

SECTION I

TPG Summary:

The University of Pennsylvania (UPENN) Occupational and Environmental (OEM) Medicine Program, established in 1997, is committed to continual improvement of the quality of education and training of the Nations' primary workforce, preparing residents for the comprehensive practice of OEM in a variety of settings. We plan to continue increasing the number of OEM/preventive medicine physician expert in the conservation and restoration of health of the workforce, in the promotion of worker health, productivity and well-being, and in the recognition, control and prevention of occupational hazards. In keeping with the 2015 Institute of Medicine recommendation in its report entitled *Graduate Medical Education the Meets the Nation's Needs*, we will continue training residents to provide population health, increasing the nations' primary care workforce, and increasing diversity in the health professions. Our program meets a critical national need by providing mid-career physicians formal residency training accredited by the Accreditation Council for Graduate Medical Education (ACGME). Designed to provide structured, supervised training and experience it allows residents to achieve competency in all areas required by the program, the 26 ACGME OM Milestones, American College of Occupational and Environmental Medicine (ACOEM), and the American Board of Preventive Medicine - Occupational Medicine (ABPM-OM), for the specialist practice in OEM.

We plan to continue this highly innovative and successful Competency Based Residency Training Program, initially directed primarily at experienced physicians making a mid-career change to full-time OEM practice and more recently expanded on capacity to accept and train physicians newer to the field of OEM. Program output is highly trained OEM specialists with eligibility for the ABPM-OM. In 2015 UPENN OEM residents comprised 7% of new diplomats of the ABPM-OM.

The program will graduate one NIOSH supported resident each year for a total of five NIOSH supported residents over the 5-year grant period. Successful applicants meet requirements of at least one ACGME-accredited clinical PGY-1 year, have completed or are actively enrolled in an MPH (or other masters' degree program) with completion or partial completion of the 5 core courses required by the ACGME. All residents will be trained at an approved clinical training site with appropriate supervision by a board certified preventive medicine physician. Since this grant period 2 NIOSH supported residents have graduated, one of whom (Dr. Kowalski) successfully sat the ABPM-OM and the other (Dr. Liu) will sit the examination in October 2016. Dr. Liu successfully sat the ABPM-GPM during her OM-1 year.

We continue to offer five 2-month long subject-area rotations (SARs) during the first year and five 1-month long SARs during the second year along with the Second Year Project and presentations of research at the annual AOHC. These SARs run in tandem with the supervised clinical training. The OM-1 SARs are: The Workplace: Industrial Hygiene, Safety and Ergonomics; Organizational Management; Environmental Health: Risk Hazard Communication and Control; Population Based Occupational Medicine; and The Worker: Disability and Work Fitness. The OM-2 SARs are: Mindfulness, Leadership, Resiliency & Team Building; Industrial Hygiene II & Clinical Exposure Assessment; Advanced & Emerging Topics in Organizational Management and Health Care Management; Career & Personal Development; and Disaster Preparedness & Emergency Management. In addition, five longitudinal courses are offered over the course of the two years: Research Methods Course & Second Year Project; Clinical Toxicology; Occupational Epidemiology; Critical Review of the Occupational & Environmental Health Literature; and Clinical Occupational Medicine. The mentored 2nd Year Project is the final research project of sufficient quality to be presented at a national meeting and submitted for publication. All abstracts submitted were accepted for publication at AOHC. The OM-2 SARs are practical and experiential in nature. For example, during the Emergency Preparedness rotation a Tabletop Exercise is conducted. During the Industrial Hygiene II rotation the residents interview a standardized exposure patient and are expected to give a 30 minute power point presentation, evaluated by toxicologists, an epidemiologist and their peers, on an exposure assessment of a patient they have seen, with sources cited.

CTS and SAR directors are diplomates of the ABPM and national experts in the area they teach. The UPENN OEM residency program has successfully achieved objectives of training OEM physicians who are expert in the field preparing them to carry out the purposes of the Occupational Safety and Health Act of 1970 as well as increasing the number of OEM physicians and underrepresented physicians. Since its inception in 1997 the program has 118 alumni to date with 13 residents currently enrolled. Employed in industry, government, and academic centers as well as in cities and rural areas, they report that the program met their needs and substantially increased their knowledge of OEM. Most work in areas underserved by residency trained OEM physicians.

Public Health Relevance:

There is a well-documented, long-standing shortage of formally trained physicians in Occupational and Environmental Medicine (OEM) despite a strong and increasingly robust market of available positions. The number of residencies, currently 26, the same number in 1989, has fluctuated largely due to funding challenges. The ABPM reported a decline in the number of newly certified OEM physicians, and projections made of a net workforce reduction of 33% - from 2015 to 2025. Given that physicians often become aware of the field of OEM after formal training in another specialty and many years of practice, this unique program allows them the opportunity to make a mid-career shift to OEM without prohibitive financial, social and family sacrifice, and graduates physicians ready to meet the nations' primary and preventive medicine healthcare needs. Most graduates practice outside of the 25 largest Standard Metropolitan Statistical Areas, underserved as regards occupational, environmental and preventive medicine.

Key Personnel:

Judith Green-McKenzie, MD, MPH

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Dr. McKenzie is Associate Professor, Division Chief, Residency Program Director of and Occupational and Environmental (OEM) at UPENN. She is active in clinical practice, research, education and administration. She is also a senior fellow of the Leonard Davis Institute for Health Economics, the Graduate Program in Public Health Studies and the Prevention Research Center. After graduating Princeton University and Yale Medical School, Dr. McKenzie completed her Internal Medicine training at New York University/Bellevue Hospital and her Masters of Public Health degree and OEM Fellowship at the Johns Hopkins School of Hygiene and Public Health. Dr. McKenzie is a diplomate of the American Board of Preventive Medicine, Occupational Medicine. She was presented with the 2015 lifetime achievement 2015 Kehoe Award for Excellence in Education or Research in Occupational and Environmental Medicine by the American College of OEM, which recognized her for outstanding leadership as director of UPENN's OEM Residency Program which has resulted in the development of a train-in-place program – an innovative model of post-graduate medical education. She has served on the NIOSH Study Sections, on its Board of Scientific Counselors and on the National Academy of the Sciences Committee on Social Security. She is the editor of the Journal of Environmental Medicine FORUM.

Sajjad A. Savul, MD, MS, FACOEM

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Dr. Savul is a Clinical Assistant Professor and Associate Program Director of the UPENN Occupational and Environmental (OEM) Residency Program at UPENN. He is a 2007 graduate of the University of Pennsylvania, Perelman School of Medicine, OEM Residency Program where he was selected to be Chief Resident and former Medical Director of Bayhealth Medical Center in Delaware. Dr. Savul is a diplomate of the American Board of Preventive Medicine, Occupational Medicine and Family Medicine. He also

sits on the board of the Philadelphia Occupational and Environmental Medical Society (POEMS) and is a fellow of the American College of Occupational and Environmental Medicine (ACOEM) and the American College of Preventive Medicine (ACPM).

Edward A. Emmett, MD, MS

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Dr. Emmett is Professor & Director of Academic Programs in Occupational Medicine at UPENN. Founder of the OEM residency program at both UPENN and Johns Hopkins, he is also the former Director of Community Based Participatory Research, Center of Excellence in Environmental Toxicology. He studied medicine at the University of Sydney, Australia and obtained an MS in Industrial Hygiene from the University of Cincinnati, Ohio. He has substantial OEM experience in government in both Australia and the United States. He has also worked successfully with communities, particularly those meeting environmental justice criteria, to address important environmental health problems. In 2008 & 2010 he was the recipient of the Adolph G. Kammer Merit in Authorship Award by the American College of Occupational & Environmental Medicine and in 2010 he was awarded the William S. Knudson Lifetime Achievement Award, the highest award given by this body to recognize an individual who has made outstanding contributions to the field of OEM. He is a diplomate of the American Board of Preventive Medicine, Occupational Medicine and of Toxicology. A member of the JOEM Editorial Board he is author of over 100 scientific publications.

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Dr. Tepper is Adjunct Professor of OEM in the Department of Emergency Medicine at the UPENN. He is advisor and mentor to the program and teaches the Toxicology Course to trainees. He graduated from Dartmouth College then attended medical school at both Dartmouth Medical School and Harvard Medical School. A protégé of Dr. Alice Hamilton, he has a Masters in Industrial Health from Harvard School of Public Health and a Doctor of Science in Hygiene from Harvard School of Public Health. Dr. Tepper completed his Clinical Fellowship in Occupational Medicine at the Massachusetts General Hospital and was a Research Associate in Occupational Medicine at the Massachusetts Institute of Technology. He was a resident in Occupational Medicine at the Eastman Kodak Company. Dr. Tepper was Editor of the Journal of Occupational and Environmental Medicine. He was also a director of the Chemical Industry Institute of Toxicology and has several scholarly articles and textbook chapters in his portfolio. A diplomate of the American Board of Preventive Medicine, Occupational Medicine, he was honored by ACOEM when he was invited to give the C.O. Sappington Lecture in 1980. He was also the 1984 recipient of William S. Knudson Lifetime Achievement Award, the highest award given by this body to recognize an individual who has made outstanding contributions to the field of OEM. Dr. Tepper is former Vice Chair of the American Board of Preventive Medicine

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Dr. Saberi is section chief of Occupational and Environmental Medicine (OEM) at the Michael J Crescenz Philadelphia VA Medical Center. She completed her undergraduate degree at University of Massachusetts-Amherst and received her medical degree and Masters of Public Health degree from Tufts University School of Medicine. She completed her Family Medicine at UPENN and after several years in practice completed her OEM residency at UPENN. She currently serves as a faculty member in the OEM Residency Program at UPENN teaching the Industrial Hygiene II subject area rotation as well as serving as the site supervisor for Internal Tack residents at the Philadelphia VA Medical Center. A diplomate of

the ABPM-OM, she also teaches a graduate level class on Fundamentals of Environmental Health at the Jefferson School of Population Health

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Dr. Shofer is Adjunct Professor and the Director of Epidemiology & Biostatistics in the Department of Emergency Medicine (EM) at the University of Pennsylvania. She is Co-Director of the Population Occupational Medicine Subject Area Rotation, the Critical Review of the Literature course and the Research Methods & Second Year Project Course. Dr. Shofer completed her undergraduate degree in Biochemistry and doctorate in Epidemiology at the University of Pennsylvania. For more than 30 years, she has collaborated with clinical investigators working in the fields of occupational medicine and other areas on the design, execution, and analysis of studies, as well as laboratory/bench research. She has expertise in the design, data management, data analysis, and evaluation of clinical studies and has successfully applied these skills to a multitude of fields. She has over 300 peer-reviewed clinical or biomedical publications that she co-authored through collaborations with many clinical investigators. Dr. Shofer plays a major role in mentoring junior faculty, residents, medical and graduate students in research design, epidemiology and biostatistics. Of these mentees, the majority have presented at national meetings (15 have won awards for best presentation or poster) or have produced manuscripts that have been published in peer reviewed journals.

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Dr. Taylor is Statistician (Psychometrics, Evaluation, Biostatistics) at the Center of Excellence for Diversity in Health Education and Research, Center of Epidemiology and Biostatistics at the University of Pennsylvania, Department of Medicine. She is also program faculty in the Occupational and Environmental Medicine residency program. Dr. Taylor oversees the evaluation lecture: Statistical Analysis and is one of the faculty moderators of the moderates the Critical Review of the Literature course. She received her PhD and master's degree from Measurement, Evaluation & Techniques of Experimental Research, University of Pennsylvania, Graduate School of Education.

TPG web link:

<http://www.med.upenn.edu/oem/residency.shtml>

SECTION II

Program Highlights:

The following resident activities were accomplished during this cycle (7/1/2015-6/30/2016):

Accepted Oral Presentation, 2016 American Occupational Health Conference (AOHC) & Recipient of 2015 ACOEM Resident Research Award:

Kalliny M, Shofer F, McKenzie J: Obstructive Sleep Apnea-Hypopnea Syndrome Among Professional Drivers. AOHC April 2016 [*Acknowledged NIOSH support*]

Accepted Poster Presentations to the 2016 American Occupational Health Conference (AOHC), Chicago, IL:

Jones, CM, Duran, H, Shofer F, Morris R, McKenzie J: Occupational Medical History Taking. AOHC April 2016 [*Acknowledged NIOSH support*]

Liu X, McKenzie J, Shofer F, Alavi A, Werner T, Torigian D: Utility of 18F-2-fluoro-2-D-deoxyglucose-

positron emission tomography/computed tomography (FDG-PET/CT) in differentially assessing metabolic activity in organs of chronic smokers vs. nonsmokers. AOHC April 2016 [*Acknowledged NIOSH support*]

Newcomb RD, Buchta WG, Breeher LE, Shofer FS, Frasso R, McKenzie J: Accessing Current Practices in Hazardous Drugs Surveillance Programs. AOHC April 2016 [*Acknowledged NIOSH support*]

Omeogu C, Saberi P, McKenzie J: Barriers to Respiratory Fit Testing in a HCP Population. AOHC April 2016 [*Acknowledged NIOSH support*]

Omeogu C, Shofer F, Gehrman P, Green-McKenzie J: Efficacy of a Mobile Behavioral Intervention for Workers with Insomnia. AOHC April 2016 [*Acknowledged NIOSH support*]

Sayre WB, McKenzie J, Jeff Miller J, Nettles W: Development of Chronic Pulmonary Disease After Acute Lithium Hydride Exposure. AOHC April 2016 [*Acknowledged NIOSH support*]

Vanichkachorn G, Emmett E, Blair I, Vachari A: Biomarkers of Libby Vermiculite Exposure. AOHC April 2016 [*Acknowledged NIOSH support*]

Wheat-Hitchings L, Shofer F, McKenzie J: Educational Model to Increase Resident Scholarly Activity. AOHC April 2016 [*Acknowledged NIOSH support*]

Publications:

Jemielita T, Gerton GL, Neidell M, Chillrud S, Yan B, Stute M, Howarth M, **Saberi P**, Fausti N, Penning TM, Roy J, Propert KJ, Panettieri RA Jr. eCollection 2015. Unconventional Gas and Oil Drilling Is Associated with Increased Hospital Utilization Rates. PLoS One. 2015 Aug 28;10(8):e0137371. doi: 10.1371/journal.pone.0137371.

Griffis HM, Band RA, Ruther M, Harhay M, Asch DA, Hershey JC, Hill S, Nadkarni L, Kilaru A, Branas CC, **Shofer F**, Nichol G, Becker LB, Merchant RM. Employment and residential characteristics in relation to automated external defibrillator locations. Am Heart J. 2016 Feb;172:185-91. doi: 10.1016/j.ahj.2015.09.022. Epub 2015 Oct 28.

Ioannides KL, Mamtani M, **Shofer FS**, Small DS, Hennessy S, Abella BS, Scott KR. Medical Students in the Emergency Department and Patient Length of Stay. JAMA. 2015 Dec 8;314(22):2411-3. doi: 10.1001/jama.2015.16476.

Vanichkachorn G, **Green-McKenzie J**, **Emmett E**: Occupational Medicine for the Family Medicine Physician. Family Medicine 2015.

Green-McKenzie J, **McCarthy R**, **Shofer F**: Characterization of Occupational Blood and Body Fluid Exposures beyond the Needlestick Safety and Prevention Act. British Medical Journal 17(5): 226-232, May 2016. [*Acknowledged NIOSH support*]

Tepper LB. A Compilation of Best Papers. J Occup Environ Med. 2016 Feb;58(2):111-3.

Jang DH, **Shofer FS**, Weiss SL, Becker LB. Impairment of mitochondrial respiration following ex vivo cyanide exposure in peripheral blood mononuclear cells. Clin Toxicol (Phila). 2016 Feb 5:1-5. [Epub ahead of print]

Gompf S, **Green-McKenzie J**, Velez AP: Leptospirosis. Medscape Drugs and Diseases 2016 Notes: Updated February 22, 2016. Available at: <http://emedicine.medscape.com>.

Breyre A, **Green-McKenzie J**: A Case of Acute Lead Toxicity associated with Ayurvedic Supplements. British Medical Journal Case Reports May 2016 Notes: DOI: 016; doi:10.1136/bcr-2016-215041 Medical Student Mentored Research. One of top 10 most read case reports in July 2016. [*Acknowledged NIOSH support*]

Torigian D, **Green-McKenzie J**, **Liu X**, **Shofer FS**, Werner T, Smith CE, Strasser AA, Moghbel MC, Parekh AH, Choi G, Goncalves MD, Spaccarelli N, Gholami S, Kumar PS, Tong Y, Udupi JK, Mesaros C, Alavi A: A Study of the feasibility of FDG-PET/CT to systematically detect and quantify differential metabolic effects of chronic tobacco use in organs of the whole body - a prospective pilot study. Academic Radiology 2016 Notes: In Press. Co-PI on grant that funded the research.

Kalliny M, **Green-McKenzie J**: Occupational Health and Sleep Disorders in Underserved Populations.

International Occupational Health. In Primary Care: Clinics in Office Practice on Primary Care of the Medically Underserved America. Morelli V, In Press March 2017. *[Acknowledged NIOSH support]*

Other Accomplishments

- ✓ Dr. Deveau, an Internal Track resident is currently enrolled in the University of Pennsylvania Master of Public Health Program, the first OEM resident to do his MPH at UPENN.
- ✓ Four OM-2 residents successfully sat the ABPM-OM examination this year (Drs. Wheat, Vanichkachorn, Newcomb and Sayre).
- ✓ Drs. Sayre and Vanichkachorn were both promoted to Corporate Health Director at their respective clinical training sites.
- ✓ Drs. Sayre and Newcomb were elevated to fellow of the ACOEM.
- ✓ Dr. Kalliny completed a faculty development fellowship, was granted the teaching award by the Academy of Family Medicine, and was promoted to assistant CMO at his institution.
- ✓ Dr. Wheat, an OM-2 resident, is the Chair of the Inclusion and Diversity Committee. The co-chair is Dr. Jones (OM-1). We decided to have a resident from each class share the chair position to help promote the classes working together on projects and also getting to know one other better in a non-academic setting. The trainees appreciate this extra attention to their well-being. Dr. Wheat, along with two other OM-2 committee members Drs. Sayre and Vanichkachorn, as well as other committee members organized a 1-day observership for medical students and college students interested in the OEM field. These students are invited to shadow the residents for a day and given a small stipend (reimbursement) for food and transportation as part of our UPENN OMR Diversity outreach. Two students observed current residents at their primary site location during this period. The expectation is that by spending a day with one of our residents or alumni the student will gain a feel for what OEM practice is with a desire to explore further. This endeavor was deliberated last year so it is exciting to see it come to fruition. It will be continued as an initiative of this committee.
- ✓ Dr. Omeogu, successfully competed for pilot funds and was awarded a pilot grant by the UPENN Prevention Research Center. Dr. McKenzie is faculty PI for the grant and along with Dr. Shofer is her faculty advisor for the study on utilizing cognitive behavioral therapy via a mobile phone app in self-treatment of insomnia (CBTI coach). She presented her preliminary results at the annual AOHC as a poster presentation and is currently enrolling her last couple participants..
- ✓ OM2 resident, Dr. Newcomb, worked on a project with the Director of the Center for Public Health Initiatives, Dr. Rosie Frasso using NVIVO methodology to assess attitudes towards safe handling of and surveillance for hazardous drugs. Drs. McKenzie and Shofer are the research mentors.
- ✓ OM2 residents went on a narrated tour of the Battleship New Jersey, during their Industrial Hygiene II rotation for hands on look at how navy men worked in the mid-1900s. Prior to the tour Dr. Kalliny, who also holds a PhD in Industrial Hygiene, delivered a fact filled lecture on relevant occupational aspects hazards of the navy men and on confined space, the latter being a prominent feature of such a vessel.
- ✓ Two OM-2 residents have become fellows of ACOEM (Drs. Warren Sayre and Richard Newcomb).
- ✓ Two residents, Drs. Omeogu and Liu, became certified by the NCRME and also became certified MROs.
- ✓ Dr. Vanichkachorn became an FAA examiner.
- ✓ Dr. Wheat-Hitchings acquired a Travel Medicine certification through Concentra.
- ✓ Dr. Vanichkachorn published a chapter on OEM with Drs. Emmett and McKenzie.
- ✓ Dr. Kalliny had an article accepted for publication on Sleep Medicine and OEM in Underserved Populations, which was co-authored by Dr. McKenzie.

- ✓ Dr. Newcomb completed an examination and quality improvement project, and became certified as a silver quality fellow at Mayo for Quality improvement.
- ✓ Dr. Newcomb also had a paper accepted for publication in the British journal of Occupational Medicine, “Screening for Depression in Occupational Health Setting: A Prospective Controlled Study”
- ✓ Dr. Robert Carr, our RAC Chair and PEC committee chair is the President of ACPM this year.
- ✓ Many of our residents and recent graduates have been elected as officers for ACOEM and ACPM. New officers of the *ACOEM Residents and Recent Graduates Section*:
 - ✚ Chair: David L. DeRegis, MD (Class of 2014)
 - ✚ Secretary/Treasurer: Kenji Saito, MD, JD (Class of 2015)
 - ✚ Past Chair: Mark J. Boquet, MD, MPH, MS, FACOEM (Class of 2014)
 - ✚ Section Alternate Delegate: Greg S. Vanichkachorn, MD (current OM-2 resident)
 - ✚ Outreach Representative: Rebecca M. Steinberg, MD, MPH (Class of 2014)
 - ✚ IT Administrator: Harry L. Duran, MD, PhD, MPH (Class of 2014)
- ✓ Kenji Saito, MD, JD (Class of 2015) is a new officer of *NECOEM*: Education Chair and *ACPM*: Young physician section.

The UPENN OEM Residency focus remains to nurture and grow academically and clinically exceptional physicians with attention to diversity, health promotion and disease prevention, surveillance and injury prevention, and population health, who will utilize their competence and skills in their own diverse regions throughout the U.S.