

## Final Progress Report

### Title Page

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#### Abstract:

This program supported two trainees per year in a competency-based, Accreditation Council for Graduate Medical Education (ACGME)-certified institutional program leading to completion of physician residency requirements in Occupational Medicine. The Meharry Medical College program is the only Occupational Medicine Residency program in Tennessee as well as the only such program offered by the nation's four Historically Black medical schools. Consistent with the mission of Meharry Medical College, the program aims to educate and serve those in need by identifying physicians-in-training with a commitment to practice in vulnerable working populations and a desire to serve through the prevention and treatment of occupational and environmental diseases. There is a heavy emphasis on becoming competent in providing culturally appropriate health promotion services. Partly because of Meharry's status as one of the major producers of minority physicians, the Meharry Occupational Medicine program has a record of not only attracting minority physicians who go on to practice occupational medicine, but who also give back to the program and the field by serving as mentors for the next generation.

Physicians completing the program are skilled in the diagnosis and treatment of occupational injury and disease; develop and administer occupational and environmental health programs for unions, industry, government and academic institutions, and be active in the development of scientific, legal, political and ethical questions of the field. The academic phase leads to a Council on Education for Public Health (CEPH)-accredited Master of Science in Public Health degree from Meharry's School of Graduate Studies. Residents are required to complete a research thesis on an occupational health and safety area as part of this academic experience. The Occupational Medicine Residency program aims to have each resident present the results of their research work at a national scientific meeting and to submit the work for consideration to be published in a peer reviewed scientific journal. The practicum year experience provides each resident with exposure to a variety of occupational medicine settings employing vulnerable populations, including low income military veterans, migrant farm workers, and African American and Latino workers in urban settings.

## Highlights/Significant Results

**Specific Aim 1:** Maintain a full complement of 6 residents in the training program.

**Findings:** The program has been able to maintain a full complement since July 2014 and from July 2009 – June 2011. There was a momentary decline between July 2011 – June 2014 due to the ACGME imposed restriction on all Occupational Medicine Residency programs to transition to two year programs instead of three year programs where the program maintained five residents. The funding of these positions could not have occurred without the support of this grant.

**Specific Aim 2:** One month Agricultural health and safety rotation at Greene County Healthcare Inc., Snow Hill, NC and The Center for Worker Health, Wake Forest University, NC.

**Findings:** This community outreach and research rotation provided our residents with valuable insight into the working conditions and occupational health issues of migrant farm workers. During this grant period nine (9) residents completed this rotation.

**Specific Aim 3.** One month of research rotation in the academic or practicum year of training. During this rotation, residents work on their thesis or residency research project and prepare and submit a manuscript for publication.

**Findings:** All residents participated in the research rotation as planned. This rotation enabled the residents to gain better understanding about occupational health disparities and work on ways to address them in their future career choices.

**Specific Aim 4.** Develop/expand research activities at Meharry, which would allow residents to actively participate in research.

**Findings:** Collaborative research activities are ongoing and opportunities for expansion explored continuously. Activities include work safety educational programs at Progreso Community Center, research projects at Tennessee Valley Healthcare System and Occupational Health at Vanderbilt University Medical Center. Discussion is ongoing to partner with Vanderbilt University as it moves toward becoming an affiliate member of the NIOSH Total Worker Health (TWH) Program.

## Translation of Findings:

The project has enabled training of a full complement of 6 post-graduate physicians in the specialty of occupational medicine. Training has been focused to assure that theses written in partial fulfillment of requirements for the degree of Master of Science in Public Health as part of the training program address workplace diseases and injuries.

**Outcomes/Relevance/ Impact:**

- 1) Potential Outcomes. a. By adding to the much needed cadre of trained occupational medicine physicians, this project helps to bring highly trained, culturally sensitive physicians to the profession.

Research activities by the residents have impacted their practice of occupational medicine both during residency and also into their workplaces. For example, one resident reviewed the Federal Motor Carrier Service Administration (FMCSA) guidelines and policies regarding the use of prescription and over-the-counter medications by CMV drivers and examined the role of the Department of Transportation (DOT) medical examiners in the approval of medical certificates for drivers on prescription drugs. This led to a better understanding of the process and the rationale for approval.

- 2) Intermediate and End Outcomes: Residents who have graduated from the NIOSH-funded program are now employed in occupational medicine and are applying state-of-the-art knowledge to influence practices, legislation, product design, and safety management and to reduce work-related morbidity, mortality and exposure

## Final Progress Report (Section 2)

### Scientific Report

#### Background for the project:

African-American, Hispanic, and immigrant workers are disproportionately employed in some of the most dangerous occupations. African-American males are twice as likely as non-Hispanic white males to work in service occupations and as laborers, fabricators, and operators, yet are half as likely to be in managerial or professional specialty occupations. The result is that the African-American injury rate is about a third higher for both African-American males and females compared to white non-Hispanic workers. In addition to the disproportionate employment of African Americans in dangerous and low wage jobs, within individual workplaces African-American workers may also experience the additional stress caused by a discriminatory and racist work climate. Although few studies have systematically studied the nature and magnitude of racism in the workplace, a recent poll by the National Urban League found that 39% of African Americans felt that race and gender discrimination is widely accepted at their workplace.

As the demand for occupational medicine trained physicians' rises, we have been seeing a decline in the number of residency program over the last couple of decades resulting in diminished supply. Moreover the existing programs have been suffering from funding limitations which hampers the quality of the training. The only occupational medicine residency program in a historically black college in the US is at Meharry Medical College

Meharry Medical College (MMC) is the largest private, historically black institution exclusively dedicated to educating health care professional and biomedical scientists. MMC has graduated nearly 15 % of African American physicians and dentists practicing in the United States today and more than 12% of the Ph.D.s in biomedical sciences. Since 1876, Meharry Medical College has remained committed to the education, health and health care needs of underserved populations. More than 76% of alumni return to underserved communities to provide healthcare services. The student body has approximately 725 students from 43 states and 22 foreign nations enrolled in its professional and graduate programs, and has 202 full-time faculty engaged in a wide variety of teaching and research activities in clinical and basic sciences. Meharry Medical College, including the Schools of Medicine, Dentistry and Graduate Studies, is fully accredited by the Southern Association of Colleges and Schools. The campus comprises 20 buildings on 26 acres in the metropolitan area of Nashville, Tennessee. Meharry is committed to excellence in the delivery of quality community-based health care services and the conduct of outstanding basic and patient oriented research as expressed in the mission of the college: Meharry Medical College exists to improve the health and health care of minority and underserved communities by offering excellent education and training programs in the health sciences; placing special emphasis on providing opportunities to people of color and individuals from disadvantaged backgrounds, regardless of race, or ethnicity; delivering high quality health services; and conducting research that fosters the elimination of health disparities

Throughout the history of Meharry Medical College, the mission of the school has been to educate and serve those in need. The occupational medicine residency program fits well within the mission of the school. The Occupational Medicine Residency Program was initially accredited by ACGME in 1978. We are the only such program in Tennessee and Meharry Medical College is the only Historically Black College or University (HBCU) in the country with an occupational medicine residency program.

The Occupational Medicine Residency Program is a 2 year institutional program that supports the completion of residency requirements in Occupational medicine. The training program is accredited by the ACGME Residency Review Committee for residency programs. The program has maintained continued full accreditation since 1978 and is currently accredited through NAS ( Next Accreditation System) until 2019.

One of the main goals of our grant proposal and the mission of Meharry occupational medicine residency program is to train Occupational medicine physicians. During the grant period (July 2011 – June 2016) we have had 16 residents enrolled in the program, with a total of 15 graduates.

In our last grant proposal (2011-2016), we had proposed to incorporate the following training and experiences into our training structure:

**1.One month Agricultural health and safety rotation** at Greene County Healthcare Inc., Snow Hill, NC and The Center for Worker Health, Wake Forest University, NC. This community outreach and research rotation provided our residents with valuable insight into the working conditions and occupational health issues of migrant farm workers.

Progress: This goal has been successfully met. Since July 2011, the following nine (9) residents have completed the Agricultural health and safety rotation:

Vivian Onunkwo (June 2012) completed her rotation in June of 2012, during which time she worked on two projects: PACE4 project and SERS project. PACE4: utilizes community-based participatory research (CBPR) approach to assess the effects of pesticide exposure as indicated by pesticide urinary metabolites among exposed and non-exposed Latino migrant and seasonal farmworker. SERS: This project involved the use of a new procedure called the Surface-Enhanced Raman Spectroscopy to measure pesticide exposure in farm workers. Dr. Onunkwo assisted in data collection and analysis.

Jorge Benitez completed his rotation in May of 2012. During this rotation, he participated on a community-based participatory research (CBPR) project in collaboration with the Farm Workers' Project Foundation. The goal of the study was to assess the biological effects of chronic low-level exposure to pesticides on migrant/seasonal workers, and identify any biomarkers. The results will lead to the development of new standards for health safety as well as regulatory policies. As part of data collection for the study, he participated in biomedical sample collections and neurocognitive examinations.

Margaret Hasek completed her rotation in September of 2012. During this rotation, she worked on defining and acquiring data metrics for a performance measurement report that was being completed at Greene County Healthcare, Inc. (GCHC). Another project was assisting with development protocols and pilot testing the Patient Portal at GCHC (patient-provider communication tool). Her main research project included data tabulation and analysis of survey data collected on a cohort of Latino migrant farm work.

Pete Obeng completed this rotation in June 2013. Activities during this rotation included Migrant Farm Workers Health outreach program. The workers were encouraged to discuss medical concerns so that they may be directed to appropriate resources if their need could not be met immediately. Research activities consisted of collecting various information and biometrics data from study participants. He also participated in the Migrant Farmworker Housing study, which

consisted of review and analysis of a 50-page questionnaire for relevant musculoskeletal content for possible inclusion as variables in a musculoskeletal complaint study.

Richard Price completed this rotation in September 2013. He assisted in drafting a proposal for “Innovations in Rural Health Award” to the Kate B Reynolds Charitable Trust Committee and participated in evening outreach projects. His outreach activities included: a.) Administering questionnaires to migrant workers participating in an East Carolina University study on the adverse effects of sun exposure and the protection available; and b.) performing blood sugar and blood pressure screens and providing health counseling to migrant farm workers at their homes and barracks.

Elmang Nchako completed his Agricultural Health and Safety rotation in June 2014. He participated in outreach activities with migrant farm workers that included performing routine blood sugar and blood pressure screens and providing health counseling to migrant farmworkers in their camps, learning about the administrative aspects of a community based health care center at GCHC, and conducted a literature review on the incidence and prevalence of *Helicobacter pylori* infection among migrant workers. His research activity also included a literature search on mobile health in occupational medicine settings. His findings were presented to Dr. Arcury and his staff.

Robert Carver completed his Agricultural Health and Safety rotation in August 2014. He assisted in data collection to assess the effects of pesticides on migrant farmworkers at outreach sites. He also participated in a Latino community meeting sponsored by Amexcan, a North Carolina farmworker networking organization. At GCHC he identified organizational decision-making structures, stakeholders, style, and processes involved in the daily activities of a nonprofit community outreach program, along with implementing a quality improvement project dealing with depression screening rates, and updating evidence-based cardiovascular health screening recommendations.

Omotayo Fawibe completed his Agricultural Health and Safety rotation in May 2015. He participated in weekly outreach at migrant farm worker campsites providing routine preventive care and arrange follow-up for needed management of discovered medical conditions at the clinic. Outreach also included medical education to the migrant farmworkers about chronic diseases like hypertension, diabetes, depression, alcoholism and on lifestyle modifications needed to appropriately manage these conditions. His research activity included a literature review on pesticide exposure and men’s reproductive health.

Rakhee Urankar completed her Agricultural Health and Safety rotation in June 2015. She assisted in the pilot study data collection to assess knowledge of cancer among Mexican born female Latino farm workers. This also involved explaining the significance and the purpose of the study, providing health education, and answering health related questions posed by the farmworkers. She participated in multiple outreach encounters with migrant workers at their campsites. She educated them on care of low back strain, proper lifting, and posture techniques. She also worked on the needs assessment for GCHC Foundation application.

**2. One month of research rotation in the academic or practicum year of training.** During this rotation, residents work on their thesis or residency research project and prepare and submit a manuscript for publication. This rotation enables the residents to gain better understanding about occupational health disparities and work on ways to address them in their future career choices.



## Research projects

Zhiqiang Chen, MD, completed his thesis research titled “Work-Related Knee Injuries Treated in Emergency Departments in the United States, 1998-2007”. The research was based on data from the National Electronic Injury Surveillance System (NEISS). He collaborated with Larry Jackson, Chief, Injury Surveillance Team, Division of Safety Research at the National Institute for Occupational Safety and Health. This resulted in a publication in *J Occup Environ Med* doi: 10.1097/JOM.0b013e31829b27bf

Sajidkhan Pathan, MD, completed his research project on “Worker Characteristics and Occupational Sprain and Strain Injuries: The NIOSH Work-RISQS, 1998-2000”. He received a research award at AOHC for this work.

Vivian Onunkwo, MD, completed her thesis project titled “Correlates of Work-related burn injuries treated in Emergency Rooms in the United States, 1998-2000.” The objective of the study was to provide a national estimate for rates of work-related burn injuries treated in emergency departments in the U.S. and to characterize trends by age, race, and other demographic correlates.

Jorge Benitez, MD, completed his thesis project titled “Coexisting Carpal Tunnel Syndrome and Lateral Epicondylitis: Identifying population specific prevalence and contributing risks factors.” The objectives of this study is to determine the burden of co-existing carpal tunnel syndrome and lateral epicondylitis examine factors contributing to the development of co-existing disease identify individuals at increased risk and assess treatment outcomes relating to the use of corticosteroids.

Pete Obeng, MD, completed his MSPH thesis project titled “Correlates in Fatal Occupational Injury”. This project evaluated work-related fatal injuries recorded by the Fatality Assessment Control and Evaluation Program (FACE). Using predefined risk factors (age, length of employment, hazard recognition, equipment failure, personal protective equipment use, and written safety program); each case was analyzed to determine the major contributory factor that resulted in the work place death. Analysis of the data further characterized significant factors leading to work related deaths by industry, age and mechanism of death.

Bhavana Anand, MD, completed her research project titled; “Evidence Based Complementary and Alternative Medicine (CAM) Modalities for Non-specific Chronic Low Back Pain Management. A Systematic Review”. This work was presented as a poster at the American Occupational Health Conference (AOHC) in 2015.

Robert Carver, MD, completed his MSPH thesis project titled “**V**anderbilt **A**ssessment of New **L**atent Tuberculosis Infection **D**iagnosis and **A**ceptance of **T**reatment for **E**mployees (VALIDATE)”. The objective of the study was to evaluate variables that increase the likelihood of TB conversions among healthcare workers at a large medical center using the tuberculin skin test (TST) and determine if employees are more likely to accept treatment for a conversion when confirmation using QuantiFERON-TB Gold-In-Tube (QFT-GIT Cellestis Limited) assay is offered. Dr. Carver presented his research findings at the AOHC in May, 2015.

Elmang Nchako, MD, worked on two projects during his research rotation:

1. Meharry Medical Residents' Knowledge of Ebola Virus Disease (EVD): He conducted a survey among Meharry Medical College residents to ascertain their knowledge of CDC guidelines on prevention and management of EVD.

2. Prescription Drug Use among CMV Drivers: A Policy Review: Dr. Nchako reviewed the Federal Motor Carrier Service Administration (FMCSA) guidelines and policies regarding the use of prescription and over-the-counter medications by CMV drivers and examined the role of the Department of Transportation (DOT) medical examiners in the approval of medical certificates for drivers on prescription drugs.

3. **Develop/expand research activities** at Meharry in the following areas which would allow residents to actively participate in research:

**Progreso Community Center:** Based on an earlier community needs assessment, workplace safety was found to be a major concern of Latino community members. Residents work with Progreso Center officers to incorporate occupational safety into their existing evening English classes. The impact of these work safety educational programs are measured by pre- and post-surveys.

**Tennessee Valley Health System:** Associate Program Director Dr. Muktar Aliyu worked with resident Dr. Margaret Hasek on a research project on trends in prevalence of hypogonadism and testosterone supplementation in male veterans presenting for care at the Tennessee Valley Health System. The findings from the study will raise awareness among primary care and specialty providers regarding appropriate screening and treatment of hypogonadism.

**Occupational Health at Vanderbilt:** Drs. Aliyu and O'Hara, along with other faculty in the Vanderbilt Occupational Health Clinic supervised Dr. Carver on his MSPH thesis project at Vanderbilt University Medical Center looking at TB skin conversions among health workers (VALIDATE study -- mentioned earlier).

Discussion is ongoing to partner with Vanderbilt University as it moves toward becoming an affiliate member of the NIOSH Total Worker Health (TWH) Program. The goal of the TWH Program is to advance greater integration of worker health protection and health promotion through collaborations with public and not-for-profit organizations. The affiliate status will enable the residency program conduct joint research, develop interventions, and collaborate on educational opportunities with NIOSH and other TWH members.

Other Accomplishments:

1. During this period we have applied for and received the following training grants:

A) HRSA Integrative Medicine Program grant (IM0HP25099, 2012-2016) - incorporates evidence-based Integrative Medicine curriculum into our occupational medicine training program. This includes faculty lectures, grand rounds on Integrative Medicine topics, and an Integrative Medicine rotation at TVHS. Residents are exposed to music therapy, biofeedback, motivational interviewing, and auricular therapy. Funding provided assistance with faculty development training. Dr. Chakrabarty completed a two year Integrative Medicine Fellowship training at the University of Arizona. Other faculty have attended various faculty development seminars and workshops and we have established a core group of providers who practice and promote integrative treatment.

B) HRSA Preventive Medicine Grant (D33HP25767, 2013-2018) - for occupational medicine and preventive medicine residency training programs at Meharry. The main objectives of the proposal are to improve and transform these residency programs. As a result of this funding, a preventive cardiology rotation, an ethics training opportunity at Tuskegee University, and PLAR activities (Prevention Leadership Advocacy Rotation) have been added to the training programs to enhance resident experiences

C) HRSA Integrative Health Grant (1D33HP29248-01-00, 2015-2018) – for occupational and preventive medicine residency training programs at Meharry. This grant serves to advance the opportunities for the residents in integrative health care by enhancing the evidence-based integrative health care curriculum and enriching their training in this area.

Expanded our collaboration with other local organizations representing worker health and safety concerns:

Workers Dignity – Began collaborations with this group to assist with researching the plights of hospitality workers in the Nashville area. Through this association, several residents have developed potential thesis and/or research topics around this sub population of workers.

Michelin – through the HRSA funding from the Integrative Health Care grant, residents will have the opportunity to rotate through an industrial site as part of a Health Administration experience, assess employee knowledge, acceptance, and use of integrative health care, and participate in an inter-disciplinary team to discuss findings and potential enhancements to worker health.

Vanderbilt Health and Wellness (H&W) – through the HRSA funding from the Integrative Health Care grant, residents will acquire skills and knowledge in health administration through planned rotations at the Vanderbilt H&W program under the leadership of Mary Yarbrough, MD, MPH. Residents will participate in the design, implementation, and evaluation of workplace wellness programs and have opportunity to communicate technical and clinical information to professional and lay audiences.

### Conclusions

As proposed, the funding from this grant was used for direct resident salary support, tuition for the MSPH degree, resident travel to North Carolina for the Agricultural Health and Safety rotation; consultant fees and travel expenses; faculty support; travel to attend scientific meetings for research presentations, in- training exam fees, reference books and supplies. Our faculty and residents in the program have continued to show an impressive track record of scholarly activity in the past five (5) years. Cumulatively, papers and abstracts published in the past 5 years by core faculty and residents exceeds 25 scholarly works. A list of recent presentations and papers is attached.