JOHNS HOPKINS EDUCATION and RESEARCH CENTER for OCCUPATIONAL SAFETY and HEALTH

Annual Report
July 1, 2005-June 30, 2006

Submitted by:

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JOHNS HOPKINS EDUCATION and RESEARCH CENTER for OCCUPATIONAL SAFETY and HEALTH

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II

INTRODUCTION and EXECUTIVE SUMMARY

Jacqueline Agnew

INTRODUCTION and EXECUTIVE SUMMARY

MAJOR ACCOMPLISHMENTS

During this report period, the Johns Hopkins Education and Research Center for Occupational Safety and Health (ERC) successfully accomplished its mission of providing professional training, research training and continuing education and outreach in the field of occupational safety and health (OSH). Professional training in the core ERC programs, Occupational and Environmental Hygiene (OEH), Occupational and Environmental Health Nursing (OEHN) and Occupational and Environmental Medicine (OEM) has sustained and even surpassed its tradition of excellence. Research training continued to be the focus of the two allied programs, Biomarkers of Exposure and Susceptibility (BOES) and Occupational Injury Prevention – which, combined with the OEH and OEHN programs, graduated 13 doctorally prepared occupational safety and health researchers. Faculty and students of the ERC produced more than 175 publications during this year and made numerous other professional contributions, such as presentations, consultations and leadership in the field. Additionally, ERC faculty and students have received numerous awards for their contributions to research, teaching and professional practice.

As described in this report, the ERC is committed to an interdisciplinary approach to OSH training and practice. Similarly, our professional practice and research activities promote and set the example of a team approach. Aided by the fact that all ERC programs are located in close proximity, there is an exceptional degree of interaction among students and faculty from all of the programs in courses, projects, seminars, research committees and other center opportunities.

Our two allied programs, BOES and Occupational Injury Prevention, fill specialized areas of need in occupational safety and health research. Our BOES Program is the only one of its kind that directly addresses workplace applications of measures that are being used increasingly for the purpose of public health decision-making and for the development and application of biological markers in human populations. Worker characteristics and workplace exposures pose unique opportunities and challenges for the use of these relatively new approaches. Thus the program has an important place in the evolution of the protection of worker health and well-being. Over this period, we have continued to improve the curriculum of this program by adding course offerings in molecular and population genetics. This curriculum complements the expansion of research opportunities in the area of genetic susceptibility to diseases of occupational or environmental origin.

Another rather unique program is that in Occupational Injury Prevention, which focuses on the advanced preparation of professionals in this field. Students are trained in epidemiologic research methods through coursework and development of independent research. They gain experience in teaching and acquire a strong background in the causes and prevention of occupational injury as well as in basic injury control methods. Trainees have excelled in research (both their own and collaborative projects) and teaching. Many have given presentations at national conferences, at least four of which have been chosen as the best paper at the conference. The work of these students has resulted in or contributed to more than 20 published manuscripts. Consistent with the new sector-based direction that NIOSH has established for the National Occupational Research Agenda (NORA), the program has been especially successful in building programs that address OSH problems in the transportation sector.

The Pilot Projects Research Training Program (PPRT) supported eight studies, four of which are being conducted at other institutions. The investigators include six doctoral students and two junior faculty. Thus, in addition to supporting the thesis projects of doctoral trainees, the program is enhancing the OSH research training capacity at several institutions in Region III. The program is also building ties between this ERC and potential education and research partners.

The Continuing Education and Outreach Program has successfully reached a large proportion of practicing OSH professionals. As an illustration, during this reporting period, we provided 49 Continuing Education courses that drew more than 700 participants. It should be noted that, consistent with the combined funding and similar missions of continuing education and outreach activities as of this reporting period, they have been directed out of the same ERC office.

We have established new partnerships and strengthened existing ones with professional associations such as the Chesapeake and Potomac sections of the American Industrial Hygiene Association (AIHA), the Chesapeake section of the American Society of Safety Engineers (ASSE), the Chesapeake and National Capital Chapters of the Academy of Certified Hazardous Materials Managers (ACHMM), the Maryland College of Occupational and Environmental Medicine (MdCOEM), and the Metropolitan Washington, Maryland Area and Seneca Valley Associations of Occupational Health Nurses (MWAOHN, MAAOHN and SVAAOHN). Similarly, we interact with state and local organizations such as the Maryland Department of the Environment, the Maryland Board of Environmental Sanitarians, county Public Health Departments, Maryland Occupational Safety and Health (MOSH) and public safety and other municipal workers (e.g., fire, EMT, police and sanitation). These relationships have led to valuable needs assessments and collaboration to meet their specific continuing education needs. Increased visibility of the Continuing Education and Outreach Program has enabled us to offer conferences and seminars that have attracted broader groups of occupational and environmental health professionals; for example, registered sanitarians and hazardous materials managers.

In summary, this ERC continues to provide OSH professional training of the highest quality. We look forward to developing new initiatives, such as the inception of the recently approved (July 2006) Continuing Education Program in Hazardous Substance Training. Additionally, we are planning new and innovative directions for some of our other programs, such as Outreach and the NORA supplemental funding for research training. All of our ERC programs, accomplishments and future plans are discussed more fully throughout the rest of this report.

SIGNIFICANT CHANGES SINCE JUNE 30, 2005

Faculty Changes

Faculty changes occurred in four of the ERC academic programs during this period. Dr. Tim Buckley of the OEH program left the school to join the faculty at Ohio State University as chair of a new department of environmental health. OEH faculty were joined by Dr. Rey DeCastro, who is currently in his second year as a research associate. Dr. DeCastro's research interests include statistical analyses of large longitudinal data sets, exposure assessment and air pollution.

In the OEHN program, Dr. Sheila Fitzgerald replaced Dr. Jacqueline Agnew as director. Dr. Fitzgerald is an associate professor and has been a member of the program faculty since 1987. As the new director, she has assumed a greater leadership and administrative role. Additionally, Dr. Maureen Cadorette completed her PhD in August 2006 and has been promoted to assistant scientist in the Department of Environmental Health Sciences. Dr. Cadorette was previously a member of the OEHN faculty at the rank of research associate. With the completion of her degree and promotion, she is now qualified to sit on doctoral student research committees, advise masters students, and serve on school and university committees. She has also taken on greater teaching responsibilities as co-director of the course *Fundamentals of Occupational Health*.

Virginia Weaver, MD, MPH was named director of the OEMR and the Occupational Medicine (OEM) Program of the ERC in June 2006. She replaced Dr. Clifford Mitchell, who recently (June 2006) left

Johns Hopkins, after eight years as director of the OEMR, for an outstanding opportunity to assume the directorships of the Office of Environmental Health Coordination and the Public Health Residency Program at the Maryland Department of Health and Mental Hygiene. Dr. Weaver is an associate professor of Environmental Health Sciences and has been a core faculty member of the OEMR since 1993.

A national search was successfully concluded in the Department of Health Policy and Management with the appointment of a new tenure-track assistant professor, Dr. Keshia Pollack, who will join the faculty of the Injury Prevention Program. Plans are in place to mentor her into the position of co-director of the Occupational Injury Prevention Program. A recent graduate of the Occupational Injury Prevention Program who completed a fellowship at the Robert Wood Johnson Foundation, Dr. Pollack's expertise includes the epidemiology and prevention of workplace injuries, specifically among vulnerable populations.

Finally, the supporting faculty of the ERC was strengthened when the Division of Occupational and Environmental Health performed a national search and recruitment for two new faculty during 2004-2005. This culminated in the hiring (in August and October 2005, respectively) of Dr. Sining Chen and Dr. Ana Navas-Acien. Dr. Chen, who has a PhD in biostatistics, will help meet the growing need of trainees for biostatistical support, especially in view of the increasingly complex data that are acquired in occupational and environmental epidemiologic studies and clinical research. Dr. Ana Navas-Acien, MD, PhD, is trained in preventive medicine and received her PhD in occupational and environmental epidemiology. She will be available to serve as a research mentor to OEMR trainees as well as doctoral students in the OEHN and OEH programs.

Curriculum Changes

Changes to course and other academic activities have been minor. The BOES Program added course offerings and training in the area of molecular and population genetics and, a new course titled *Making Change through Policy* was added to the core MPH curriculum, thus affecting master's students in the OEHN Program. The new course replaces *Problem Solving in Public Health* and has been received with overwhelming enthusiasm. Other changes occurred in available seminars. The Department of Health Policy Injury Center seminar series focused on occupational injury topics for one term, thus exposing all injury training program students to workplace safety issues. A new seminar has been added to the DOEH monthly offerings: the *Occupational & Environmental Health/Epidemiology Journal Club.* Dr. Virginia Weaver organizes this series, which is particularly relevant to doctoral students and is co-sponsored by the Division of Occupational and Environmental Health and the Department of Epidemiology.

Practicum & Field Experiences

Additional sites for Occupational Injury Prevention Program student research training are constantly being identified. The most recent additions include The State of Maryland Department of Health and Mental Hygiene in Baltimore; the Northrop Grumman Corporation Electronic and Oceanic Division in Baltimore; and the International Association of Firefighters in Washington, D.C. Elective rotations for practicum-year OEM residents have included GlaxoSmithKline and the U.S. Department of Agriculture Animal and Plant Health Inspection Services. Other potential manufacturing sites for OEM resident experience have included Middle River Aircraft Systems and Merck.

Recently established connections with other centers in the Department of Environmental Health Sciences (The Johns Hopkins NIEHS Center, the Center for Public Health Preparedness and the Mid-Atlantic Public Health Training Center) offer more opportunities for graduate student participation in workshops, seminars and projects that reach community populations, nurses, physicians, and other

health care professionals. Several new opportunities focus on preparedness issues as they relate to worker health and safety.

In conclusion, there have been no major changes to the configuration or program content of the ERC over the course of this reporting period. As described above, the most significant changes have been related to faculty positions and changes in program leadership in OEHN and OEM. New opportunities have been added to seminar and field experiences, and links to external organizations have been strengthened.

ERC WEB SITES

ERC Home Page:
http://www.jhsph.edu/erc/index.html

OEH Program:
http://www.jhsph.edu/erc/oeh.html

OEHN Program:
http://www.jhsph.edu/erc/oehn.html

OEMR Program:
http://www.jhsph.edu/erc/oemr.html

Injury Program:
http://www.jhsph.edu/erc/injury.html

CE/Outreach Program:
http://www.jhsph.edu/erc/ce/index.html

ERC director list (also the ERC homepage):
http://www.jhsph.edu/erc/index.html

Faculty directory for the whole school:
http://faculty.jhsph.edu/facultylist.cfm

Center for Injury Research and Policy:
http://www.jhsph.edu/injurycenter/index.html

III

PROGRAM PROGRESS REPORTS

CENTER WIDE PROGRAMS

CENTER ADMINISTRATION

Jacqueline Agnew

PROGRESS REPORT: CENTER ADMINISTRATION

ERC Director: Jacqueline Agnew, RN, PhD, MPH, Professor, Department of Environmental Health Sciences

CENTER DESCRIPTION AND OBJECTIVES

Dr. Jacqueline Agnew, the director of the Education and Research Center for Occupational Safety and Health (ERC), holds primary responsibility for all center operations. The center deputy is Dr. Peter Lees, and each of the five academic programs is directed by a senior faculty member. As the ERC has become increasingly complex in its structure over recent years, the duties of the director, deputy director and others with key administrative roles have expanded. Center administration priorities have been to ensure: strong leadership and oversight; effective coordination and communication among the center components and with external contacts; and flexibility to respond to emerging occupational health problems and to incorporate changes that occur at the departmental and school levels.

The ERC Executive Committee is charged with sharing information across programs, setting and pursuing new directions, and evaluating the progress of the center. Specifically, the Executive Committee includes: the center director and deputy director, the five academic program directors, the continuing education/outreach director, and the business administrator of the Department of Environmental Health Sciences (or designee). During this year, we have also established a management team that is available to deal with the day-to-day issues associated with management of the ERC. Specifically, these issues are generated by external organizations such as NIOSH or other stakeholders, school or university entities, or the ERC programs themselves. This team consists of the director, the deputy director, and the director of Continuing Education/Outreach (Drs. Agnew and Lees and Ms. Doyle). All three are prepared to serve as primary contacts, thus ensuring timely communication with all ERC components and with external constituents. Another key element in the administration of the ERC is the Department Business Office, which, with the center director, manages the several component budgets, student appointments, personnel payroll, interaction with the Office of Grants Administration, coordination with external institutions (such as non-JHU pilot project grantees), and NIOSH reporting requests.

The ERC External Advisory Board has represented the core disciplines in which we provide academic training, and members come from the private sector, academia, and labor. Its function has been to help evaluate the center's effectiveness and to provide advice regarding priorities and new directions. (Examples of topics addressed in the past include diversity recruiting and student funding.) However, several of the board members have recently retired or moved from their positions. Thus, we are in the process of reconstructing the board. To this end, we plan to expand the representation of the board to include occupational safety and health individuals from academia, professional organizations, government agencies, labor occupational health and safety education, the private sector, and small business.

Administrative issues that have faced the ERC over the funding period have been both external and internal in nature. The administrative core has worked to track and respond to new directions established by NIOSH. Specifically, NIOSH has revised the focus of the National Occupational Research Agenda (NORA) to address sector-based occupational health and safety issues in contrast to the previous 21 research priority areas. This new direction has led us to evaluate our strengths in sector-based research and to begin planning ways in which the ERC programs can work together to address the new NORA priorities. Our co-sponsorship of the NIOSH regional town hall meeting assisted us in identifying important regional sector-based and cross-cutting research

concerns. Additionally, Dr. Agnew's membership on the NORA Liaison Committee, and ERC faculty attendance at the NORA Symposium in Washington, D.C., have informed our plans for NORA-related research and research training. We hope to further develop our coordinated efforts to address sector-specific occupational health and safety problems.

A number of new centers in the school have recently been formed to address contemporary public health issues. One of the administrative actions of the ERC has been coordinating opportunities for training, outreach and continuing education with these partner centers. Examples are the Center for Public Health Preparedness and the MidAtlantic Public Health Training Center.

Other responsibilities of the administrative core include coordination of centralized ERC activities, e.g., seminars, guest speakers, joint projects, meetings, and events held with other centers. These are described in other sections of this report.

FUTURE PLANS

The ERC will continue to progress under strong leadership and committed faculty, and we will meet our objective to provide outstanding training in occupational safety and health. Ongoing activities to track the success of our graduates will document their contributions to the field.

We do not expect any significant changes in the structure or curriculum of our five academic programs. However, we did submit a competing supplemental application to add a Continuing Education Program in Hazardous Substance Training. (It has subsequently been funded.) That program will allow us to increase our scope of training, as well as to reach a wider segment of the occupational safety and health community. In particular, it will increase our contacts with, and contributions to, those in the public sector.

With regard to faculty recruitment, we look forward to the addition of a new assistant professor in the Occupational Injury Prevention Program. This will bring opportunities for expanded research training directions, as well as a prospective leader and educator in this specialized academic area. The transition in leadership of the Occupational and Environmental Medicine Residency (OEMR) from Dr. Mitchell to Dr. Weaver is expected to go smoothly, based on Dr. Weaver's longtime affiliation with the program and Dr. Brian Schwartz's continued participation and contributions. We intend to explore ways to reinforce the OEMR faculty.

We look forward to input from our expanded Advisory Board, particularly with regard to the development of new initiatives for outreach to the practicing community. In the next grant period, we anticipate a requirement for greater emphasis on outreach, in contrast to its currently merged status within the Continuing Education Program.

Student recruitment will remain a priority, with specific attention to recruiting minority students. Additionally, we constantly explore additional sources of student funding. The support provided by NIOSH funding is vital to sustaining and growing our programs, and allows us to leverage funding from other sources such as school scholarships.

Finally, the next year will bring a number of renewal and recertification activities that directly or indirectly impact the ERC. The most important of these is the ERC competitive renewal for the period 2007 to 2012. Two program recertification processes will also take place – recertification of the Occupational and Environmental Hygiene (OEH) Program by the Accreditation Board of Engineering and Technology (ABET), and recertification of the Occupational and Environmental Medicine Residency (OEMR) by the Accreditation Council for Graduate Medical Education (ACGME). Further,

the Bloomberg School of Public Health is completing a self-study in preparation for upcoming recertification by the Council on Education for Public Health (CEPH).

In summary, we do not anticipate major changes in the ERC within the next year. However, we will evaluate our current approaches to our training mission and will consider new directions that might be proposed as we prepare for a new budget period.

OUTREACH

Mary Doyle

OUTREACH PROGRAM

Outreach Program Director: Mary Doyle, RN, MPH, COHN-S/CM, Research Associate, Department of Environmental Health Sciences

During this grant period, Education and Research Center for Occupational Safety and Health (ERC) faculty routinely interacted with universities and schools, professional societies, labor organizations and corporations. Within our own institution, we have worked with faculty and students of the Schools of Arts & Sciences, Engineering, Medicine and Nursing to increase curricular opportunities in occupational safety and health. Lectures and seminars and consultations have been conducted in Region III with professional as well as non-professional groups to raise awareness of workplace health and safety issues. Examples of our Outreach activities are presented below.

EDUCATIONAL DEVELOPMENT

- The Occupational and Environmental Hygiene (OEH) Program launched the *Principles of Industrial Hygiene* course on the School's open courseware Web page this year. In addition, faculty continued to consult with Pennsylvania State University on the development of an on-line safety and industrial hygiene course.

- Occupational and Environmental Health Nursing (OEHN) Program faculty have added content on occupational health to the undergraduate and graduate curriculums in the Johns Hopkins School of Nursing by presenting lectures in several courses and by offering a specific course in *Occupational & Environmental Health Nursing* (Dr. Sheila Fitzgerald). The latter saw a rise in enrollment, indicating greater interest and exposure to the field. ERC Director Dr. Jacqueline Agnew was appointed to the School of Nursing Academic Council, further advancing the visibility of occupational health in the School of Nursing curriculum.

- The Continuing Education (CE) Program faculty is working with the local chapters of the Academy of Certified Hazardous Materials Managers to revise the *Certified Hazardous Materials Manager Review Course* based on previous course feedback. The revised course is planned for the new budget year.

PRESENTATIONS/LECTURES/AWARENESS SEMINARS

- OEH Program faculty gave numerous presentations at scientific meetings, academic institutions and other venues, including international conferences in Italy and Saudi Arabia.

- OEHN faculty provided outreach to several regional professional associations, including the three regional chapters of the American Association of Occupational Health Nurses (AAOHN), the Chesapeake and Potomac Sections of American Industrial Hygiene Association (AIHA), the National Capital Chapter of the Academy of Certified Hazardous Materials Managers (ACHMM), the Maryland Board of Environmental Sanitarians, and the Chesapeake Region Safety Council.

- Occupational and Environmental Medicine Residency (OEMR) faculty presented numerous seminars both nationally and internationally – on occupational and environmental nephrotoxicants, mold, indoor air quality, emergency preparedness, work-related

dermatological conditions, asthma and spirometry – to professional organizations, medical students, residents, labor organizations and manufacturing employees.

- Under the guidance of Occupational Injury Prevention faculty, students nearing the completion of their doctoral work presented at the annual American Public Health Association (APHA) Conference in Philadelphia this year. Professor Susan Baker presented seminars for state health professionals on environmental change and on her new research work on EMS and helicopter safety.

- Dr. Paul Strickland spoke to the Maryland Environmental Public Health Tracking Program's Scientific Advisory Committee on the subject of biomarkers for polycyclic aromatic hydrocarbon exposure.

CONSULTATIONS

- Faculty members of the OEH Program provided consultation to various government, labor, non-profit and professional organizations, including the National Institute for Occupational Safety and Health (NIOSH), the Laborers International Union of North America, the National Center for Healthy Housing, Ecology and Environment, Inc., and the Fraternal Order of Police.

- Dr. Clifford Mitchell (OEM) provided consultation with the Occupational Safety and Health Administration (OSHA) on respiratory protection and continues to consult with the International Association of Fire Fighters (IAFF) on various occupational medicine issues.

- Gary Sorock from the Occupational Injury Prevention Program provided consultation to Daimler Chrysler on preparation for a company-wide descriptive study of lacerations and sprain/strain injuries to be used for intervention study planning.

- Dr. Paul Strickland (BOES) provided advice on biomonitoring and biomarker applications for the Maryland Environmental Public Health Tracking (EPHT) Program**.**

OTHER ACTIVITIES

- OEH faculty participated in a National Toxicology Program (NTP) review, and served on: an expert panel for the Center for the Evaluation of Risks to Human Reproduction (CERHR); the Safety and Occupational Health NIH Study Section; and the Maryland Department of the Environment, Air Quality Control Advisory Council.

- Dr. Fitzgerald (OEHN) was appointed to the Institute of Medicine (IOM) Committee on the Study of the Social Security Disability Determination Process during this period. The OEHN Program has increased its interaction with other interdisciplinary centers within the Johns Hopkins Bloomberg School of Public Health, reaching a greater number of nurses in occupational health and other specialties. These centers include: the Johns Hopkins National Institute for Environmental Health Sciences (NIEHS) Center, the Center for Public Health Preparedness, and The MidAtlantic Public Health Training Center.

- Dr. Clifford Mitchell (OEM) was on the Maryland Commission on Environmental Justice and Sustainable Communities working group on environmental health indicators, developing a tool for public display of community environmental health indicators.

- Dr. Gary Sorock (Occupational Injury Prevention) worked with University of Nebraska and Harvard investigators regarding studies on lacerations in meatpacking. Professor Susan Baker served on the Armed Forces Epidemiology Board.

- Dr. Paul Strickland (BOES) is on the scientific peer review committee organized by the American Institute of Biological Sciences (AIBS) to review research proposals submitted to the Peer Reviewed Medical Research Program (PRMRP) of the U.S. Army Medical Research and Materiel Command (USAMRMC).

- Ms. Mary Doyle (CE) has provided significant assistance to charter members in establishing the new Chesapeake Chapter of the Academy of Certified Hazardous Materials Managers (ACHMM).

FUTURE PLANS

During the next year, we will continue to serve our practicing community and other stakeholders in occupational safety and health at the individual faculty, program and ERC levels. We will maintain our strong ties to professional organizations and will pursue opportunities to partner on new and existing activities. However, in the absence of dedicated funding for this program, it is unlikely that we will launch new large-scale outreach projects. In planning for the upcoming renewal, we anticipate that Outreach will be viewed as a programthat will be funded separately from Continuing Education. In that case, we will design more focused activities to assist stakeholders and to enhance awareness of the field of occupational health. To this end, our Executive Committee will seek input from our Advisory Board as well as from our current outreach contacts.

INTERDISCIPLINARY COORDINATION

INTERDISCIPLINARY COORDINATION

Students from all of the Education and Research Center for Occupational Safety and Health (ERC) academic programs work and learn together in didactic and field-oriented courses, joint seminars, special field trips, research, and team investigations of occupational health problems. The academic year begins with an ERC orientation and introductory session to greet new students, present an overview of the history and purpose of the ERC and introduce ERC programs and faculty. All activities emphasize the ERC goal of interdisciplinary interaction.

Research activities are another setting in which students interact with faculty and students of other disciplines and from other ERC programs. Most faculty research projects involve cross-disciplinary collaboration and provide similar opportunities for students, who typically have research mentors who represent multiple disciplines. Examples during this period of multidisciplinary doctoral research projects included studies of: heavy metal biomarkers and neurobehavioral function (Occupational and Environmental Medicine and Biomarkers of Occupational Exposure and Susceptibility programs); PCB biomarkers and associations with diet and central nervous system functioning (Occupational and Environmental Health Nursing, Occupational and Environmental Medicine, and Biomarkers of Occupational Exposure and Susceptibility programs); and the association between radiation exposure and thyroid dysfunction (Occupational and Environmental Health Nursing and Occupational and Environmental Hygiene programs).

Interaction also takes place in seminars, including: the monthly ERC seminar that all students attend; the seminars of the Injury Center, which devotes one term to occupational injuries; and the new joint Division of Occupational and Environmental Health – Epidemiology seminar and journal club that Dr. Virginia Weaver (Occupational and Environmental Medicine) initiated during this year.

A project that previously provided an excellent opportunity for multidisciplinary practice and research opportunities has recently expanded. In New Mexico, the Department of Energy-funded program for medical surveillance of former workers of Los Alamos National Laboratory is being extended to Sandia National Laboratory in Albuquerque. Several elements of this program have brought together students of the Occupational and Environmental Health Nursing, Occupational and Environmental Hygiene, and Occupational and Environmental Medicine programs, who, along with faculty from the same programs, have participated in practice and research projects.

There are also several examples of faculty and student interdisciplinary interactions with occupational health professionals outside of the Johns Hopkins University – in government, labor and private sector organizations. These opportunities continue to grow. Finally, because students from the various ERC academic programs take their core coursework together, the classroom is a venue for interdisciplinary interaction. In the coming year, Dr. Maureen Cadorette of the Occupational and Environmental Health Nursing faculty will co-instruct the course *Fundamentals of Occupational Health* with Dr. Brian Schwartz (Occupational and Environmental Medicine). The flagship interdisciplinary course in the final term, *Occupational Health*, is also co-taught by faculty from Occupational and Environmental Health Nursing and Occupational and Environmental Hygiene and requires students to work in teams.

PILOT PROJECTS RESEARCH TRAINING

Peter Lees

PILOT PROJECTS RESEARCH TRAINING (PPRT) PROGRAM

PPRT Program Director: Peter S.J. Lees, PhD, Professor, Department of Environmental Health Sciences

PROGRAM DESCRIPTION AND GOALS

The Pilot Projects Research Training Program (PPRT) enhances the research training capacity of the Johns Hopkins Education and Research Center for Occupational Safety and Health (ERC) and other institutions with occupational safety and health training programs in Region III through direct support of pilot research activities. Funds are used to support short-term research projects to explore the feasibility of new or improved areas of study, as well as to enable new investigators to obtain data to successfully compete for support through conventional research funding sources. The program fosters increased interdisciplinary interaction and promotes collaboration with Training Program Grantees (TPGs) and other institutions with occupational safety and health research training programs in Region III.

The following are examples of research activities that are appropriate for Pilot Projects Research Training Program funding:

- Collection of preliminary data in support of a subsequent extramural grant application
- Feasibility studies to test and develop new methods, approaches and applications
- Travel costs to field sites for data collection
- Data entry or computer costs for data analysis
- Costs for printing and reproduction of data collection instruments

Project proposals are reviewed and prioritized by a panel designated by the ERC director (Jacqueline Agnew), chaired by the PPRT Program director (Peter S.J. Lees) and consisting of one faculty member from each ERC program (Occupational and Environmental Health Nursing, Occupational and Environmental Medicine, Occupational and Environmental Hygiene, Biomarkers of Occupational Exposure and Susceptibility, Occupational Injury Prevention) as well as a representative of regional Training Program Grant (TPG) faculty. Standardized evaluation criteria include: importance of the problem; relevance to NORA objectives; and soundness of design. The review also addresses whether: the expertise of investigators is adequate; the resources and facilities are adequate; the research is ethically acceptable; and the budget is appropriate. The merits of the proposal are then scored, and those that rank highest are funded.

PROGRAM ACTIVITIES

We continue to offer the PPRT Request for Proposals to all NIOSH-supported institutions and other institutions engaged in occupational safety and health research in the region; 16 applications were received this year, from West Virginia University School of Medicine, the University of Pennsylvania School of Nursing, the University of Pennsylvania School of Medicine, the University of Maryland School of Nursing, the Uniformed Services University of Health Sciences, the Johns Hopkins University School of Medicine, and the Johns Hopkins Bloomberg School of Public Health.

Of the 16 applications received in 2005, the following eight were selected for funding:

Name: David Colquhoun, MS
Status: PhD Candidate, Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health
Mentor: Rolf Halden, PhD
Project title: *Application of Proteomics for the Development of Biomarkers of Occupational Exposure*

Name: Victoria V. Dickson, CRNP, MSN
Status: PhD Candidate, University of Pennsylvania, School of Nursing
Mentor: Linda A. McCauley, PhD, FAAN, RN
Project title: *Variables Affecting Heart Failure Self-Care Management in the Workforce*

Name: Cherise B. Harrington, BA
Status: PhD Candidate, Uniformed Services University of Health Sciences, Department of Medical and Clinical Psychology
Mentor: Michael Feuerstein, PhD
Project title: *Ergonomic and Psychosocial Interventions and Outcomes in Patients with Acute Low Back Pain*

Name: Andrew Lincoln, ScD
Status: Assistant Professor, Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health
Reliability and Validity of Shoulder Impairment Ratings

Name: Priscah Murjuru, DrPH
Status: Assistant Professor, West Virginia University, School of Medicine
Evaluation of Various Injury Trends Among Young Workers, 1996-2005

Name: My Linn Sawyer, MD, MPH
Status: Occupational Medicine Resident, University of Pennsylvania, School of Medicine, Institute of Occupational and Environmental Health
Mentor: Edward A. Emmett, MD
Project title: *Mandatory Overtime Increases Occupational Injuries at an Automotive Assembly Plant*

Name: Plernpit Suwan-Ampai, MSc, MHS
Status: PhD Candidate, Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health
Mentor: Jacqueline Agnew, PhD
Project title: *Individual Factors and Geographical Variation of Polycyclic Aromatic Hydrocarbon (PAH) Exposures and Acute Respiratory Symptoms Among a Sample of the NHANES 1999-2002*

Name: Jennifer Taylor, MPH
Status: PhD Candidate, Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health
Mentor: Prof. Susan Baker
Project title: *Poor Organizational Culture Leads to Injuries in the Nursing Workforce: Are the Same Cultural Risk Factors Putting Patients at Risk?*

PROGRAM PRODUCTS

PPRT recipients underlined:

Chapin A, Rule A, Gibson K, Buckley T, Schwab K: "Airborne multi-drug resistant bacteria isolated from a concentrated swine feeding operation." *Environ Hlth Perspect 113*:137-145 (2005).

McDevitt, JJ, PSJ Lees, WG Merz, KJ Schwab: "Use of green fluorescent protein-expressing *Aspergillus fumigatus* spores to validate quantitative PCR analysis of air samples collected on filters." *J Occup Environ Hygiene 2*(12):633-640 (2005).

Sapkota A, Williams D, Buckley TJ: "Tollbooth workers and mobile source-related hazardous air pollutants: how protective is the indoor environment?" *Environ Sci Technol 39*(9):2936-2943 (2005).

Sapkota A, Halden RU, Dominici F, Groopman JD, Buckley TJ: "Urinary biomarkers of 1,3-butadiene in environmental settings using liquid chromatography isotope dilution tandem mass spectrometry." *Chem Biol Interact 160*(1):70-79 (2006).

Sapkota AR, Ojo KK, Roberts MC, Schwab KJ: "Antibiotic resistance genes in multidrug-resistant *Enterococcus spp*. and *Streptococcus spp*. recovered from the indoor air of a concentrated swine feeding operation." *Letters in Applied Microbiology* (In Press, June 2006).

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FUTURE PLANS

There are no substantial new plans for this program. We will continue to seek outstanding and relevant proposals. Program success will be monitored by reviews of project reports and outcomes such as publications, grants and reported impact of findings on occupational safety and health practice.

NORA RESEARCH TRAINING

Jacqueline Agnew

NATIONAL OCCUPATIONAL RESEARCH AGENDA (NORA)
RESEARCH TRAINING PROGRAM

NORA Program Director: Jacqueline Agnew, MPH, PhD, Professor, Department of Environmental Health Sciences

PROGRAM DESCRIPTION

Purpose and Goals

The Johns Hopkins University Education and Research Center for Occupational Safety and Health (ERC) is a center of excellence for the development of future leaders in occupational health research and for professionals who must translate research into practice within their respective disciplines. The National Occupational Research Agenda (NORA) supplemental funds have been critical to this mission. To this end, the Johns Hopkins University ERC Program has targeted three broad areas for support with NORA funds: 1) development of junior faculty for their roles as research mentors; 2) continuing education/outreach to address the translation of NORA-related research to practice; and 3) doctoral student support and training. The latter is our primary objective, in order to train as many future occupational safety and health (OSH) researchers as possible.

Responsible Conduct of Science Training

Students funded by the NORA supplemental program are in doctoral degree programs, thus they must complete required courses that address the responsible conduct of science. They must select either *Research Ethics* (one unit), or Re*search Ethics and Integrity: US and International Issues* (three units). These courses cover the principles of research ethics and regulatory requirements. Both courses satisfy the NIH requirements for instruction in the responsible conduct of science. Students also receive content in research ethics in other courses, such as *Public Health Perspectives* (two units, over two terms), which is mandatory for all doctoral students. Completion of these courses is monitored and recorded, and each course is evaluated at the end of the term.

Faculty Participation

Faculty in each of the research training programs within the ERC are involved in this supplemental program to the extent that they advise, teach and are otherwise engaged in training and in the interdisciplinary interactions within the ERC as a whole. In most cases, their support is provided by their respective program funding or by other sources. Exceptions are the faculty members who receive additional direct support from this supplement to strengthen their research training programs, as described below.

Curricula

The students funded through this supplemental program may be affiliated with any of the four academic programs that offer doctoral degrees. Students may be enrolled in PhD, DrPH, or ScD programs. The Occupational and Environmental Medicine (OEM) Program does not prepare researchers; thus, tuition and stipends of residents have not been supported. Within each academic program, students follow the same curriculum established for that respective program regardless of their source of funding (i.e., core or NORA). Refer to the specific curriculum of each academic program (in Appendix A) for further information about these requirements.

PROGRAM ACTIVITIES AND ACCOMPLISHMENTS

Progress towards the goals of this supplemental program is presented below, according to the three program goals.

Goal 1: Development of junior faculty for their roles as research mentors

Four faculty members who received partial funding from this program represent the programs in Occupational and Environmental Hygiene (OEH), Occupational and Environmental Health Nursing (OEHN), Occupational and Environmental Medicine (OEM) and Biomarkers of Occupational Exposure and Susceptibility (BOES). Each conducts research in at least one NORA area and has received support in an effort to increase the interdisciplinary research training capacity within this ERC. These individuals are listed in Table 1, below, with their respective areas of interest according to the 21 original NORA priorities. An additional member of our faculty, Ms. Mary Doyle, guides the Continuing Education and Outreach efforts that bring research findings and interpretation to practicing professionals. All are involved in interdisciplinary projects that include students.

Table 1. NORA-funded faculty and NORA priority areas of research and research training

NAME	NORA PRIORITY AREA(S)
S. Fitzgerald (OEHN)	Special populations at risk, organization of work
V. Weaver (OEM and BOES)	Exposure assessment methods, mixed exposures, surveillance research methods
M. Cadorette (OEHN)	Surveillance research methods
A. Geyh (OEH)	Exposure assessment methods, mixed exposures, risk assessment methods

Dr. Sheila Fitzgerald's research addresses vulnerable populations such as disabled and young workers, workplace cardiovascular risk factors and workplace violence. She has been a co-investigator on a series of studies that have prospectively followed teen workers into their early jobs. NORA supplemental support has helped her develop new directions for this research, and the number of research trainees whom she advises has increased substantially. Dr. Fitzgerald has also built research relationships with faculty in the Johns Hopkins University School of Nursing, where she is a co-investigator and advises an Occupational and Environmental Health Nursing (OEHN) doctoral candidate in a study of workplace violence.

Dr. Virginia Weaver's research bridges an established ERC program, Occupational and Environmental Medicine (OEM), with the newer area of biomarkers research training. This specialized area is considered innovative and is relevant to the NORA priority areas of exposure assessment methods and surveillance research methods. In addition to her recently increased duties as the director of the OEM Program, Dr. Weaver is now the co-advisor of an OEHN student with an interest in biomarkers research. We anticipate that her advising activities will increase.

Dr. Weaver and Dr. Maureen Cadorette have had major roles in an interdisciplinary project that conducted medical surveillance of former Department of Energy workers at Los Alamos National Laboratory. The project has already provided practice and research opportunities for ERC students (Occupational and Environmental Health and OEMR) and will be a potential site for OEHN experiences. These are examples of increased research training capacity attributable to NORA-related funding.

Dr. Cadorette recently completed her doctoral degree and has become a full-time member of the faculty. Thus, she will continue building her research program and ultimately will assume increased research training responsibilities.

Dr. Allison Geyh's research addresses airborne particulate matter, air pollution and exposure assessment. The work she has done to assess World Trade Center exposures of workers and the community has demonstrated the relevance of her research to the area of public health preparedness and response to disasters. Her teaching and advising duties are now expanding to that area.

Goal 2: Continuing education/outreach to address the translation of NORA-related research to practice

Under the direction of Ms. Mary Doyle, the Continuing Education and Outreach Program brings cutting-edge research findings and their interpretation to practicing professionals. Of note is the involvement of Ms. Doyle in planning and conducting professional conferences and presentations to professional organizations in the region, such as the:

- Chesapeake and Potomac Sections of the American Industrial Hygiene Association (AIHA)
- Four regional chapters of the American Association of Occupational Health Nurses (AAOHN)
- Chesapeake (MD) and Delmarva (DE) Sections of the American Society of Safety Engineers (ASSE)
- Maryland section of the American College of Occupational and Environmental Medicine (ACOEM)

Many of these activities could not have been conducted without the additional NORA funding that was provided to support Ms. Doyle's efforts. Similar activities are planned for the coming year.

Goal 3: Doctoral student support and training

Our primary application of NORA funding has been the support of doctoral students in each of the academic programs. A total of 10 doctoral students, most in the research phase of their programs and with a focus on NORA topics, received full or partial support in the form of stipends and or tuition. Students from each academic research training program were funded. This funding was critically important because it enabled us to prepare more future researchers in the field of OSH than otherwise would have graduated from our institution. The students and their areas of interest are listed below in Table 2.

Additionally, we were able to provide limited supplies for use in training students in techniques for laboratory and epidemiological studies, and for presenting study results within the school and at professional meetings. We were also able to support out-of-state travel so that one doctoral student could conduct the negotiations required for acquisition of her study data.

Table 2. Trainees supported by NORA-related funds

NAME	PROGRAM	AREA OF INTEREST	NORA AREA
J. Gaitens	OEHN	Relationship between markers of PCB exposure, genotype, and neurobehavioral outcomes	Exposure assessment methods
L. Edwards	OEHN	Occupational health risks to Vietnamese American nail salon workers – community based participatory research	Special populations at risk; organization of work
S. Van Zandt	OEHN	Effects of workplace violence on the work experience of nursing personnel	Special populations at risk; traumatic injury
R. Clouse	OEHN	Relationahip between biomarkers of exposure to metals and health effects	Surveillance research methods
J. Richman	OEH	Noise exposures in manufacturing industries	Exposure assessment methods; hearing loss
K. Rees	OEH	Methods for modeling noise exposure in a hospital environment and effects on early hearing loss in newborns	Exposure assessment methods; hearing loss
V. Park	OEH	Second-hand smoke exposure assessment methods	Exposure assessment methods
R. Castillo	INJURY	Modeling the Course of Disability and Return to Work Following Trauma	Traumatic injury
K. Archer	INJURY	Referral practices related to work disability management	Traumatic injury; intervention effectiveness
M. Chervak	INJURY	Behavioral risk factors for injury	Traumatic Injury; Surveillance Methods

PROGRAM PRODUCTS

Publications and other achievements of the students and faculty who received support from this supplement are described in their respective program sections of this report.

FUTURE PLANS

The plans for the use of NORA supplemental funds will remain the same in the coming period. We will continue to support the three stated goals, with doctoral student funding as the main priority. Each academic program director will nominate students for support, thus maintaining balance across the programs and providing opportunities for students in each of the represented disciplines. Students selected for this support will be focused on NORA-related topics. Faculty will be selected for support on the basis of the potential for such funding to enhance their research training capacity. Finally, a portion of these funds will support our Continuing Education Program director, to promote her ability to interact with local and national professional associations and to plan programs that will bring research findings to practitioners for application in their practice.

CORE ACADEMIC PROGRAMS

OCCUPATIONAL and ENVIRONMENTAL HYGIENE

Patrick Breysse

OCCUPATIONAL AND ENVIRONMENTAL HYGIENE (OEH) PROGRAM

OEH Program Director: Patrick N. Breysse, PhD, CIH, Professor, Department of Environmental Health Sciences

PROGRAM DESCRIPTION

Goals and Objectives

The objectives of the Occupational and Environmental Hygiene (OEH) Training Program are to: 1) provide high quality interdisciplinary master's level professional education with a research/problem-solving perspective (including the five core areas of public health as specified by the Council on Education for Public Health (CEPH)); 2) provide courses in occupational and environmental hygiene and related fields that are critical to the training of other Johns Hopkins Education and Research Center for Occupational Safety and Health (ERC) core students and students in other disciplines; 3) prepare doctoral students for careers as independent investigators with OEH research skills; and 4) be an occupational and environmental health resource regionally, nationally and internationally.

The OEH Program offers training at the master's (Master of Health Sciences; MHS) and doctoral (PhD, DrPH and ScD) levels. We also train post-doctoral fellows (PDFs), although NIOSH funds have not supported PDF training. By providing faculty and student support, NIOSH funding continues to provide crucial resources to the OEH Program. The OEH Master's Program is accredited by the Accreditation Board for Engineering Technology (ABET), and a reaccredidation site visit is planned for the fall of 2006.

Responsible Conduct of Science

All students who are enrolled in research degree programs (i.e., the PhD, ScD, or DrPH) are required to have formal course instruction in the responsible conduct of research by taking one of the following courses: *Research Ethics* (1 unit) or *Research Ethics and Integrity: US and International Issues* (3 units). These courses ensure that students know and abide by the principles of research ethics and regulatory requirements. One of these courses is completed by every student in a research degree program. Both courses satisfy the NIH requirements for instruction in the responsible conduct of science. Masters and doctoral students also receive content in research ethics in the Academic Ethics Module, an on-line course that is required of all students in the school. Completion of these courses is monitored and recorded, and each course is evaluated at the end of the term.

Faculty Participation

The OEH Program operates with three full-time core tenure-track faculty and a variety of supporting and affiliated faculty. Full-time tenure-track faculty includes Patrick N. Breysse (program director), Peter S.J. Lees and Alison Geyh. Dr. Timothy Buckley recently left the program to head the Department of the Environmental Health Sciences at the Ohio State University. Supporting faculty include numerous full-time Bloomberg School of Public Health faculty who teach required courses, and affiliated professional faculty who also assist the program by teaching required courses. Core, supporting and affiliated faculty are listed in the table below.

OEH Program core, supporting and affiliated faculty.		
Name	**Appointment**	**Expertise/Research Interest**
Core Program Faculty		
Breysse, PN (CIH)	Professor, Program Director	exposure assessment, fibers, allergens, childhood asthma
Lees, PSJ (CIH)	Professor, Deputy Director of ERC, Director Pilot Project Program	exposure assessment, surface contamination, fibers, chromium, lead
Geyh, A	Assistant Professor	particulate matter, air pollution, metals, and exposure assessment
Supporting Program Faculty		
De Castro, R	Research Associate	exposure measurement, statistics
Agnew, J	Professor, ERC Director	occupational health nursing,
Curriero, F	Assistant Professor, EHS*	biostatistics, spatial modeling
Schwab, K	Associate Professor, EHS	molecular microbiology, bioaerosols, water quality
Halden, R	Assistant Professor, EHS	water quality, bioremediation
Burke, T	Professor, Health Policy and Management	risk assessment
Goldman, L	Professor, EHS	environmental health, risk assessment, risk policy
Links, J	Professor, EHS	preparedness, radiation health
Locke, P	Associate Professor, EHS	law, risk policy
Samet, J	Professor, Epidemiology	epidemiology, air pollution
Schwartz, B	Professor, EHS	occupational medicine, environmental epidemiology
Silbergeld, E	Professor, EHS	neurotoxicology, occupational health, risk assessment, risk policy
Tankersley, C	Associate Professor, EHS	physiology, air pollution
Trush, M	Professor, EHS	toxicology, chemoprevention
White, R	Associate Scientist, Epidemiology	risk assessment, risk policy
Yager, J	Professor, EHS	toxicology
Zeger, S	Professor, Biostatistics	biostatistics
Affiliated Faculty		
Knowles, E (CIH, CSP)	Department Associate	safety sciences, management
Lopez, M	Department Associate	ergonomics
Sliney, D	Department Associate	physical agents, lasers
Koegel, A (CIH)	Department Associate	general industrial hygiene
Kesavan, J	Department Associate	aerosol sciences, bioaerosols

* EHS – Environmental Health Sciences

Curriculum

Required courses for the 1.5-year OEH Master's Program and OEH Doctoral Program are listed in Appendix A.

Doctoral students in the OEH Program are expected to have a master's degree from a program providing similar training to the Johns Hopkins OEH Master's Program. If there are significant gaps in a student's master's coursework, they are to be made up at the doctoral level. Additional doctoral course work requirements are as follows: 4 u

PROGRAM ACTIVITIES AND ACCOMPLISHMENTS

During the past year, we have maintained progress towards training goals and objectives. Some specific program activities and accomplishments include the following:

- The OEH Program graduated two MHS and five doctoral students in this year.
- We have received an important new source of funding: Both Drs. Geyh and Breysse are principal investigators in the EPA-funded Particulate Matter Research Center.
- Two student posters presentations received awards at the recent American Industrial Hygiene Conference and Exposition.
- Dr. Breysse received the Meritorious Achievement Award from the American Conference of Governmental Industrial Hygienists.
- Two master's students received 3M Scholarships
- One master's student received an American Industrial Hygiene Foundation Scholarship.
- Dr. Geyh received the Advising Mentoring and Teaching Award from the School's Student Assembly.
- Three doctoral graduates recently accepted faculty appointments (two at the University of Maryland and one at the State University of New York).
- We increased our focus on the agricultural sector through expanded research on health effects associates with concentrated animal feeding operations (CAFOs).
- In our faculty research and doctoral training program, we continued to focus on exposure to mobile source pollutants and exposures in the transportation sector.
- We successfully recruited two minority students to the OEH program.

PROGRAM PRODUCTS

- Program faculty and students have produced 33 publications (see Appendix C) during the project year. Twenty-two of these publications have included students as author or co-author.
- Program faculty continue to collaborate on the interdisciplinary DOE Former Worker Medical Screening Program, which involves students from the OEH Program.
- The OEH Program has placed the content for the *Principles of Industrial Hygiene* course on the School's "OpenCourseWare" Web site.
- The OEH Program continues to offer a CIH review course
- The *Principles of Occupational and Environmental Hygiene Course* continues to be offered for credit on-line.
- Dr. Geyh spearheaded an environmental monitoring effort in New Orleans following Hurricane Katrina.

- Drs. Geyh and Breysse's published studies on exposures and effects at the World Trade Center have helped to focus medical screening efforts for clean-up workers.
- Dr. Breysse served on the NIOSH Safety and Occupational Health Study section. This study reviews applications for funding.
- OEH Program faculty very frequently serve as peer-reviewers for numerous journals. Peer-reviewed science is crucial to improving worker health and safety.
- Drs. Breysse and Stefaniak (graduate of the program) continue to research and publish studies on beryllium particle toxicity. This work is needed to conduct beryllium risk assessments.
- The Program applied for ASAC-ABET reaccreditation and prepared and submitted a detailed self-study.
- Research in CAFO health effects, particularly with respect to antibiotic resistant bacteria, has provided opportunities for numerous student projects and theses.
- Hurricane Katrina service activities included evaluation of basic sanitation at Red Cross shelter sites. While this primarily benefited evacuees, it also benefited Red Cross workers.
- Dr. Breysse reviewed the potential for hazardous waste exposures to police officers working at a canine facility adjacent to a hazardous waste site. As a result of this investigation, the site is undergoing a thorough evaluation and the officers have been moved off-site.
- An OEH student collaborated with an Occupational Medicine faculty member to write an OSHA white paper on respiratory protection for infectious diseases.
- Research on potential health effects from exposure to antibiotic resistant microorganisms in CAFOs has helped to raise awareness about the potential for this important emerging health concern.

FUTURE PLANS

Future plans include continuing to train and graduate well qualified professionals and researchers. We also plan to develop a Web-based option for the MHS in OEH. Finally, we plan to address any concerns identified by the ASAC-ABET self-study review and site visit.

OCCUPATIONAL and ENVIRONMENTAL HEALTH NURSING

Sheila Fitzgerald

OCCUPATIONAL AND ENVIRONMENTAL HEALTH NURSING (OEHN) PROGRAM

OEHN Program Director: Sheila T. Fitzgerald, MSN, PhD, RN-C, Associate Professor, Department of Environmental Health Sciences (joint appointment, School of Nursing)

PROGRAM DESCRIPTION

Goals and Objectives

The primary goal of the Occupational and Environmental Health Nursing (OEHN) Program is to prepare nurses to function as consultants, researchers, managers and educators in industry, academia and a variety of new occupational health service models. This is accomplished by offering an academic program of excellence that leads to the graduate degrees of Master of Public Health (MPH), Master of Science in Nursing and Master of Public Health (MSN/MPH), Doctor of Philosophy (PhD) and Doctor of Public Health (DrPH). The Doctor of Science (ScD) is also an option but is rarely pursued. An additional goal of the OEHN Program is to serve as a resource to Region III nurses, educational institutions and organizations such as labor, government, private sector organizations and occupational health services.

The OEHN Program is located in the Division of Occupational and Environmental Health (DOEH), in the Department of Environmental Health Sciences, which also includes the divisions of nursing, medicine, law, epidemiology, biostatistics and laboratory science. The result is an interdisciplinary training climate that focuses on prevention, intervention and evaluation, and a research focus on occupational and environmental health problems. The OEHN Program's location, administratively and physically, facilitates interaction with faculty and students of the Occupational and Environmental Medicine, Biomarkers of Exposure and Susceptibility and Occupational and Environmental Health Engineering programs. The Occupational Injury Prevention Program, which resides in the Department of Health Policy and Management – one block away , is also very accessible. Examples of other Education and Research Center (ERC) program faculty interaction with OEHN students include numerous required courses as well as co-advising and membership on doctoral research committees. Shared seminars include a monthly journal club, the OEHN weekly seminar series, two DOEH seminars and the monthly ERC seminar.

Responsible Conduct of Science Training

All students enrolled in research degree programs (i.e., the PhD, DrPH, or ScD) complete formal course instruction in the responsible conduct of research by taking one of the following courses: *Research Eth*ics or Re*search Ethics and Integrity: US and International Issues*, which are designed to ensure that students know and abide by the principles of research ethics and regulatory requirements. Both courses satisfy the NIH requirements for instruction in the responsible conduct of science. Students also receive research ethics content in other courses, such as *Public Health Perspectives*, which is mandatory for all doctoral students. Completion of these courses is monitored and recorded, and each course is evaluated at the end of the term.

Faculty Participation

Four nurses (discussed below) are committed to and contribute to the OEHN Program through teaching, mentoring and advising, participation in school and university governance, outreach, national and international professional activities and conduct of research.

Sheila Fitzgerald MSN, RN-C, PhD. replaced Dr. Jacqueline Agnew as program director in July 2006. A member of the OEHN faculty since 1987, Dr. Fitzgerald is an associate professor in Environmental Health Sciences with a joint appointment in the School of Nursing. She directs and oversees all aspects of the OEHN Program, directs courses, participates in several research and outreach activities and contributes to the peer-reviewed literature. Dr. Fitzgerald works closely with her nurse colleagues, Drs. Agnew and Cadorette and Ms. Doyle, to coordinate research and teaching activities as well as student mentoring in the OEHN program. Additionally, she works closely with the other ERC program directors to promote interdisciplinary interaction among students – e.g., Drs. Weaver (the Occupational and Environmental Medicine director) and Fitzgerald are planning a fall monthly seminar for residents and nurses on topics of shared interest.

Dr. Fitzgerald directs the OEHN Seminar series in the School of Public Health and directs and teaches the popular elective course *Occupational and Environmental Health Nursing* (jointly sponsored by the Schools of Nursing and Public Health). In the School of Nursing, Dr. Fitzgerald teaches in both the undergraduate and graduate programs – in particular, the Public Health Nursing Graduate Program and its MSN/MPH component (which represents most of the OEHN students). She provides occupational and environmental health nursing content to the broader School of Nursing curriculum, and arranges and oversees practicum experiences for students in occupational settings. Her expertise in education extends to her outreach activities; for example, she has been chair of the Maryland Area Association of Occupational Health Nurses Education Committee for more than 10 years. As chair of the school's Affirmative Action Committee, she is involved in efforts to improve recruitment and retention of minority students.

Dr. Fitzgerald's research addresses vulnerable populations such as disabled and young workers, workplace cardiovascular risk factors and workplace violence. She is currently a co-investigator with a School of Nursing faculty member on a NIOSH-funded prospective study of workplace violence directed at nursing personnel and work functioning consequences. She is mentoring a doctoral student whose research project stems from this project.

Jacqueline Agnew MPH, PhD, COHN-S, FAAN, is a professor in the Department of Environmental Health Sciences and directs the ERC. She holds a joint appointment in the School of Nursing, serves on the School of Nursing Advisory Board and chairs the MSN/MPH Steering Committee. She directs the course *Advanced Topics in Occupational and Environmental Health Nursing* with Dr. Fitzgerald and will direct *Occupational Health*, the capstone course of the occupational health curriculum. She is a faculty participant in the MidAtlantic Center for Public Health Training and the Center for Public Health Preparedness, representing occupational and environmental health nursing in both of these forums. She serves on the departmental DrPH Committee, the Faculty Affairs Committee and is an associate director of the school MPH Program.

Most of Dr. Agnew's service contributions within the School of Public Health are related to issues that impact the ERC. For example, she is a member of the Divisional Research Committee that coordinates the doctoral student application review process (which includes OEHN Program applications), monitors and advises students, and sets policy regarding program and curriculum requirements. Dr. Agnew's areas of research include workplace stress, musculoskeletal injuries, and workplace issues of vulnerable workers such as immigrants and older workers. She is also a co-investigator on the Workplace Violence Study and is completing a study of stress and Army Reservists. She is currently working with an OEHN Program doctoral student on a project to be conducted with Vietnamese-American nail salon workers.

Maureen Cadorette, PhD, MPH, RN, completed her PhD in August 2005 and was promoted to assistant scientist in the Department of Environmental Health Sciences. (She was previously a part-time research associate.) Her addition to the full-time OEHN Program faculty has enhanced our efforts to expand and strengthen the research and practice opportunities for students.

Dr. Cadorette co-directs the course *Principles of Occupational Health*, advises MPH students and has assumed additional teaching roles in the OEHN program. She also directs the evaluation of the sequencing and potential overlap of course content in the required curriculum in the Division of Occupational and Environmental Health, in addition to her research commitment to an ongoing Department of Energy Grant. She adds expertise to our program in the areas of medical surveillance, risk communication and needs assessment of worker populations. We anticipate that Dr. Cadorette's educational and research activities within the OEHN Program will rapidly increase.

Mary Doyle, MPH, RN, COHN-S/CM, is a research associate in the Department of Environmental Health Sciences. She directs the ERC Continuing Education and Outreach Program and the recently awarded Hazardous Substance Training Continuing Education (HST-CE) Program. In the course of those primary duties, she has forged a significant relationship with the Institute for Johns Hopkins Nursing, a collaborative partnership between the School of Nursing and Johns Hopkins Hospital Department of Nursing. This impacts the OEHN program by facilitating the organization of courses specifically for occupational health nurses. She ensures that OEHN students can attend these events, and most of the courses offered by the ERC, at no charge. In addition to her role as CE Program director, Ms. Doyle's primary contributions are teaching and enhancing our communication with current, past and future students. She organizes OEHN seminars and teaches in ERC academic courses, such as *Noise and Other Physical Agents in the Environment* and *Fundamentals of Occupational Health*. She surveys OEHN Program alumni for tracking purposes and arranges events to bring graduates together. Additionally, Ms. Doyle's contacts in the practicing community make her a resource for master's students who are trying to identify practicum experience sites and employment leads.

Curricula

MPH, MSN/MPH, PhD and DrPH degree requirements and a sample curriculum for each program are included in Appendix A. The differences between the requirements for the PhD and DrPH are now more clearly delineated as a result of a DrPH school-wide review.

During this funding period, we identified a cadre of former OEHN Program graduates in the Baltimore-Washington metropolitan area who have been instrumental as role models and mentors to our students. We frequently engage these colleagues as seminar speakers. Additionally, these alumni provide practicum opportunities for our students to work with interdisciplinary teams in their respective work settings; for example, the Maryland Department of Health and Mental Hygiene, the Agency for Toxic Substances and Disease Registry (ATSDR) and the Farm Worker Justice Fund.

Information regarding new and innovative curriculum content related to occupational and environmental health nursing is also discussed by the newly re-established the OEHN advisory committee, and input is also provided by the ERC Advisory Board.

PROGRAM ACTIVITIES AND ACCOMPLISHMENTS

Trainee Achievements

During this year, six OEHN students have completed degrees (three MPH and three PhD). Five doctoral students are currently in various phases of their program, and we plan to admit new MPH and/or MSN/MPH students in the upcoming academic year.

The three OEHN students who completed doctoral degrees (PhD) and their dissertation titles are listed here: Maureen Cadorette: *Thyroid Function in Former Workers from a Nuclear Weapons Research and Development Facility*, August 2005; Joanna Gaitens, *Polychlorinated Biphenyl Exposure and Neurobehavioral Function in Older Adults*, November 2005; and Theresa Pluth Yeo*, Assessment of the Gene-Environment Interaction in Cases of Familial Pancreatic Cancer as Compared to Cases of Sporadic Pancreatic Cancer*, June 2006.

Faculty Achievements

In 2005, Dr. Fitzgerald was appointed as the only nurse member to the Institute of Medicine Committee on "Improving the Disability Decision Process: The Social Security Administration's Listing of Impairments and Agency Access to Medical Expertise." Dr. Agnew also serves on the Institute of Medicine Roundtable on Environmental Health Sciences, Research, and Medicine, and on the NIOSH NORA Liaison Committee.

New Faculty Positions

The addition of Dr. Cadorette to the OEHN Program Faculty has expanded and strengthened the OEHN program's ability to provide new opportunities for students.

New Courses

A new seminar has been added to the DOEH monthly offerings: *the Occupational & Environmental Health/Epidemiology Journal Club* (which is cosponsored with the Department of Epidemiology). Dr. Virginia Weaver organizes this series, which is particularly relevant to doctoral students.

Trainee Recruitment

During this period, Ms. Doyle has taken the lead in updating and improving program promotional materials, including print and electronic brochures and the program Web site. She also displays an ERC promotional booth at various professional conferences (e.g., APHA, AIHCE). We have developed a log to track OEHN Program inquires, for ease of follow-up and record keeping. All faculty respond to inquiries about the program. We provide material about the program in written form and as part of presentations at professional meetings (e.g., the Maryland Nurses Association and the four regional chapters of the American Association of Occupational Health Nurses.) As a result of these recruiting efforts, as well as presentations to graduate program students and referrals from program graduates, we have noted increased interest and applications to the program. In particular, the rate of doctoral program applicants has increased.

Dr. Fitzgerald plays a major role in the school's minority recruitment activities and applies her knowledge and experience to the OEHN Program diversity recruitment plan. As chair of the school's Affirmative Action Committee, she has formulated strategies for the recruitment and retention of racial and ethnic minorities to the school and program. During this funding period, she personally contacted

the deans or chairs of the five Historically Black Colleges and Universities (HBCU) in Region III and is establishing contacts at these schools. Visits to two of these schools are being planned. A new director of Diversity in the School was recently named, and recruitment plans on a national scale will be discussed. In addition, the dean's office has recently committed funds for every department in the school to support two minority doctoral students; doctoral OEHN students are eligible.

PROGRAM PRODUCTS (publications and presentations appear in Appendix C)

Conferences/Symposia and Continuing Education

The OEHN Program sponsored two conferences during the year, both of which provided continuing education credits. The first, *Lessons from Katrina – Keeping Responders Safe and Healthy*, was a panel composed of representatives from OSHA and ATSDR, a mental health professional and an acute-care nurse, who discussed strategies to protect health care workers and shared experiences in disaster response. Attendance included a broad representation of public health nurses, OHNs, school health nurses and students. A second one-day conference that was co-sponsored by the Maryland Area Association of Occupational Health Nurses for OHNs in the Metropolitan Washington area was *Keys to Solving the FMLA/ADA/WC Puzzle*. Additionally, the OEHN faculty taught the two-and-a-half-day course to prepare OHNs for the certification exam, titled *Overview of Occupational and Environmental Health Nursing.* The OEHN Program has very close ties with three of the local occupational health nursing associations in Region III. During this reporting period, we provided continuing education credits as well as speakers for eight dinner meetings of the Maryland Area, Metropolitan Washington and Seneca Valley Associations of Occupational Health Nurses. Additionally, Ms. Doyle and Dr. Cadorette, taught two three-day *NIOSH Approved Spirometry Courses*.

Successful r2p Projects

Advised by OEHN faculty, a recent graduate developed testimony for the Farmworkers Justice Fund to protect pesticide-exposed migrant workers, thus influencing OSH policy. Another student developed education programs for first responders who encounter methamphetamine labs, and another worked with the Maryland Department of Maternal Health to develop Web information and guidelines for workplaces to support breastfeeding among employees.

FUTURE PLANS

Future program plans include a review of course content to ensure that contemporary issues in occupational safety and health are addressed. Possible expansion areas include workplace and worker preparedness (based on the all-hazards model) through interaction with the Public Health Preparedness Center. We will also explore ways to further address international occupational health, and will continue to emphasize the broader scope of environmental health, since these exposures (air, food, water, etc.) have major implications for workers in all the NORA identified sectors. Examples of continued development of individual research programs and pursuit of external sources of student support include Dr. Agnew's Vietnamese-American worker project, the needs assessment project directed by Dr. Cadorette at Los Alamos and Sandia Laboratories, and Dr. Fitzgerald's pending application to NLHBI for a prospective follow-up of young workers. Recruitment of early-career OEHN faculty remains an objective.

OCCUPATIONAL and ENVIRONMENTAL MEDICINE

Virginia Weaver

OCCUPATIONAL AND ENVIRONMENTAL MEDICINE RESIDENCY (OEMR) PROGRAM

OEM Program Director: Virginia Weaver, MD, MPH, Associate Professor, Department of Environmental Health Sciences

PROGRAM DESCRIPTION

Goals and Objectives

The mission of the Occupational and Environmental Medicine Residency (OEMR) is to train physicians who will be leaders in occupational and environmental medicine. We expect that our graduates will be able to manage and improve the health of populations through: 1) the development and implementation of programs to reduce or mitigate occupational or environmental exposure; 2) the direction of clinical care and the health management of individuals exposed to potentially harmful chemical, physical and biological agents in a variety of occupational and non-occupational settings; 3) the application of new technologies, new research findings and new management techniques to improve the health of working populations; and 4) the application of population health skills to improve population health status and minimize disability.

Responsible Conduct of Science Training

All residents are required to complete the on-line *Research Ethics* training module and the on-line *General Privacy Issues* course module on the Johns Hopkins Medical Institutions HIPAA training Web site. The *Occupational Safety and Health Management* course has specific content in ethics, and the school also provides a faculty-directed Research Ethics Consulting Service, which raises awareness of ethical issues in research and is an additional resource for residents doing research projects. Formal instruction in the responsible conduct of research can also be obtained from one of the following courses: *Research Ethics*, *Research Ethics And Integrity: U.S. And International Issues* or *Public Health Perspectives On Research*, which are required for PhD students but can also be taken by residents interested in research careers. These courses satisfy the NIH requirements for instruction in the responsible conduct of science.

Faculty Participation

The OEMR benefits from the skills and expertise of a wide range of faculty and preceptors at Johns Hopkins and throughout the mid-Atlantic region.

Dr. Weaver, the OEMR Director, an associate professor of Environmental Health Sciences, has been a core faculty member of the OEMR since 1993 and is board-certified in internal and occupational medicine. Responsible for all aspects of the OEMR, Dr. Weaver combines research, teaching and clinical work in her position at the Johns Hopkins Bloomberg School of Public Health. Her research utilizes molecular epidemiologic tools to evaluate populations with exposure to occupational and environmental chemicals. Her research goals include validation of exposure and early biological effect markers to improve risk assessment, medical surveillance and exposure management (including treatment). Her primary research focus is on nephrotoxicants, including lead and cadmium. She has conducted a range of clinical/professional practice activities, including a medical surveillance program for cadmium-exposed workers, and her work as a co-investigator in the Department of Energy Former Worker Medical Surveillance program for former Los Alamos National Laboratory workers.

Dr. Brian Schwartz is a professor of Environmental Health Sciences and has served as deputy director of the OEMR since 1998. He directed the OEMR from 1993 to 1998 and the Division of Occupational and Environmental Health (DOEH) from 1996 to 2006. Dr. Schwartz is board-certified in both internal and occupational medicine. His areas of expertise include occupational and environmental molecular epidemiology, with a focus on the adult central nervous system. Dr. Schwartz's clinical interests include medical surveillance and causation determination for exposed individuals and populations. He directs the Department of Energy Former Worker Medical Surveillance program for former Los Alamos National Laboratory workers.

Dr. Clifford Mitchell, associate professor, recently left Johns Hopkins, after eight years as the OEMR director, to join the Maryland Department of Health and Mental Hygiene. His research interests are in medical surveillance, cost-effectiveness analysis, occupational health policy and repetitive motion-related disorders. He is board-certified in both internal medicine and occupational medicine. During his tenure, he directed *Occupational Safety and Health Management* and *Occupational Health,* the plant walk-through and evaluation course.

Several other Hopkins faculty have key supporting roles in the OEMR. Dr. Edward Bernacki is executive director of Health, Safety & Environment for the University. His areas of expertise include workers' compensation management, occupational hazards in the health care industry, ergonomics and flight medicine. Dr. Lynn Goldman is a professor in Environmental Health Sciences and chair of the Interdepartmental Program in Applied Public Health. Her interests include children's environmental health, and public health practice, including her role as co-director of the National Study Center for Preparedness and Critical Event Response (PACER), a university-based Center of Excellence that will support the mission of the Department of Homeland Security by conducting research and educational initiatives to build the science of preparedness and response and international chemical and biotechnology safety.

In addition, we utilize the strengths of the occupational and environmental medicine community in the mid-Atlantic area, many of whom have trained or been faculty at Johns Hopkins. Preceptors include: Drs. Melissa McDiarmid, Craig Thorne, and Carrie Dorsey at the University of Maryland; John Piacentino and colleagues at The Occupational Safety and Health Administration (OSHA); Margit Bleecker at the Center for Occupational and Environmental Neurology; and Mr. Rich Duffy at the International Association of Fire Fighters (IAFF). Other faculty are discussed below, under "New Faculty Positions" and in "Future Plans."

Curricula

The core curriculum in the first year (academic phase) of the program provides OEMR trainees with the intellectual foundations of occupational and preventive medicine with a focus on population health issues. This year is particularly strong as a result of the depth and breadth of the Johns Hopkins Bloomberg School of Public Health, the largest school of public health in the world. During the academic year, the primary obligation of the resident is to complete the requirements of the MPH degree. Additional requirements during this time include weekly attendance at departmental and divisional seminars and conferences. Residents matriculate in the MPH program, taking a wide range of MPH and OEMR required courses, as shown in Appendix A. The OEMR core consists of courses taught by OEMR faculty and other Johns Hopkins Education and Research Center for Occupational Safety and Health (ERC) members. The core consists of *Fundamentals of Occupational Health* (Drs. Schwartz and Cadorette), *Clinical Environmental and Occupational Toxicology* (Dr. Weaver), *Principles of Occupational and Environmental Hygiene* (Dr. Lees), *Public Health Toxicology* (Drs. Trush and Yager), *Environmental Health* (Dr. Links), the *Occupational Health* (worksite inspection) course (Drs. Agnew and Lees) and the *Occupational Medicine Seminar* series (Dr. Weaver). These

are augmented by a wide variety of attractive electives, including *Public Health Practice*; *Introduction to Ergonomics*; *Introduction to Radiation Health Sciences*; *Epidemiology of Injuries*; *Molecular Biology of Carcinogenesis*; *Toxicokinetics and Molecular Epidemiology and Biomarkers in Public Health*; *Noise and Other Physical Agents in the Environment*; *Health Effects of Indoor and Outdoor Air Pollution*; and *International Health*. The epidemiology and biostatistics offerings in the school are particularly rich, and residents are encouraged to complete as many of the five-course epidemiology and four-course biostatistics series as possible; a minimum of two courses in each area is required.

The second year consists of 10 months of required rotations (with choices within these requirements) and two months of electives. The three core rotations are:

1. Johns Hopkins University-University of Maryland Clinical Rotation. This four-month rotation provides opportunities in: 1) comprehensive health care industry occupational health programs; and 2) academic occupational and environmental clinics.
2. International Association of Fire Fighters (IAFF). This two-month rotation at an international union representing 274,000 full-time professional fire fighters and paramedics provides residents with an understanding of the health concerns and advocacy role of a major trade union.
3. Occupational Safety and Health Administration (OSHA). This two-month rotation at OSHA's national office in Washington, D.C., is designed to provide residents with an understanding of the legal and regulatory environment of occupational safety and health. Residents work with OSHA staff in the Office of Occupational Medicine, which now includes three of our graduates.

For additional corporate and industrial experience, residents choose one of the following three two-month employer-based rotations: GlaxoSmithKline; the U.S. Department of Agriculture Animal and Plant Health Inspection Services (APHIS); or the National Security Agency. Residents select from a number of elective options (clinical, research, or administrative) for the remaining two months of the practicum year. Elective rotations allow residents to tailor the practicum year to fit their career objectives. Examples include: corporate rotations such as McCormick and Company, Inc., at its spice and food manufacturing facility in Hunt Valley, Md.; clinical rotations with Johns Hopkins faculty in physical medicine and rehabilitation and with faculty in the Allergy & Immunology Service at the National Naval Medical Center; and public health rotations with the Johns Hopkins Bloomberg School of Public Health Center for Public Health Preparedness. Residents may also use elective time to complete their research projects.

PROGRAM ACTIVITIES AND ACCOMPLISHMENTS

Progress Towards Goals and Objectives

The OEMR has continued to achieve the goals of the program. Our three 2006 graduates were extremely successful in their job searches (two are now in academic positions). We have continued to attract highly qualified applicants, as evidenced by the number of our trainees who have received Occupational Physician Scholarship Fund (OPSF) scholarships.

Trainee Honors, Awards and Scholarships

Dr. Carrie Dorsey was an OPSF recipient, and her poster on **"**Comparison of patella lead with blood lead and tibia lead and their associations with neurobehavioral test scores" was awarded first prize in the Irving J. Selikoff and Cesare Maltoni Student Poster Competition at the 2005 Collegium Ramazinni conference in Bologna, Italy. Dr. Ekong Ekong was awarded the 2006 Randall Bass

Award. Dr. Terence Navin was also an OPSF scholar; though he withdrew from the program before completion due to a substantial change in family circumstances.

Faculty Honors, Awards and Appointments

Dr. Virginia Weaver was promoted to associate professor in July 2005. Both Drs. Weaver and Schwartz have been elected to the Faculty Senate at the Bloomberg School of Public Health.

New Faculty Positions

The continued growth and evolution of the faculty within the division have enhanced the strength of the faculty and, as a result, of the OEMR. Several recruitments are important in this regard. Drs. Daniel Barnett and Cindy Parker are instructors in the division and are key faculty in the Center for Public Health Preparedness. Both have extensive expertise in all-hazards public health emergency readiness and response. They are trained in general preventive medicine and have had extensive experience working with employers on workplace preparedness-related issues. They provide a series of lectures on this topic to residents in the general preventive medicine and OEM programs. In addition, residents may spend an elective month with them in the Center for Public Health Preparedness. Dr. Ana Navas-Acien is an assistant professor and environmental epidemiologist whose research interests include the cardiovascular effects of arsenic, selenium, lead, cadmium and other trace metals. She is also involved in research and policy activities to reduce exposure to environmental tobacco smoke and can serve as a research mentor to residents in either area. Dr. Maureen Cadorette is a nurse and recent doctoral program graduate who is a co-investigator on two Department of Energy-funded programs that offer medical examinations to former workers from nuclear weapons defense facilities to determine if they have occupational illnesses related to past exposures during their employment at these facilities. The sites involved are the Los Alamos National Laboratory and Sandia National Laboratory, both in New Mexico. Dr. Cadorette's research interests include adverse thyroid effects from radiation and chemicals and the health of former workers from exposures in the nuclear weapons complex. Residents work with her during their elective time in New Mexico.

New Courses

Dr. Weaver will now direct the *Clinical Environmental and Occupational Toxicology (CEOT)* course. This was formerly *Clinical Occupational and Environmental Medicine*, a course she directed from 1997 to 2006; we anticipate that this new course will attract a wider audience than the previous one. Residents will be instructed in specific occupational medicine content in the *Occupational Medicine* seminar series, which will be specifically for clinicians (physicians and nurses) and will provide the in-depth details needed by this audience.

Trainee Recruitment

The OEMR continues to have an excellent record in the recruitment of trainees from under-represented racial and ethnic groups. In the most recent reporting period: of 15 applicants to the program, 10 voluntarily identified themselves on their applications as belonging to a minority group. Of those, six were accepted into the program, of whom four were from a minority group and two self-identified as Caucasian. As in previous years, recruitment continues to be the single biggest challenge confronting the residency. The competition between programs for the limited number of highly qualified applicants is a cause for concern for the entire specialty.

PROGRAM PRODUCTS (See Appendix C for OEM faculty and trainee publications)

Conferences

During this reporting period, OEMR faculty offered four conferences, all of which provided continuing education credits. Drs. Mitchell and Weaver gave a two-day *Occupational Medicine Primer Course* at the Forty-Fifth Navy Occupational Health and Preventive Medicine Conference in Hampton, VA, in March 2006. This course had 51 participants. Two half-day *Occupational and Environmental Medicine Updates* were provided by ERC faculty in collaboration with the Maryland College of Occupational and Environmental Medicine. Speakers at the update in October included: Mr. Timothy Donovan, LCSW, director of the Baltimore County Crisis Response System; Dr. Gina Orton, Employee Assistance Program psychiatrist for the Federal Bureau of Investigation; and Dr. Mitchell of our OEMR. Their respective talks were titled: "Critical Incident Response: Debriefing Workers After Occupational Traumatic Events"; "Employee Stress Claims: The Role of EAP in Averting Claims"; and "First Responder Health: Developing Medical Surveillance for Workers Responding to Disasters." Seventeen participants attended. The May 2006 update had 23 participants. Speakers included Drs. Dana Bradshaw, director of the General Preventive Medicine Residency Program of the Uniformed Services University, and Michael Sauri, medical director at Occupational Health Consultants, presenting on Infectious Aerosols. Finally, Dr. Mitchell was one of the primary organizers of a March 2006 conference titled “Genes in the Workplace: The Right Fit?” Co-sponsored by the Johns Hopkins ERC, Oregon Labor Safety and Health Education and the University of Pennsylvania nursing program, this interdisciplinary conference included perspectives from occupational medicine, occupational health nursing, law, labor, ethics, industry and science.

FUTURE PLANS

In the previous period, the OEMR made substantial progress in two areas. First, the program instituted more objective measures of competency, particularly in the clinical rotations during the practicum year. Residents are now routinely evaluated by patients during their clinical encounters at the Center for Occupational and Environmental Health with the OEMR faculty. These evaluations are reviewed by the program director as part of assessing the residents’ progress.

Second, in recent years, the OEMR faculty have noted an increased interest in training from physicians who already possess an MPH, although they have little or none of the core didactic content in occupational medicine. These physicians could successfully complete the practicum year training if they had an efficient way to prepare academically prior to starting the practicum. We have made substantial progress in the development of a shortened (15- to 18-month) training program for residents with an MPH degree who lack specific courses that are required by the OEMR. On-line course options are allowing us to offer these physicians a practicum year position when it is preceded by 3 to 6 months of coursework. We have done this recently with two trainees and plan for a third to start in January 2007.

Finally, although Drs. Weaver and Schwartz have the time and expertise to manage the OEMR, the program has had three core faculty since 1993 and we are taking several steps to maintain this critical mass. First, we are increasing the involvement of Dr. John Piacentino, an alumnus of our program who is currently the director of OSHA’s Occupational Medicine Elective Program (where each of our residents spends two months). Dr. Piacentino has now been approved to spend two days per month at the Johns Hopkins Bloomberg School of Public Health, where he will be involved in the OEMR. Activities will include presentations, conferences, assisting with resident interviews, and resident professional practice mentoring. In addition, we will increase the involvement of the OEM physicians at the University of Maryland, with joint conferences as well as the practicum year rotation.

ALLIED OS&H ACADEMIC PROGRAMS

BIOMARKERS of EXPOSURE and SUSCEPTIBILITY

Paul Strickland

BIOMARKERS OF OCCUPATIONAL EXPOSURE AND SUSCEPTIBILITY (BOES) ALLIED RESEARCH TRAINING PROGRAM

BOES Program Director: Paul T. Strickland, PhD, Professor, Department of Environmental Health Sciences

PROGRAM DESCRIPTION

Goals and Objectives

The rationale for the Biomarkers of Exposure and Susceptibility (BOES) Research Training Program is to expand the opportunities for students to utilize state-of-the-art molecular and biochemical methods to measure biomarkers of importance in occupational health research. Application of these biomarkers spans the entire range of the exposure-disease continuum and leads to interdisciplinary research with other components of the Education and Research Center for Occupational Safety and Health (ERC), as well as school-wide collaborations. This program in molecular biomarkers bridges and complements the disciplines of epidemiology, toxicology and occupational health in its goal to develop tools for identifying individuals with high exposure and at high-risk for disease development. Molecular approaches to estimating toxin exposure and understanding disease causation are assuming a greater role in risk assessment methodology, and are increasingly important in making decisions on health and exposure screening. The large size of the school and the strong emphasis on research makes this setting a unique environment for research and doctoral studies. The importance of collaboration and interdisciplinary research is well accepted in the department and the school. As a result, the school's faculty members are readily willing to assist students by serving as informal advisors and committee members, and by providing laboratory resources.

The program's purpose is to provide interdisciplinary research training for PhD or DrPH candidates in the development and application of biological markers in human populations exposed to occupational and environmental hazards. The main objective of this training program is to graduate highly qualified doctoral students with the knowledge and skills necessary to develop, evaluate and apply molecular and biochemical biomarkers of exposure, effect and susceptibility in occupational settings. The subject matter of doctoral research projects focuses on current problems in occupational health that are amenable to study by molecular and biochemical biomarkers, and reflects the expertise of the program-affiliated faculty. Program graduates are prepared to enter research, teaching, or regulatory careers in several venues, including academic universities, research institutes, governmental health agencies and international health organizations. Continued ERC training support benefits the BOES Program by allowing us to maintain a critical mass of students and faculty focused in this research area, and by including these students within the ERC. We have previously benefited from ERC funding by increasing the size and momentum of the program. BOES faculty have advised an average of six doctoral students per year over the past four years in this program area, whereas these faculty advised an average of only three-to-four doctoral students prior to the beginning of NIOSH funding in 2002. More importantly, the BOES Program has provided a more defined curriculum for these students, and interaction with students and faculty with related interests through affiliation with an ERC. The training provided by this program has broad application in occupational health research and practice. General areas of importance for research include: the better identification of causal factors; the more precise delineation of dose-effect relationships; the development of techniques for the earliest identification of adverse effects; contributions to the scientific basis of monitoring, including: biologic monitoring and surveillance; the ethical use of biomarkers in occupational settings; the evaluation of preventive measures, including health promotion; and an understanding of important

pathophysiologic mechanisms involved in the development of occupational disease. Thus, the expertise and knowledge gained by program graduates is applicable in risk assessment, biomonitoring, disease etiology, and the diagnosis and prevention of human diseases of occupational origin.

Program Description and Curriculum

Doctoral candidates in the BOES Training Program matriculate through the Division of Occupational and Environmental Health (DOEH), or another division within the Department of Environmental Health Sciences, and work toward either the PhD or DrPH degree. The distinction between the university-wide PhD and school-wide DrPH degrees is one of emphasis. Research toward the PhD often leads to an expanded understanding of one of the several domains of occupational health, including molecular epidemiology, exposure assessment, clinical (and laboratory) toxicology, health promotion and disease prevention. In contrast to PhD training, the program for DrPH training emphasizes: the skills necessary to assess the needs for occupational health services at regional, national and international levels; the development of policy and regulatory frameworks to address the integration of exposure assessment and measurement of health effects; and the skills to define the consequences of specific occupational exposures. Candidates for either degree are expected to develop the ability to express research ideas verbally and in writing, and to develop skills in critical reading, discussion and evaluation of the literature. Due to the nature of their research, most of the doctoral candidates in the BOES Program receive the PhD degree.

Completion of a doctoral degree in the School of Public Health requires four to five years. Students admitted to the BOES Doctoral Program are expected to complete the requirements for the PhD in the DOEH. Additional coursework is based on the research focus of the student and is designed on an individual basis by the student's advisor, with input from the divisional faculty and the student's doctoral committee.

Responsible Conduct of Science Training

All students who are enrolled in research degree programs at the Bloomberg School of Public Health are required to have formal course instruction in the responsible conduct of research by taking one of the following courses: 550.860.01 *Research* Ethics (1 unit) or 306.665.01 *Research Ethics and Integrity: US and International Issues* (3 units). These courses are designed to ensure that students know and abide by the principles of research ethics and regulatory requirements. Both courses satisfy the NIH requirements for instruction in the responsible conduct of science. Students also receive content in research ethics in other courses, such as 550.865.01 *Public Health Perspectives on Research* (2 units), which is mandatory for all doctoral students.

Before involvement in any research project, students must complete on-line training in human research and/or the use of animals in research, and additional training in HIPAA if any medical records or health care data are to be used. On-line training modules have been developed by the Committee on Human Research of the Office of Research Subjects (ORS) at the Johns Hopkins Bloomberg School of Public Health. The ORS also organizes a lecture/workshop "brown bag" lunchtime series concerning IRB ethical issues. In conjunction with the school's Phoebe Berman R. Bioethics Institute, the ORS also provides a faculty-directed Research Ethics Consulting Service, which assists investigators in addressing ethical issues in research and is available to students and faculty members. The Bioethics Center occasionally sponsors short courses on bioethical issues of broad interest to the public health community, such as the recent one-day course entitled *Ethical & Legal Considerations in Genetic Research*.

PROGRAM ACTIVITIES AND ACCOMPLISHMENTS
(7/1/05-6/30/06)

Graduates and Current Students

Several of our recent graduates have successfully transitioned to full-time employment in occupational, environmental and public health related fields. Shannon Henshaw (Gaffney) has published two papers on her doctoral research involving the geographic spatial distribution of serum organochlorine levels in some 2000 subjects living in Washington County, Maryland. Individual serum levels were compared to the proximity of their residences to a former pesticide/fertilizer manufacturing site in the city of Hagerstown. She is currently employed by an industrial hygiene and risk assessment consulting firm. Binh Thai Le successfully defended her PhD doctoral dissertation entitled “Efficiency of pathogen removal through river bank filtration” in 2005, and is currently the national program officer for a United Nations Scientific Development Program in her native Vietnam. Megan Weil successfully defended her dissertation entitled “Blood mercury levels and neurobehavioral function” in 2005, and is currently the director of Environmental Health Services at the Association of State and Territorial Health Officials, in Bethesda, Maryland.

Our current students continue to make satisfactory progress in their graduate training. Fifth-year doctoral candidate Keson Theppeang has completed the data collection and analysis phases of her dissertation research, and she anticipates defending her thesis in early 2007. Fourth-year doctoral candidate Nicole Cardello has completed the collection of biological samples from participants in her research study, and is now completing the laboratory analysis of these samples. Fourth-year doctoral candidate David Colquhoun completed his doctoral written and oral comprehensive exams in 2005, and is in the midst of his doctoral research. Kimberley Drnec completed her coursework and a master’s thesis to earn an MHS degree in Environmental Health Sciences in 2005. Third-year trainee Ellen Wells completed her doctoral written comprehensive exams in January 2006, and completed her oral comprehensive doctoral examination in September. Second-year trainee Jing Feng passed her doctoral written comprehensive exams in June 2006 and is preparing for her oral exam later in 2006. We are recruiting several candidates to join the program in Sept 2006.

New Faculty and Courses

In the past year, we have continued to implement recommendations made during previous external reviews of this program. These include: 1) the addition of new contributing faculty to enhance our expertise in population genetics and genetic epidemiology; 2) the addition of newly required courses in genetic epidemiology to enhance training in biomarkers of susceptibility; 3) the requirement for laboratory-based training in molecular techniques; 4) the explicit requirement to take at least one of the school’s scientific ethics courses; 5) the availability of student resources to deal with ethical and human research issues; and 6) the use of advisory faculty to assist in establishing and developing the program.

Two new contributing faculty have enhanced our expertise in population genetics and genetic epidemiology: Dr. Danielle Fallin, associate professor (genetic epidemiology), whose research interests include population genetics, haplotype-based SNP analysis, statistical genetics, multi-locus tests in genetic association studies, and genetic epidemiology of Alzheimer’s disease and other neuropsychiatric disorders; and Dr. Yin Yao, associate professor (genetic epidemiology), whose research interests include human genetics, statistical genetics of risk for nasopharyngeal cancer, and modifying genes in FAP patients and in BRCA1/2 carriers. These faculty play major roles in teaching

the newly required courses in genetic epidemiology and will assist in mentoring and advising program students in the areas of human and population genetics.

We have also made recommended additions to the curriculum to improve student training in genetic susceptibility to disease. Students will be required to take either *Genetic Epidemiology in Populations* (340.670) and *Molecular Biology for Genetic Epidemiology* (340.665), offered in the Graduate Summer Institute of Epidemiology and Biostatistics, or, for students undertaking major research projects in genetic susceptibility of disease, two more extensive courses in genetic epidemiology, *Introduction to Genetic Epidemiology* (340.664) and *Fundamentals of Genetic Epidemiology* (340.630). We have also included as specific program requirements the following courses as recommended in our previous review: either *Scientific Ethics* (550.860) or *Research Ethics and Integrity* (306.665).

Trainee Recruitment

We have successfully increased the number of doctoral students in the program from three-to-four (pre-funding) to six students this year, with six students graduating in 2002-2006. These students were recruited from the pool of successful applicants to the doctoral program in Environmental Health Sciences and were funded through a combination of resources, including ERC, personal, foreign government, research and university funds. The support provided through the BOES Program grant was targeted toward recruiting and retaining additional eligible students into this research area and toward developing a centralized organizational program structure.

PROGRAM PRODUCTS

Faculty and student publications in the past year are listed in Appendix C. A major product of the program is the graduation of highly trained individuals skilled in a diverse mix of disciplines with the ability to coordinate their scientific expertise and professional skills to address problems in occupational and environmental health.

The majority of faculty and student research is related to one or more of the priority areas identified by NIOSH in the National Occupational Research Agenda (NORA). For instance, under the *Research Tools and Approaches* category, our faculty use biomarkers to improve: a) cancer research methods; b) exposure assessment methods; c) intervention effectiveness research; and d) surveillance research methods. Examples of methodological advances by researchers and students affiliated with this program include:

- Improved methods for modeling biomarkers of exposure in populations
- Identification of design issues for epidemiologic studies of exposure and effect biomarkers
- Improved analytic methods for detection and measurement of biomarkers

Through his affiliation with the ERC, Dr. Strickland has had the opportunity to participate in several activities sponsored by the ERC's Continuing Education Program. For example, he attended the one-day genetics symposium entitled: "Genes in the Workplace: The Right Fit?" held at the Georgetown University Law Center in Washington, D.C. in March 2006. In this symposium, which examined how genetic research may affect the workplace and employment, Dr. Strickland served as a panelist for the discussion of the scientific aspects of genetic research in the workplace. Dr. Strickland has also consulted with a number of ERC graduate students outside the BOES Program regarding the use of molecular biomarkers of exposure and effect in their research.

The strength and reputation of the full-time core faculty in the BOES Program is demonstrated by their significant local, national and international professional activity. The faculty publication lists indicate a high level of research productivity, as evidenced by published papers, review articles and book chapters. (See Appendix C for a selection of faculty publications.) These publications are augmented by numerous presentations at national and international conferences and participation on professional committees of national and international organizations.

FUTURE PLANS

We will continue to use the majority of program funds for student support to maintain the critical mass of the BOES Program. This past year, we supported two doctoral students with BOES funding, and we will continue to do so during the research phase of their doctoral programs. In the upcoming academic year, we will also begin to support new trainees with additional ERC funding. We will continue to actively recruit the most competitive students available to the program, which currently numbers six.

OCCUPATIONAL INJURY PREVENTION

Gary Sorock

OCCUPATIONAL INJURY PREVENTION PROGRAM

Program Director: Gary Sorock, PhD, Associate Professor, Department of Health Policy and Management

PROGRAM DESCRIPTION

The Occupational Injury Prevention Program focuses on the advanced preparation of professionals in the field of occupational injury prevention. Students are trained in epidemiologic research methods through coursework and development of independent research. They gain experience in teaching and acquire a strong background in the causes and prevention of occupational injury as well as basic injury control methods. Working closely with their advisors, other faculty and student colleagues, they acquire the knowledge and skills to excel in this specialized area of public health. Thus, our graduates bring a new public health perspective to injury prevention in the workplace and assume leadership roles of faculty, researchers and instructors to train the next generation of occupational injury prevention professionals. During 2005-2006, there were seven trainees in the program, three of whom have now completed their dissertations, adding substantially to the body of new occupational injury researchers.

Objective

The program objective is to train independent researchers who can take an integrated epidemiological approach to occupational injury control. The educational objectives of our program combine the broader foundations of public health measurement sciences (e.g., survey methods, exposure assessment, research/experimental design, intervention evaluation) and health policy with specific training in occupational injury epidemiology and prevention (e.g., injury surveillance, injury control, occupational safety, ergonomics).

Instruction in the Responsible Conduct of Science

In 1996, The School of Public Health began requiring all research students (PhD, ScD, MSc, MHS) to take a course in *Research Ethics and Integrity*, taught by our noted ethicist Dr. Nancy Kass. The course introduces concepts inherent to the ethical conduct of research with human participants, issues of scientific integrity, and ethical theories and principles. It addresses: topics in human research, such as the just selection of research participants, risk/benefit balancing and protecting the welfare of participants, and informed consent; issues that arise in clinical and survey research as well as in conducting research with special populations; and issues of academic and scientific integrity and role responsibilities of investigators.

Faculty Participation

Gary S. Sorock, PhD, has directed the program since 2003. Dr. Sorock has expertise in occupational injury epidemiology from his years with the Liberty Mutual Research Institute for Safety, the New Jersey Department of Health, and the University of Massachusetts Occupational Health Program. He advises doctoral students, teaches the course on *Epidemiology of Injury*, and plays a lead role in the *Occupational Injury Prevention and Safety Practice* course. Dr. Sorock currently collaborates on a NIOSH-supported study of lacerations in meatpacking with the College of Engineering at the

University of Nebraska, Lincoln and Harvard School of Public Health in Boston. More of his work in the field of occupational injury prevention is detailed below, under “Program Products.”
Professor Susan Baker, MPH, ScD (honorary), professor of Health Policy and Management, has been the co-director of the program since its inception. She works closely with Dr. Sorock on budgetary matters, recruitment, on-going assessment of students and matching prospective students with potential faculty advisors or resources. She assists in planning and oversight of the training program and in making sure that objectives are met and guidelines adhered to. Professor Baker chairs the admissions committee that reviews the credentials of HPM students who are potential candidates for the training program and mentors junior faculty.

Keshia Pollack, MPH, PhD, will become the program co-director in January 2007. In 2006, Dr. Pollack was selected through an intensive national search to join the School of Public Health, Department of Health Policy and Management as assistant professor. Beginning in the 2007-2008 academic year, she will co-teach the *Occupational Injury Prevention* course, advise doctoral students, run the occupational injury journal club, and assist in developing and implementing the training program. Her major research emphasis is obesity in the workplace.

Guohua Li, MD, DrPH, is professor of Emergency Medicine at the Johns Hopkins School of Medicine, with a joint appointment at the Department of Health Policy and Management. A physician scientist specializing in injury epidemiology and research methodology, Dr. Li advises trainees on their thesis research and contributes to the seminar series.

Robert Dodd, ScD, an associate faculty member in the Department of Health Policy and Management, teaches the *Politics, Policies and Transportation Safety* course and works closely with trainees, especially those interested in safety of transportation workers.

Andrew E. Lincoln, ScD, adjunct assistant professor in the Department of Health Policy and Management, has been the primary instructor for the course *Occupational Injury Prevention/Safety Practice* since 2002. He serves as a consultant to trainees on their doctoral research and sits on students' doctoral committees.

James L. Weeks, ScD, is adjunct assistant professor in the Department of Health Policy and Management. He has co-taught the *Occupational Injury Prevention* course for the past decade.

Twelve additional faculty members make important contributions to the program through advising, teaching and consulting. The interdisciplinary flavor of the occupational injury program is exemplified by having Environmental Health Sciences (EHS) faculty sit on dissertation committees of doctoral students in Health Policy and Management.

A seminar series in occupational injury prevention is jointly sponsored by the ERC and the Center for Injury Research and Policy; students have interacted in other seminars – e.g., the joint Division of Occupational & Environmental Health and Department of Epidemiology seminar. Dr. Pollack lectured in the EHS *Anna Baetjer Course* on the work environment in the aluminum manufacturing industry. Dr. Pollack also has been a valuable resource for two other doctoral students (including one in Occupational and Environmental Health Nursing); students represent occupational injury prevention on interdisciplinary project teams.

Minority Recruitment and Retention

During 2005-2006, two minority students (an African-American and a Latino) were funded through the NIOSH training program. We have a number of activities planned to continue our efforts to recruit and

retain trainees from underrepresented minority groups. In addition to institutional recruitment, we will send information about the training program to the numerous Historically Black Colleges and Universities (HBCU). We plan to work more closely with neighboring Morgan State University, the only HBCU with a school of public health. This will be facilitated by a graduate of Health Policy and Management who is now on their faculty, after a long career in industry and government. Promising applicants are contacted by telephone early in the application/admissions process to encourage their attention to this program.

PROGRAM ACTIVITIES AND ACCOMPLISHMENTS

Our accomplishments have been in the area of training doctoral students for academic/research careers in occupational injury prevention and control, and in publishing research on occupational injury epidemiology. During this period, three ERC-supported pre-doctoral trainees graduated or passed their final defense, and four have passed their preliminary exams and expect to defend their dissertations by the end of 2007. All are already contributing to the field. In addition, the faculty over this time period have authored or co-authored 45 publications on occupational injuries. (See Appendix C for a selected list of faculty and student publications.)

Our trainees have excelled in research (both their own and collaborative projects) and teaching. They have given award-winning presentations at national conference, and their work has resulted in, or contributed to, more than 20 published manuscripts. With Air Force funding, 2006 program graduate Dr. Meg Haynes has helped clarify the role of cardiovascular fitness and physical activity to unintentional injury to military forces. Another 2006 graduate, Dr. Keshia Pollack successfully competed for a National Research Scientific Award from the NIH and has done groundbreaking research on the contribution of obesity and overweight to occupational injuries. All of our doctoral students have participated in monthly journal club seminars in occupational safety, led by each student in turn.

Courses

Required courses as well as relevant electives for the doctoral program of study appear in Appendix A. Sixteen courses are required in the doctoral program, many of which are also required by the student's home department. For example, biostatistics courses are required of all doctoral programs. Areas of study within the Occupational Injury Program include: occupational injury; general injury prevention; occupational health; public policy and risk sciences; behavioral sciences; teaching and research skills; epidemiology; and biostatistics.

The course on *Research and Proposal Writing* requires students to develop a proposal that could be used to apply for dissertation support from federal or foundation sources. Students also critique one another's proposals under faculty guidance, which contributes to their growth as independent researchers and their ability to serve as reviewers for journals and grant proposals after they complete the doctoral program.

Research Training

Our trainees are supervised by experienced occupational injury researchers in the design, conduct and analysis of descriptive, analytic and evaluation-based studies to reduce the incidence of work-related injury. Research is conducted with various occupational groups, which will allow trainees to study many of the sectors outlined in the new NORA II sector-based approach. We require all trainees to directly participate in one or more projects or research efforts; this training takes the form of: 1)

work with faculty on existing projects; 2) development of students' own projects, culminating in dissertation research; 3) work and research experience as part of collaborative arrangements with outside groups. In 2005-2006, students participated in the following research projects, in addition to their dissertation research:

- A study of work limitations in a cohort of individuals with severe leg injuries
- Injuries to correctional officers and ways to reduce them through modification of potential weapons, a collaborative project with the JHU Applied Physics Laboratory

Student Accomplishments (Publications are listed in Appendix C)

- Kristin Archer (Swygert) expects to defend her dissertation, “Determinants of Referral to Physical Therapy: Influences of Patient Work Status and Surgeon Efficacy Beliefs,” in the summer of 2007. She is senior author of two recent journal articles, and two others are submitted or in preparation.
- Maria Bulzacchelli will defend her dissertation, “Evaluation of the Impact of OSHA’s Lockout/Tagout Standard On Occupational Injury Rates,” in October 2006. As a research assistant, she has assisted in grant proposals for occupational injury research and coordinated data collection for the Baltimore component of the NIOSH taxicab shield use evaluation project. Maria has been a teaching assistant in six courses, received a NIOSH Pilot Project Research Training Award (2004-2006), made two presentations at national meetings, and contributed to three papers published or in press.
- Renan Castillo expects to complete and defend his dissertation on “Modeling the Course of Disability and Return to Work Following Trauma" in 2007. He has served as a teaching assistant and guest lecturer and given prize-winning papers at three national conferences. As a research assistant, while sponsored by NIOSH, he served as project director of the DOD-sponsored *Online Self Management Program for Trauma* and was an investigator in several other projects seeking to improve the outcomes of trauma survivors, including return-to-work. While supported by NIOSH, he has authored or contributed to nine papers published or in press.
- Michelle Chervak successfully defended her dissertation on “The Association Of Health Risk Behaviors And Occupational Injury Among U.S. Army Basic Trainees” and graduated in May 2006. She is now an epidemiologist with the Injury Prevention Program at the U.S. Army Center for Health Promotion and Preventive Medicine. As a NIOSH trainee, she gave 10 scientific presentations and participated as a co-author in nine others. She recently volunteered for a NORA committee and also accepted a request to serve on a NIOSH grant review committee.
- Roni Neff has successfully defended her dissertation, “In the Wrong Place? Geographic Variations in U.S. Occupational Injury/Illness Rates,” and will graduate in 2007. She is currently preparing papers for publication based upon her thesis. During her training, she served as a teaching assistant and research project manager. Since 2002, she has obtained three grants of $10,000 to $20,000 each, made four presentations at national meetings, and published five papers and reports.
- Keshia Pollack defended her dissertation on “Obesity and Overweight in the Workplace: Prevalence, Trends and Injury Implications” in 2005 and then became a Postdoctoral Fellow in Research and Evaluation at the University of Pennsylvania School of Education Campbell Collaboration/Robert Wood Johnson Foundation. She is now assistant professor in the Department of Health Policy and Management at Johns Hopkins. In her last year as a trainee, she gave three lectures in various courses.
- Jennifer Taylor is writing her dissertation on “Comparison and Application of Patient Safety Event Case-Finding Methods using Administrative Data and an Error-reporting System.” She

is also conducting a related research project, “Poor Organizational Culture Leads to Injuries in the Nursing Workforce: Are the same cultural risk factors putting patients at risk?”

PROGRAM PRODUCTS

- Program faculty in this period have authored or co-authored 45 publications on occupational injuries, and the work of our trainees has resulted in, or contributed to, more than 20 published manuscripts. See Appendix C for a list of these publications.
- Dr. Sorock collaborates with the Whiting School of Engineering at Johns Hopkins on the design and testing of a lifting device for the U.S. Army for multiple lifting tasks.
- Our students have given presentations at national conferences, at least four of which have been chosen as the best paper at the conference.
- A NIOSH-supported trainee, Dr. Jennifer Lincoln has made important contributions to our understanding of commercial fishing vessel sinking and survivability in Alaskan waters. Having graduated from our program in 2006, Dr. Lincoln is now interim director of the NIOSH office in Anchorage, Alaska, and has authored five NIOSH reports on hazards within the commercial fishing industry.

FUTURE PLANS

Interactions will continue with the Applied Physics Laboratory of JHU, the U.S. Army Center for Health Promotion, Liberty Mutual Research Institute for Safety, the Office of the Chief Examiner of Maryland, the Maryland Institute for Emergency Medical Services and Systems, the Veterans Administration, and the Daimler Chrysler-UAW Health and Safety Committee. We are exploring opportunities to work with the Ford-UAW Health and Safety Committee. Plans are being made to collaborate with our industrial partners on a study of acute hand injury prevention. Injuries to health care workers in acute care hospitals are a growing focus of our program.

Through in-person meetings, we will consider new avenues for our training and research, taking advantage of the expertise represented within our Advisory Committee, which has been expanded and now includes representatives of industry (Gordon Reeve, Ford Motor Company), small business (Rebecca Moreland, Chesapeake Occupational Health Services), research (Robert Dodd, Dodd Associates), labor and research community (James Weeks, former Health and Safety Director of United Mine Workers of America and faculty at George Washington University), insurance (Gordon Smith, Liberty Mutual), military (Bruce Copley, Col. [ret.], U.S. Air Force, and Joseph Myers, U.S. Coast Guard and a Certified Safety Professional) and professional organizations (Russell Rayman, Aerospace Medical Association).

A new area of emphasis, consistent with the NORA II sector approach to occupational injury prevention, will be transportation worker safety. Many of these workers, including professional drivers, pilots and EMS crews, are among the occupational groups with the very highest death rates. Moreover, in most sectors, road deaths are the leading cause of on-the-job injury death. This program will build on the research experience of Professor Baker and Drs. Dodd and Li.

CONTINUING EDUCATION in OCCUPATIONAL SAFETY and HEALTH

Mary Doyle

CONTINUING EDUCATION (CE) TRAINING PROGRAM

CE Program Director: Mary Doyle, RN, MPH, COHN-S/CM, Research Associate, Department of Environmental Health Sciences

PROGRAM GOALS AND DESCRIPTION

The Continuing Education (CE) Training Program is an interdisciplinary effort coordinated across multiple Departments at the Johns Hopkins Bloomberg School of Public Health and is a key component of the Johns Hopkins Education and Research Center for Occupational Safety and Health (ERC). Under the leadership of Mary Doyle, the program supports the mission of the ERC by offering short courses and seminars to practicing professionals such as physicians, nurses, industrial hygienists, safety engineers and sanitarians. In addition, the ERC CE Training Program serves as a resource to private, state, local and federal government personnel working in Region III and nationally to ensure occupational and environmental safety and health.

The goals of the Continuing Education Training Program are to:

- Serve as a regional educational resource for addressing occupational and environmental safety and health issues and the prevention of hazards that occur in the workplace;
- Provide access to skills and information related to occupational safety and health and environmental health; and
- Develop, present, coordinate and participate in occupational and environmental safety and health programs designed to be disseminated to government agencies, health departments, professionals, industry, labor, private and public service organizations, and individuals.

Within this framework, our specific objectives are to:

- Increase the competencies of practicing occupational safety and health professionals to function effectively in the increasingly complex areas related to occupational safety and health and environmental health;
- Assist public health workers, sanitarians, medical practitioners, engineers, nurses and other professionals with newly designated occupational safety and health responsibilities to acquire the needed knowledge and skills in occupational and environmental safety and health; and
- Meet community needs by developing and supporting outreach activities that will help other institutions to address problems related to occupational and environmental safety and health, which will be addressed in the outreach section of this grant proposal.

As program director, Ms. Doyle is responsible for establishing the vision and strategic plan for the CE program. This is accomplished by her close affiliation with the ERC academic program directors and all ERC faculty to assess the needs of practicing professionals and to develop course offerings, both new and recurring. In addition to planning the types and content of courses, and identifying expert faculty for courses and developing and analyzing evaluations, she is solely responsible for the logistics and financial management of the program. She oversees all applications for continuing

education credit from each respective discipline, and a significant amount of her time is devoted to establishing partnerships and planning major conferences such as the recent multidisciplinary conference on genetics and workplace issues, a collaborative effort with the University of Pennsylvania Training Program Grant (TPG).

The CE Program recruits instructors for courses from the faculty of the Johns Hopkins Bloomberg School of Public Health whose diverse backgrounds and expertise enhance the quality of the education, practice and research components of our programs. Continuing education course instruction is provided by ERC and other JHU faculty and associate faculty members, as well as faculty from outside the university. Our faculty is a major reason for the excellence of the Continuing Education Program, as they are recognized experts in the core areas of occupational and environmental hygiene and safety sciences, occupational and environmental health nursing, occupational and environmental medicine, occupational injury prevention and biomarkers of occupational exposure and susceptibility. To insure quality control, a JHU faculty member is involved in planning each course. All faculty in the ERC core areas participate in the Continuing Education programs related to their fields of interest. Participation of faculty includes planning of curriculum content, development and critique of course materials, recruitment and mentoring of course instructors and course evaluation.

During this reporting period, 160 faculty members taught in 49 courses, which are displayed in Table 12a (in Appendix B). In addition to ERC and other Hopkins faculty, course instructors were recruited from federal, state and local governments and agencies (including health departments), the U.S. military, for-profit companies, non-profit organizations, private health practice, professional associations, and other academic institutions.

Course curricula are individually designed based on the learning objectives of each Continuing Education course and the target audience. Courses range from one to three days in length, depending on the complexity of the content. Off-site, weekend and evening courses are offered in response to the needs of the target audience. Shorter seminars and conferences are also held to meet the continuing education needs of occupational safety and health (OSH) practitioners who are unable to attend longer offerings due to staffing or work commitments.

Courses are designed utilizing a continuous quality improvement approach to ensure training effectiveness. This process includes assessing a clear need for the course from various sources, developing targeted program objectives and curriculum, designing an efficacious delivery system, choosing the appropriate program format, identifying subject area experts, and developing a useful evaluation system. Feedback is used to improve course content, delivery systems and presenter quality. This approach incorporates training models such as hands-on exercises, lectures, discussions, role playing, breakout groups and knowledge assessments.

The CE Training Program responds to requests from local public health agencies, regional private employers and non-profit organizations for specific assistance with consultation or training for occupational and environmental health professionals. This is accomplished by the close association of the faculty with Ms. Doyle to develop and implement these courses. Examples of these types of programs are included below.

PROGRAM ACTIVITIES AND ACCOMPLISHMENTS

During the grant period, the CE Training Program demonstrated progress toward our program goals and objectives. A total of 729 occupational safety and health professionals were trained in 49 courses, seminars and workshops covering a multitude of broad and innovative topics.

The CE Program has been strengthened by developing and expanding numerous external partnerships within Region III occupational safety and health professional organizations; these include the Chesapeake and Potomac sections of the American Industrial Hygiene Association (AIHA), the Chesapeake section of the American Society of Safety Engineers (ASSE), the Chesapeake and National Capital Chapters of the Academy of Certified Hazardous Materials Managers (ACHMM), the Maryland College of Occupational and Environmental Medicine (MdCOEM), the Metropolitan Washington, Maryland Area and Seneca Valley Associations of Occupational Health Nurses (MWAOHN, MAAOHN and SVAAOHN), and state and local organizations such as the Maryland Department of the Environment, the Maryland Board of Environmental Sanitarians and county public health departments. These partnerships have enhanced the CE Training Program by providing speakers, trainers, members of the advisory board, course participants, and assessment of needs for course topics. Based on needs assessments within these professional organizations, we have collaborated with these groups to develop new training courses to meet their particular continuing education needs. During the grant period, Ms. Doyle also served on several planning committees for local, national and international meetings and conferences involving occupational safety and health professionals, including taking the lead in the planning and implementation of a March 2006 multidisciplinary conference on the ethical issues of genetic testing in the workplace.

Partnerships with other academic institutions, particularly Training Project Grants (TPGs) such as the University of Pennsylvania School of Nursing, the Oregon Labor Safety and Health Education Program at the University of Oregon, and the Maryland Center for Environmental Training at the College of Southern Maryland, have increased the visibility of the CE Program and have enabled us to offer conferences and seminars that have attracted a broader group of occupational and environmental health professionals (such as registered sanitarians and hazardous materials managers).

As part of the ERC Outreach Program, faculty collaborate with training programs directed within labor organizations; for example, the George Meany Center for Labor Studies/National Labor College, the International Chemical Workers Union (IWCUC), the American Postal Workers Union and the International Association of Fire Fighters (IAFF). We recognize that several labor organizations have continuing education programs in place, and we do not want to replicate those resources. We do, however, consult these organizations and seek ways in which we can collaborate. The CE Program provides opportunities to augment worker training programs in place at these organizations, to provide a broad range of training activities for this population. Based on their recommendations, we are capable of providing courses perceived to fill existing gaps in their curriculum and/or meeting the needs of specific subgroups. JHU ERC faculty participate in the CE programs currently offered by other organizations; for example, the national professional organization conferences of AIHA, AAOHN, ASSE and ACOEM.

We maintain numerous connections to the public sector through ties with local, county and state public health departments. Private sector groups with whom we have worked include the Maryland Department of the Environment and Maryland Occupational Safety and Health (MOSH). Several faculty have worked with public safety and other municipal workers (e.g., fire, EMT, police, sanitation), and we gain access to leaders and training officials within the organizations and identify training needs we can provide. An example of this networking is our relationship with county and state health officers and environmental health leaders in Region III.

Various organizations contact the ERC with requests for faculty to speak at their meetings or conferences. In particular, Ms. Doyle was invited to present a lecture on *What's New in Spirometry* at "The MidAtlantic Regional Conference for Nurse Practitioners" for the Nurse Practitioner Association

of Maryland (NPAM) in April 2006. She has also accepted an invitation to participate in a roundtable presentation on emergency preparedness as part of the conference "Workplace Issues for Nurses: Adapting to Change in the 21st Century" on November 3, 2006 in Hagerstown, Md., sponsored by the Western Maryland Area Health Education Center (AHEC).

The CE Program presented 48 courses, conferences and presentations during the current grant period. The Program also responded to requests for consultation on training needs for specific projects. For example, ERC faculty worked with occupational safety and health management from BP Solar to design and deliver an ergonomic training program for the industrial engineers at their Frederick, Md. plant in February 2006. Ergonomic principles were reviewed and specific industrial work processes at the plant were analyzed to assist the engineers to ameliorate existing problems and design ergonomically safe assembly lines in new areas of the plant. ERC Director Jacqueline Agnew and Ms. Doyle collaborated with a Pilot Project Research Training (PPRT) grant recipient to implement this training.

Prompted by requests from sanitarians-in-training for a course to help them prepare for the registration exam administered by the Maryland Board of Environmental Sanitarians, Ms. Doyle met numerous times with the board and the Maryland Environmental Health Directors to plan a new course to meet that need. In the past two years, 73 newly hired Sanitarians-in-training participated in the *Principles of Environmental Health/Registered Sanitarian Review Course*, which the CE Program developed and directed. Course content focused on a broad overview of the field, which is necessary to successfully sit for the state examination. In our October 2004 pilot training, students who took the review course had a 78.5% pass rate on the state board examination, while students who did not had a 38.5% pass rate. The course was revised based on feedback and evaluation from the pilot and was offered again in January 2006. Examination pass rates for students who took the 2006 review course continue to be higher than those who do not take the course.

In March 2006, the Johns Hopkins ERC, Oregon Labor Safety and Health Education, the National Human Genome Institute and the University of Pennsylvania Nursing Program co-sponsored an interdisciplinary conference titled "Genes in the Workplace: The Right Fit?," which included perspectives from occupational medicine, occupational health nursing, law, labor, ethics, industry and science. Approximately 40 participants representing all areas of OSH had an opportunity to discuss the various ethical, legal and scientific aspects of workplace genetic testing with some of the leading experts in this field.

For the past two years, the ERC CE Program, the Institute for Johns Hopkins Nursing and Abbott Laboratories have co-sponsored a Web-based bi-monthly continuing education program open to Abbott Laboratories nurses and ERC students. This year, to make these sessions more accessible to more practitioners and students, each one-hour session is recorded and available for 30 days after the session. Post-session evaluations are coordinated by the CE Program and completed via the Web using SurveyMonkey.com.

We recently developed a new seminar series that will have a broader appeal to include practicing public health and community health nurses. Our first seminar was *Lessons from Katrina: Keeping Responders Safe and Healthy*, which was videotaped and formatted both as a DVD and in Web stream format on the ERC CE Web site for distance learning and continuing education credit. A panel discussion was held after the presentations; highlights included a description of one nurse's story as a member of a Katrina response team, discussions by two nurses employed by federal agencies – the Occupational Safety and Health Administration (OSHA) and the Agency for Toxic Substances and Disease Registry (ATSDR) – that responded to the disaster, and a psychologist who is experienced at providing essential recommendations regarding responses to stress and responder health.

Specific recruitment efforts are tailored according to course topic and intended audience. Methods include use of listserves, newsletters, trade publications, Web site listings, e-mail and postcards. Additionally, mailing lists are purchased for various organizations and professional groups based on the target audience and topics.

The CE Program will continue to consult with the Johns Hopkins Bloomberg School of Public Health Student Diversity Office. Their mission is to increase the number of underrepresented minority students in the School. Dr. Fitzgerald, the Occupational and Environmental Health Nursing director, is chair of the school's Affirmative Action Committee to achieve these goals. In the CE Program, we plan to recruit through minority professional associations such as the National Association of Hispanic Nurses and the National Black Nurses Association in order to increase minority representation in our courses.

PROGRAM PRODUCTS

One of our goals is to produce enduring resources such as CD-ROMS, other audio-visual reference materials, and library resource materials as products of course design. During this grant period we have utilized several of these methods and plan to expand these efforts with NIOSH support in the new grant period. CDs or web streaming videotaped conferences and seminars have significantly increased the numbers of occupational health and safety professionals we are able to reach with our training. Examples of these resources include a DVD from the conference titled "Genes in the Workplace: The Right Fit?" and a DVD was also produced from the nursing seminar "Lessons from Katrina: Keeping Responders Safe and Healthy." We grant continuing education credits for completion of these versions. Web streaming from the CE Program web site is supported by the Johns Hopkins Bloomberg School of Public Health Distance Education Division.

FUTURE PLANS

Ms. Doyle is exploring various opportunities for the Johns Hopkins ERC to collaborate with the American Industrial Hygiene Association on national continuing education course offerings. For example, the ERC will co-sponsor the *CHMM Overview Course* at the American Industrial Hygiene Conference & Expo (AIHce) in Philadelphia in June 2007, as well as proctor the examination the following day. ERC faculty are planning a spring 2007 teleWeb conference (with AIHA) on the health effects of methamphetamine laboratory disasters.

The CE Program plans to expand our work as a network partner with the National Center for Healthy Housing. Our goal is to recruit more public health nurses and to expand the types of courses offered in this program.

We will continue to work closely with the professional organizations in the OSH field. The Chesapeake section of ASSE in particular has requested our assistance in designing CE course offerings for their membership based on the needs assessment survey results. Ms. Doyle will continue to serve on the planning committees for regional and national conferences, as she has gained considerable expertise in this area.

IV

SPECIFIC IMPROVEMENTS in OS&H RESULTING from ERC PROGRAMS

REPORT on SPECIFIC IMPROVEMENTS in OS&H RESULTING from ERC PROGRAMS

The following are examples of the impact of this ERC on worker safety and health and the field of occupational safety and health during the reporting year:

- Five graduates of the ERC entered academic positions. Four were among the 13 doctoral program graduates of the OEH, OEHN and Occupational Injury Prevention programs. One had completed the occupational medicine residency.

- A large proportion of ERC academic graduates during this report period have assumed national leadership positions, such as the acting chief of the NIOSH Alaskan Field Station and Injury Epidemiologist in the U.S. Air Force. Others work for organizations that are regionally based but have an impact on nationwide occupational safety and health, such as the international Association of Firefighters, Robert Wood Johnson Foundation, National Center for Healthy Housing and Exxon Mobile.

- The Continuing Education Program presented 49 courses, reaching more than 750 professionals.

- An ergonomic training course was designed for managers and safety personnel of a local manufacturing industry. The delivery of the course was combined with consultation that resulted in improvements to the design of work tasks. Similar improvements to workplace design have resulted from training interactions in other local industries.

- Faculty of three ERC programs continued to operate a large medical surveillance program for former Department of Energy workers at Los Alamos National Laboratories in New Mexico. In addition to providing professional practice and research opportunities, this program has identified workers in need of medical follow-up for work-related exposures.

- With NIOSH, the ERC co-sponsored a regional Town Hall meeting to solicit stakeholders' input regarding perceived research priorities in the transportation and warehousing industry. Additionally, we identified stakeholders from our region who presented testimony regarding the major occupational health and safety concerns in our area.

- The ERC collaborated with Oregon Labor Safety and Health Education, the National Human Genome Institute and the University of Pennsylvania nursing program to co-sponsor an interdisciplinary conference titled "Genes in the Workplace: The Right Fit?" which included perspectives from occupational medicine, occupational health nursing, law, labor, ethics, industry and science. Approximately 40 participants representing all areas of OSH had an opportunity to discuss the various ethical, legal and scientific aspects of workplace genetic testing with some of the leading experts in this field.

- Four of eight funded Pilot Project Research Training Program grants were awarded to regional institutions outside of Johns Hopkins. This is one means by which we have helped increase the OSH research training capacity of other universities.

- Outreach activities, particularly interactions with OSH professional societies in the core areas of occupational and environmental medicine, occupational and environmental health nursing, occupational and environmental hygiene, and safety have greatly increased over this period (see report for specific organizations).

- ERC programs have increased their research focus on two important sectors – agriculture and transportation. This work has relevance to the new NORA sector-based framework.

- We have had exceptionally positive experiences in recruiting minority candidates to our programs. Additionally, Dr. Fitzgerald, the director of OEHN, is prominently involved in school diversity recruitment efforts as the chair of the Affirmative Action Committee and a former member of the university Diversity Council.

- AN OEHN student developed testimony for the Farmworkers Justice Fund to protect pesticide-exposed migrant workers, thus influencing OSH policy.

- An OEHN student developed education programs for first responders who encounter methamphetamine labs.

- An OEHN student worked with the Maryland Department of Maternal Health to develop Web information and guidelines for workplaces to support breastfeeding among employees.

- The OEH Program has placed the content for the *Principles of Industrial Hygiene* course on the school's OpenCourseWare Web site.

- OEH faculty spearheaded an environmental monitoring effort in New Orleans following hurricane Katrina. Additional Hurricane Katrina service activities included evaluation of basic sanitation at Red Cross shelter sites. While this primarily benefited evacuees, the shelters have Red Cross employees.

- OEH faculty published studies on exposures and effects at the World Trade Center that have helped to focus medical screening efforts for clean-up workers.

- Dr. Breysse reviewed the potential for hazardous waste exposures to police officers working at a canine facility adjacent to a hazardous waste site. As a result of this investigation, the site is undergoing a through evaluation and the officers have been moved off site.

- An OEM faculty member and an OEH student collaborated to write a white paper on respiratory protection for infectious diseases for OSHA.

- Research on potential health effects from exposure to antibiotic resistant microorganisms on concentrated animal feeding operations (CAFOs) has helped to raise awareness about the potential for this important emerging health concern.

V

APPENDICES

APPENDIX A

PROGRAM CURRICULA

Occupational and Environmental Hygiene (OEH) Program – MHS & PhD

SAMPLE CURRICULUM

Bolded: Required courses for Occupational and Environmental Health Program
Italicized: Required courses for the Division of Environmental Health Engineering MHS & PHD Program

Course Number	Course Title	Units
	First Year	
1st Term		
140.621	*Statistical Methods in Public Health I*	4
182.840	*Special Studies/Seminar*	1
187.610	***Public Health Toxicology***	4
188.680	***Fundamentals of Occupational Health***	3
340.601	*Principles of Epidemiology*	5
2nd Term		
140.622	*Statistical Methods in Public Health II*	4
182.621	***Introduction to Ergonomics***	4
182.625	***Principles of Occupational & Environmental Hygiene***	4
182.840	*Special Studies/Seminar*	1
183.631	***Fundamentals of Human Physiology***	4
3rd Term		
140.623	*Statistical Methods in Public Health III*	4
180.629	*Environmental and Occupational Health Law & Policy*	4
182.614	***Industrial Hygiene Laboratory***	5
182.623	***Occupational Safety & Health Management***	3
182.840	Special Studies/Seminar	1
4th Term		
182.615	*Airborne Particles*	3
182.622	*Ventilation Controls*	4
182.840	*Special Studies/Seminar*	1
188.681	***Occupational Health***	5

Electives		3
Second Year		
1st Term		
182.631	***Principles of Occupational Safety***	2
182.840	*Electives or Special Studies/Essay*	6
182.840	*Special Studies/Seminar*	1
186.601	***Introduction to Radiation Health Sciences***	5
317.600	*Introduction to the Risk Sciences & Public Policy*	3
2nd Term		
182.637	***Noise and Other Physical Agents in the Environment***	4
182.840	*Electives or Special Studies/Essay*	8
182.840	*Special Studies/Seminar*	1
317.610	*Risk Policy, Management and Communication*	3
Doctoral (PhD) students in the OEH program are expected to have a master's degree from a program providing similar training to the OEH master's program described above. If there are significant gaps in master's coursework they are to be made up at the doctoral level. **Additional doctoral course work requirements are as follows:**		
3rd Term		
180.609	*Principles of Environmental Health I*	4
180.610	*Principles of Environmental Health II*	4
182.638	*Water and Health*	4
317.605	*Methods in Quantitative Risk Assessment*	4
182.617	*Intro to Chem of Amb Air Poll Air Pollution Chem*	2
4th Term		
182.616	*Advanced Topics in Airborne Particles*	2
183.641	*The Health Effects of Indoor and Outdoor Air Pollution*	3
317.615	*Topics in Risk Assessment*	2
187.634	*Molecular Dosimetry & Biomarkers*	4
OR		
180.640	*Molecular Epi & Biomarkers in Public Health*	4

Occupational and Environmental Health Nursing (OEHN) Program – MPH
SAMPLE CURRICULUM

Bolded: Required courses for Occupational and Environmental Health Nursing Program
Italicized: Required courses for MPH Program

Course Number	Course Title	Units
Summer		
140.609	*Statistical Computing in Public Health*	2
140.610	*Introduction to Public Health Statistics*	2
221.637	*Health Information Systems*	3
223.668	*Social Behavioral Foundations*	4
550.605	*History of Public Health*	2
550.608	*Problem Solving in Public Health*	4
550.863	*Special Topics: MPH Goals Analysis*	0
1st Term		
140.621	*Statistical Methods in Public Health I*	4
187.610	**Public Health Toxicology**	4
188.680	**Fundamentals of Occupational Health**	3
188.840	**Special Studies/Occupational & Environmental Health**	1
317.600	*Intro to Risk Science & Public Policy*	3
340.601	*Principles of Epidemiology*	5
2nd Term		
140.622	*Statistical Methods in Public Health II*	4
182.625	**Principles of Occupational & Environmental Hygiene**	4
340.602	Intermediate Epidemiology	6
317.610	Risk Policy, Management and Communication	3
3rd Term		
140.623	*Statistical Methods in Public Health III*	4
182.623	**Occupational Safety & Health Management**	3
188.684	**Occupational and Environmental Medicine**	4
188.687	Occupational Health in Developing Countries	4
188.840	**Special Studies/Occupational Health**	1

550.866	Special Topics: MPH Integrating Experience	2
340.612	Epidemiologic Basis for TB Control	2
4th Term		
180.611	Global Environment and Public Health	4
180.840	**Special Studies/Environmental Health**	2
188.681	**Occupational Health**	5
188.840	**Special Studies/Occupational Health**	1
340.618	Occupational Epidemiology	Audit
550.002	Internet Skills	Audit
188.694	**Advanced Topics in Occupational Health Nursing**	3

Occupational and Environmental Health Nursing (OEHN) Program – MSN/MPH

SAMPLE CURRICULUM

Bolded: Required courses for Occupational and Environmental Health Nursing Program
Italicized: Required courses for MSN/MPH Program

Course Title	Course Number	Units
SUMMER		
550.605	*History of Public Health*	2
550.608	*Problem Solving in Public Health*	4
550.863	*MPH Educational and Professional Goals Analysis*	1
140.610	*Introduction to Public Health Statistics*	2
140.609	*Statistical Computing*	3
221.637	*Health Information Systems*	3
302.690	*Social and Behavioral Aspects of Public Health*	4
FALL (1)		
187.610	**Public Health Toxicology**	4
188.680	**Fundamentals of Occupational Health**	3
340.601	*Principles of Epidemiology*	5
180.610	*Principles of Environmental Health*	5
500.601	*PHN: Theory and Practice*	3
140.611	*Statistical Reasoning in Public Health*	6
100.515	*Nursing Informatics*	1
SPRING (1)		
182.625	**Principles of Occupational & Environmental Hygiene**	4
182.623	**Occupational Safety & Health Management**	3
188.684	**Occupational and Environmental Medicine**	4
500.605	*PHN: Leadership and Management*	3
100.500	*Concepts and Theories in Nursing*	3
100.503	*Research Design Methodology*	3
300.600	*Introduction to Health Policy*	4
260.605	Genomics	4
	Elective	

SUMMER (2)		
500.602	*PHN: Theory and Practice Practicum*	3
100.561	Program Evaluation	2
188.681	**Occupational Health**	5
188.840	**Special Studies/Occupational and Environmental Health**	1
188.694	**Advanced Topics in Occupational Health Nursing**	3
100.533	*Ethics of Health Care*	2
FALL (2)		
188.840	**Special Studies/Occupational & Environmental Health**	1
500.603	*PHN: Leadership, Management and Evaluation Practicum*	3
100.509	*Scholarly Project*	1
	Elective	

Occupational and Environmental Health Nursing (OEHN) Program – DrPH

SAMPLE CURRICULUM

Bolded: Required courses for Occupational and Environmental Health Nursing Program
Italicized: Required courses for DrPH Program

Course Number	Course Title	Units
YEAR 1		
1st Term		
140.621	*Statistical Methods in Public Health I*	4
187.610	***Public Health Toxicology***	4
188.840	**Special Studies/Occupational Health**	1
317.600	*Introduction to Risk Sciences and Public Policy*	3
550.873	Seminar in Public Health Leadership	1
2nd Term		
140.622	**Statistical Methods in Public Health II**	4
188.840	**Special Studies/Occupational Health**	1
340.602	*Intermediate Epidemiology*	6
340.608	Observational Epidemiology	4
550.873	Seminar in Public Health Leadership	1
3rd Term		
140.623	*Statistical Methods in Public Health III*	4
180.640	***Molecular Epidemiology and Biomarkers in Public Health***	4
188.840	**Special Studies/Occupational Health**	1
306.655	*Ethical Issues in Public Health*	3
550.873	Seminar in Public Health Leadership	1
4th Term		
140.623	Statistical Methods in Public Health IV	4
180.611	*Global Environment and Public Health*	4
188.840	**Special Studies/Occupational Health**	1
340.618	***Occupational Epidemiology***	4
550.873	Seminar in Public Health Leadership	1
YEAR 2		

1st Term		
551.603	*Fundamentals of Budgeting & Financial Management*	3
551.602	Approaches to Managing Hlth Svcs Organizations	2
188.840	**Special Studies/Occupational Health**	1
2nd Term		
182.621	Introduction to Ergonomics	4
182.637	Noise and Other Physical Agents in the Environment	4
305.861	Graduate Seminar in Injury Res and Policy	1
3rd Term		
188.684	***Occupational and Environmental Medicine***	4
305.612	**Epidemiology of Injuries**	
4th Term		
183.641	*Health Effects of Indoor and Outdoor Air Pollution*	3
305.613	Design and Evaluation of Comm Hlth & Safety Interventions	3
340.613	Design and Conduct of Clinical Trials	3
YEAR 3		
1st Term		
188.840	**Special Studies/Occupational Health**	3
2nd Term		
188.840	**Special Studies/Occupational Health**	1
300.750	Teaching at the University Level	3
313.790	Understanding Cost-Effectiveness Analysis in Health Care	2
3rd Term		
188.840	**Special Studies/Occupational Health**	3
4th Term		
188.840	**Special Studies/Occupational Health**	3
YEAR 4		

1st Term		
140.613	Data Analysis Workshop I	2
140.614	Data Analysis Workshop II	2
2nd Term		
188.840	**Special Studies/Occupational Health**	3
3rd Term		
188.840	**Special Studies/Occupational Health**	3

Occupational and Environmental Health Nursing (OEHN) Program – PhD

SAMPLE CURRICULUM

Bolded: Required courses for Occupational and Environmental Health Nursing Program
Italicized: Required courses for PhD Program

Course Number	Course Title	Units
	YEAR 1	
1st Term		
140.621	*Statistical Methods in Public Health I*	4
140.607	Multilevel Models	1
221.637	Health Information Systems	2
187.610	***Public Health Toxicology***	4
188.680	***Fundamentals of Occupational Health***	3
188.840	**Special Studies/Occupational Health**	1
340.601	*Principles of Epidemiology*	5
2nd Term		
182.625	**Principles of Occupational & Environmental Hygiene**	4
140.622	*Statistical Methods in Public Health II*	4
188.840	**Special Studies/Occupational Health**	1
300.600	*Introduction to Health Policy*	4
305.610	**Issues in Injury and Violence Prevention**	2
308.602	Role of Government in Health Policy	3
182.621	Introduction to Ergonomics	3
3rd Term		
188.684	**Occupational and Environmental Medicine**	4
188.840	**Special Studies/Occupational Health**	1
182.623	**Occupational Safety & Health Management**	3
4th Term		
188.681	**Occupational Health**	5
188.840	**Special Studies/Occupational Health**	1
302.690	*Social and Behavioral Aspects of Public Health*	3
188.694	**Advanced Topics in Occupational Health Nursing**	3

YEAR 2		
1st Term		
188.840	**Special Studies/Research in Occupational Health**	3
2nd Term		
180.601	Environmental Health	5
550.860	*Research Ethics*	1
3rd Term		
140.623	Statistical Methods in Public Health III	4
4th Term		
140.624	Statistical Methods in Public Health IV	4
340.618	Occupational Epidemiology	4
YEAR 3		
1st Term		
188.840	**Special Studies/Research in Occupational Health**	3
2nd Term		
340.602	Intermediate Epidemiology	6
3rd Term		
180.640	Molecular Epidemiology and Biomarkers in Public Health	4
4th Term		
188.840	**Special Studies/Research in Occupational Health**	3
YEAR 4		
1st Term		
188.820	Thesis Research in Occupational Health	3
2nd Term		
188.820	Thesis Research in Occupational Health	3
3rd Term		
188.820	Thesis Research in Occupational Health	3

Occupational and Environmental Medicine Residency (OEMR) Program – MPH

SAMPLE CURRICULUM

Term and Course	Units	Requirement for:
Summer Session		
340.601 Principles of Epidemiology	5	MPH
180.601 Environmental Health	5	MPH, OEMR
550.608 Problem Solving in Public Health	4	MPH
550.863 MPH Educational & Professional Goals Analysis*	0	MPH
188.840 Special Studies/Research Occ./Env. Health	1	OEMR
1st Term		
140.621 Statistical Methods in Public Health I	4	MPH
187.610 Public Health Toxicology	4	MPH, OEMR
302.690 Social and Behavioral Aspects of Public Health	4	MPH
188.680 Fundamentals of Occupational Health	3	OEMR
182.631 Principles of Occupational Safety	2	Elective
188.840 Special Studies/Research Occ./Env. Health	1	OEMR
2nd Term		
182.625 Principles of Industrial Hygiene	4	OEMR
140.622 Statistical Methods in Public Health II	4	OEMR
182.621 Introduction to Ergonomics	4	Elective
340.608 Observational Epidemiology**	4	OEMR
182.633 Occupational Safety & Health Law	3	Elective
188.840 Special Studies/Research Occ./Env. Health	1	OEMR
3rd Term		
140.623 Statistical Methods in Public Health III	4	Elective
180.629 Environmental and Occupational Health Law And Policy	4	Elective
188.686 Clinical Environmental and Occupational Toxicology	3	OEMR
340.xxx Topics in Applied Epidemiology	4	Elective
188.840 Special Studies/Research Occ./Env. Health	1	OEMR
4th Term		
188.681 Occupational Health	5	OEMR
305.623 Fundamentals of Clinical Preventive Medicine	3	OEMR
188.611 The Global Environment and Public Health	4	Elective
300.651 Introduction to the U.S. Healthcare System	4	MPH
188.840 Special Studies/Research Occ./Env. Health	1	OEMR

*This is not a course, but rather a required document that must be submitted by each resident by the end of the first term.

**Residents interested in research or academic careers will follow the Epidemiologic Research Track which includes Epidemiologic Methods 1, 2 and 3 in the first, second and third terms, respectively. All are five-credit courses.

Biomarkers of Occupational Exposure and Susceptibility (BOES) Program – PhD

SAMPLE CURRICULUM

Bolded: Required courses for the BOES PhD Program
Italicized: Required courses for the Division of Occupational and Environmental Health PhD Program

Course Number	Course Title	Units
1st Term		
188.680	***Fundamentals of Occupational Health***	3
187.646	***Principles of Toxicology***	4
340.751	*Epidemiologic Methods I*	5
140.621	*Statistical Methods in Public Health*	4
180.609	*Principles of Environmental Health I*	4
2nd Term		
182.625	**Principles of Occupational and Environmental Hygiene**	4
340.752	*Epidemiologic Methods II*	5
140.622	*Statistical Methods in Public Health II*	4
180.610	*Principles of Environmental Health II*	4
550.860	*Scientific Ethics*	1
3rd Term		
188.686	***Clinical Environmental & Occupational Toxicology***	3
180.640	***Molecular Epidemiology & Biomarkers***	4
140.623	*Statistical Methods in Public Health III*	4
187.634	**Molecular Dosimetry and Biomarkers**	4
340.753	*Epidemiologic Methods 3*	5
4th Term		
188.681	***Occupational Health***	5
180.603	**Molecular Techniques for Environ Sciences**	3
340.618	*Occupational Epidemiology*	4
Summer Term		
340.760	**Genetic Epidemiology in Populations**	2
340.665 OR	**Molecular Biology for Genetic Epidemiology**	1

340.664	**Intro to Genetic Epidemiology**	3
In addition, all students are **required** to complete the Academic Ethics Module (on-line course located at: http://commprojects.jhsph.edu/academics/AcademicEthics.cfm). This module should be completed within two terms of matriculation and before graduating.		
The following courses are suggested **electives but not required:**		
306.665	*Research Ethics and Integrity*	3
340.630	**Fundamentals of Genetic Epidemiology**	3
340.631	**Methods in Genetic Epidemiology I**	3
340.632	**Methods in Genetic Epidemiology II**	3
340.669	**Statistical Approaches to Genetics of Cancer**	3
187.630	Role of Metabolism of Xenobiotics in Toxicology	4
183.631	Fundamentals of Human Physiology	4
183.641	*Health Effects of Indoor and Outdoor Air Pollution*	3
340.610	Etiologic Factors in Cancer Epidemiology	3
340.603	Cohort Studies: Design, Analysis, and Application	4
340.604	Design and Applications of Case-Control Studies	5
340.637	Environmental Epidemiology	2
301.630	Environmental and Occupational Health Policy	4
260.601	Biologic Basis of Public Health	4
182.621	Introduction to Ergonomics	4
182.623	**Occupational Safety and Health Management**	3
182.631	Principles of Occupational Safety	2
180.611	*The Global Environment and Public Health*	4
180.631	Environmental and Occupational Health Policy Seminar	3
The four course Risk Sciences series *(course numbers listed below)* is also available for those with an interest in applying biomarkers to the risk sciences:		
317.600	Introduction to Risk Sciences & Public Policy	3
317.605	Methods in Quantitative Risk Assessment	4
317.610	Risk Policy, Management & Communication	3
317.615	Topics in Risk Assessment	2

Occupational Injury Prevention Program – PhD

SAMPLE CURRICULUM

Bolded: Required courses for Occupational Injury Prevention Program

Course Number	Course Title	Units
First Year		
1st Term		
140.621	**Statistical Methods in Public Health I**	4
340.601	**Principles of Epidemiology**	5
305.610	**Issues in Injury and Violence Prevention**	2
300.701	Doctoral Seminar in HPM I	4
300.700	Teaching Assistant Orientation Seminar	1
305.861	**Graduate Seminar in Injury Res and Policy**	1
Electives – up to 5 units.		
2nd Term		
140.622	**Statistical Methods in Public Health II**	4
300.702	Doctoral Seminar in HPM II	4
308.601	Role of Government in Health Policy	3
306.650	Public Health and the Law	3
301.861	**Graduate Seminar in Injury Res and Policy**	1
340.602	Epidemiologic Methods	6
Elective – up to 1 units.		
3rd Term		
140.623	**Statistical Methods in Public Health III**	4
300.703	Doctoral Seminar in HPM	4
305.607	Public Health Practice	4
305.612	**Epidemiology of Injuries**	4
301.861	**Graduate Seminar in Injury Res and Policy**	1
Electives – up to 6 units.		
4th Term		
305.615	**Occupational Injury Prevention and Safety Practices**	2

300.844	First Year Doctoral Capstone	2
140.624	Statistical Methods in Public Health IV	4
301.861	Health and Public Policy Graduate Seminar	2
Electives – up to 9 units, including two of the following:		
305.613	**Design and Eval of Comm Hlth and Safety Interventions**	3
309.630	Emergency Medical Services and Trauma Systems	3
301.627	Understanding and Preventing Violence	3
305.625	Injury Mechanisms	2
Second Year		
1st Term		
188.680	**Fundamentals of Occupational Health**	3
300.750	**Teaching at the University Level**	3
300.870	**Research and Proposal Writing Seminar**	2
550.865	Public Health Perspectives on Research	1
182.631	**Principles of Occupational Safety**	2
Electives including special studies and thesis research up to 15 units.		
2nd Term		
300.871	**Research and Proposal Writing Seminar**	2
182.621	Introduction to Ergonomics	4
550.865	Public Health Perspectives on Research	1
Electives including special studies and thesis research up to 14 units.		
3rd Term		
306.665	Research Ethics and Integrity: US & International Issues	3
182.623	**Occupational Safety and Health Management**	3
Electives including special studies and thesis research up to 14 units.		
4th Term		
188.681	**Occupational Health**	5
340.618	**Occupational Epidemiology**	4
Electives including special studies and thesis research up to 13 units.		

APPENDIX B

UPDATED DATA TABLES

SEE EXCEL FILES FOR DATA TABLES

APPENDIX C

PUBLICATIONS

PUBLICATIONS AND PRESENTATIONS BY PROGRAM AREA

JULY 1, 2005-JUNE 30, 2006

Faculty names **bolded**; Trainee names underlined.

OCCUPATIONAL AND ENVIRONMENTAL HYGIENE (OEH)

Dalton P, M Gould, D Dilks, **PSJ Lees**, G Triebig, M Bader, E Hungerford and A Ihrig: "Biomonitoring to Determine Effective Occupational Exposure to Styrene Vapor and Effects on Olfactory Function." *Int Arch Occup Environ Health*. Submitted. (2006).

Geer LA, BA Curbow, DH Anna, **PSJ Lees** and TJ Buckley: Development of a Questionnaire to Assess Worker Knowledge, Attitudes, and Perceptions Underlying Dermal Exposure. *Scan J Work Environ Health*. Accepted. (2006).

Giardet, R.: Essay title "Office Ergonomic Project at a Federal Agency." (May 2006).

Jones, E.: Essay title "Evaluation of a Respirable Dust Engineering Control for Roofing Tile Saws" (May 2006)

Kang HK, NA Dalager, LL Needleman, DG Patterson, **PSJ Lees**, K Yates, GM Matanoski: Health Status of Army Chemical Corps Vietnam Veterans Who Sprayed Defoliant in Vietnam. *Am J Ind Med*. Accepted (2006).

LaRosa, L: "Field and Laboratory Evaluation of an Unrefined Method for Assessing Small Airway Function" (thesis) (May 2006).

Sastry CM, Strickland P, **Breysse PN**. Urinary Urocanic Acid Excretion in Individuals Recreationally Exposed to Solar Ultraviolet Radiation. *Archives of Environmental and Occupational Health*, submitted (2006).

Stefaniak AB, Day GA, Hoover MD, Breysse PN, Scripsick RC. Differences in Dissolution Behavior in a Phagolysosomal Simulant Fluid for Single-Constituent and Multi-Constituent Materials Associated with Beryllium Sensitization and Chronic Beryllium Disease. Toxicol In Vitro 20(1):82-95 (2006).

Sung-Roul Kim: "Methods and Measurements to Assess Mobile Source Air Toxics within a Micro-Environmental Hotspot and in Human Milk" (thesis) (May 2006).

Symons, JM, Wang L, Guallar E, Howell, E, Schwab M, Ange BA, Samet JM, Ondov, J, Harrison D, **Geyh AS.** "A Case-Crossover Study of Fine Particulate Matter Air Pollution and Congestive Heart Failure Hospitalization" Amer. J. Epi. published online June 22, 2006. DOI: 10.1093/aje/kwj206. (2006).

Breysse PN, Williams DL, Herbstman JB, Symons JM, Chillrud SN, Ross J, Henshaw S, Rees K, Watson M, Geyh AS: Asbestos Exposures to Truck Drivers During World Trade Center Clean-Up Operations. *Journal Occupational and Environmental Hygiene* 2(8):400-5 (2005).

Chapin AR, Carpenter CM, Dudley WC Gibson LC, Pratdesaba R, Torres 0, Sanchez D, Belkind J, Nyquist I, Karnell A, Gustaffson B, Halpern S, Borgeois AL, Schwab KJ: *Prevalence of Norovirus among Visitors from the United States to Mexico and Guatemala Who Experienced Traveler's Diarrhea.* J Clin Microbiol43(3):1112-7 (2005).

Chapin AR, Rule A, Gibson K, Buckley T, Schwab K: *Airborne Multidrug-Resistant Bacteria Isolated from a Concentrated Swine Feeding Operation.* Environ Hlth Perspec 113(2): 137-42 (2005).

Eggleston PA, Butz A, Rand C, Curtin-Brosnan J, Kanchanaraksa S, Swartz L, **Breysse P**, Buckley T, Diette G, Merriman B, Krishnan JA: A Randomized Controlled Clinical Trial of Home Environmental Intervention in Inner City Asthma, *Journal of Allergy & Clinical Immunology*, 95(6):518-24 (2005).

Farfel M, **PSJ Lees**, A Orlova, P Ashley and C Rohde: An Evaluation of Maryland's Lead Risk Reduction in Housing Law Based on Dust Lead Outcomes Following Mandatory Treatments. *Public Health Reports*. Accepted. (2005)

Farfel MR, A Orlova, **PSJ Lees**, P Ashley and Rohde. A Study of Urban Housing Demolitions as a Source of Lead on Streets, Sidewalks and Alleys. *Environmental Research 99:*204-213. (2005)

Farfel MR, R Chaney, A Orlova, **PSJ Lees**, C Rohde and P Ashley. Biosolids Compost Amendment for Reducing Soil Lead Hazards: A Pilot Study of Orgro Amendment and Grass Seeding in Urban Yards. *Sci Tot Environment 340*/1-3:81-95. (2005)

Gaffney (Henshaw) S, Curriero, FC, Strickland PT, Glass GE, Helzlsouer KJ, **Breysse PN**: *Influence of Geographic Location in Modeling Blood Pesticide Levels in the Community Surrounding a US Environmental Protection Agency Superfund Site.* Environ Hlth Perspec 113 (12): 1712-6 (2005).

Gafney SL, Curriero FC, Shields TM, Glass GE, Strickland PT, **Breysse PN.** Does Living Near a Superfund Site Impact the Levels of Organochlorine Compounds in Your Blood? *Env. Health Perspectives*, 113(12):1712-6 (2005).

Geyh AS, Chillrud S, Williams D, Herbstman JB, Symons JM, Rees K, Trupin BJ, Lim HJ, Kim SR, **Breysse PN**. "Assessing Truck Driver Exposure at the World Trade Center Disaster Site: Personal and Area Monitoring for Particulate Matter and Volatile Organic Compounds during October 2001 and April 2002". J Occ Environ Health 2:179-193 (2005).

Graham JP, Corella Barud V, Avitia Diaz R, Gurian P: *The In-Home Environment and Household Health: A Cross-Sectional Study of Informal Urban Settlements in Northern Mexico.* Int J Environ Res Public Health 2(3-4):394-402 (2005).

Herbstman JB, Frank R, Schwab M, Williams, DL, Samet JM, **Breysse PN**, **Geyh AS**. "Respiratory Effects of Inhalation Exposure Among Workers During the Clean Up Effort at the World Trade Center Disaster Site". Environ Res 99: 85-92 (2005).

Johnson SB, Langlieb A, Teret S, Gross R, Schwab M, Massa J, **Geyh A**. "Rethinking First Response: Effects of the clean up and recovery effort on low-profile workers at the World Trade Center disaster site" J. Occ. Environ Med Apr; 47(4):386-391 (2005).

Landon P, **Breysse PN**, Chen Y**:** *Noise Exposures of Rail Workers at a North American Chemical Facility*. Am J Ind Med 47(4):364-9 (2005).

Manson J, MJ Brabec, J Buelke-Sam, GP Carlson, RE Chapin, JB Favor, LJ Fischer, D Hattis, **PSJ Lees**, S Perrault-Darney, J Rutledge, TJ Smith, RR Tice and P Working: NTP-CERHR Expert Panel Report on the Reproductive and Developmental Toxicity of Acrylamide. *Birth Defects Research (Part B) 74*(4):17-113 (2005).

Matsui EC, Simons E, Rand C, Butz A, Buckley TJ, **Breysse P**, Eggleston PA. Airborne mouse allergen levels in inner-city homes. *Journal of Allergy & Clinical Immunology* 115(2):358-63 (2005).

McDevitt JJ, **PSJ Lees**, WG Merz and KJ Schwab: *Use of Green Fluorescent Protein-Expressing Aspergillus fumigatus Spores to Validate Quantitative PCR Analysis of Air Samples Collected on Filters*. *J Occ Environ Hyg 2*(12):633-640 (2005).

Nachman KE, Graham JP, Price LB, Silbergeld EFT. *Arsenic: A roadblock to potential animal waste management solutions.* Environ Hlth Persp 113(9):1123-4 (2005).

Rule AM, Chapin AR, *McCarthy S*, Gibson K, Schwab KJ, Buckley TJ: *Assessment of an Aerosol Treatment to Improve Air Quality in a Swine Concentrated Animal Feeding Operation (CAFO). Environmental Science & Technology* 39:9649 (2005).

Sapkota A, Symons JM, Kleissl J, Wang L, Parlange MB, Ondov J, **Breysse PN**, Diette G, Eggleston PA, Buckley TJ: Impact of the 2002 Canadian Forest Fires on PM Air Quality in Baltimore City. *Environ. Sci. Tech.* 39(1):24-32 (2005).

Sastry CM, Whitmore SE, **Breysse PN**, Morison WL, Strickland PT. The Effect of Clinical UVA/B Exposures on Urinary Urocanic Acid Isomer Levels in Individuals With Caucasian Type (II/III) Skin Types*. Dermatology Online Journal* 11 (3):1 (2005).

Stefaniak AB, Guilmette RA, Day GD, Hoover MD, **Breysse PN**, Scripsick RC: Characterization of Phagoloysosomal Simulant Fluid for Study of Beryllium Aerosol Particle Dissolution. *Toxicol*. *In Vitro*, 9(1):123-34 (2005).

Wu HM, Fornek M. Schwab KJ, Chapin AR, Gibson K, Schwab E, Spencer, Henning K: *A Norovirus Outbreak at a Long-Term-Care Facility: The Role of Environmental Surface Contamination.* Infect Control Hosp Epidemiol 26(10): 8002-10 (2005).

OCCUPATIONAL AND ENVIRONMENTAL HEALTH NURSING (OEHN)

Brown M.J., McLaine P., Dixon S. and Simon P. “A randomized community-based trial of Home visiting to reduce blood lead levels in children.” *Pediatrics* 117;147-153 (2006).

Burns, L. Co-investigator, EPA Education Grant, “Controlling Asthma in the Richmond Metropolitan Area Asthma In-Home Environmental Trigger Assessment and Mitigation Education” (12/31/05-12/30/06).

Clouse, R. “Nursing organizations call for phase-out of agricultural practices that promote antibiotic resistance.” *Policy, Politics, & Nursing Practice*, 7(1) (in press) (February 2006).

Dixon S., McLaine P., Kawecki C., Maxfield R., Duran S., Hynes P., Plant T., “The effectiveness of low-cost soil treatments to reduce soil and dust lead hazards: the Boston Lead Safe Yards low Cost Lead in Soil Treatment, Demonstration and Evaluation” (accepted by *Environmental Research* in January 2006).

Doyle, M. "What's New in Spirometry." Lecture in the Maryland Association of Nurse Practitioners conference (February 28, 2006).

McLaine P., Shields W., Farfel M., Chisolm JJ. Jr., and Dixon S. “A coordinated relocation strategy for enhancing case management of lead poisoned children: outcomes and costs.” *Journal of Urban Health* (2006).

McLaine, P., Brown, M.J., Simon, P. “Home visiting and childhood lead poisoning prevention: in reply,” *Pediatrics*; 117; 2329-2330 (2006).

Yeo, T. Pluth, Godlewsky, E., & Morrison, C. “Nursing grand rounds: An unexpected diagnosis of aplastic anemia.” *American Journal of Nursing* (in press, August 2006).

Yeo, T.P. “Assesment of Gene-Environment Interaction in Cases of Familial Pancreatic Cancer as Compared to Cases of Sporadic Pancreatic Cancer” (doctoral dissertation) (May 2006).

Berk, R., Berg, J., Mortimer, R., Walton-Moss, B., & Yeo, T. “Measuring the effectiveness of faculty mentoring relationships.” *Academic Medicine*, 80:1 (2005).

Cadorette M. “Thyroid Function in Former Workers from a Nuclear Weapons Research and Development Facility” (doctoral dissertation) (2005).

Clark C.S., Galke W., Succop P., Grote J., McLaine P., Roda S., Bornschein R., Wilson J., Dixon S., Menrath W., and Jacobs D. “The effects of HUD-supported lead-hazard control interventions in housing on children’s blood lead” (accepted by *Environmental Research* in September 2005).

Clouse, R. “Mercury use in health care: An occupational and public health hazard.” *American Journal of Nursing*, 105(9), 104 (September 2005).

Dixon S., Tohn E., Wilson J., Dignam T., McLaine P., Brown M., Galke W., Clark S., “The use of an exterior visual assessment protocol to identify buildings with a high risk of dust lead hazards” (submitted to *Environmental Health Perspectives* September 2005).

Edwards L. “’Salud’ – to your health”. *Advance for Nurses*; 8 (2): 19-23 (2005).

Edwards, L. "Community Based Participatory Research at JHU School of Nursing.” Presentation at conference at American University of Beirut, School of Nursing (December 2005).

Edwards, L. “Settling the Resettled”, presentation APHA (December 2005).

Gaitens J.M., “Polychlorinated Biphenyl Exposure and Neurobehavioral Function in Older Adults” (doctoral dissertation) (2005).

Owens S.G., Selnes O., Curbow B., **Agnew J., Fitzgerald S.** (2005). "Neurocognitive changes after coronary artery bypass graft surgery and effects on return to work, hobbies, and activities of daily living" (in press) (2005).

Van Zandt S.E., Edwards L., Jordan E.T. "Lower epidural anesthesia use associated with labor support by student nurse doulas: implications for intrapartal nursing practice." *Complementary Therapeutic Clinical Practice*; 11(3):153-160 (2005).

Van Zandt, S. E. "Interventions for clients with sexually transmitted diseases." In D. D. Ignatavicius & M. L. Workman (Eds.), *Medical Surgical Nursing*. Philadelphia: W. B. Saunders Company (2005).

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