process for each degree program must be followed and determination of admission is at the degree program's discretion. Admission to or completion of the PHCert-OHS Program does not guarantee admission to any University of Minnesota degree program.

Special Notes on Application to a Master of Public Health (MPH) Degree Program
If admitted to an MPH degree program, credits acquired in the PHCert-OHS (15-credit maximum) may be transferred to the MPH at the discretion of the major program and under the following circumstances:

- Courses were completed for graduate credit.
- A grade of at least a "B" was achieved in all courses requested for transfer.
- Courses were completed within the five years prior to the MPH application.

TUITION AND FEES

All certificate students will be charged in-state resident tuition rates regardless of state of residency.

Students may be charged additional fees for courses taken as part of the Public Health Institute.

All admitted students will be assessed a one-time credential fee of $160.00 for the certificate program payable prior to course registration.

FOR MORE INFORMATION

Public Health Practice Major
Website: www.php.umn.edu

Major Coordinators: Anne Ehrenberg and Sarah Harper
E-mail: php@umn.edu
Phone 612.626.5665
Fax: 612.624.4498

Major Chair Debra Olson
E-mail: olson002@umn.edu

School of Public Health, Student Services Center
Application Information and Materials
Website: www.sph.umn.edu/students/studentservices/application/
E-mail: sph-ssc@umn.edu
Phone: 612.626.3500
Toll Free: 800.774.8636
Fax: 612.624.4498

Certificate requirements are subject to change for each incoming class, without prior notice to applicants. Contact a Major Coordinator for specific information. 02/06

Occupational Medicine Program

Program Curricula/Course Requirements and Sample Schedules

OM Appendix: Program Plan

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

Introduction: Occupational and Environmental Medicine is a vital and unique medical specialty component of both clinical medical and public health practice, that focuses on both individual and population health. The specialty incorporates principals and practices of clinical and preventive medicine, epidemiology, industrial hygiene, safety engineering, and toxicology.

Goal: The goal of our occupational Medicine residency is to prepare our graduates for leadership positions in clinical, public health, governmental, academic, industry, and other practice settings.

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

1. Insure 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, 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 opportunities for relevant additional experiences, such as
    a. participation in the hospital toxicology service, regional poison control center, local or regional ATSDR designated hazardous waste site evaluations, and other clinical or public health experiences according to a resident's experience or specific interests

7. 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, and systems based practice.

Goals and Objectives

Academic Phase

Consistent with the Goal of the complete residency experience, which is to prepare our graduates for leadership positions in clinical, public health, governmental, academic, industry, and other practice settings, the goals of the academic phase will be to: 1) introduce residents to the population perspective of Occupational and Environmental Medicine as a Preventive Medicine Specialty; 2) provide a suitable experience in the relevant graduate academic coursework; and, 3) provide orientation and initial experience in the medical issues relevant to Occupational and Environmental Clinical Practice. In order to meet these goals, the following objectives will be met by the resident:

1. Obtain a strong foundation in the 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. Obtain preliminary experience in both primary and specialty occupational and environmental medical clinical practice.

3. Attendance, whenever possible (unless conflicting with class schedule or activities) at the weekly participation and presentations in clinically oriented case conference and monthly grand round activities.

4. Gain familiarity with investigative activities and critical appraisal of the scientific literature with participation (unless conflicting with classroom responsibilities) in monthly journal club activities.

5. Begin first hand experience with research activities by evaluating possible research topics and questions, deciding on a topic, and beginning preparation for project design, structure, and IRB approval.

6. Gain familiarity and review key topics related to occupational and environmental medicine, toxicology, preventive medicine and public health practice through attendance, when not prevented by class work activities, at weekly formal didactic staff presentations.

7. Gain, based on individual interest relevant additional experiences, when allowed by academic calendar, such as
    a. participation in the hospital toxicology service, regional poison control center, local or regional ATSDR designated hazardous waste site evaluations, and other clinical or public health experiences according to a residents experience or specific interests

8. Participate in 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.

Goals and Objectives

Practicum Phase

Consistent with the Goal of the complete residency experience, which is to prepare our graduates for leadership positions in clinical, public health, governmental, academic, industry, and other practice settings, the goals of the practicum phase will be to: 1) consolidate residents appreciation of the population perspective of Occupational and Environmental Medicine as a Preventive Medicine Specialty; 2) strengthen the foundation of the academic understanding of public health, preventive medicine, and Occupational and Environmental Medicine gained from the academic experience; 3) provide sufficient academic and clinical experience to strengthen existing knowledge, and gain additional expertise in specific sub-specialty competencies within the medical specialty as desired by the trainee.

In summary, the goal of the practicum phase is to complete the transformation of a physician with an interest and some knowledge of Public Health, Preventive Medicine, and Occupational and Environmental Medicine, into a medical specialist with broad knowledge of a wide array of public health, preventive medicine, and occupational and environmental medicine areas, including special expertise in clinical occupational medicine practice, as well as in specific sub-specialty areas of the discipline as determined by the trainees interests and areas of concentration. In order to meet these goals, the following objectives will be met by the resident:

1 Obtain 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.

2 Obtain a broad range of practicum experiences, including corporate, governmental, and public health organizations, selected, as appropriate, on the basis of resident experience or specific interests.

3 Strengthen capabilities with the critical appraisal of the scientific literature through active participation, and presentation, at monthly journal clubs.

4 Expand confidence with key topics related to occupational and environmental medicine, toxicology, preventive medicine and public health practice through attendance, and participation, in weekly staff formal didactic presentations.

5 Continue first hand experience with research activities by the implementation of their research project study, including, after appropriate IRB approval, data collection, analysis, interpretation, and appropriate reporting through formal academic venues, such as grand rounds, thesis defense, and publication in a peer review journal.

6 Provide opportunities for relevant additional experiences, such as
   a. participation in the hospital toxicology service, regional poison control center, local or regional ATSDR designated hazardous waste site evaluations, and other clinical or public health experiences according to a residents experience or specific interests

7 Achieve 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.

8 Active involvement in teaching occupational and environmental medicine, through presentations and participation in case conferences and journal clubs, as well as clinical mentoring, of the teaching of graduate occupational health nursing students, medical students, and primary care residents.

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 & 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. Spring, 4:40 pm-7:40 pm Mon every other year.

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 & Preventive Medicine Rotation

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

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

Site: 1. Saint Paul-Ramsey County
Department of Public Health
555 Cedar Street
St. Paul, MN 55101
Neal Holtan, M.D., MPH
(651)-266-1222
Email: holta002@umn.edu

2. Minnesota Institute of
Public Health
2720 Highway 10
Mounds View, MN
55112
(763)-427-5310
Fax: (612)-317-0713

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.

1. 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

Preceptors: Travel Clinic
Pat Walker, M.D.
Scheduling: Karen Cox (254-7419)

Duration: One week during the Occupational Medicine Clinic rotation

Site: Travel Clinic, HealthPartners Specialty Center

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

1. Educational Goals and Objectives:
   A. To evaluate and appropriately treat international travelers in the Travel Clinic

2. Resident Duties:
   A. Attendance at assigned clinic
   B. Perform travel evaluations

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

   A. 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.

   B. Interpret legal and regulatory authority relating to protection and promotion of the public's health and employee’s health.

   C. 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:
   B. Perform fitness for duty examination, preplacement examination, work injury evaluation

   C. Complete educational packets

   D. Understand follow-up and treatment of blood and body fluid exposures

   E. Understand tuberculosis surveillance program

   F. Attendance at relevant meetings

Respiratory Medicine Rotation

1. Coordinator: Beth Baker, M.D., MPH
   Occupational 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, M.D., MPH
   Occupational 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 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 Prawer, 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 & Environmental Medicine Clinic/Service*

1. Preceptor: Beth Baker, M.D., MPH
   Occupational & 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 & 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 OHNs
Occupational Medicine residents
OHN faculty and students from the School of Public Health
OM physicians and OHNs from the 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: OM 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: OM 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: OM 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 OM 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.

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

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

Attending Staff: Occupational & 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

OM 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 & 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)

-3-

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 & 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 & 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 & 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 & Prev. Med (2 days/wk)	PubH 6170 Intro Occ Health & Safety PubH 6414 Biostats Online		Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club Colloquia/Didactics	(1d/wk)
Year 1: January	PH& Prev. Med (2 days/wk)	PubH 6130 OEM PubH 6105 Env Occ Health Policy PubH 6150 OH & 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 & 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 & Field Problems		Case Conference(3/month) Community Rds (1/month) OM Lecture, Journal Club Colloquia/Didactics	(1 d/wk)
Year 1: April	OEM Clinic (2 days/wk)	PubH 6130 OEM PubH 6105 Env Occ Health Policy PubH 6150 OH & 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 & 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 Colloquia/Didactics	(1 d/wk)

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 Colloquia/Didactics	(1 d/wk)
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

Occupational Health Services Research and Policy (OHSRP Program)

Table A-1
PhD Curriculum-Course Outlines
FOR STUDENTS ADMITTED TO EHS IN 2005-06

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 & 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 & Occupational Policy (2)
Occupational Health & Safety	2	6	PubH 6170 Introduction to Occupational Health & Safety (3) PubH xxxx Occupational Health & Safety Electives (1, 2-3 credits)
Ethics	1	1	PubH 6742, Ethics in Public Health: Research & Policy (1)
TOTAL Core courses & Credits	**12**	**30**	

Additional Requirements	# of Courses	# of Credits	Comments
Supporting Program	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)
Social/Psychological Theories to Health	1	3	PubH 8805 Sociological Theory in Health Services Research (3) OR PubH 6855 Medical Sociology (3)
Health Care Policy	1	3	PubH 8801 Health Services Policy Analysis: Theory (3)
Electives	2 (minimum)	6	Student choice in concert with advisor's recommendations
Dissertation	None	24 Thesis Credits	Student writes dissertation on topic selected by student and approved by faculty.
TOTAL CREDITS		68 - 73	

Table A-2
PhD Curriculum-Course Outlines
FOR STUDENTS ADMITTED TO HPM IN 2005-06

Core Subject Areas	# of Courses	# of Credits	Course Title
Statistics	2	8	PubH 7400 Fundamentals of Biostatistical Inference (4) PubH 7400-2 Biostatistical Modeling & 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)

Core Subject Areas	# of Courses	# of Credits	Course Title
Economics of Health Care	2	6	PubH 6832 Economics of the Health Care System (3) PubH 8820 Health Economics I (3)
Social/Psychological Theories to Health	2	6	PubH 6855 Medical Sociology (3) OR PubH 8806 Sociology of Health Care Occupations & Organizations (3) PubH 8805 Sociological Theory in Health Services Research (3)
Health Care Policy	2	5	PubH 8801 Health Services Policy Analysis: Theory (3) PubH 8802 Health Services Policy Analysis: Applications (2)
Ethics	1	1	PubH 6742, Ethics in Public Health: Research and Policy (1)
TOTAL Core courses & Credits	**13**	**36**	
Additional Requirements	**# of Courses**	**# of Credits**	**Comments**
Supporting Program **Environmental Health Sciences**	Variable 3	12-16 6	Supporting Program is developed by the student with the assistance of their advisor. PubH 6103 Exposure to Environmental Hazards (2) PubH 6104 Environmental Health Effects: Introduction to Toxicology (2) PubH 6105 Environmental & Occupational Policy (2)
Occupational Health & Safety	2 (minimum)	6 -10	PubH 6170 Introduction to Occupational Health & Safety (3) PubH xxxx Occupational Health & Safety Electives (2-3 each)
Dissertation	None	24 Thesis Credits	Student writes dissertation on topic selected by student and approved by faculty.
TOTAL CREDITS		**72 -76**	

Examples of potential elective courses, dependent on student's interest, dissertation topic, and career goals include those listed below. Syllabi are included (Center-Wide Appendices).

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 & Uncertainty Analysis.

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
ASH ELECTIVE		2 cr

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

Occupational Health Services Research and Policy (OHSRP) Program Appendix

Table B-1

Coursework Schedule for Students Admitted to Environmental Health Sciences
(Semester credits are shown in parentheses.)

	Fall	*Spring*
Year One	PubH 6103 Exposure to Environmental Hazards (2) PubH 6104 Environmental Health Effects: Introduction to Toxicology(2) PubH 6341 Epidemiological Methods I (3) PubH 8801 Health Services Policy Analysis: Theory (3)	PubH 6105 Environmental & Occupational Policy (2) PubH 6140 Occupational & Environmental Epidemiology (2) (*Elective)* PubH 6450 Biostatistics I (4) PubH 6130 Injury Prevention in the Workplace, Community and Home (2) (*Elective*)
Year Two	PubH 8120 Occupational Injury Prevention Research Training Program Research Seminar (to be renamed Occupational Health and Safety Research Seminar) (1) PubH 8140 Validity Concepts in Epidemiological Research (2) PubH 6451 Biostatistics II (4) Supporting Program or Minor (minimum 12 credits)	PubH 8120 Occupational Injury Prevention Research Training Program Research Seminar (to be renamed Occupational Health and Safety Research Seminar) (1) PubH 6862 Cost Effectiveness in Health Care (2) PubH 6855 Medical Sociology (3) PubH 8142 Epidemiology & Uncertainty Analysis (2) PubH 8813 Measurement of Health-Related Social Factors (3) (*Elective)* Complete Supporting Program or Minor

Any Summer Session: PubH 6170 Introduction to Occupational Health & Safety (3): online course, and PubH 6742, Ethics in Public Health: Research & Policy (1) online course

Table B-2
Coursework Schedule for Students Admitted to HPM
(Semester credits are shown in parentheses.)

	Fall	*Spring*
Year One	PubH 7400 Fundamentals of Biostatistical Inference (4) PubH 6832 Economics of the Health Care System (3) PubH 8810 Research Studies in Health Care (3) PubH 6103 Exposure to Environmental Hazards (2) PubH 6104 Environmental Health Effects: Introduction to Toxicology(2)	Stat PubH 7400-2 Fundamentals of Biostatistical Inference (4) PubH 8820 Health Economics I (3) PubH 8806 Sociology of Health Occupations & Organizations (3) PubH 6105 Environmental & Occupational Policy (2)
Year Two	PubH 8811 Research Studies in Health Care (3) PubH 8805 Sociological Theory in Health Services Research (3) PubH 8801 Health Services Policy Analysis Theory (3) PubH 8830 Research Project (1) OHS Elective (2-3) Supporting Program or Minor (minimum 12 credits)	PubH 8802 Health Services Policy Analysis Applications (2) PubH 8831 Research Project (1) PubH 6742 Ethics in Public Health: Research and Policy (1) OHS Elective (2-3) Elective (2-3) Complete Supporting Program or Minor

Any Summer Session: PubH 6170 Introduction to Occupational Health & Safety (3): online course

Occupational Injury Prevention Research Training Program

DOCTOR OF PHILOSOPHY (Ph.D.) DEGREE IN ENVIRONMENTAL HEALTH

Program Curricula/Course Requirements and Sample Schedules

Susan Goodwin Gerberich, PhD, Professor and Director
Bruce H. Alexander, PhD, Associate Professor and Co-Director
Occupational Injury Prevention Research Training Program
Division of Environmental Health Sciences
School of Public Health
University of Minnesota
MMC 807 - 420 Delaware Street S.E.
Minneapolis, Minnesota 55455

Telephone 612-625-5934
Telefax 612-626-0650
Email gerbe001@umn.edu

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)

OIPRTP COURSE DESCRIPTIONS

CURRICULUM-OIPRTP DOCTORAL DEGREE STUDENT
Courses listed in order by course identification number.

Required Coursework:

Course Number	Course Title	Instructor	Credits
‡PubH 6103	*Exposure to Environmental Hazards* Concepts, assessment, and control of exposure to biological, physical, and chemical hazards in the environment; places multi-disciplinary field of environmental health into context of wider field of public health.	Ramachandran/ Raynor	2
‡PubH 6104	*Environmental Health Effects: Introduction to Toxicology* Identification of mechanisms and effects on human health of environmental agents, including chemical, biological, physical, and psychological.	Wattenberg	2
‡PubH 6105	*Environmental and Occupational Health Policy* Environmental and occupational health policies, laws, concepts, and principles; proposals and approaches for regulatory reform; approaches to policy analysis, and overall phases and issues in the policy-making process.	McGovern	2
*PubH 6120	*Injury Prevention in the Workplace, Community, and Home* Injury Epidemiology: Analyses of major injury problems affecting the public in the workplace, community, and home using epidemiologic model and conceptual framework; emphasis on strategies/program development for prevention and control.	Gerberich	2
*PubH 6121	*Topics: Injury Prevention in the Workplace, Community, and Home* Selected projects.	Gerberich	1-2
*PubH 6122	*Seminar: Safety in the Workplace* Realm of potential risk factors for occupational safety problems; strategies for prevention and control.	Gerberich	1
*PubH 6140	*Occupational and Environmental Epidemiology* Principles and concepts in identifying health effects in the workplace; strategies for identifying excess risk, evaluating strengths and weaknesses of research techniques, and assessing bias and confounding.	Church	2
*PubH 6150	*Interdisciplinary Evaluation of Occupational Health and Safety Field Problems* 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.	Nachreiner	3

*PubH 6170	*Introduction to Occupational Health and Safety* Concepts and issues in occupational health and safety; application of public health principles and decision-making process in prevention of injury and disease, health promotion of adults, and protection of worker populations from environmental hazards; observational visits to manufacturing facilities.	Nachreiner	3
*PubH 6325	*Data Processing with PC-SAS* Introduction to methods for transferring/processing existing data sources; hands-on approach to pre-statistical data processing and analysis with PC-SAS statistical software.	Oakes	1

§PubH 6341	*Epidemiologic Methods I* Subject matter science; research methodology. Study designs applied to human populations; randomized trials; four types of observational studies: cohort, case-control, cross-sectional, and ecological; causal inference, bias, and effect modification.	Flood/Spector	3
*PubH 6342	*Epidemiologic Methods II* Builds on PubH 6341, with in-depth focus on cohort and case-control study designs; methods/techniques for collecting/managing epidemiologic research data: practical aspects of sampling, response rates/bias, measurement error, forms design, selecting/training interviewers; data preparation, entry, cleaning, management, and analyses; ethical issues in research.	Harwood/Steffen	3
*PubH 6343	*Epidemiologic Methods III* Analysis of epidemiologic data; further methods/techniques for designing, implementing, analyzing, and interpreting observational epidemiologic studies, including cohort, case-control, and cross-sectional studies.	Pankow	3
§PubH 6450	*Biostatistics I* Descriptive statistics; Gaussian probability models; point/interval estimation for means and proportions; hypothesis testing, including t, chi-square, and non-parametric tests; regression and correlation techniques; one-way analysis of variance; applications using output from statistical packages.	Carlin/Telke	4
*PubH 6451	*Biostatistics II* Two-way analysis of variance; interactions, repeated measures, and general linear models; logistic regression for cohort and case-control studies; log-linear models, contingency tables, Poisson regression, survival data, Kaplan-Meier methods, and proportional hazards models.	Thomas	4
§PubH 6742	*Ethics in Public Health: Research and Policy* Ethical issues in public health research/policy; ethical analysis; recognizing/analyzing moral issues.	DeBruin	1
*PubH 8100	*Topics: Environmental Health Research* Selected readings and discussion of research topics.	McGovern/ Gerberich/ Alexander	1-8

*PubH 8100 (002)	*Applied Analyses of Occupational Health Data* Students conceptualize, develop and justify a research question; develop an analysis plan; conduct appropriate analyses and interpretation of data; and report the research findings as a scientific paper	Alexander/Ryan/ Gerberich	4
*PubH 8120	*Occupational Injury Prevention Research Training Program Seminar* Facilitates student research training in occupational injury prevention through roundtable discussions and interdisciplinary involvement.	Gerberich/ Alexander	1 per semester
*PubH 8140	*Validity Concepts in Epidemiologic Research* Conceptual basis for validity in observational epidemiologic research; recognizing, evaluating, preventing, and correcting for confounding, specification error, measurement error bias, and selection/follow-up bias.	Maldonado	2
*PubH 8141	*Doctoral Seminar in Observational Inference* Fundamentals of epidemiologic inference; methods for designing, analyzing, and interpreting epidemiologic studies, including use of sensitivity analysis for bias assessment, and meta-analysis.	Church/ Maldonado	2 per semester
‡PubH 8888	*Thesis Credit: Doctoral Dissertation*		24
*GRAD 8101	*Teaching in Higher Education* Students model a variety of active learning strategies (e.g. cooperative learning, collaborative learning, problem-posing, case study, interactive lecture, discussion, critical thinking, role-playing) and facilitate discussions addressing educational theory and practice; participants explore and develop teaching skills that promote learning within a diverse student body across a variety of settings.	Gonzalez/Ching/ Wingert	3
*IE 5511	*Human Factors and Work Analysis* Human factors engineering (ergonomics), methods engineering, and work measurement; human-machine interface: displays, controls, instrument layout and supervisory control; anthropometry, work physiology and biomechanics; work environmental factors: noise, illumination, toxicology; methods engineering, including operations analysis, motion study, and time standards.	Hayes	4

*IE 5513	*Engineering Safety* Occupational health and product safety; standards, laws, and regulations; hazards and their engineering control, including general principles, tools and machines, mechanics and structures, electrical safety, materials handling, fire safety and chemicals; human behavior and safety, procedures; training, warnings, and instructions.	Chaplin/Shutske	4
*Psy 5501	*Vocational and Occupational Health Psychology* Survey of history, concepts, theories, methods, and findings of vocational/occupational health psychology; burnout, personality, violence, stressors/stress-relations, counter-productive behaviors, and coping in the workplace; vocational development/assessment, career decision-making/counseling, person-environment fit.	Wilkinson	3

§ School of Public Health Requirement
‡ Division of Environmental Health Sciences Core Course Requirement
*OIPRT Program Requirement

Minor in Human Factors/Ergonomics:

Course Number	Course Title	Instructor	Credits
HumF 5001/ Kin 5001	*Foundations of Human Factors/Ergonomics* Consumer Product Design; Cognitive Performance and Learning; Psychomotor Performance; Behavioral Cybernetics of Human Performance; Effects of Perturbed Sensory Feedback on Performance; Machine and Tool Performance; Interactive Performance with Complex Technological Systems (Human/Computer; Human/Robot); Occupational Performance and Safety; Social and Team Performance; Organizational Performance; and Performance of Complex Sociotechnical Systems (Aerospace, Educational, Manufacturing, Transportation, Community and Health Systems).	Smith	3
HumF 8001	*Special Topics: Human Factors/Ergonomics* Survey course in human factors/ergonomics; concepts, methods, empirical findings, different systems applications, and current research. Topics vary.	Stoffregen	2-3
HumF 8002	*Proseminar in Human Factors/Ergonomics* Issues and concerns tailored to interests of faculty and students regarding human factors/ergonomics.	Stoffregen	1 per semester

Elective Coursework: ***Highly Recommended***

Course Number	Course Title	Instructor	Credits

PubH 6348	*Writing Research Grants* Focuses on NIH-type grants; mechanisms of grant development/writing, principles of informed consent, budget development, grant-review process, identification of funding sources.	Luepker/Harlow	2
PubH 7405	*Biostatistics: Regression* T-tests, confidence intervals, power, type I/II errors; exploratory data analysis; simple linear regression, regression in matrix notation, multiple regression, diagnostics; ordinary least squares, violations, generalized least squares, nonlinear least squares regression; introduction to General Linear Model.	Wu	4
PubH 7406	*Biostatistics: ANOVA and Design* Single factor ANOVA, diagnostics, classical nonparametrics, multifactor ANOVA, multiple comparisons, power and sample size determination, calculating expected mean squares, random/mixed effects models; ANOVA in regression notation; randomized block designs, nested designs, repeated measures designs, cross-over designs.	Bergemann	4
PubH 7407	*Analysis of Categorical Data* Contingency tables, odds ratios, relative risk, chi-square tests, log-linear models, logistic regression, conditional logistic regression, Poisson regression, matching, generalized linear models for independent data.	Hanson	3

PubH 7430	*Statistical Methods for Correlated Data* Correlated data arising from data collected over time or space, group randomizations, cluster sampling, nested designs, or random effects assumptions; modeling, analysis, and interpretation appropriate for such data, for normally or non-normally distributed outcomes.	Li	3
PubH 7435	*Latent Variable Models* Introduction to use of statistical techniques known collectively as latent variable methods; exploratory/confirmatory factor analysis, path analysis, structural equation modeling, latent trait models, latent class models.	Wall	3
PubH 7450	*Survival Analysis* Statistical methodologies in analysis of survival data, including Kaplan-Meier estimators, proportional hazards multiple regression model, time-dependent covariates, analyses of residuals, and multiple failure outcomes.	Pan	3
PubH 8142	*Epidemiologic Uncertainty Analysis* Scientific interpretation of statistical analysis as dependent on both data and assumptions; techniques that enable an investigator to incorporate uncertainty about assumptions for quantitative analysis.	Maldonado	2
PubH 8422	*Modern Nonparametrics* Classical nonparametric inference, exact tests, and confidence intervals; robust estimates; the jackknife; bootstrap and cross-validation; nonparametric smoothing and classification trees.	Basu	3

*PubH 8813	*Measurement of Health-Related Social Factors* How social factors such as innovativeness, compliance, religiosity, and stress are measured and tested for reliability and validity; relationships between theory, concepts, variables, and data.	Rockwood	3
GRAD 8102	*Practicum for Future Faculty* Collegial support for teaching and faculty mentorship at regional college or university, investigation of faculty role at variety of institutions, classroom observation/feedback, and preparation for the academic job search.	Rozaitis	3
GRAD 8200	*Teaching/Learning Topics in Higher Education* Applications to specific contexts/topics; students create course materials for a context/discipline and assess an action plan in terms of student learning; students write an action plan; topics such as active learning in the sciences, teaching with technology, multicultural education, teaching in clinical settings, learning-community course design.	Rozaitis/ Alexander/ El-Fakahany	1

Elective Coursework: ***Complementary According to Focus and Needs***

Course Number	Course Title	Instructor	Credits
PubH 6114	*Foundation of Environmental and Worker Protection Law* Traditional/constitutional law-making authority of courts, legislatures, and administrative agencies.	Austin	1
PubH 6115	*Worker Protection Law* Role of government in protecting rights of citizens; labor movement history as starting point for discussion of modern systems for protecting workers from unsafe environments and compensating them for injuries; review of laws that protect individuals against class-based discrimination.	Austin	1
PubH 6123	*Violence Prevention: Theory, Research, and Application* Analysis/critique of major theories and of epidemiologic research pertinent to violence, including characteristics of violence and relevant risk factors, reporting/treatment protocols, and current/potential intervention efforts and prevention initiatives; emphasizes interdisciplinary contributions to violence prevention/control.	Findorff	2
PubH 6130	*Occupational Medicine: Principles and Practice* Pathogenesis of diseases caused by occupational hazards; evaluating work-related illnesses; overall regulatory framework governing occupational health and safety.	Greaves/Baker	2-3

PubH 6173	*Exposure to Physical Agents* Nature, health effects, monitoring, and control of physical agents in working/living environments; ionizing/non-ionizing radiations (including lasers and ultraviolet, visible and infrared light); noise and vibration; heat/cold stress; dose, response, and engineering interventions.	Brosseau	2
PubH 6344	*Epidemiologic Methods IV* Further statistical and modeling techniques for epidemiologic data; students simultaneously carry out analyses of data from cohort or case-control studies.	Harwood/ Steffen/Pankow	3
PubH 6355	*Pathophysiology of Human Disease* Compendium of human diseases relevant to public health professionals; presented from epidemiologic perspective; significance of diseases in terms of prevalence, incidence, morbidity, and mortality; risk factors and prevention strategies.	Crow/Berger	4
PubH 6540	*Health care Organizational Behavior* Human behavior in organizations; motivation, leadership, influence of organizational structure, informal group behavior, interpersonal relations, supervision; emphasizes preventing/solving problems among individuals/groups in organizations.	Begun	2
PubH 6806	*Principles of Public Health Research* Evaluation of public health literature and planning for independent research projects; formulation of research question, research design, sampling techniques, use of research concepts, and data analysis; data collection techniques, including questionnaires, interviews, and data analysis.	Call	2

PubH 6852	*Program Evaluation in Health and Mental Health Settings* Overview of evaluation, models of evaluation, objectives of an evaluative study, sampling of subjects, methods of data collection, methodological designs, interpretation of data, preparation of final report, and ethical and political considerations.	Garrard	3
PubH 7400 - 001	*Fundamentals of Biostatistical Inference* Concepts of probability, sample spaces, distributions, the central limit theorem, likelihood theory, statistical estimation, hypothesis testing, and analysis of variance.	Hanson	4
PubH 7400 - 002	*Biostatistical Modeling and Methods* Fundamentals of generalized linear models: model construction, application to actual datasets, and implementation of appropriate models in standard statistical software.	Bergemann/Le	4
PubH 7420	*Clinical Trials: Design, Implementation, and Analysis* Introduction to and methodology of randomized clinical trials. Design issues, sample size, operational details, interim monitoring, data analysis issues, overviews.	Neaton	3

BAE 5212	*Safety and Environmental Health Issues in Agricultural Work Environments* Safety/health issues in food production, processing and horticultural work environments using public health, injury control, and health promotion frameworks: regulation, engineering, and education. Traumatic injury, occupational illness, ergonomics, pesticide health effects, biotechnology, and air contaminants.	Shutske	3
Kin 5122	*Applied Exercise Physiology* Mechanisms of cardiorespiratory and muscular responses to exercise; application of exercise physiology to assessment of work capacity; athletic conditioning and requirement of human-powered vehicles; low to moderate exercise as an intervention in lowering risk of common health problems.	Kelly	3
Kin 5723	*Psychology of Sport Injury* Psychosocial bases of: risk factors preceding sport injury, responses to the occurrence of sport injury, and rehabilitation processes.	Wiese-Bjornstal	3

OIPRTP PROGRAM PLAN EXAMPLE

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)**
‡PubH 6103 Exposure to Environmental Hazards (2 cr.) ‡PubH 6104 Environmental Health Effects: Introduction to toxicology (2 cr.) §PubH 6341 Epidemiology I (3 cr.) §PubH 6450 Biostatistics I (4 cr.) §PubH 6742 Ethics in Public Health: Research and Policy (1 cr.) *PubH 8120 Occupational Injury Research Seminar (1 cr.)	‡PubH 6105 Environmental and Occupational Health Policy (2 cr.) *PubH 6120 Injury Prevention in the Workplace, Community, and Home (2 cr.) *PubH 6122 Seminar: Safety in the Workplace (1 cr.) *PubH 6342 Epidemiology II (3 cr.) *PubH 6451 Biostatistics II (4 cr.) *PubH 8120 Occupational Injury Research Seminar (1 cr.)	*PubH 6121 Topics: Injury Prevention in the Workplace, Community, and Home (1-2 cr.) *PubH 8100 Topics: Environmental and Occupational Health Research (1-8 cr.) *PubH 8120 Occupational Injury Research Seminar (1 cr.)

Fall Year Two (14-15 Credits)	**Spring Year Two (14 Credits)**	**Summer Year Two (3-11 Credits)**
*IE 5511: Human Factors and Work Analysis (4 cr.) or *HumF 5001 Foundations of Human Factors/ Ergonomics (3 cr.) *PubH 6170 Introduction to Occupational Health and Safety (3 cr.) *PubH 6343 Epidemiology III (3 cr.) *PubH 8120 Occupational Injury Research Seminar (1 cr.) *PubH 8140 Validity Concepts in Epidemiological Research (2 cr.) PubH 6325 Data Processing with PC-SAS (1 cr.)	*Psy 5501 Vocational and Occupational Health Psychology (3 cr.) *PubH 6140 Environmental and Occupational Epidemiology (2 cr.) *PubH 6150 Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3 cr.) *PubH 8120 Occupational Injury Research Seminar (1 cr.) *PubH 8141 Doctoral Seminar (2 cr.) *GRAD 8101 Teaching in Higher Education (3 cr.) *Grant Writers' Seminars and Workshops, L.L.C.: Write Winning Grants (2 days)	*PubH 6121 Topics: Injury Prevention in the Workplace, Community, and Home (1-2 cr.) *PubH 8100 Topics: Environmental and Occupational Health Research (1-8 cr.) *PubH 8120 Occupational Injury Research Seminar (1 cr.)

Fall Year Three (10 Credits)	Spring Year Three (8 Credits)	Summer Year Three (8 Credits)
*PubH 8100(002) Applied Analysis of Occupational Health Data (3 cr.) *PubH 8120 Occupational Injury Research Seminar (1 cr.) *PubH 8141 Doctoral Seminar (2 cr.) *IE 5513: Engineering Safety (4 cr.)	*PubH 8120 Occupational Injury Research Seminar (1 cr.) *PubH 8141 Doctoral Seminar (2 cr.) ‡PubH 8888 Dissertation Credits (5 cr.)	*PubH 8120 Occupational Injury Research Seminar (1 cr.) *PubH 8141 Doctoral Seminar (2 cr.) ‡PubH 8888 Dissertation Credits (5 cr.)

Fall Year Four (8 Credits)	Spring Year Four (8 Credits)	Summer Year Four (7 Credits)
*PubH 8120 Occupational Injury Research Seminar (1 cr.) *PubH 8141 Doctoral Seminar (2 cr.) ‡PubH 8888 Dissertation Credits (5 cr.)	*PubH 8120 Occupational Injury Research Seminar (1 cr.) *PubH 8141 Doctoral Seminar (2 cr.) ‡PubH 8888 Dissertation Credits (5 cr.)	*PubH 8120 Occupational Injury Research Seminar (1 cr.) *PubH 8141 Doctoral Seminar (2 cr.) ‡PubH 8888 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)	Spring (1 credit)	Summer (Credits arranged)
HumF 5001 Foundations of Human Factors/Ergonomics (Refer, also, to IE 5511) (3 cr.) HumF 8001 Special Topics: Human Factors/Ergonomics (2-3 cr.)	HumF 8002 Proseminar in Human Factors/Ergonomics (1 credit per semester)	Research Credits: arranged

Other Elective Courses (Partial Listing)

Fall	Spring	Summer
PubH 6114 Foundation of Environmental Worker Protection Law (1 cr.) PubH 6173 Exposure to Physical Agents (2 cr.) PubH 6348 Writing Research Grants (2 cr.) PubH 6355 Pathophysiology of Human Disease (3 cr.) PubH 6806 Principles of Public Health Research (2 cr.) PubH 7400(001) Fundamentals of Biostatistical Inference (4 cr.) PubH 7405 Biostatistics: Regression (4 cr.) PubH 7407 Analysis of Categorical Data (3 cr.) PubH 7430 Statistical Methods for Correlated Data (3 cr.) PubH 7435 Latent Variable Models (3 cr.) PubH 7450 Survival Analysis (3 cr.) GRAD 8102 Practicum for Future Faculty (3 cr.) Kin 5122 Applied Exercise Physiology (3 cr.) Kin 5723 Psychology of Sports Injury (3 cr.)	PubH 6115 Worker Protection Law (1 cr.) PubH 6123 Violence Prevention: Theory, Research, and Application (2 cr.) PubH 6130 Occupational Medicine: Principles and Practice (2-3 cr.) PubH 6344 Epidemiology IV (3. cr.) PubH 6540 Health Care Organizational Behavior (2 cr.) PubH 6852 Program Evaluation in Health and Mental Health Settings (3 cr.) PubH 7400(002) Biostatistical Modeling and Methods (4 cr.) PubH 7406 Biostatistics: ANOVA and Design (4 cr.) PubH 7420 Clinical Trials: Design, Implementation, and Analysis (3 cr.) PubH 8142 Epidemiologic Uncertainty Analysis (2 cr.) PubH 8422 Modern Nonparametrics (2 cr.) PubH 8813 Measurement of Health-Related Social Factors (3 cr.)	BAE 5212 Safety and Environmental Health Issues in Agricultural Work Environments (3 cr.) GRAD 8200 Teaching/Learning Topics in Higher Education (3 cr.)

B. Data Tables 7/1/05 – 6/30/06

Data Tables

Industrial Hygiene Program

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: Gurumurthy Ramachandran, PhD
Discipline: Industrial Hygiene

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1*]	# Full-Time NIOSH-Supported Trainees*	# Part-Time Trainees Enrolled*	# Part-Time NIOSH-Supported Trainees*	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
	Master of Public Health (IH)	6 (1)	2 (5)	2 (1)	1 (0)	2	
	Master of Science (IH)	3 (5)	2 (5)	2 (0)	0 (0)	1	
Doctorate degree							
	Doctor of Philosophy in Environmental Health	5 (0)	1 (0)	1 (0)	0 (0)	1	
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.)[3]							
Other (specify, e.g., undergraduate Certificate program trainees)							

Refer to: Supplemental Instructions, page 8.

[1] Trainee counts include all students in the approved programs.

[2] Does not include trainees counted in any of the full-time or part-time categories

[3] In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

* The numbers represent IH students only. The numbers in parantheses are those counted in the HSAT and ASH programs.

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: Gurumurthy Ramachandran, PhD
Discipline: Industrial Hygiene

Table 13
Minority Recruitment Data[1]
Since Beginning of Current Project Period: July 1, 2005 - June 30, 2006

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
July 1, 2005 to June 30, 2006						
1	1	1	4	In training	05/06 NIOSH traineeship	

Refer to: Supplemental Instructions, page 11.

[1] First three columns are a group total; last four columns refer to individual trainees.

** Trainee also enrolled in the ASH program

Data Tables

Occupational Health Nursing Program

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: Patricia M. McGovern, PhD, MPH, RN
Discipline: Occupational Health Nursing

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1]	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
	Master of Public Health (EH) (including 2 students with ASH concentration)	10	10	2	2	36	4
	Master of Public Health & Master of Science (Nursing)	2	2	2	2		1
Doctorate degree							
	Doctor of Philosophy in Environmental Health	1	1	0	0		0
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.)[3]							
		0					
Other (specify, e.g., undergraduate Certificate program trainees)							
	Public Health Certificate in Occupational Health & Safety(PHCert-OHS)			2	2		2

Refer to: Supplemental Instructions, page 8.

[1] Trainee counts include all students in the approved programs.

[2] Does not include trainees counted in any of the full-time or part-time categories

[3] In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: Patricia M. McGovern, PhD, MPH, RN
Discipline: Occupational Health Nursing

Table 13
Minority Recruitment Data[1]
Since Beginning of Current Project Period: July 1, 2005 - June 30, 2006

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
July 1, 2005 to June 30, 2006						
None						

Refer to: Supplemental Instructions, page 11.

[1] First three columns are a group total; last four columns refer to individual trainees.

Data Tables

Occupational Medicine Program

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: Beth A. Baker, MD
Discipline: Occupational Medicine

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1]	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
Doctorate degree							
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.)[3]							
MPH	Master of Public Health	7	4	1 withdrew in		0	4
				Oct. 2005			
Other (specify, e.g., undergraduate Certificate program trainees)							

Refer to: Supplemental Instructions, page 8.

[1] Trainee counts include all students in the approved programs.

[2] Does not include trainees counted in any of the full-time or part-time categories

[3] In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: Beth A. Baker, MD
Discipline: Occupational Medicine

Table 13
Minority Recruitment Data[1]
Since Beginning of Current Project Period: July 1, 2005 - June 30, 2006

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
July 1, 2005 to June 30, 2006						
15	3	0				

Refer to: Supplemental Instructions, page 11.

[1] First three columns are a group total; last four columns refer to individual trainees.

Data Tables

Hazardous Substances Academic Training Program

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: Peter C. Raynor, PhD
Discipline: Hazardous Substance Academic Training

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1]	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
	Master of Public Health (EH)	0	0	1	1		1
	Master of Science (EH)	4	4	1	1		2
Doctorate degree							
	Doctor of Philosophy in Environmental Health	0	0	0	0		0
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.)[3]							
Other (specify, e.g., undergraduate Certificate program trainees)							

Refer to: Supplemental Instructions, page 8.

[1] Trainee counts include all students in the approved programs.

[2] Does not include trainees counted in any of the full-time or part-time categories

[3] In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: Peter C. Raynor, PhD
Discipline: Hazardous Substance Academic Training

Table 13
Minority Recruitment Data[1]
Since Beginning of Current Project Period: July 1, 2005 - June 30, 2006

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
Year 4: July 1, 2005 to June 30, 2006						
0						

Refer to: Supplemental Instructions, page 11.
[1] First three columns are a group total; last four columns refer to individual trainees.

Data Tables

Agricultural Safety and Health Program

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: John M. Shutske, PhD
Discipline: Agricultural Safety and Health Academic Minor--All students enrolled in other programs also

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1]	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
Note: All students in the ASH minor are also enrolled in other ERC core or allied OSH programs	Master of Public Health (EH)	4	4	0	0		2
	Master of Science (EH)	1	1	0	0		0
Doctorate degree							
	Doctor of Philosophy	1	1	0	0		0
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.)[3]							
Other (specify, e.g., undergraduate Certificate program trainees)							

Refer to: Supplemental Instructions, page 8.

[1] Trainee counts include all students in the approved programs.

[2] Does not include trainees counted in any of the full-time or part-time categories

[3] In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: John M. Shutske, PhD
Discipline: Agricultural Safety and Health Academic Minor--All students enrolled in other programs also

Table 13
Minority Recruitment Data[1]
Since Beginning of Current Project Period: July 1, 2005 - June 30, 2006

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
July 1, 2005 to June 30, 2006						

Refer to: Supplemental Instructions, page 11.
[1] First three columns are a group total; last four columns refer to individual trainees.

Data Tables

Occupational Health Services Research and Policy Program

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: Patricia M. McGovern, PhD, MPH, RN & Bryan Dowd, PhD
Discipline: Occupational Health Services Research & Policy

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1]	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
Doctorate degree							
	Doctor of Philosophy in Environmental Health or Doctor of Philosophy in Health Services Research, Policy and Administration	3	3	1	1		0
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.)[3]							
Other (specify, e.g., undergraduate Certificate program trainees)							

Refer to: Supplemental Instructions, page 8.

[1] Trainee counts include all students in the approved programs.

[2] Does not include trainees counted in any of the full-time or part-time categories

[3] In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: Patricia M. McGovern, PhD, MPH, RN & Bryan Dowd, PhD
Discipline: Occupational Health Services Research & Policy

Table 13
Minority Recruitment Data[1]
Since Beginning of Current Project Period: July 1, 2005 - June 30, 2006

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
July 1, 2005 to June 30, 2006						

Refer to: Supplemental Instructions, page 11.

[1] First three columns are a group total; last four columns refer to individual trainees.

Data Tables

Occupational Injury Prevention Research Training Program

Page

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: Susan Goodwin Gerberich, PhD, MSPH and Bruce H. Alexander, PhD
Discipline: Occupational Injury Prevention Research Training Program

Table 4a
Academic Training Report
Previous Budget Period: July 1, 2005 to June 30, 2006

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled[1]	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses[2]	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
Doctorate degree							
PhD	Doctor of Philosophy in Environmental Health	8	8	0	0	55	*
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.)[3]							
Other (specify, e.g., undergraduate Certificate program trainees)							

* 2 graduates: 1 graduated, July 31, 2006; 1 graduated, August 31, 2006

Refer to: Supplemental Instructions, page 8.

[1] Trainee counts include all students in the approved programs.

[2] Does not include trainees counted in any of the full-time or part-time categories

[3] In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

Page

ERC Applicant Institution: University of Minnesota, School of Public Health
Program Director: Susan Goodwin Gerberich, PhD and Bruce H. Alexander, PhD
Discipline: Occupational Injury Prevention Research Training Program

Table 13
Minority Recruitment Data[1]
Since Beginning of Current Project Period: July 1, 2005 - June 30, 2006

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
1	1	1		In training	DOVE Fellowship; NIOSH Training Grant	

Refer to: Supplemental Instructions, page 11.
[1] First three columns are a group total; last four columns refer to individual trainees.

Data Tables

Continuing Education Program

ERC Applicant Institution:
Program Director:

Table 12a
CE Course Offerings by Program Area
Previous Budget Period: July 1, 2005 to June 30, 2006

Program Area:

					# Trainees by Profession					# Trainees by Employer						
Course/Seminar Title[1]	**Prog Area**	**Total Trainees**	**Length of Course**	**Total Pers Days**	**MD**	**RN**	**HYG**	**SAF**	**OTHR**	**Prvt Ind**	**Fed Gov**	**State Gov**	**Loc Gov**	**Foreign Country**	**Academic**	**Other**
Comprehensive Industrial Hygiene Review (8093-10A)	IH	6	5	30	0	0	5	1	0	1	2	2	1	0	0	0
Mold Identification (8093-07)	IH	14	3	42	0	0	1	3	10	3	1	0	6	0	1	3
Subtotal IH		**20**	**8**	**72**	**0**	**0**	**6**	**4**	**10**	**4**	**3**	**2**	**7**	**0**	**1**	**3**
NIOSH-Approved Spirometry Training (8093-14)	OHN	*7*	2	14	0	3	0	0	4	3	0	0	0	0	0	4
NIOSH Approved Spiriometry (8093-43)	OHN	*22*	2	44	0	15	0	2	5	4	0	1	0	0	0	17
NIOSH-Approved Spirometry Training (8093B-43	OHN	*11*	2	22	0	4	0	1	6	1	0	0	0	0	0	10
Occupational Hearing Conservation Refresher Training (8093-12)	OHN	9	1	9	0	6	0	0	3	2	0	0	0	0	0	7
Occupational Hearing conservation Refresher (8093-	OHN	13	1	7	0	5	0	0	8	5	0	0	0	0	0	8

44A																
Mini Course III: Case Management Best Practices (8093-11D)	OHN	1	0.5	0.5	0	0	0	1	0	1	0	0	0	0	0	0
Mini course III: Case Management Best Practices (8093-42D)	OHN	4	0.5	2	0	3	0	0	1	4	0	0	0	0	0	0
Making Health and Safety Training Fun (8093-21)	OHN	10	0.5	5	0	1	0	3	6	2	0	0	1	0	1	6
Case Management for Occupational Health Professionals (8093-11A)	OHN	10	3	30	0	9	0	0	1	7	1	0	0	0	0	2
Case Management for Occupational Health Professionals (8093-42A	OHN	8	3	24	0	8	0	0	0	5	0	0	0	0	0	3
Consulting as a Business: Recognizing Your Potential as a Consultant (8093-23A)	OHN	5	0.5	2.5	0	0	0	2	3	1	0	0	1	0	1	2
Mini Course II: Case Management Processes, Tools and Quality Assurance (8093-11C)	OHN	1	0.5	0.5	0	0	0	1	0	1	0	0	0	0	0	0
Mini course II: Case Management Processes, Tools and Quality Assurance (8093-42B	OHN	2	0.5	1	0	2	0	0	0	1	0	0	0	0	0	1

Mini Course IV: Can an Employee Do the Job: Red Flag or Green Flag? (8093-11E)	OHN	1	0.5	0.5	0	0	0	1	0	1	0	0	0	0	0	0
Mini Course IV: Can an Employee do the Job: Red Flag or Green Flag (8093-42E	OHN	4	0.5	2	0	3	0	0	1	4	0	0	0	0	0	0
Implementing a Successful Respiratory Protection Program in a Business/Hospital/ Medical Facility and Respirator Fit Testing (8093-22)	OHN	4	0.75	3	0	3	0	0	1	0	0	0	0	0	1	3
Mini Course I: Introduction to Case Management and Its Concepts (8093-11B)	OHN	1	0.5	0.5	0	0	0	0	0	1	0	0	0	0	0	0
Mini course I: Introduction to Case Management and Its concepts (8093-42B	OHN	1	0.5	0.5	0	1	0	1	0	1	0	0	0	0	0	0
Consulting as a Business: Setting Up Your Own Consulting Business (8093-23B)	OHN	5	0.5	2.5	0	0	0	2	3	1	0	0	1	0	1	2
Occupational Hearing Conservation Training (8093-13)	OHN	19	2.5	47.5	0	7	0	1	11	6	0	0	0	0	0	13
Occupational Hearing conservation Training (8093-44)	OHN	14	2.5	35	0	9	0	5	0	6	0	0	0	0	0	8

Mini course V: Bottom Line (8093-42F)	OHN	2	1	2	0	2	0	0	0	1	0	0	0	0	0	1
Mini course VI: Legal & Ethical Issues (8092-42G	OHN	2	1	2	0	2	0	0	0	1	0	0	0	0		1
Subtotal OHN		**156**	**27.25**	**218**	**0**	**83**	**0**	**20**	**53**	**59**	**1**	**1**	**3**	**0**	**4**	**88**
PHI - Ergonomics and the Prevention of Work Place Injuries (confirm MD's)	OM	9	2	18	**3**	0	0	0	6	0	0	0	0	0	0	9
Grand Rounds - May	OM	8	0.15	1.2	7	1										8
Grand Rounds - June	OM	8	0.15	1.2	7	1										8
Subtotal OM		**25**	**2.3**	**20.4**	**17**	**2**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**25**

Note: 41 MD's also participated in Interface Between Rural Family Practice and Farm Families listed under Ag Safety & Health;

OSHA 510: Occupational Safety and Health Standards for the Construction Industry (8093-02)	OS	14	4	56	0	0	0	9	5	5	0	0	0	0	3	6
OSHA 510: Occupational safety and Health Standards for the construction industry (8093-49)	OS	4	4	16	0	0	0	2	2	2	0	1	0	0	1	0
OSHA 7000: Ergonomics Guidelines Training for Nursing Homes (8093-03)	OS	6	1	6	0	1	0	0	5	0	0	0	0	0	1	5

OSHA 2250: Principles of Ergonomics Applied to Work-Related Musculoskeletal and Nerve Disorders (8093-08)	OS	11	3	33	0	2	0	2	7	4	1	0	0	0	1	5
A Practical Approach to Office Ergonomics (8093-15)	OS	8	1	8	1	1	0	0	6	0	3	0	0	0	0	5
OSHA 500: Trainer Course in Occupational Safety and Health Standards for the Construction Industry (8093-04)	OS	19	4	76	0	0	0	12	7	0	5	0	1	0	6	7
OSHA 500: Trainer course in Occupational Safety & Health Standards for the Construction Industry	Mankato-OH	10	4	40	0	0	1	7	2	6	0	1	0	0	2	1
OSHA 500: Trainer course in Occupational Safety & Health Standards for the Construction Industry (8093-58) contract	OS	12	4	48	0	0	0	9	3	0	12	0	0	0	0	0
OSHA 511: Occupational Safety & Health Standards for General Industry Outreach Trainers (8093-05)	OS	24	4	96	0	0	0	16	8	19	0	0	0	0	0	5

OSHA 511: Occupational Safety & Health Standards for General Industry Outreach trainers (8093-50)	OS	14	4	56	0	0	0	7	7	11	0	0	1	0	1	1
OSHA 501: Trainer Course in Occupational Safety and Health Standards for General Industry (8093-07)	OS	9	4	36	0	0	1	7	1	7	0	1	0	0	0	1
OSHA 501: Trainer Course in Occupational Safety and Health Standards for General Industry (8093-54)	OS	8	4	32	0	0	0	8	0	8	0	0	0	0	0	0
OSHA 501: Trainer Course in Occupational Safety and Health Standards for General Industry (8093.59)	OS	8	4	32				4	4	7						1
OSHA 2225 Resp. Protection (8093-36)	OS	9	3	27	0	0	3	5	1	1	1	5	2	0	0	0
OSHA 3110 Fall arrest Systems	OS	6	3	18	0	0	6	0	0	0	0	0	0	0	6	0
PHI - Personal Protective Equipment & Respiratory Protection	OS	10	2	20					10							10
Subtotal OS		**172**	**51**	**580**	**1**	**4**	**11**	**88**	**68**	**70**	**22**	**8**	**4**	**0**	**21**	**47**
40H Hazwoper Waste Site Worker	HST	12	5	60	0	0	6	2	4	1	0	4	1	0	4	2

Trainings																
Hazardous Materials 8H Refresher Training *	HST	1	1	1				1				1				
40 H Hazwoper Waste Site Worker Training *	HST	1	5	5				1					1			
OSHA 2225 Training **	HST	2	1	2				2				2				
Hazardous Materials Emergency Response 40H Training	HST	2	5	10	0	0	1	1	0	0	0	0	2	0	0	0
Hazardous Materials Awareness and Right To Know Training (6 hours)	HST	9	1	9	0	0	6	1	2	8	0	1	0	0	0	0
Hazwoper Awareness (8096-36A)	HST	35	0.3	10.5	0	0	0	0	35	0	0	0	0	0	0	35
Hazwoper Awareness (8096-36B	HST	35	0.3	10.5	0	0	0	0	35	0	0	0	0	0	0	35
Subtotal HST		**97**	**18.3**	**108**	**0**	**0**	**13**	**8**	**76**	**9**	**0**	**8**	**4**	**0**	**4**	**72**

All courses offered as HST courses
*Courses were conducted by the Midwest Center as part of the NIEHS Hazardous Worker Training Program ** Course was conducted as an OSHA course. Numbers in the table represent state, local andgovernment personnel receiving a NIOSH HST tuition subsidy

The Interface Between Rural Family Practice Physicians and Farm Families	Ag S&H	18	0.2	3.6	18	0	0	0	0	0	0	0	0	0	18	0

The Interface Between Rural Family Practice Physicians and Farm Families	Ag S&H	23	0.2	4.6	23	0	0	0	0	0	0	0	0	0	23	0
FSI MN Food Security Investigation: Retail	Ag S&H	21	0.15	3.15	0	0	6	0	15	3	2	3	6	0	3	4
FSI MN Food Security Investigation: Processing & Production	Ag S&H	24	0.15	3.6	0	3	2	0	19	7	3	6	0	0	5	3
FSI MN Food Security Investigation: distribution	Ag S&H	23	0.15	3.45	0	1	1	0	21	4	4	2	5	0	5	3
Subtotal Ag S&H		**109**	**0.85**	**18.4**	**41**	**4**	**9**	**0**	**55**	**14**	**9**	**11**	**11**	**0**	**54**	**10**

2005 NORA Online: Reaching the Hard to Reach: Outreach Programs for Vulnerable Working Populations*	Multi-disciplinary	279	0.15	41.85	0	0	0	0	279	0	0	0	0	0	0	279
2005 NORA Online: Consequences of Thinking About Environmental and Occupational Health as Separate Entities*	Multi-disciplinary	187	0.15	28.05	0	0	0	0	187	0	0	0	0	0	0	187
2005 NORA Online: Health and Safety Issues in the Workplace*	Multi-disciplinary	305	0.15	45.75	0	0	0	0	305	0	0	0	0	0	0	305
NORA at Nine: Looking Back and Looking Forward*	Multi-disciplinar	54	0.3	16.2	0	0	0	0	54	0	0	0	0	0	0	54

	y															
Priorities for Occupational Injury Surveillance in the 21st Century: The Need to Improve Information for Non-Fatal Injuries*	Multi-disciplinary	21	0.15	3.15	0	0	0	0	21	0	0	0	0	0	0	21
Economic Incentives for Health Behavior Change*	Multi-disciplinary	13	0.2	2.6	0	0	0	0	13	0	0	0	0	0	0	13
Musculoskeletal Disorders: Interventions, Outcomes and Proposals: Welcome to 'Reality Science'*	Multi-disciplinary	16	0.2	3.2	0	0	0	0	16	0	0	0	0	0	0	16
The Clinical and Occupational Correlates of Work Productivity Loss Among Employed Patients with Depression*	Multi-disciplinary	9	0.15	1.35	0	0	0	0	9	0	0	0	0	0	0	9
Team Approach	Multi-disciplinary	110	0.3	33	2	42	15	15	36	0	0	0	0	0	0	110
Team Approach – Online*	Multi-disciplinary	221							221							221
Introduction to Occupational Health & safety 2cr.*	Multi-disciplinary	5	5.6	28					5							5
Subtotal Other Category		**1220**	**7.35**	**203.15**	**2**	**42**	**15**	**15**	**1146**	**0**	**0**	**0**	**0**	**0**	**0**	**1220**

* This program contains both a CE and Outreach component and is therefore reported in both areas of this document. The outreach component includes service to/collaboration with professional, practitioner and stakeholder communities. The CE component includes an education/training program which provides knowledge or skill building at the awareness, knowledge or proficient level and may be delivered using a variety of methods i.e., face-to-face, videostreaming, webcast or blended formats.

GRAND TOTALS (All Program Areas		**1799**	**115**	**1220**	**61**	**135**	**54**	**135**	**1414**	**156**	**35**	**30**	**29**	**0**	**84**	**1465**

Refer to: Supplemental Instructions, page 10.

[1] Group together by Program Area and provide sub-totals for each Program Area in Table 12b. Add or delete rows as necessary.

ERC Applicant Institution:
Program Director:

Table 12b
Summary of CE Course Offerings by Program Area
Previous Budget Period: July 1, 2005 to June 30, 2006

					# Trainees by Profession					# Trainees by Employer						
Course/Seminar Title[1]	**Program Area**	**Total Trainees**	**Total # of Courses**	**Total Pers Days**	**MD**	**RN**	**HYG**	**SAF**	**OTHR**	**Pvt Ind**	**Fed Gov**	**State Gov**	**Loc Gov**	**Foreign Country**	**Academic**	**Othr**
Subtotal IH	**IH**	20	**2**	72	0	0	6	4	10	4	3	2	7	0	1	3
Subtotal OHN	**OHN**	156	**23**	218	0	83	0	20	53	59	1	1	3	0	4	88
Subtotal OMR	**OMR**	25	**3**	20.4	17	2	0	0	6	0	0	0	0	0	0	25
Subtotal OS	**OS**	172	**16**	580	1	4	11	88	68	70	22	8	4	0	21	47
Subtotal HST	**HST**	97	**8**	108	0	0	13	8	76	9	0	8	4	0	4	72
Subtotal Ag S&H	**Ag S&H**	109	**5**	18.4	41	4	9	0	55	14	9	11	11	0	54	10
Subtotal Other Category	**OT**	1220	**11**	203.15	2	42	15	15	1146	0	0	0	0	0	0	1220
GRAND TOTALS (All Program Areas)		**1799**	**68**	**1220**	**61**	**135**	**54**	**135**	**1414**	**156**	**35**	**30**	**29**	**0**	**84**	**1465**

Refer to: Supplemental Instructions, page 10.

[1] Group together by Program Area and provide sub-totals for each Program Area in Table 12b. Add or delete rows as necessary.

C. Faculty and Trainee Publications

Faculty and Trainee Publications

Industrial Hygiene Program

IH Student Publications

Publications and Presentations

Publications

1. Peter C. Raynor, Seung Won Kim, and Mrinal Bhattacharya, "Mist Generation from Metalworking Fluids Formulated Using Vegetable Oils", *The Annals of Occupational Hygiene*, 49(4):283-293 (2005)
2. Zhang, Y., Banerjee, S., Ramachandran, G., Yang, R. Bayesian modeling of air pattern for two-zone fields. Submitted to *Biometrics*, 2006.
3. 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.
4. 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.
5. 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*. Accepted for publication, 2006.
6. Monkkonen P., Pai P., Maynard A., Lehtinen KE., Hameri K., Rechkemmer P., Ramachandran G., Prasad B., Kulmala M. Fine particle number and mass concentration measurements in urban Indian households. *Science of the Total Environment*. 347(1-3):131-47, 2005.
7. Rechkemmer, P., Ramachandran, G., Pai, P., Maynard, A. “Women’s personal and indoor exposures to PM2.5 in Mysore, India: Impact of domestic fuel usage”, *Atmospheric Environment*, 39:5500-5508, 2005.
8. Ramachandran, G., Adgate, J.L., Banerjee, S., Church, T.R., Jones, D., Sexton, K. “Indoor Air Quality in Two Urban Elementary Schools—Measurements of Airborne Fungi, Carpet Allergens, CO2, Temperature, and Relative Humidity” *Journal of Occupational and Environmental Hygiene*. 2: 553–566, 2005.
9. Ramachandran, G., Watts, W.F., Kittelson, D. “Mass, surface area, and number metric in diesel occupational exposure assessment”. *Journal of Environmental Monitoring*. 2005, **7**(7), 728 – 735.
10. 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).
11. Peter C. Raynor, Seung Won Kim, and Mrinal Bhattacharya, "Mist Generation from Metalworking Fluids Formulated Using Vegetable Oils", *The Annals of Occupational Hygiene*, 49(4):283-293 (2005).
12. Debra K. Olson, William H. Lohman, Lisa M. Brosseau, Ann L. Fredrickson, Patricia M. McGovern, Susan G. Gerberich, and Nancy M. Nachreiner, "Crosscutting Competencies for Occupational Health and Safety Professionals", *Journal of Public Health Management & Practice*, 11(3):235-243 (2005).
13. L.M. Brosseau, P.C. Raynor, and C. Lungu, "Employers' Expectations of Knowledge and Skills of Master's-Trained Industrial Hygienists", *Journal of Occupational and Environmental Hygiene*, 2(1):1-7 (2005).
14. Kaizad Munshi, David Parker, Yogindra Samant, Lisa Brosseau, Wei Pan, and Min Xi, "Machine Safety Evaluation in Small Metal Working Facilities: An Evaluation of Inter-Rater Reliability in the Quantification of Machine-Related Hazards", *American Journal of Industrial Medicine*, 48(5):381-388 (2005)
15. Lisa M. Brosseau and Shelby Yahui Li, "Small Business Owners' Health and Safety Intentions: A Cross-Sectional Survey", *Environmental Health*, 4(23) (2005).
16. 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).

Presentations

1. Ramachandran, G., Basic Principles of Occupational Health and Safety – Application to Ultrafine Aerosols, 2nd International Symposium on Nanotechnology and Occupational Health, 2005.

2. Ramachandran, G., Invited presentation on Nanoparticles and Occupational Health, AIHA – Chicago Local section, March 2006.
3. Ramachandran, G., Health relevance of airborne nanoparticle concentration measurements, Roundtable on Nanoparticle Exposure Assessment, American Industrial Hygiene Conference and Exposition (AIHCE) in Chicago, IL, May 2006.
4. Ramachandran, G., Improving accuracy of professional judgments in exposure assessment, Roundtable on New Heights in Exposure Assessment and Control Banding Utilizing Professional Judgment and Bayesian Decision Analysis, American Industrial Hygiene Conference and Exposition (AIHCE) in Chicago, IL, May 2006.
5. Ramachandran, G., Reconstruction of Silica and Non-silica Exposures and Lung Burdens, American Industrial Hygiene Conference and Exposition (AIHCE) in Anaheim, CA, May 2005.
6. Seung Won Kim, James Farnsworth, Sagar Goyal, Peter C. Raynor, and Thomas Kuehn, "Bacterial Aerosol Measurements Using Ventilation Filters in Building Air Handling Units", *2006 American Industrial Hygiene Conference and Exposition*, Chicago, IL, May 2006.
7. Ji Young Park, Gurumurthy Ramachandran, Peter C. Raynor, Lynn E. Eberly, and Andrew D. Maynard, "Comparison of Two Surface Area Concentration Estimation Methods Using Number and Mass Concentrations", *2006 American Industrial Hygiene Conference and Exposition*, Chicago, IL, May 2006 (poster).
8. Sook Ja Cho, Ramachandran, G. Residential characteristics associated with cat allergen (Fel d l) levels over one year in Minneapolis, MN, American Industrial Hygiene Conference and Exposition (AIHCE) in Chicago, IL, May 2006.
9. 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).
10. Tricia Carmody, Peter C. Raynor, and Martin Bevan, "Development of an Air Sampling Protocol for Sampling in Former Methamphetamine Laboratories", *2006 American Industrial Hygiene Conference and Exposition*, Chicago, IL, May 2006 (poster).
11. Jo Anne Brock and Peter C. Raynor, "Efficiency of Filter Media with Biological and Non-Biological Agents", *2006 American Industrial Hygiene Conference and Exposition*, Chicago, IL, May 2006 (poster).
12. Seung Won Kim and Peter C. Raynor, "Mist Generation from Vegetable-Oil Based Metalworking Fluids by Three Mechanism", presentation to the Upper Midwest Section-American Industrial Hygiene Association, Roseville, MN, October 2005 (invited).
13. Peter C. Raynor, "Worker Competencies for Emergency Preparedness", *The 3rd Annual Statewide Partners' Conference on Public Health and Hospital Emergency Preparedness*, Milwaukee, WI, September 2005 (invited).
14. Lisa Brosseau, "Filter Efficiency and Facial Fit of Health Care Masks", Roundtable 242, *2006 American Industrial Hygiene Conference and Exposition*, Chicago, IL, May 2006.

Faculty and Trainee Publications

Occupational Health Nursing Program

OHN Publications and In-press Manuscripts

Nachreiner N, Hansen H, Okano A., **Gerberich S**, Ryan A, **McGovern P, Church T**, Watt G. Difference in Work-Related Violence Related to Nurse License Type. Journal of Professional Nursing. (In press).

Hart P, **Olson D**, Frederickson A, **McGovern P**. Competencies most valued by employers—Implications for master's prepared OHNs. AAOHN Journal. 54: 327-335, 2006.

McGovern P, **Dowd B**., Gjerdingen D, Gross C, Kenney S, Ukestad L, McCaffrey, D, Lundberg U. The Postpartum Health of Employed Mothers. Annals of Family Medicine. 4:159-167, 2006.

Schult, T., **McGovern, P**., Dowd, B., Pronk, N. The future of health promotion/disease prevention programs: the challenges and opportunities faced by stakeholders. JOEM, 48: 541-548, 2006.

Findorff M, McGovern P, Gerberich S, Wall M. Reporting violence to a health care employer. AAOHN Journal. 53: 399-406, 2005.

Findorff M, McGovern P, Sinclair S. Work-related Violence Policy: A Process Evaluation. AAOHN Journal. 53: 360-369, 2005.

Gerberich SG, Church T, **McGovern PM**, Hansen H, **Nachreiner N** et al. Risk factors for work-related assaults on nurses. Epidemiology.16 (5): 704 -709, 2005.

Nachreiner N, Gerberich S, McGovern P, Church T, Hansen H, Geisser M, Ryan A. The Impact of training on work-related assault. Research in Nursing and Health, 28: 67-78, 2005.

Nachreiner N, Gerberich SG, McGovern P, Church T, Hansen H, Geisser M, Ryan A. Relation between policies and work related assault: Minnesota Nurses' Study. Occupational and Environmental Medicine. 62 (10): 675-81, 2005.

Olson D, **Lohman W**, **Brosseau L**, Frederickson A, **McGovern P., Gerberich S**, **Nachreiner N**. Crosscutting Competencies for Occupational Health and Safety Professionals. Journal of Public Health Management and Practice, 11:235-243, 2005.

Olson DK, **Stedman-Smith M**, **Fredrickson AL**. Environmental health & nursing: Piloting a technology-enhanced distance module, AAOHN. 53:353-359, 2005.

Faculty and Trainee Publications

Occupational Medicine Program

OM Student and Faculty Publications

Student

DeMoss C, McGrail MP, Haus E, Crain L, Asche S. Workplace Injuries and Common Health and Performance Factors in Health Care Shift-Workers. *JOEM* 2004 Dec; 46(12): 1278-81.

Zheng CJ, Adams AB, McGrail MP, Marini J, **Greaves IA** (2005). A proposed curvature index for quantifying the curvilinearity phenomenon present in an obstructive flow-volume curve. *Respir Care* 2006 Jan; 51(1): 40-5.

Ide, L, Parker, D. Hazardous Child Labor. *Public Health Reports* 2006; vol 120 (6); 607-61.

Nabeel, I, Baker BA, Zheng CJ, McGrail M, Marshall P**,** Flottemetsch T. Physical Fitness and Self-Reported Injuries in Police (Submitted to *Medicine & Science in Sports and Exercise*).

Baker BA, Dodd K, Greaves I, Zheng CJ, Brosseau, L, Guidotti T. Occupational Medicine Physicians in the United States: Demographic and Core Competencies. (Submitted to *JOEM*)

Faculty:
Baker BA, Topliff A, Messing RB, Small Johnson J. Persistent Arsenic Neuropathy after Distant Arsenic Exposure. *J Agromed* 2005; 10 (4): 43-54.

Baker BA, Alexander BH, Mandel JS, Acquavella JF Honeycutt R, Chapman P. Farm Family Exposure Study: methods and recruitment practices for a Biomonitoring Study of Pesticide Exposure. *J Expo Anal Environ Epidemiol* 2005; 15(6): 491-9.

Mandel JS, Alexander BH, **Baker B**, Honeycutt R, Chapman P, Acquavella JF. Biomonitoring for farm families in the farm family exposure study. *Scand J Work Environ Health* 2005; 31 (suppl 1): 98-104.

Alexander BA, Burns C, Bartles M, Mandel JS, **Baker BA**. Chlorpyrifos Exposure In Farm Families Results from the Farm Family Exposure Study. *J Expo Anal Environ Epidemiol* 2005; 15: 491-499.

Abrar F, Baker B, Brodehl M. Medicine du travail des Personnels de Sante aux Etats Unis. Bulletin d'Information de Association Nationale de Medicine du Travail et d'Ergonomie du Personnel des Hopitaux. Dec. 15, 2005, vol 63; 18-24.

Zheng CJ, Luebeck EG, Byers B and Moolgavkar SH (2005) On the number of founding germ cells in humans. *Theor Biol Med Model* 2:32-7.

Baker BA, McGrail M. Metals: Arsenic, Lead, Mercury and Metal Fume Fever. In: *The Toxicology Handbook for Clinicians.* Elsevier (In Press).

Greaves IA, Sexton K, Adgate JL, Church TR, Blumenthal M, Ramachandran G, Fredrickson AL, Geisser MS, Ryan AD. Asthma, atopy and lung function among racially diverse, poor inner urban Minneapolis school children. *Environ Res* (In Press).

Alexander BH, Mandel JS, **Baker BA**, Burns C, Bartles M, Mandel JS, Acquavella JF, Gustin C. Biomonitoring of 2,4-D Exposure and Dose in Farm Families (Submitted to Environmental Health Perspectives).

Hirschhorn N, **Greaves IA.** Louisa May Alcott: Her mysterious illness unmasked. *Perspect Biol Med* (In Press).

Greaves IA, Silbergeld EL, Strickland GT, Torres EB, Tapiodor JI, Ramos ER. An outbreak of toxic neuropathy among inmates of a Philippine jail. *Environ Res* (Submitted).

Faculty and Trainee Publications

Hazardous Substance Academic Training Program

HSAT Student Publications

DeAnn Lazovich, David L. Parker, Lisa M. Brosseau, F. Thomas Milton, **Siobhan K. Dugan**, Wei Pan, and Lynette Hock, "Effectiveness of a Worksite Intervention to Reduce an Occupational Exposure: The Minnesota Wood Dust Study", *American Journal of Public Health*, 92(9):1498-1505 (2002).

DeAnn Lazovich, David M. Murray, Lisa M. Brosseau, David L. Parker, F. Thomas Milton, and **Siobhan K. Dugan**, "Sample Size Considerations for Studies of Intervention Efficacy in the Occupational Setting", *Annals of Occupational Hygiene*, 46(2):219-227 (2002).

L.M. Brosseau, D.L. Parker, D. Lazovich, T. Milton, and **S. Dugan**, "Designing Intervention Effectiveness Studies for Occupational Health and Safety: The Minnesota Wood Dust Study", *American Journal of Industrial Medicine*, 41(1):54-61 (2002).

Gina M. Letts, Peter C. Raynor, and Rebecca L. Schumann, "Selecting Fiber Materials to Improve Mist Filters", *Journal of Aerosol Science*, 34(11):1481-1492 (2003).

Publications

1. Peter C. Raynor, Seung Won Kim, and Mrinal Bhattacharya, "Mist Generation from Metalworking Fluids Formulated Using Vegetable Oils", *The Annals of Occupational Hygiene*, 49(4):283-293 (2005)
2. 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).
3. Peter C. Raynor, Seung Won Kim, and Mrinal Bhattacharya, "Mist Generation from Metalworking Fluids Formulated Using Vegetable Oils", *The Annals of Occupational Hygiene*, 49(4):283-293 (2005).
4. Debra K. Olson, William H. Lohman, Lisa M. Brosseau, Ann L. Fredrickson, Patricia M. McGovern, Susan G. Gerberich, and Nancy M. Nachreiner, "Crosscutting Competencies for Occupational Health and Safety Professionals", *Journal of Public Health Management & Practice*, 11(3):235-243 (2005).
5. L.M. Brosseau, P.C. Raynor, and C. Lungu, "Employers' Expectations of Knowledge and Skills of Master's-Trained Industrial Hygienists", *Journal of Occupational and Environmental Hygiene*, 2(1):1-7 (2005).
6. Kaizad Munshi, David Parker, Yogindra Samant, Lisa Brosseau, Wei Pan, and Min Xi, "Machine Safety Evaluation in Small Metal Working Facilities: An Evaluation of Inter-Rater Reliability in the Quantification of Machine-Related Hazards", *American Journal of Industrial Medicine*, 48(5):381-388 (2005)
7. Lisa M. Brosseau and Shelby Yahui Li, "Small Business Owners' Health and Safety Intentions: A Cross-Sectional Survey", *Environmental Health*, 4(23) (2005).
8. 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).

Presentations

1. Ji Young Park, Gurumurthy Ramachandran, Peter C. Raynor, Lynn E. Eberly, and Andrew D. Maynard, "Comparison of Two Surface Area Concentration Estimation Methods Using Number and Mass Concentrations", *2006 American Industrial Hygiene Conference and Exposition*, Chicago, IL, May 2006 (poster).
2. 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).
3. Tricia Carmody, Peter C. Raynor, and Martin Bevan, "Development of an Air Sampling Protocol for Sampling in Former Methamphetamine Laboratories", *2006 American Industrial Hygiene Conference and Exposition*, Chicago, IL, May 2006 (poster).
4. Jo Anne Brock and Peter C. Raynor, "Efficiency of Filter Media with Biological and Non-Biological Agents", *2006 American Industrial Hygiene Conference and Exposition*, Chicago, IL, May 2006 (poster).

5. Seung Won Kim and Peter C. Raynor, "Mist Generation from Vegetable-Oil Based Metalworking Fluids by Three Mechanism", presentation to the Upper Midwest Section-American Industrial Hygiene Association, Roseville, MN, October 2005 (invited).
6. Peter C. Raynor, "Worker Competencies for Emergency Preparedness", *The 3rd Annual Statewide Partners' Conference on Public Health and Hospital Emergency Preparedness*, Milwaukee, WI, September 2005 (invited).
7. Lisa Brosseau, "Filter Efficiency and Facial Fit of Health Care Masks", Roundtable 242, *2006 American Industrial Hygiene Conference and Exposition*, Chicago, IL, May 2006.

Faculty and Trainee Publications

Agricultural Safety and Health Program

ASH Student Publications

- Bartz, P. 2005. Storytelling as a Delivery Method of Farming Safety Education for Hmong Farmers. Unpublished MPH Plan B Paper, University of Minnesota School of Public Health, Minneapolis, MN.
- Jensen, K., Gerberich, S.G., Alexander, B., Renier, C.M., Mongin, S., Ryan, A., Zhang, X., Gibson, R.W., French, L.R., Masten, A.S. Injuries Among Farm Household Members in a Five-State Region: Regional Rural Injury Study -II. In review, 2006.
- Hagen, E., Gerberich, S.G., Alexander, B., Ryan, A., Renier, C.M., et al. Fall-Related Injuries Among Farm Household Members in a Five-State Region: Regional Rural Injury Study -II, In press, *Journal of Occupational and Environmental Medicine*, 2006.
- Rasmussen, R. C., Schermann, M. A., Shutske, J. M., & Olson, D. K. 2003. Use of the North American Guidelines for Children's Agricultural Tasks with Hmong farm families. *Journal of Agricultural Safety and Health*, 9(4): 265-274.
- Carmody, T. 2006. Determination of an Air Sampling Protocol for Methamphetamine to be used in Former Clandestine Laboratories. Unpublished MPH Plan B Paper, University of Minnesota School of Public Health, Minneapolis, MN.
- Periakaruppan, P. 2006. Assessment of milk processing worker exposure to potential bioterrorism agents in the milk supply. Unpublished MPH Plan B Paper, University of Minnesota School of Public Health, Minneapolis, MN.
- Olson DK, Stedman-Smith M, Fredrickson AL. Environmental health & nursing: Piloting a technology-enhanced distance module, *AAOHN*. 53:353-359, 2005.
- Olson DK, Stedman-Smith M, Fredrickson AL. Environmental health & nursing: Piloting a technology-enhanced distance learning module. Poster presentation: AAOHN 2005 Symposium & Expo, Minneapolis, Minnesota, May 2005.
- Olson DK, Stedman-Smith M, Fredrickson AL. Environmental health & nursing: Piloting a technology-enhanced distance module, *AAOHN*. 53:353-359, 2005.
- 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 & Expo, Albuquerque, New Mexico, May 2006.

Faculty and Trainee Publications

Occupational Health Services Research and Policy Program

OHSRP Student and Faculty Publications and Manuscripts in Review [6]

A. Publications

Atherly A, **Dowd B**. The Effect of Medicare Advantage Payments on Dually Eligible Medicare Beneficiaries. Health Care Financing Review, forthcoming.

Nachreiner N, Hansen H, Okano A, **Gerberich S**, Ryan A, **McGovern P, Church T**, Watt, G. Difference in Work-Related Violence Related to Nurse License Type. Journal of Professional Nursing, forthcoming.

Baxter NN, **Habermann EB**, Tepper JE, Durham SB, **Virnig BA**. Risk of Pelvic Fractures in Older Women Following Pelvic Irradiation. JAMA. 294:2587-2593, 2005.

Judson PL, **Habermann EB**, Baxter NN, Durham SB, **Virnig BA**. Trends in the Incidence of Invasive and In Situ Vulvar Carcinoma. Obstetrics & Gynecology. 107:1018-1022, 2006.

McGovern P, Dowd B, Gjerdingen D, Gross C, Kenney S, Ukestad L, McCaffrey, D, and Lundberg U. Postpartum Health of Employed Mothers Five Weeks After Childbirth, *Annals of Family Medicine* 4:2: 159-167, 2006.

Nyman J, **Barleen N**, The Effect of supplemental private health insurance on health care purchases, health and welfare in Brazil" Available at SSRN: http://ssrn.com/abstract=894443 , April 5, 2006.

Schult T, McGovern P, Dowd B, Pronk N. The future of health promotion/disease prevention programs: the challenges and opportunities faced by stakeholders. Journal of Occupational and Environmental Medicine , 48: 541-548, 2006.

Dowd B, Feldman R and Coulam R. FFS Medicare in a Competitive Market Environment, *Health Care Financing Review* 27:113-126, Winter, 2005-2006.

Findorff M, McGovern P, Gerberich S, Wall M. Reporting violence to a health care employer. AAOHN Journal. 53: 399-406, 2005.

Findorff M, McGovern P, Sinclair S. Work-related Violence Policy: A Process Evaluation. AAOHN Journal. 53: 360-369, 2005.

Gerberich, S., Church, T., McGovern, P., Hansen, H., Nachreiner, N., Geisser, M., Ryan, A., Mongin S, Watt G. (2005). Risk factors for work-related assaults on nurses. Epidemiology.16(5): 704 -709.

Kralewski J, **Dowd B**, Health A, and Amer K. The Influence of the Structure and Culture of Medical Group Practices on Prescription Drug Errors, Medical Care 43: 817-825, 2005.

Nachreiner N, Gerberich SG, McGovern P, Church T, Hansen H, Geisser M, Ryan A. Relation between policies and work related assault: Minnesota Nurses' Study. Occupational and Environmental Medicine. 62: 675-81, 2005.

Nachreiner N, Gerberich SG, McGovern P, Church T, Hansen H, Geisser M, Ryan A. The Impact of training on work-related assault. Research in Nursing and Health, 28: 67-78, 2005.

B. Manuscripts in Review

[6] Faculty and student names are noted in bold font and student names are underscored

Lindsay, G; Owens A, Merrill R, **Barleen, N**. Different content emphases in alcohol industry and non-industry underage drinking parenting manuals.

Nyman J, **Barleen N**, **Dowd B**, Russell D, Coons S, Sullivan P. Quality-of-life weights for the U.S. population: self-reported health status and priority health conditions by demographic characteristics.

Virnig B, Baxter N, **Habermann E**, Feldman R, Bradley, C. Overwhelming racial disparity in stage at cancer diagnosis of the 34 most common solid tumors.

[1] Faculty and student names are noted in bold font and student names are underscored

Faculty and Trainee Publications

Occupational Injury Prevention Research Training Program

OCCUPATIONAL INJURY PREVENTION RESEARCH TRAINING PROGRAM (OIPRTP)

PUBLICATIONS AND PRESENTATIONS

OIPRTP Publications Involving Faculty (Bold) And Trainees (Bold And Underlined)

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). *Injury Prevention*, In review, 2006.

Larson-Bright M, **Gerberich SG, Alexander BH, Gurney JG**, Masten AS, **Church TR, Ryan AD**, Renier CM: Parental Safety Beliefs and Childhood Agricultural Injury, *Journal of Agricultural Safety and Health*, In review, 2006.

Nachreiner NM, Church TR, Gerberich SG, McGovern PM, Hansen H, Geisser M, **Ryan A**, Watt G, **Feda DM**: A comparison of follow-up reminders: the Minnesota Nurses' Study, In review, 2006.

Grice M, **Feda D**, **McGovern P, Alexander B**, McCaffrey D, and Ukestad L: Giving birth and returning to work: The impact of work-family conflict on women's health after childbirth, In Review, 2006.

Jensen KE, **Gerberich SG, Alexander BH**, Mongin SJ, Ryan AD, Masten AS, **Ferguson Carlson K**: Injuries Among Agricultural Operation Household Members: Regional Rural Injury Study – II (RRIS-II) – 1999. *Journal of Agricultural Safety and Health*, In review, 2006.

Ferguson Carlson K, **Langner DM**, **Alexander BH, Gurney J, Gerberich SG, Ryan AD**, Renier CM, Mongin SJ: 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,* In Press, 2006.

Nachreiner NM, Hansen HE, Okano A, **Gerberich SG, McGovern PM, Church TC, and Ryan A**: Work-Related Violence: Impact of License Type, In Press, *Journal of Professional Nursing*, 2006.

Paulson EH, **Gerberich SG, Alexander BH, Ryan AD**, Renier CM, Zhang X, French LR, Masten AS, **Ferguson Carlson K**: Fall-related Injuries Among Agricultural Household Members: Regional Rural Injury Study – II (RRIS-II). *Journal of Occupational and Environmental Medicine* 48:959-968, 2006.

Ferguson Carlson K, **Langner DM**, **Alexander BH, Gurney J, Gerberich SG, Ryan AD**, Renier CM, Mongin SJ: 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,* In Press, 2006.

Kurszewski LS, Gerberich SG, Serfass RC, Ryan AD, Renier CM, **Alexander BH**, **Ferguson Carlson K**, Masten AS: Sports and Recreational Injuries: Regional Rural Injury Study-II. Impact on Agricultural Households and Operations. *British Journal of Sports Medicine*. 40(6):527-535, 2006.

Ferguson Carlson K, **Gerberich SG, Church TR, Ryan AD, Alexander BH**, Mongin SJ, Renier CM, Zhang X, French LR, Masten A: Tractor-Related Injuries: A Population-Based Study of a Five-State Region in the Midwest. *American Journal of Industrial Medicine*, 47(3): 254-264, 2005.

Brunner WM, Lindgren PG, **Langner DM**, Williams AN, Yawn BP: Asthma among rural Minnesota adolescents. *Journal of Asthma*, 42(9): 787-792, 2005.

Gerberich SG, Church TR, Alexander BH, Masten AS, Renier CM, **Ferguson Carlson K**, **Ryan AD**, Mongin SJ: Surveillance of injury burden and risk factors for agricultural injury among children and youth: Regional Rural Injury Study. *American Journal of Epidemiology*, 161:64, 2005.

Findorff MJ, **McGovern PM, Wall MM, Gerberich SG**: Reporting violence to a health care employer, *AAOHN*, 53(9): 399-406, 2005.

Nachreiner NM, **Gerberich SG, McGovern PM, Church TR**, Hansen H, Geisser MS, Ryan AD, Watt GD: Relation between policies and work-related assault: Minnesota Nurses' Study. *Occupational and Environmental Medicine*, 62: 675-681, 2005.

Nachreiner NM, **Gerberich SG, McGovern PM, Church TR**, Hansen H, Geisser MS, **Ryan AD**, Watt GD: Impact of training on work-related assault. *Research in Nursing and Health*, 28:67-78, 2005.

Gerberich SG, Church TR, McGovern PM, Hansen H, **Nachreiner NM**, Geisser MS, **Ryan AD**, Mongin SJ, Watt GD, **Jurek** A: Risk factors for work-related assaults on nurses, *Epidemiology*. 16(5): 704-709, 2005.

Alexander BH, Bloemen L, Allen RH. Summary of sessions on the epidemiology of agricultural exposure and cancer: Oxford International Symposiums on Agriculture Exposures and Cancer. *Scand J Work Environ.*31 Suppl 1:5-7, 2005.

Acquavella JF, Gustin C, **Alexander BH**, Mandel JS. Implications for epidemiologic research on variation by pesticide in studies of farmers and their families. *Scandinavian Journal of Work, Environment & Health*.31 Suppl 1:105-9; discussion 63-5, 2005.

Mandel JS, **Alexander BH**, Baker BA, Acquavella JF, Chapman P, Honeycutt R. Biomonitoring for farm families in the farm family exposure study. *Scandinavian Journal of Work, Environment & Health*. 31 Suppl 1:98-104; discussion 63-5, 2005.

Yoshinaga S, Hauptmann M, Sigurdson AJ, Doody MM, Freedman DM, **Alexander BH**, Linet MS, Ron E, Mabuchi K. Non-melanoma skin cancer in relation to ionizing radiation exposure among u.s. radiologic technologists. *International Journal of Cancer*. (115:828-834), 2005.

Baker BA, **Alexander BH,** Mandel JS, Acquavella JF, Honeycutt R, Chapman P. Farm Family Exposure Study: Methods and Recruitment Practices for a Biomonitoring Study of Pesticide Exposure. *Journal of Exposure Analysis and Environmental Epidemiology*. (15:491-499), 2005.

Acquavella JF, **Alexander BH,** Mandel JS, Burns CJ, Gustin C. Exposure Misclassification in Epidemiologic Studies of Agricultural Pesticides: Insights from Biomonitoring Studies of Farmers. *Epidemiology*. (17:69-74), 2005.

Linet MS, Freedman DM, Mohan AK, Doody MM, Ron E, Mabuchi K, **Alexander BH**, Sigurdson A, Hauptmann M. Incidence of haematopoietic malignancies in US radiologic technologists. *Occupational & Environmental Medicine*. 62(12):861-7, 2005.

Sigurdson AJ, Hauptmann M, **Alexander BH**, Doody MM, Thomas CB, Struewing JP, Jones IM. DNA damage among thyroid cancer and multiple cancer cases, controls, and long-lived individuals. *Mutation Research* 2005;586(2):173-88.

Peretz C, **Alexander BH**, Nagahama SI, Domino KB, Checkoway H. Parkinson's disease mortality among male anesthesiologists and internists. *Movement Disorders*. 20(12):1614-7, 2005.

Doody, MM, , Freedman DM, **Alexander BH**, Hauptmann M, Hill DA, Tarone R, Rao RR, Mabuchi K, Ron E, Sigurdson AJ Linet MS. Breast Cancer Incidence in U.S. Radiologic Technologists. *Cancer.*106:2707-2715, 2006.

Zabel EW, **Alexander BH**, Mongin SJ, Doody, MM, Sigurdson AJ, Linet MS, Freedman DM, Hauptmann M, Mabuchi K, Ron E. Thyroid Cancer Incidence and Employment as a Radiologic Technologist *International Journal of Cancer*. 119:1940-1945, 2006.

Stredrick DL, Garcia-Closas M, Pineda MA**, Alexander BH**, Doody MM, Lissowska J, Brinton LA, Peplonska B, Bhatti P, Chanock SJ, Struewing JP, Sigurdson AJ. The *ATM* missense mutation Ser49Cys and risk of breast cancer. *Human Mutation* 2006;27:538-544.

Alexander BH, Burns CJ, Bartels MJ, Acquavella JF, Mandel JS, Gustin C, Baker B. Chlorpyrifos Exposure in Farm Families: Results form the Farm Family Exposure Study. *Journal of Exposure Science and Environmental Epidemiology*. doi:10.1038/sj.jes.7500475), 2006.

Scher DP, **Alexander BH**, Adgate JL, Eberly LE, Mandel JS, Acquavella JF, Bartels MJ, Brzak KA Agreement of pesticide biomarkers between morning void and 24-hour urine samples from farmers and their children**.** *Journal of Exposure Science and Environmental Epidemiology.* doi:10.1038/sj.jes.7500505), 2006.

Rajaraman P, Sigurdson AJ, Doody MM, Freedman DM, Hauptmann M, Ron E, Linet MS. **Alexander BH**, Lung Cancer Incidence among U. S. Radiologic Technologists, 1983–1998. *International Journal of Cancer* 2006 (In Press) Published Online: 20 Jul 2006 DOI: 10.1002/ijc.22148.

Pinsky PF, Miller A, Kramer B, **Church T**, Reding D, Prorok P, Gelmann E, Schoen R, Buys S, Hayes RB, Berg CD. (2006) Evidence of a healthy volunteer effect in the Prostate, Lung, Colorectal and Ovarian (PLCO) Cancer Screening Trial. *American Journal of Epidemiology*, in press, 2006.

Grau MV, Haile RW, Mandel JS, Summers R, Beck G, Church TR**, Sandler RS, Cole BF, Barry EL, Baron JA, Snover D, Rothstein RI, Wallace K. Prolonged effect of calcium supplementation on the risk of colorectal adenomas. *Journal of the National Cancer Institute*, in press, 2006.**

Peters U, Chatterjee N, **Church TR**, Mayo C, Stürup S, Foster CB, Schatzkin A, Hayes RB. High serum selenium and reduced risk of advanced colorectal adenoma in a colorectal early detection program. *Cancer Epidemiology, Biomarkers and Prevention* 15(2): 315-20, 2006.

Ramachandran G, Adgate, JL, Banerjee S, **Church TR**, Jones D, Fredrickson A, Sexton K. Indoor air quality in two urban elementary schools – Measurements of airborne fungi, carpet allergens, CO(2), temperature, and relative humidity.*Journal of Occupational and Environmental Hygiene* 2(11): 553-566, 2005.

Weissfeld JL, Schoen RE, Pinsky PF, Bresalier RS, **Church T,** Yurgalevitch S, Austin JH, Prorok PC, Gohagan JK for the PLCO Project Team. Flexible sigmoidoscopy in the PLCO Cancer Screening Trial: Results from the baseline screening examination of a randomized trial. *Journal of the National Cancer Institute* 97(13): 989-97, 2005.

Robertson DJ, Greenberg ER, Beach M, Sandler RS, Ahnen D, Haile RW, Burke CA, Snover DC, Bresalier RS, McKeown-Eyssen G, Mandel JS, Bond JH, van Stolk RU, Summers RW, Rothstein RI, **Church TR**, Cole BF, Byers T, Mott L, Baron JA. Colorectal cancer in patients under close colonoscopic surveillance. *Gastroenterology* 129(1):34-41, 2005.

Jurek AM, Greenland S, **Maldonado G**, **Church TR**. Proper interpretation of non-differential misclassification effects: Expectations vs observations. *International Journal of Epidemiology* 34(3):680-687, 2005.

Moore SM, Gierada DS, Clark KW, Blaine J, **Church T,** Cordes J, Fagerstrom R, Fletcher G, Flynn M, Ford M, Fritz M, Garg K, Larke F, Marquez G, Moore A, Nath H, Ohan P, Payne T, Wu X. Image quality assurance in the Prostate, Lung, Colorectal, and Ovarian Cancer Screening Trial Network of the National Lung Screening Trial. *Journal of Digital Imaging* 18(3):242-250, 2005.

Andriole G, Levin D, Crawford ED, Gelmann E, Pinksy P, Chia D, Kramer B, Reding D, **Church T**, Grubb R, Izmirlian G, Ragard L, Clapp J, Prorok P, Gohagan J. for the PLCO Project Team. Prostate cancer screening in the Prostate, Lung, Colorectal and Ovarian (PLCO) Cancer Screening Trial: Findings from the initial screening round of a randomized trial. *Journal of the National Cancer Institute* 97(6):433-438, 2005.

Sexton K, Adgate JL, **Church TR**, Ashley DL, Needham LL, Ramachandran G, Fredrickson AL, Ryan AD. Children's exposure to volatile organic compounds as determined by longitudinal measurements in blood. *Environmental Health Perspectives* 113(3):342-349, 2005.

Gohagan JK, Marcus PM, Fagerstrom RM, Pinsky PF, Kramer BS, Prorok PC, Ascher S, Bailey W, Brewer B, **Church TR**, Engelhard D, Ford M, Fouad M, Freedman M, Gelmann E, Gierda D, Hocking W, Inampudi S, Irons B, Cole Johnson D, Jones A, Kucera G, Kvale P, Lappe K, Manor W, Moore A, Nath H, Neff S, Oken M, Plunkett M, Price H, Reding D, Riley T, Schwartz M, Spizarny D, Yoffie R, Zylak C. Final results of the Lung Screening Study, a randomized feasibility study of spiral CT versus chest X-ray screening for lung cancer. *Lung Cancer* 47(1): 9-15, 2005.

Graff JJ, Sathiakumar N, Macaluso M, **Maldonado G**, Matthews R, Delzell E. Chemical exposures in the synthetic rubber industry and lymphohematopoietic cancer mortality. J Occup *Environmental Med*icine 47:916-932, 2005.

Laberge JC, Creaser JI, Rakauskas ME, **Ward NJ**. Design of an Intersection Decision Support (IDS) Interface to Reduce Crashes at Rural Stop-Controlled Intersections, *Transportation Research Part C: Emerging Technologies*, In press, 2006.

Creaser JI, Rakauskas ME, **Ward N,** Laberge JC. Concept evaluation of intersection decision support (IDS) systems to support drivers' gap acceptance decisions at rural stop-controlled intersections. Transportation Research Part F: *Traffic Psychology*, In Press, 2006.

Smith P, **Ward N J**, Waterman M. Driving aggression in forensic and non-forensic populations; relationships to self-reported levels of aggression, anger, and impulsivity. *British Journal of Psychology*, in press, 2006

Ward NJ, Shankwitz C, Gorgestani A, Donath M, de Waard D., Boer E. Bus Rapid Transit and bus driver stress. *Ergonomics*, 49, 832-859, 2006.

Lawton R and **Ward NJ**. A systems analysis of a fatal train crash. *Journal of Accident Analysis and Prevention*, 37, 235-244, 2005.

Hansen JC and Dik B. Evidence of 12-Year predictive and concurrent validity for SII occupational scale scores. *Journal of Vocational Behavior*, 67, 365-378, 2005.

Hansen J C. Assessment of interests. Chapter 13 in S.D. Brown & R.W. Lent (Eds.). Career development and counseling: Putting theory and research to work. New York: Wiley & Sons, 2005.

Wilkinson T. and **Hansen JC.** The relationship among leisure interests, personality traits, affect, and mood. *Measurement and Evaluation in Counseling and Development*, 39, 31-41, 2006.

Leuty M and **Hansen JC.** Bennett Mechanical Comprehension Test (BMCT). Chapter in J. Greenhaus & G. Callanan (Eds.), Encyclopedia of Career Development. Thousand Oaks, CA: Sage Publications, 2006.

Leuty M and **Hansen JC**. The Minnesota Clerical Test (MCT). Chapter in J. Greenhaus & G. Callanan (Eds.), Encyclopedia of Career Development. Thousand Oaks, CA: Sage, Publications, 2006.

Hansen J C. Strong Interest Inventory. Chapter in N.J. Salkind (Ed.), Encyclopedia of Measurement and Statistics. Thousand Oaks, CA: Sage Publications, 2006.

Lee WV and **Hansen JC.** Jackson Personality Inventory. Chapter in N.J. Salkind (Ed.), Encyclopedia of Measurement and Statistics. Thousand Oaks, CA: Sage Publications, 2006.

Wilkinson T and **Hansen JC.** California Psychological Inventory (CPI). Chapter in N.J. Salkind (Ed.), Encyclopedia of Measurement and Statistics. Thousand Oaks, CA: Sage Publications, 2006.

Kaler ME And **Hansen JC.** Edwards Personal Preference Scale. Chapter in N.J. Salkind (Ed.), Encyclopedia of Measurement and Statistics. Thousand Oaks, CA: Sage Publications, 2006.

Zhou S and **Hansen JC.** Jackson Vocational Interest Survey. Chapter in N.J. Salkind (Ed.), Encyclopedia of Measurement and Statistics. Thousand Oaks, CA: Sage Publications, 2006.

Leuty ME and **Hansen JC.** NEO Personality Inventory. Chapter in N.J. Salkind (Ed.), Encyclopedia of Measurement and Statistics. Thousand Oaks, CA: Sage Publications, 2006.

Buban S and **Hansen JC.** Minnesota Clerical Test. Chapter in N.J. Salkind (Ed.), Encyclopedia of Measurement and Statistics. Thousand Oaks, CA: Sage Publications, 2006.

Hansen JC and Lee WV. Person-Vocation Fit. Chapter in S.G. Rogelberg (Ed.) Encyclopedia of Industrial/Organizational Psychology. Thousand Oaks, CA: Sage Publications, 2006.

Hansen JC and Zhou S. Careers. Chapter in S.G. Rogelberg (Ed.), Encyclopedia of Industrial/Organizational Psychology. Thousand Oaks, CA: Sage Publications, 2006.

Hansen JC and Leuty ME. Career Development/Paths. Chapter in S.G. Rogelberg (Ed.), Encyclopedia of Industrial/Organizational Psychology. Thousand Oaks, CA: Sage Publications, 2006.

Venem MT, **Shutske J**, and Gilbert W. Testing and creation of a safety system to disengage the PTO of a tractor. *Applied Engineering in Agriculture.* 22(1): 5-12, 2006.

Olson DK, Atchison C, Leitheiser A, Larson S, Homzik C. Public health and terrorism preparedness cross-borders Issues, *Public Health Reports* 20(1): 76-83, 2005.

Olson D, Lohman W, Brosseau L, Frederickson A, **McGovern P, Gerberich S, Nachreiner N**. Crosscutting competencies for occupational health and safety professionals*, Journal of Public Health Management and Practice.* 11(3): 235-243, 2005.

OIPRTP Presentations Involving Faculty (Bold) And Trainees (Bold And Underlined)

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, 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)

Ferguson Carlson KR, **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.

Gerberich SG, Church TR, Alexander BH, Masten AS, Renier CM, **Ferguson KR**, **Ryan AD**, Mongin SJ: Unique Occupational Injury Surveillance: Identification of the Total Injury Burden and Risks on Agricultural Operations, NORA Symposium 2006, Washington, DC, 2006.

Gerberich SG, Church TR, McGovern PM, Hansen H, **Nachreiner NM,** Geisser MS, **Ryan AD**, Mongin SJ, Watt GD, **Jurek** A: Occupational Violence: Incidence, Consequences and Identification of Risk Factors as a Basis for Prevention, NORA Symposium 2006, Washington, DC. 2006.

Ferguson K, **Langner D, Alexander BH, Gurney J, Gerberich SG, Ryan AD**, Renier CM, Mongin SJ: The History Of Parent Agricultural Injury And Risk Of Child Agricultural Injury; Regional Rural Injury Study-II (RRIS-II). [7th World Conference on Injury Prevention and Safety Promotion, Vienna, Austria. *Best Poster Award, 7th World Conference on Injury Prevention and Safety Promotion in Vienna]* Midwest Center for Occupational Safety and Health, Poster Symposium, 2006.

Ferguson KR, **Gerberich SG, Alexander BH, Church TR, Ryan A**, Mongin SJ, Renier CM, Zhang X, French LR, Masten AS: A Population-Based Study Of Tractor-Related Injuries: Regional Rural Injury Study - II (RRIS-II). [American Public Health Association, San Francisco, California, *Delta Omega Award for Best Student Abstract]* Midwest Center for Occupational Safety and Health, Poster Symposium, 2006.

Gerberich SG, Church TR, Alexander BH, Masten A, Renier CM, **Ferguson K**, **Ryan A**, Mongin S: Surveillance Of The Burden Of Injury And Relevant Risk Factors Among Agricultural Household Members: Regional Rural Injury Study – II. Midwest Center for Occupational Safety and Health, Poster Symposium, 2006.

Gerberich SG, Church TR, McGovern PM, Hansen H, **Nachreiner NM**, Geisser M, **Ryan AD**, Mongin S, Watt G, **Jurek A**: Minnesota Nurses' Study: Environmental Risk Factors for Occupational Violence. Midwest Center for Occupational Safety and Health, Poster Symposium, 2006.

Grice M, Gromala T**, Gerberich SG, Alexander BH, Gurney J, Ryan AD, and McGovern PM**: Past Violence, Future Violence: The Effect of History of Violence on Nurses' Risk of Work-Related Physical Assault. Midwest Center for Occupational Safety and Health, Poster Symposium, 2006.

Fisher L, **Ferguson Carlson K,** Guard A: Shaping the Millennium. From the History of Child Home Injury in the United States, in public health journals (1900 - 1975), to Applications of Leadership Systems, 2005 National Injury Prevention and Control Conference, Injury and Violence in America: Meeting Challenges, Sharing Solutions, Denver, Colorado, 2005.

Ferguson Carlson K, **Alexander BH, Gerberich SG, Ryan AD**, Renier CM, Mongin SJ, Masten A, **Church TR**: Musculoskeletal Back Injuries Among Agricultural Household Members in the Regional Rural Injury Study – II: Incidence, Characteristics, and Potential Risk Factors, 2005 Program: The National Occupational Research Agenda (NORA): Health and Safety Issues in the Ageing Workforce, Minneapolis: University of Minnesota, April 2005.

Gerberich SG, Church TR, Alexander BH, Masten AS, Renier CM, **Ferguson Carlson K, Ryan AD**, Mongin SJ: Surveillance of the Burden of Injury and Relevant Risk Factors Among Agricultural Household Members: Regional Rural Injury Study – II, American Public Health Association Meeting, Philadelphia, Pennsylvania, 2005.

Renier CM, **Gerberich SG, Church TR**, Masten AS, **Ferguson Carlson K**, Mongin SJ, **Ryan AD, Alexander BH**: Regional Rural Injury Study-II: Innovative Design and Methods for Surveillance of the Burden of Injury and Relevant Risk Factors among Agricultural Household Members, American Public Health Association Meeting, Philadelphia, Pennsylvania, 2005.

Nachreiner NM, Hansen HE, Okano A, **Gerberich SG, Ryan AD, McGovern PM, Church TR**: Minnesota Nurses' Study: Relation Between Nurse License Type and Violence, American Public Health Association Meeting, Philadelphia, Pennsylvania, 2005.

Feda D, Grice M, McGovern P, Alexander B, McCaffrey D, Ukestad L: The Impact of Work-Family Conflict on Maternal Health After Childbirth. Women's Health Research Conference, Minneapolis, Minnesota, 2005.

Gerberich SG, Church TR, Alexander BH, Masten AS, Renier CM, **Carlson KF**, **Ryan AD**, Mongin SJ: Surveillance Of Injury Burden and Risk Factors For Agricultural Injury Among Children And Youth: Regional Rural Injury Study – II. Society for Epidemiologic Research, Toronto, Canada, 2005.

Kurszewski LS, Gerberich SG, Serfass RC, **Ryan AD**, Renier CM, Mongin SJ, **Alexander BH**, **Ferguson KR,** Masten A: Sports and Recreational Injuries: Regional Rural Injury Study – II (RRIS-II), Midwest Center for Occupational Health and Safety, NORA Program Seminar Poster Session, Minneapolis, Minnesota, 2005.

Ryan AD, Mongin SJ, Gerberich SG, Renier CM, **Alexander BH, Church TR**, Masten AS, **Ferguson KR:** A Comparison of Exposure Measurements for Injury Rates: Regional Rural Injury Study – II (RRIS-II). Midwest Center for Occupational Health and Safety, NORA Program Seminar Poster Session, Minneapolis, Minnesota, 2005.

Gerberich SG, Church TR, Alexander BH, Masten A, French LR, Renier CM, Mongin SJ, **Ryan AD**, **Ferguson KR,** Howse G: Surveillance of the Burden of Injury and Relevant Risk Factors Among Agricultural Household Members: Regional Rural Injury Study – II, Midwest Center for Occupational Health and Safety, NORA Program Seminar Poster Session, Minneapolis, Minnesota, 2005.

Gerberich SG. Invited: Minnesota Nurses' Study: Work-Related Violence Research to Identify the Magnitude, Consequences, and Risk Factors, Anoka-Ramsey Nursing Alumni Association, Performing Arts Center, 2005.

Gerberich SG. Invited: Overview of Disease and Injury Through a Public Health Lens: Injury: A Public Health Problem? School of Public Health, Academic Warm Up, Minneapolis: University of Minnesota, 2005.

Nachreiner NM, Gerberich SG, McGovern PM, Church TR, Hansen, HE, Geisser MS, **Ryan AD**: Work-Related Assault: Impact of Training, Women's Health Research Conference, Minneapolis, Minnesota, 2005.

Nachreiner NM, **Gerberich SG, McGovern PM, Church TR**, Hansen HE, Geisser MS, **Ryan AD**: Work-Related Assault: Impact of Training. National Occupational Research Agenda Seminar, Minneapolis, Minnesota, 2005.

Nachreiner NM, Wyman JF, McCarthy TC, Peters JA, **Findorff MJ**: Circumstances and Consequences of Falls in the Fall Evaluation and Prevention Program: Preliminary Findings. University of Minnesota School of Nursing Annual Research Day: Translating Research into Practice, Minneapolis, Minnesota, 2005.

Nachreiner NM, Gerberich SG, McGovern PM, Church TR, Hansen HE, Geisser MS, Ryan AD: Work-Related Assault: Impact of Training. American Association of Occupational Health Nurses (AAOHN) Conference, Minneapolis, Minnesota, 2005.

Findorff M, **McGovern PM**, Wall MM, and **Gerberich SG**: Reporting Violence to a Health Care Employer American Occupational Health Nurses' Association. Minneapolis, Minnesota, 2005.

Church TR. Screening bias in observational studies of behavioral risk factors and chronic disease. Contributed paper presented at 2nd North American Congress of Epidemiology, Seattle, WA, 2006.

Church TR. Invited: Lung cancer, Clinical Update, Minnesota Cancer Summit, Brooklyn Center, MN, April 25, 2006.

Church TR. Invited: A censored multinomial model for binary, longitudinal survey data with missing values, International Biometric Society Annual Meeting, Eastern North American Region, Tampa, FL, 2006.

Church TR. **Invited:** Issues in CISNET modeling, Cancer Intervention and Surveillance Modeling Network Meetings, Rockville, MD, 2005.

Church TR. Invited: Effect of polyp removal in the Minnesota study, Polyp Prevention Study Group Meeting, Chicago, IL, 2005.

Church TR. **Invited:** Lung cancer screening issues, Cancer U Fall Series sponsored by the University of Minnesota Cancer Center, Minneapolis, MN, 2005.

Church TR. "Bias from variability in diagnostic delay," Session on Methodological Issues in Studies Involving Cancer Screening, Eastern North America Region, International Biometric Society Meetings, Austin, TX, March 22, 2005.

Church TR. **Invited:** Lung cancer prevention: Beyond tobacco cessation, Cancer Prevention and Clinical Practice Workshop, Mayo Clinic, Rochester, MN , 2005.

Church TR. **Invited:** Counterfactual reasoning to illuminate solutions for causal inference. Environmental Health Sciences Seminar, University of Minnesota, Minneapolis, MN, 2005.

Maldonado G. **Invited:** A method for point-of-exposure attribution of foodborne illness: the blending project. FoodNet Annual Vision Meeting, Nashville, TN, 2005.

Maldonado G. Adjusting study results for study imperfections. Joint meeting of the Canadian Society for Biostatistics and Epidemiology and the Society for Epidemiologic Research, Toronto, Canada, 2005.

Maldonado G. **Invited**: Study design for causal inference. FoodNet Annual Vision Meeting, Atlanta, GA, 2006.

Maldonado G. **Invited**: Adjusting a relative-risk estimate for study imperfections. FoodNet Annual Vision Meeting, Atlanta, GA, 2006.

Maldonado G. **Invited:** A method for point-of-exposure attribution of foodborne illness. FoodNet Annual Vision Meeting, Atlanta, GA, 2006.

Maldonado G. **Invited:** Adjusting a relative-risk estimate for study imperfections: methodological concepts. Emory University School of Public Health, Department of Epidemiology, 2006.

Maldonado G. **Invited:** Adjusting a relative-risk estimate for study imperfections: example. Emory University School of Public Health, Department of Epidemiology, 2006.

Maldonado G. **Invited:** Adjusting a relative-risk estimate for study imperfections. McGill University Department of Epidemiology, Biostatistics and Occupational Health, 2006.

Boer ER, Manser MP, **Ward NJ**, and Kuge N. Impact of an ecologically valid haptic driver support on visual sampling and multi-tasking strategies. Vision in Vehicles Eleventh Annual International Conference, Dublin, Ireland, 2006.

Boer ER, de Bruin J, Abbink D, **Ward NJ**, and Manser M. Are drivers with small feet or long legs at greater risk of rear end collisions? Proceedings of the 50th Annual Human Factors and Ergonomics Society Meeting. San Francisco, FL, 2006.

Kuge N, Boer ER, Yamamura T, **Ward NJ**, and Manse, M. Study on driver's car following abilities based on an active haptic support function (SAE 06AE-168). Proceedings of the SAE 2006 World Congress, Detroit, Michigan, 2006.

Alexander L, Cheng P, Donath M, Gorgestani A, Menon A, Newstrom B, Shankwitz C, **Ward N**, and Starr R. Rural expressway intersection surveillance for an Intersection Decision Support System. Proceedings of 85th Annual Meeting of the Transportation Research Board, Washington, DC, 2006.

Rakauskas M and **Ward NJ**. Behavioral effects of driver distraction and alcohol impairment. Proceedings of the 49th Annual Human Factors and Ergonomics Society Meeting. Orlando, FL, 2005.

Laberge J, **Ward NJ**, Rakauskas M, and Creaser J. Rural stop-controlled intersection decision support systems. Proceedings of the 49th Annual Human Factors and Ergonomics Society Meeting. Orlando, FL, 2005.

Manser MP, **Ward NJ**, Kuge N, and Boer, E.R. Driver behavioral adaptation in response to a novel haptic driver support system. Proceedings of the 49th Annual Human Factors and Ergonomics Society Meeting. Orlando, FL, 2005.

Boer ER, **Ward NJ**, Manser MP, Yamamura T, and Kuge N. Driver performance assessment with a car following model. Proceedings of the 3rd International Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design. Rockport, Maine, 2005.

Boer ER, Rakauskas ME, **Ward NJ**, and Goodrich MA. Steering Entropy Revisited. To be presented at the 3rd International Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design. Rockport, Maine, 2005.

Rakauskas ME, **Ward NJ**, Bernat EM, Cadwallader M, Patrick CJ, de Waard D. Psychophysiological measures of driver distraction and workload while intoxicated. Poster presented at the 3rd International Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design. Rockport, Maine, 2005.

Boer ER, **Ward NJ**, Manser MP, and Kuge, N. Driver-model-based assessment of behavioral adaptation. JSAE Annual Conference, Yokohama, Japan, 2005.

Ward NJ. Review of crash risk and driving performance of drivers with Clinical Mental and personality disorders. 84th Annual Meeting of the Transportation Research Board, Washington, DC, 2005.

Hansen J C. The Role of dustbowl empiricism in vocational psychology: Maintaining our foundation. Presented at the Bi-annual Conference for the Society for Vocational Psychology. Vancouver, BC, Canada: 2005.

Hansen JC and Leuty M. Evidence of validity for the skill scales of the Campbell Interest and Skill Survey. Paper presented at the meetings of the Society for Vocational Psychology. Vancouver, BC, Canada: 2005.

Hansen JC, Lee W V, and Ton M. Asian American and Caucasian American college students' occupational stereotyping. Paper presented at the meetings of the Society for Vocational Psychology. Vancouver, BC, Canada: 2005.

Hansen JC and Dik B. Increasing precise congruence measurement: The modified C index at work. Paper presented at the meetings of the American Psychological Association. Washington, DC: 2005.

Hansen J C and Leuty M. Evidence of construct validity for the CISS skills scales. Paper presented at the meetings of the American Psychological Association. Washington, DC: 2005.

Hansen JC and Stoever S. How do interests, personality, and values influence motivation to volunteer?. Paper presented at the meetings of the American Psychological Association. Washington, DC: 2005.

Hansen JC and Wilkinson T. Personality predictors of leisure interests. Paper presented at the meetings of the American Psychological Association. Washington, DC: 2005.

Hansen JC, Ryan RC, and Dik B. Operationalizing Holland-type person-environment congruence: An empirical test of five approaches. Rocky Mountain Psychological Association. Park City, UT: 2006.

Shutske J. Agroterrorism and Food Systems Defense: Key Issues and Research Needs. Peer reviewed abstract and invited presentation. Academy Health Annual Research Conference, Boston, MA. 2005.

Shutske J. Opportunities for Extension in Public Health and Preparedness. Presentation and proceedings of 2005 Extension Disaster Education Network Annual Conference, Fargo, ND. 2005.

Shutske J. Defending Agriculture and Our Food System. Conference proceedings and presentation materials published by Association of Schools of Public Health. Washington, DC, 2005.

Olson DK. Collaboration and Co-sponsorship for Sustainability. Public Health Training Centers, Washington DC, July 2006.

Garrard J, **Olson DK**, Baird M, **F**oote S, Moscovic I, Feldman R, Blewett L. Citizens' Health Care Working Group Town Hall, Minneapolis, Minnesota, March 2006.

Olson DK, Brosseau L, Staubus I, Vegoe S. Lifelong Learning with the Midwest Center for Occupational Health and Safety. 3M Technical Forum for the EH Product Stewards, St. Paul, Minnesota, March 2006.

Olson DK, Thompson J, Atchison C, Collins D, Moon R, Reid M, Turnock B. Making the Link: Roundtable Discussion on How Academic Centers and Health Department Partnerships are Building Public Health Capacity. NACCHO Public Health Preparedness Summit, Washington DC, February 2006,

Olson DK. **Invited:** The School of Public Health as a Global Learning Environment. 21st Alumni Institute, Program in Healthcare Administration, Minneapolis, Minnesota, September 2005.