

FINAL PROGRESS REPORT

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Occupational Health Sciences
Occupational Medicine Residency Program
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Innovative Training for Occupational Medicine Residents in Non-Urban and Agricultural Settings

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Table of Contents

	Page
Abstract	3
Highlights/Significant Results	4
Outcomes/Relevance/Impact	4
Technical Report.....	5
Background	4
Specific Objectives and Aims.....	5
Results	5
Discussion	11
Conclusions.....	12
Appendix A.....	14
Appendix B.....	15
Appendix C.....	16

Abstract

Despite centuries of recognition of the contribution of workplace factors to human health, disease, injury, disability, and death, occupational medicine remains an obscure specialty within the health care community. Little emphasis is given to educating physicians at both the undergraduate and post-graduate levels concerning occupational history-taking and little focus is placed in clinical encounters on discerning and reducing work-related risk factors. Following passage of the Occupational Safety and Health Act of 1970, there was a rise in the number of accredited residency training programs in occupational medicine, reaching a peak in the mid-90s. Since then, the number of such programs has declined dramatically in spite of a recognized shortfall of physicians with formalized training in this area. Remaining programs struggle for funding to sustain their educational efforts.

In many specialty areas of medical practice, there is also little attention given to the special needs of non-urban environments. Small employers (e.g., those with fewer than 100 employees) are not unique to rural communities. However, rural communities often lack the infrastructure for developing and sustaining a preventive approach to occupational disease and injury particularly for specific work sectors such as agriculture and construction where the hired and/or migrant workforce may constitute the majority of employees.

This project has provided innovative training opportunities for occupational medicine residents in rural/non-urban areas (Texas and Kentucky), incorporated distance learning methods, provided for practicum experiences among special populations, identified program specific competencies aligned with the ACGME core or general competencies, and engaged a team of stakeholders to improve educational delivery. Components of this project included: 1) assembly of a team of collaborating stakeholders; 2) a series of web-based interactive didactic presentations originating from NIOSH-supported Agricultural Centers, focusing on niche agricultural health issues and research activities; 3) orchestration of practicum rotations in “same state” MCHCs; and 4) development of competency-based resident evaluation for these practicum experiences. Special emphasis was given to competencies needed to address occupational health concerns in non-urban areas including cultural considerations. Three occupational medicine residency programs were engaged in the project. By their very nature, these residency programs are small (1-4 residents), but opportunities created through a project such as this one help to sustain formalized residency training while providing residents with experience(s) in special work populations such as agriculture and in rural environments.

This project is significant in that it demonstrates a team approach to resident education which spans three accredited residency programs in two states, takes advantage of multiple available resources, adopts a competency-based approach, and meets the need of increased accessibility to occupational medicine training with a focus on rural/agricultural occupational health concerns. The project was expected to continue to offer its trainees information regarding current research activities in agricultural occupational health as well as result in transfer of knowledge and experience between prevention/public health professionals and primary providers. Educational outcomes have been qualitatively assessed through feedback from preceptors, stakeholders, and residents along with collection of resident work products. These have been used to guide programmatic and educational improvement.

Highlights/Significant Results

The completed TPG cycle has resulted in innovative training opportunities for occupational medicine residents in rural/non-urban areas (Texas and Kentucky), incorporated distance learning methods, provided for practicum experiences among special populations, identified program specific competencies aligned with the Accreditation Council for Graduate Medical Education (ACGME) core or general competencies, and engaged a team of stakeholders to improve educational delivery. Components of this project included: 1) assembly of a team of collaborating stakeholders; 2) a series of web-based interactive didactic presentations originating from NIOSH-supported Agricultural Safety and Health Centers, focusing on niche agricultural health issues and current research activities; 3) orchestration of practicum rotations in “same state” migrant and community health centers (MCHCs); and 4) development of competency-based resident evaluation for these practicum experiences. Special emphasis was given to competencies needed to address occupational health concerns in non-urban areas including cultural considerations.

Outcomes/Relevance/Impact

Limited emphasis is given to educating physicians about occupational medicine and little attention is given to work-related health concerns in agriculture and rural environments. This Training Project Grant (TPG) supported by the National Institute for Occupational Safety and Health (NIOSH) focused on these two issues. The objective of this project was to provide support not only for increasing the number of occupational medicine trained physicians, but also to bring a dimension of training which concentrates on the occupational health needs of the rural workforce with special emphasis on agriculture.

The project focused on the occupational health needs of the rural workforce with a special emphasis on agriculture, and helped to forge strategic alliances which “synergistically augmented learning by bringing these partners together.” Far reaching impact or influence will continue to be achieved by serving as a model program for other OMRs for accomplishing these noted strengths.

Technical Report

Background

Despite centuries of recognition of the contribution of workplace factors to human health, disease, injury, disability, and death, occupational medicine remains an obscure specialty within the health care community. Little emphasis is given to educating physicians at both the undergraduate and post-graduate levels concerning occupational history-taking and little focus is placed in clinical encounters on discerning and reducing work-related risk factors. Following passage of the Occupational Safety and Health Act of 1970, there was a rise in the number of accredited residency training programs in occupational medicine, reaching a peak in the mid-90s. Since then, the number of such programs has declined dramatically in spite of a recognized shortfall of physicians with formalized training in this area. Remaining programs struggle for funding to sustain their educational efforts.

In many specialty areas of medical practice, there is also little attention given to the special needs of non-urban environments. Small employers (e.g., those with fewer than 100

employees) are not unique to rural communities. However, rural communities often lack the infrastructure for developing and sustaining a preventive approach to occupational disease and injury particularly for specific work sectors such as agriculture and construction where the hired and/or migrant workforce may constitute the majority of employees.

Specific Objectives and Aims

Limited emphasis is given to educating physicians about occupational medicine and little attention is given to work-related health concerns in agriculture and rural environments. This Training Project Grant (TPG) supported by the National Institute for Occupational Safety and Health (NIOSH) focused on these two issues. The objective of this project was to provide support not only for increasing the number of occupational medicine trained physicians, but also to bring a dimension of training which concentrates on the occupational health needs of the rural workforce with special emphasis on agriculture.

The specific aims of this project were to:

1. sustain and improve the supply of qualified physicians, with specific competency skills, needed to address occupational health concerns in non-urban areas.
2. increase the number of occupational medicine residency (OMR) graduates with training in agricultural occupational health regionally (Texas).
3. increase training opportunities in agricultural occupational health in four other U.S. Public Health regions, through appropriate clinical rotations and field experiences.
4. enhance occupational medicine resident understanding of responsible and culturally appropriate research activities through formal instructional tools, awareness of current research activities, and creation of opportunities for participation in research projects sponsored by the NIOSH Agricultural Centers.
5. nurture partnerships for interdisciplinary clinical experience between regional accredited occupational medicine residency programs and community/migrant health centers through collaboration with the National Center for Farmworker Health (NCFH).

Results

The project proposal was designed to permit completion of its aims for three full-time residents at The University of Texas Health Science Center at Tyler (UTHSCT) and on behalf of a fourth resident by offering a comparable experience for occupational residents from four other accredited programs in multiple Public Health regions throughout the United States. Following favorable review of the grant proposal, it became quickly clear that, "its potential for far reaching influence" would be limited by constraints of the award, namely, the level of funding and the fact that residents in three of the four "other" accredited residency programs were already supported by NIOSH ERC funds and could not receive "redundant" support from a training project grant. Therefore, the specific aims were largely achieved at UTHSCT, at the OMR at the University of Kentucky, and at a second accredited OMR in Texas at the University of Texas Medical Branch (Galveston). Aims 1, 2, 4, and 5 were achieved while aim #3 has been partially completed as a function of the circumstances outlined above.

This initiative began even before the current TPG was awarded. The Southwest Center for Agricultural Health, Injury Prevention, and Education has a history of engaging occupational

medicine residents in its outreach activities as well as providing guidance and support of several of their research projects. Examples include a project examining injury reporting among migrant Hispanic agricultural workers using the Head Start Program as a venue for reaching these workers. A second project served as a pilot for future research efforts, characterizing injury events among shrimp fishermen of the Gulf Coast in U. S. Coast Guard District 8.

The completed TPG cycle has resulted in innovative training opportunities for occupational medicine residents in rural/non-urban areas (Texas and Kentucky), incorporated distance learning methods, provided for practicum experiences among special populations, identified program specific competencies aligned with the Accreditation Council for Graduate Medical Education (ACGME) core or general competencies, and engaged a team of stakeholders to improve educational delivery. Components of this project included: 1) assembly of a team of collaborating stakeholders; 2) a series of web-based interactive didactic presentations originating from NIOSH-supported Agricultural Safety and Health Centers, focusing on niche agricultural health issues and current research activities; 3) orchestration of practicum rotations in “same state” migrant and community health centers (MCHCs); and 4) development of competency-based resident evaluation for these practicum experiences. Special emphasis was given to competencies needed to address occupational health concerns in non-urban areas including cultural considerations.

The following were accomplished during Year 1 of this project:

- Updated web site to reflect this special training opportunity for residents (see <http://www.tiosh.org/programsoccmmedtpg.asp>).
- Worked with the NCFH to identify MCHC locations in South Texas and Kentucky including identification of preceptors.
- Initiated processing of Program Letters of Agreement.
- Identified resident candidates to rotate with MCHCs in Year 1 and established dates of rotation in spring/summer.
- Recruited presenters for didactic presentations/research updates from the NIOSH Agricultural Research Centers and developed a didactic evaluation form. These presentations were conducted by on-line interactive webinar-style programming called Elluminate[®] (see presentations under “Program Products” listed below).
- Resident from host program (UTHSCT) completed “Responsible Conduct of Research” training (Human Participant Protections Education for Research Teams, National Cancer Institute, <http://cme.cancer.gov/clinicaltrials/learning/humanparticipant-protections.asp>), developed a research proposal and sought review by the Institutional Review Board (IRB), and initiated data collection (**Nick Bingham**, M.D., M.S., Occupational Medicine Resident at UTHSCT, Project Title: “Farmers’ and Ranchers’ Perceptions on Disability”). This research project was conducted within the framework of the feasibility pilot projects program of the NIOSH Southwest Center for Agricultural Health, Injury Prevention, and Education (partial support from Cooperative Agreement 1 U50 OH07541; reported within the progress report of this cooperative agreement, Protocol IRB #827, approval date 10/08/2007). Dr. **Bingham** participated in a supervised rotation at the MCHC in Crystal City, Texas (Vida y Salud) in the spring of 2008. He completed the residency program in June of 2008 and has established

practice in occupational medicine in the region of St. Joseph, MO. He presented his project findings, "Farmers' and Ranchers' Perceptions on Disability," at the annual Texas College of Occupational and Environmental Medicine (TxCOEM) meeting, one of the largest component societies of the American College of Occupational and Environmental Medicine (ACOEM), in the spring of 2008. He shared in a presentation award with another resident presenter, based upon the quality/caliber of his work.

- Outlined competencies for rural/agricultural work populations linked to ACGME and for use in the evaluation process with MCHCs.
- Developed a "Checklist of Community Involvement" (see Appendix C).
- The Cultural Context of Health, Illness, and Medicine was made available in the UTHSCT resident library (Loustaunau MO, Sobo EJ. London: Bergin and Garvey, 1997).

In Year 2 of this project there were several accomplishments:

- Worked with NCFH to finalize MCHC locations in South Texas and Kentucky. In Texas, these included Crystal City (south of San Antonio) and San Juan (in the Lower Rio Grande Valley near the Mexican border). Site visits by the program director were conducted to both Texas locations (Vida y Salud Clinic in Crystal City on 04/28/2008 and Nuestra Clinica del Valle in San Juan on 02/06/2009). Similarly, the rotation experience in Kentucky was initiated (Bluegrass Farmworker Health Center in Lexington, Kentucky).
- Program Letters of Agreement, memoranda of understanding, and suggested activities (Checklist of Community Involvement, Appendix C) for each of the practicum experiences were completed.
- Recruited presenters for didactic presentations/research updates from the NIOSH Agricultural Research Centers. See Illuminate[®] Presentations below.
- Health related language tools (Spanish) were acquired for resident use in patient care employing the use of photographs to identify key complaints, body parts, etc.
- Recruitment activities were conducted in accordance with the Diversity Recruitment Plan at a historically black college/university. Dr. Levin also gave a presentation to medical students/internal medicine residents in the Texas Lower Rio Grande Valley pertaining to occupational medicine recruitment (see below regarding MD/MPH program).
- Residents during academic year 2008-2009 engaged in the following projects-
 - **Craig, Randall** – An Analysis of Changes in Agroterrorism Preparedness Since 09/11/2001. Dr. **Craig** presented his findings to a group of faculty and local/regional public agency officials (including law enforcement) in the fall of 2008. A poster was subsequently developed.
 - **Huff, Sharon** – An Assessment of Perceptions and Behavioral Determinations of Pertussis Vaccination of Healthcare Workers. Dr. **Huff** completed human subjects training. The project was submitted and approved by the IRB. Findings were presented at the annual meeting of TxCOEM in the spring of 2009.

- **Stump, Bonnie** – After completing human subjects training, Dr. **Stump** initiated a project submitted to and approved by the IRB, involving assessment of select metals contamination of rain water harvesting in rural homes. She worked closely with faculty on the campuses of both UTHSCT and Stephen F. Austin State University (SFASU) where there is expertise in “water.” She was pursuing her MS in Environmental Science from SFASU.
- Dr. **Stump** attended the 6th International Symposium – Public Health & the Agricultural Rural Ecosystem in Saskatoon, Saskatchewan from October 19-23, 2008 on behalf of the Southwest Center for Agricultural Health, Injury Prevention, and Education. She attended many of the scientific sessions, posters sessions, and was engaged in networking with numerous professionals and representatives from agricultural safety and health including the other NIOSH Agricultural Centers. She also attended Agricultural Medicine: Occupational and Environmental Health for Rural Health Professionals at the University of Iowa (The University of Iowa’s Building Capacity Project) from June 8-12, 2009.
- Dr. **Huff** attended the New Paths Conference for Health and Safety in Western Agriculture held in Cle Elum, WA, November 11-13, 2008. She attended with other faculty from the Southwest Ag Center. She was also a participant as a recorder in a panel session on “Engaging Populations at Risk,” exploring cultural considerations in conducting community-based participatory research among agricultural populations. A manuscript was developed for this session and submitted to and accepted by the Journal of Agromedicine and Dr. **Huff** was a co-author. Dr. **Huff** completed her rotation at Nuestra Clinica del Valle in San Juan, Texas in the spring of 2009.
- Dr. **Craig** completed his MS degree in the fall of 2008. Due to personal family medical reasons, he left the residency training program mid-way and relocated to Fort Collins, CO, the location of the High Plains Ag Center, to pursue completion of OMR training at the Colorado program.
- Dr. **Carlos Martinez**, from the OMR at The University of Texas Medical Branch (UTMB, Galveston, Texas) completed a two month rotation at Nuestra Clinica del Valle (January and February, 2009). Dr. **Martinez** was a combined internal medicine/occupational medicine resident and this rotation site served as a PG-3 practicum experience for occupational medicine. He was originally from South America (Colombia) and fluent in Spanish. Dr. **Martinez** observed that –
 - There is a wonderful opportunity to participate in community outreach. This is the result of a very active health education program (using promotoras) at Nuestra Clinica combined with a high level of trust which has developed between the community and the clinic.
 - There is an opportunity to observe delivery of comprehensive primary care in a rural population with a large diversity of jobs in construction, service, and agriculture.
- Completion of rotation by University of Kentucky occupational medicine resident, Dr. **Sanjay Murthaw**, at the Bluegrass Farmworker Health Center in Lexington, Kentucky. Dr. **Murthaw**’s preliminary feedback on the experience was very favorable.
- The MD/MPH Program at the University of Texas Health Science Center at San Antonio was added to the group of participating didactic sites for webinar conferencing. The Regional Dean at that location is also a Principal Investigator for the NIOSH Southwest

Ag Center. The site serves as an important opportunity for diversity recruitment for future candidates for the residency program. Diversity recruitment continued using marketing materials which have been translated into Spanish.

- A plant tour and walk-through involving multiple Occupational Health Science faculty and OM resident trainees from UTHSCT was conducted at the Mount Vernon Mills/Brentex Division cotton mill in Cuero, Texas (southeast of San Antonio) on July 27, 2009. This mill is an important economic resource to this rural and agricultural South Texas community, providing jobs for 247 employees engaged in processing cotton primarily grown in Texas. This allowed residents to gain a more in depth understanding of the application of OSHA standards such as for noise and cotton dust while also recognizing the importance of engineering measures in controlling exposures.

Year 3 of the Project witnessed the following accomplishments:

- Recruited presenters for didactic presentations/research updates from the NIOSH Agricultural Research Centers. See Illuminate[®] Presentations below.
- Residents during academic year 2009 - 2010 engaged in the following projects-
 - **Stump, Bonnie** – Metals and Microbial Contamination of Potable Rainwater Systems in Texas
 - **Head, Phil** – Health Effects of a Citywide Smoking Ban as Measured by Hospital Discharges
 - **Nelson, Kevin** – Association of the Incidence of Select Congenital Heart Defects with Aquatic Biomarker Levels of Environmental Pesticide Pollutants in Two River Basins in Texas During 1999-2004
- Dr. **Stump** progressed to the practicum year as a PG-3 and completed her rotation at Nuestra Clinica del Valle in San Juan, Texas in the spring of 2009. As a result of her experience witnessing primary care delivery in a rural and impoverished environment, she prepared an expose describing these circumstances.
- Dr. **Stump** attended the South Texas Environmental Education and Research (STEER) rotation in Laredo, TX, from September 20 through October 17, 2009. It is a community-based educational experience, provided by UT Health Science Center in San Antonio, that allowed residents to immerse in occupational medicine with rural public and environmental health emphasis.
- Dr. **Stump** and Dr. **Head** attended the Texas Department of State Health Services Regional Pandemic Influenza Conference in Tyler, TX on September 9, 2009.
- Dr. **Stump** presented her research project to The Headwaters Groundwater Conservation District meeting in Kerrville, TX on March 12, 2010.
- Dr. **Stump** presented her research project on Metals and Microbial Contamination of Potable Rainwater Systems in Texas, at the TxCOEM Annual Meeting in Houston, Texas on May 21, 2010.
- Dr. **Stump** was awarded the degree of MS in Environmental Science and graduated from the OMR on 06/30/2010.
- Dr. **Phil Head** and Dr. **Kevin Nelson** both attended Agricultural Medicine: Occupational and Environmental Health for Rural Health Professionals at the University of Iowa (The University of Iowa's Building Capacity Project) in June of 2010.

- Recommendation and approval was given by the Residency Advisory Committee (RAC) for occupational medicine, the Graduate Medical Education Committee (GMEC), the Designated Institutional Official (DIO), and the Administration of UTHSCT for expansion of resident complement to four (4) full-time residents. Formal application for expansion of resident complement was approved by the Residency Review Committee for Preventive Medicine of the ACGME on November 9, 2009.

Program Products:

Abstracts/Posters –

- Poster presentation entitled Occupational Medicine Resident Training in Agricultural/Non-Urban Settings. Authors: Levin JL, Morrow M, Ryder ER, Gilmore K. Presented at:
 - Preventive Medicine 2008, Sponsored by the American College of Preventive Medicine, Austin, Texas, February 21, 2008.
 - 2008 ACGME Annual Educational Conference, Marvin R. Dunn Poster Session, Dallas, Texas, February 29, 2008.
- **Craig R**, et al.: An analysis of changes in agroterrorism preparedness since 09/11/2001 (poster).
- Levin JL, Morrow M, Ryder ER: Orchestrating training for occupational medicine residents to gain experience in non-urban and agricultural settings. Presented at 18th Annual Midwest Stream Farmworker Health Forum, sponsored by National Center for Farmworker Health, New Orleans, LA, November 19-22, 2008.
- Levin JL, Ryder ER, Harris M: Partnering with higher institutions to train a workforce specializing in farmworker health. Presented at 2009 National Farmworker Health Conference sponsored by the National Association of Community Health Centers, San Antonio, Texas, May 12-14, 2009.

Invited Lectures and Other Presentations –

- State of occupational medicine training in the United States. Presented by Dr. Jeffrey Levin and Dr. Larry Lowry at “Workplace Level Orange: A Public Health Perspective on Corporate Wellness and Emergency Preparedness,” The University of Texas Health Science Center at Tyler, Tyler, Texas, June 20, 2008.
- The social marketing of rollover protective structures in New York State. Presented by Dr. John May from The New York Center for Agricultural Medicine and Health/Northeast Center for Agricultural and Occupational Health via webinar, September 16, 2008.
- Overview of changing demographics of the western ag workforce. Presented by Dr. Jeffrey Levin as part of Session I: Engaging Populations at Risk, Health and Safety in Western Agriculture – New Paths, Cle Elum, Washington, November 11-13, 2008.
- Engaging populations at risk. Dr. Jeffrey Levin served as Session Chair at Health and Safety in Western Agriculture – New Paths, Cle Elum, Washington, November 11-13, 2008. (Manuscript submitted to Journal of Agromedicine with Dr. **Sharon Huff** as co-author.)
- Occupational medicine: training for the specialty. Presentation by Dr. Jeffrey Levin given to medical students and internal medicine residents of UTHSC-SA Regional Academic Campus, Harlingen, Texas, February 6, 2009.

- Occupational medicine: the gap in public health. Texas Department of State Health Services (DSHS) Grand Rounds given by Dr. Jeffrey Levin, DSHS Campus Auditorium, Austin, Texas, June 3, 2009. (Multiple interactive televideo sites throughout Texas.)

Illuminate[®] Presentations –

- First didactic presentation using Illuminate[®] software completed 10/04/2007, originating from the Southwest Center for Agricultural Health, Injury Prevention, and Education, Tyler, TX, Center Director Dr. Jeffrey Levin, see <http://www.swagcenter.org/>. Topics:
 - Ag Infections A to Z
 - Agroterrorism: What is it and what role can clinicians play?
- High Plains Center for Agricultural Health and Safety, Ft. Collins, CO, see <http://www.hicaahs.colostate.edu/>. Center Director Dr. Steve Reynolds presented in March/April 2008 on:
 - Organic/Agricultural Dusts and Respiratory Disease
 - Current/Recent Research (e.g., Cross Shift Pulmonary Function and Symptoms Following Exposure to Dust and Endotoxins in Several Agricultural Industries)
- Recognizing the long term health effects of pesticide exposure on human health. Training Project Grant (TPG) didactic presented by Dr. Helen Murphy for Rural/Agricultural Occupational Medicine Residency Training from the Pacific Northwest Agricultural Safety and Health Center (PNASH) in Seattle, WA via Illuminate[®], June 18, 2008.
- Current research activities in the commercial fishing trades presented by Dr. Jeffrey Levin and Dr. Matt Nonnenmann. TPG didactic for Rural/Agricultural Occupational Medicine Residency Training, Tyler, Texas via Illuminate[®], November 4, 2008.
- From farmers' perception of risks to behavior change presented by Dr. Chike Anyaegbunam. TPG didactic for Rural/Agricultural Occupational Medicine Residency Training from the Southeast Center for Agricultural Health and Injury Prevention at the University of Kentucky via Illuminate[®], June 9, 2008.
- Role of narrative and injury epidemiology for surveillance and prevention of occupational injuries presented by Henry Cole, Ed.D. TPG didactic for Rural/Agricultural Occupational Medicine Residency Training from the Southeast Center for Agricultural Health and Injury Prevention at the University of Kentucky via Illuminate[®], June 9, 2008.
- Getting what you need to know from your farm clients presented by Deborah Reed, PhD, RN, MSPH. TPG didactic for Rural/Agricultural Occupational Medicine Residency Training from the Southeast Center for Agricultural Health and Injury Prevention at the University of Kentucky via Illuminate[®], February 23, 2009.

Discussion

The National Center for Farmworker Health (E. Roberta Ryder, Chief Executive Officer) worked closely with the administrative directors and the preceptors at the MCHC rotation sites to clearly articulate a schedule/set of activities for occupational medicine residents and develop a set of mutually understood expectations for the residents and rotation sites during the practicum experience (Checklist of Community Involvement, see Appendix C). In addition to Program Letters of Agreement between the residency programs and rotations

sites, customized letters of understanding between the residents and rotation sites outlining the above noted expectations and educational objectives of the residents. In addition to supervised clinical work, field experiences included worksite and other field visits, as well as interaction with lay health workers.

The Residency Program Director and Principal Investigator for the project is fluent in Spanish and is also the Center Director for the NIOSH Southwest Ag Center. This creates opportunities for networking and widespread dissemination of information regarding the program to a diverse population. Advertisements, posters, and flyers have been developed regarding the program to recruit candidates including minority applicants. A Spanish translation was undertaken. This information has been added to the web pages of UTHSCT under the Texas Institute of Occupational Safety and Health (TIOSH[®]) and affiliated with the OMR (<http://www.tiosh.org/programsocmedtpg.asp>). TIOSH[®], as a member in good standing, is already listed on The Association of Occupational and Environmental Clinics (AOEC) web site. The flier was sent to AOEC for posting in their newsletter. The OMR Program is also listed there. Resident research activities from UTHSCT have been presented at the annual TxCOEM meeting. In combination with the MCHC rotation sites, all of these are venues which reach a diverse population of potentially interested candidates.

Conclusions

Occupational Medicine residents at UTHSCT who enter the program for two years, receive the academic phase of training through SFASU in Nacogdoches, Texas, located 78 miles away. SFASU awards the Master of Science Degree in Environmental Science with an emphasis in Environmental and Occupational Health and is accredited by the Southern Association of Colleges and Schools (SACS). Much of this classroom training is conducted on the campus of UTHSCT combined with live interactive televideo with SFASU. Practicum experiences are comprised of a combination of required and elective, longitudinal and block rotations both external and internal to the sponsoring institution (UTHSCT).

The facilities for resident training are located at UTHSCT and SFASU (utilizing interactive televideo instruction), the UTHSCT Occupational Health Clinic, and at multiple practicum sites. Residents also rotate at selected MCHCs and participate in didactic instruction originating from the NIOSH Agricultural Research Centers using synchronous web-based instructional technology (Elluminate[®]).

The project focused on the occupational health needs of the rural workforce with a special emphasis on agriculture, and helped to forge strategic alliances which “synergistically augmented learning by bringing these partners together.” Far reaching impact or influence will continue to be achieved by serving as a model program for other OMRs for accomplishing these noted strengths.

The project has provided innovative training opportunities for occupational medicine residents in rural/non-urban areas (Texas and Kentucky), incorporated distance learning methods, provided for practicum experiences among special populations, identified program specific competencies aligned with the ACGME core or general competencies,

and engaged a team of stakeholders to improve educational delivery. Components of this project included: 1) assembly of a team of collaborating stakeholders; 2) a series of web-based interactive didactic presentations originating from NIOSH-supported Agricultural Centers, focusing on niche agricultural health issues and research activities; 3) orchestration of practicum rotations in “same state” MCHCs; and 4) development of competency-based resident evaluation for these practicum experiences. Special emphasis is given to competencies needed to address occupational health concerns in non-urban areas including cultural considerations. Three occupational medicine residency programs were engaged in the project. By their very nature, these residency programs are small (1-4 residents), but opportunities created through a project such as this one help to sustain formalized residency training while providing residents with experience(s) in special work populations such as agriculture and in rural environments.

This project is significant in that it demonstrates a team approach to resident education which spans three accredited residency programs in two states, takes advantage of multiple available resources, adopts a competency-based approach, and meets the need of increased accessibility to occupational medicine training with a focus on rural/agricultural occupational health concerns. The project was expected to continue to offer its trainees information regarding current research activities in agricultural occupational health as well as result in transfer of knowledge and experience between prevention/public health professionals and primary providers. Educational outcomes have been qualitatively assessed through feedback from preceptors, stakeholders, and residents along with collection of resident work products. These have been used to guide programmatic and educational improvement.

APPENDIX A

Publications – these manuscripts describe the OMR program supported by this NIOSH Training Project Grant (TPG) as well as activities in which residents were involved during their training.

Resulting directly from training grant support –

- Levin JL. Occupational medicine resident experience in agricultural settings-the NIOSH Training Project Grant (letter to the editor). *Journal of Agromedicine*. 13:61-62, 2008.
- Levin JL, Doyle EI, Gilmore KH, Wickman AJ, Nonnenmann MW, Huff SD: Cultural effectiveness in research: a summary report of a panel session entitled *Engaging Populations at Risk*. Proceedings of New Paths: Health and Safety in Western Agriculture Conference in Cle Elum, Washington, November 11-13, 2008. *Journal of Agromedicine*. 14:390-399, 2009.

Not resulting directly from training grant support –

- Levin JL. Occupational medicine resident experience in agricultural settings – the NIOSH Training Project Grant. *Cultivation* (the newsletter for the NIOSH Southwest Center for Agricultural Health, Injury Prevention, and Education), Winter 2008.
- Levin J. Novel training program introduces doctors to community/migrant health center practice. *Migrant Health Newslines* (news and information from the National Center for Farmworker Health). 27(3):2, May/June 2010.

APPENDIX B

Figure – Photos which illustrate a dockside visit by resident and faculty in 2004.



APPENDIX C
Checklist of Community Involvement

Occupational Medicine Residents
Community and Migrant Health Center Rotation

Check List of Suggested Community Experiences

This check list is prepared in order to provide the hosting Community and Migrant Health Center and the Occupational Medicine Resident with a list of suggested activities that can be arranged during the rotation, in order to provide the Resident with the fullest possible set of experiences to orient him/her to the needs of patients and the reality that the Community and Migrant Health Center (C/MHC) providers must deal with in order to provide care that is both culturally and linguistically appropriate as well as cognizant of the home and workplace realities.

This list is intended to be used as a guide and should be tailored by the C/MHC and the Resident according to their particular setting, needs and interests.

Community Setting	Complete	N/A
1. Visit at least one place of agricultural employment and talk to the owner or foreman, some times called crew chief to discuss agricultural related illnesses and accidents and carefully explore risk management based on types of occupational tasks being performed for a given crop.	<input type="checkbox"/>	<input type="checkbox"/>
2. Visit with the local fire department and discuss with staff the types of emergencies they are called upon to respond to especially as they relate to agricultural employment or housing.	<input type="checkbox"/>	<input type="checkbox"/>
3. Meet with representatives of the local area disabilities program to talk about types of rehabilitation programs and activities that they are engaged in on behalf of current and former farmworkers.	<input type="checkbox"/>	<input type="checkbox"/>
4. Familiarize the Resident with the other area agencies and organizations that serve agricultural workers and understand their mission and resources available to the patient population.	<input type="checkbox"/>	<input type="checkbox"/>
5. Identify the challenges and gaps that C/MHC providers experience in providing care to agricultural workers in an environment of scarcity.	<input type="checkbox"/>	<input type="checkbox"/>
6. Visit migratory farmworking families in their home to experience both the best and the worst of living conditions and fully understand the limitations of crowding and substandard housing on full patient compliance with medical treatment plans.	<input type="checkbox"/>	<input type="checkbox"/>
7. Other community experiences as recommended that are specific to this setting:	<input type="checkbox"/>	<input type="checkbox"/>

Community/Migrant Health Center Setting		Completed	N/A
1.	Provide an overview of the history of the C/MHC in the community, the need and the stimulus for founding of the C/MHC.	<input type="checkbox"/>	<input type="checkbox"/>
2.	Provide an introduction to the role of the Board of Directors in the C/MHC setting.	<input type="checkbox"/>	<input type="checkbox"/>
3.	Provide an overview of the C/MHC's full set of services and/or departments and any information that would be helpful for internal referral purposes.	<input type="checkbox"/>	<input type="checkbox"/>
4.	Introduce the Resident to the C/MHC's medical records system and any Health Care Plan or QA requirements that he/she needs to adhere to in order to comply with the C/MHC expectations.	<input type="checkbox"/>	<input type="checkbox"/>
5.	Create an opportunity for the Resident to get acquainted with the other providers and staff that he/she will be working with during the period of the rotation.	<input type="checkbox"/>	<input type="checkbox"/>
6.	Other C/MHC activities, orientation or experiences that are appropriate for this setting:	<input type="checkbox"/>	<input type="checkbox"/>
Other		Completed	N/A
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>