

Hello and welcome to the National Institute of Environmental Health Sciences Superfund Research Program monthly Research Brief podcast. This month's Research Brief, Number 279, was released on March 7, 2018, and discusses developing training and education for emerging technologies.

The Superfund Research Program (SRP) Occupational and Safety Training Education Programs on Emerging Technologies (R25) grants are awarded to institutes of higher education to support activities that complement or enhance workforce training that meets the nation's biomedical, behavioral, and clinical research needs. This includes the development of educational activities, curricula, tools, and methods for industrial hygienists and graduate students involved in the research, evaluation, management, and handling of hazardous substances.

Under the leadership of Robert Herrick, Ph.D., the Harvard T.H. Chan School of Public Health has been partnering with the Massachusetts Institute of Technology and the Tulane University School of Public Health and Tropical Medicine since 2013 to develop a comprehensive research, education, and training program. The program includes graduate-level public health degree programs, internships, and professional continuing education and distance learning programs.

Under the mentorship of program faculty, students supported the development and evaluation of a two-hour take-home prevention training to educate workers about bringing chemicals from the workplace home on their shoes, clothes, or hands. The students also designed English- and Spanish-language visual guides for the training. During pilot testing and evaluation, the team found that the training was well-received and very effective, and they plan to expand the final training to a broader audience.

In another example, students worked under the mentorship of program faculty to carry out a pilot research project to assess metal contamination of surfaces at an electronics recycling facility that only performed sorting and refurbishing activities. They found that metals were detectable not only in production areas but in non-production areas and dining area surfaces, as well. Characterizing exposures was particularly important in this case because of the vulnerable volunteer workforce, which included special needs high school students and elderly community members. With this information, they were able to identify protective controls and target messaging to reduce workers' exposure to metals at the facility.

Under the leadership of Peter Raynor, Ph.D., the University of Minnesota formed the Midwest Emerging Technologies Public Health and Safety Training (METPHAST) Program with collaborators from the University of Iowa and the Dakota County Technical College in 2013. The METPHAST program is developing a comprehensive, Web-based curriculum on occupational hygiene, focusing on applications to worker health and safety in emerging technologies.

They have created a variety of tools and resources that can be used by diverse audiences, including a popular YouTube Channel that includes narrated lessons, hands-on activity demonstrations, and short learning videos. Their YouTube Channel has more than 50,000 views from 185 countries and all 50 states, with more than 500 active subscribers.

The course modules developed by METPHAST, which also can be used as continuing education courses with certificates of completion, include instructional videos and hands-on activities. The modules cover diverse topics, ranging from occupational hygiene principles and guidelines to the importance of particle

size in aerosols. They also cover 15 distinct topic areas related to nanomaterials and nanotechnology, such as health effects of nanoparticles, sampling instrumentation for airborne nanomaterials, and disposal of nanomaterials. All METPHAST course modules are freely available online through Nano-Link, a collaboration of educational institutions that promotes nanotech education at multiple grade levels.

Directed by Elizabeth Geltman, J.D., LL.M. the Atlantic Emerging Technologies and Industrial Hygiene Training Center (Atlantic Training Center) was established in 2016 as a multi-lingual center with extensive online courses. Led by the City University of New York (CUNY) Graduate School of Public Health & Health Policy, the Atlantic Training Center is a collaborative effort with the Rutgers School of Public Health and the School of Environmental Affairs at Universidad Metropolitana in San Juan, Puerto Rico.

The program provides graduate-level academic training in emerging technologies and develops industrial hygiene coursework in environmental management. So far, the program has developed four new courses and free training videos available online. They are working to offer ten online, multilingual courses for industrial hygienists, environmental consultants, and others, and to produce additional high-quality videos on emerging technologies.

To date, 12 students have completed research papers and course work through the program. Recently, a student contributed to a project that published a dataset summarizing the environmental health implications of current legal protections for workers and residents exposed to volatile organic compounds and other contaminants that can travel from soil or groundwater into the air of buildings and homes.

Led by Kari Brisolaro, Sc.D., the Louisiana State University Health Sciences Center in New Orleans established a collaborative center on emerging technologies in occupational health and safety in 2017. Other partners include Louisiana State University in Baton Rouge and the University of Tennessee Health Science Center.

Emerging Technologies in Occupational Health and the Environment (ÉCOLE) is developing an innovative, interprofessional approach to workforce development that incorporates diverse disciplines such as law, economics, and geographic information systems. ÉCOLE is fostering a diverse workforce that will be ready to address emerging technological issues in occupational health and safety with field-based instruction and online modules and workshops.

Their website provides information about their program, including a new interprofessional master's course in occupational health, and their many planned workshops. The first workshop, focusing on e-waste and the electronics industry, will be held March 26, 2018.

If you'd like to learn more about this research, visit the Superfund Research Program website at www.niehs.nih.gov/srp. From there, click on "Who We Fund" and follow the links to the Occupational and Safety Training Education Programs on Emerging Technologies page. If you have any questions or comments about this month's podcast or if you have ideas for future podcasts, contact Maureen Avakian at avakian@niehs.nih.gov.

Join us next month as we discuss more exciting research and technology developments from the Superfund Research Program.