UC SAFETY SPOTLIGHT

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Lab Safety

IN THIS ISSUE

POSTER OF THE MONTH

The UC Center for Laboratory Safety

By Imke Schroeder, Ph.D. and Craig Merlic, Ph.D.

The UC Center for Laboratory Safety (UCCLS) was established in March 2011 as part of a multifaceted response to a tragic accident at UCLA in 2008 that led to the death of a researcher. While implementing changes to safety programs in UCLA's research laboratories it became clear that little to no peer-reviewed published data existed to evaluate laboratory safety measures objectively. Therefore UCCLS was tasked with:

I. Conducting and sponsoring research in laboratory safety
II. Developing evidence-based best practices for researchers; and
III. Facilitating, implementing and optimizing laboratory safety practices

The larger goal of UCCLS is to improve the laboratory safety practices and culture of safety at all UC campuses, as well as academic institutions nationwide. In recognition of the Center's efforts, UCCLS was awarded a Center of Excellence grant from the UC Office of the President in 2015. In 2016, UCCLS received a Focus on Efficiency Award at the California Public Higher Education Collaborative Business Conference, and in 2017, UCCLS received an Innovation of Honor Award from the Campus Safety Health and Environmental Management Association (CSHEMA).

UCCLS communicates best safety practices and its other activities through publications, presentations, webinars, and biannual workshops. UCCLS Laboratory Safety Workshops effectively promote interactions between Environmental Health and Safety professionals and researchers to develop actionable ideas for laboratory safety. The 2016 Workshop was held at the National Institutes of Health (NIH) campus in Bethesda, MD. The next Workshop will be held 2018 in Chicago and will be co-sponsored by UCCLS, the UC Office of the President, Northwestern University, the National Institutes of Health (NIH) and the American Chemical Society (ACS).

Laboratory safety consultations were initiated in 2017 when UC Riverside's Interim Provost & Executive Vice Chancellor requested help improving their culture of safety. A UCCLS team visited UC Riverside to review and talk with their EH&S department regarding approaches to laboratory safety management. In addition, the team met with the administrative leadership and department chairs. In their presentation to UCR's research community on "Building a Culture of Safety", the team provided information on implementing the APLU Guideline and Toolkit and emphasized the importance of campus leadership and faculty engagement in research safety. This new type of outreach service turned out to be highly productive and inspirational in providing constructive guidance for strengthening the culture of safety at UC Riverside.

LAB SAFETY IMPROVED BY TECHNOLOGICAL ADVANCES BY CRYSTAL ROSS O'HARA, RISK & SAFETY SOLUTIONS

Lab safety has come a long way in the past decade, due in large part to the increasing role of technology.

While software applications designed to make necessities like chemical management, use authorization and waste management have been around for a while, up until recently much of what was being used on campus was time-consuming, clunky and fragmented.

"Most people were using homegrown systems, databases or spreadsheets," says Brent Cooley, deputy director for Environment, Health and Safety at UC.

The result, he says, was that sharing information – between colleagues, directors, departments or campuses – was difficult and each task usually required logging in to a separate system.

Over the past seven years, Risk and Safety Solutions has created several laboratory safety applications used throughout the UC system. In August 2014, the majority of these were integrated though the Profile application, which collects information common to many of the applications, like name and contact information, location of laboratories, lab groups and training information. Once the user has entered this information in to Profile, it is available throughout the suite of applications, which are all accessible through a single web site.

Following are the Risk and Safety Solutions applications used in UC laboratories:

- **BIO** – Biosafety Information Online, which automates the Biological Use Authorization process.
- **LHAT** – the Laboratory Hazard Assessment Tool, currently being expanded to new tool known as Assessment.
- **Procedures** – Energy Safety, Research Equipment Operation (LOTO) and Chemical Use SOPs – currently in development, this application is a customizable standard operating procedure development and management system.
- **Radiation** – manages the use of radioactive substances.
- **SDS** – Safety Data Sheets, which includes customized Google queries.
- **UC Chemicals** – a chemical inventory management tool.
- **WASTe** – Waste Accumulation Storage Tracking electronically, which facilitates regulatory compliant labeling, tracking, collection and disposal of hazardous wastes.

The next big advancement in lab safety, Cooley says, is big data. Several of the Risk and Safety Solutions applications – for example, LHAT and WASTe -- have associated dashboards, which provide a graphical representation of the data captured within the applications. This historical or comparative information assists users in making more informed business decisions.

"The information is improving as more people are using the applications," he says. "Then the benefit for us as a system is that we can get at that information and that becomes really powerful."

To learn more about Risk and Safety Solutions' suite of safety and risk management tools, visit www.riskandsafetysolutions.com

A major endeavor of UCCLS is creating online safety education modules through the Safety Training Consortium (STC) which it administers. STC is an academic membership organization consisting of 43 colleges and university campuses, including all 10 UC campuses. Course content is created by Subject Matter Experts (SMEs) and course production is done by a professional company. UCCLS collaborates closely with the UC Center of Excellence for Risk and Safety Training & Education and the UC Systemwide Training & Education Workgroup (STEW) to coordinate course development and course customization for the UC campuses.

Recently, UCCLS has engaged in investigating causes of major laboratory accidents and advising universities on how to improve their laboratory safety programs. In 2016, UCCLS investigated a hydrogen/oxygen explosion at the University of Hawaii at Manoa. The accident investigation reports are available to the safety and research communities as Lessons Learned. Also in 2016, California State University-Sacramento asked UCCLS to perform an investigation of a dimethylformamide spill that occurred in a Chemistry teaching lab. Detailed reports on the incident and recommendations to the university to improve their laboratory safety programs were made by UCCLS and some portions have been publically released.

The foremost interest of UCCLS is to conduct and sponsor research in laboratory safety. In a recently published study, UCCLS described how active engagement of Principal Investigators (PIs) in laboratory safety had a positive impact on researchers' safety behavior and significantly correlated with a reduced number of laboratory-related injuries. Ongoing work includes analysis of the current state of laboratory safety culture at three UC campuses through a safety culture survey; the survey will be expanded to other UC campuses. A preliminary outcome of the survey revealed that students and staff view their PIs' safety engagement to be significantly lower than the PIs view themselves. UCCLS continues the analysis of laboratory incident data at UCLA including evaluation of intervention approaches. The Center has a long-term goal of expanding this analysis to other UC campuses.

For more information on the UC Center for Laboratory Safety contact Imke Schroeder, ischroeder@ehs.ucla.edu.

BSL-3 Center of Excellence

By Gary Landucci, Director, National BSL-3 Training Program

Emerging infectious diseases are defined as infections that are caused by newly identified species or strains of pathogens that appear in a population or have existed in the wild but are now spreading due to urbanization, globalization or ecological change. Recent outbreaks of influenza, West Nile virus, Hantavirus and Zika virus infections underscore the importance of research on emerging infectious diseases. In addition, the concern that some biological agents could be used as weapons emphasizes the urgent need to develop vaccines and treatments to protect public health.

Research on a number of emerging infections and potential bioweapons is generally conducted in special laboratories known as high-containment or Biosafety Level 3 (BSL-3) facilities. These facilities allow researchers to work with dangerous pathogens in a way that protects their safety and the safety of the public. There are thousands of these labs throughout the US in the academic, corporate, hospital and public health sectors. The University of California (UC) is a global leader in research on emerging

infectious diseases and operates nearly 30 BSL-3 laboratories on seven of its 10 campuses with more being planned.

High-containment laboratories have very complex design and engineering requirements, and all personnel involved with these facilities require extensive training. Training is required not only for the researchers who, on a regular basis, work inside the labs, but also for individuals who are responsible for designing, engineering, maintaining and verifying the performance of these facilities. Additionally, emergency first responders require knowledge and training about these facilities to ensure that they can perform their jobs in a safe way if they should ever have to respond to an emergency in a high-containment laboratory.

The University of California, Irvine (UCI) School of Medicine, Department of Medicine operates a nationally recognized BSL-3 laboratory training program known as "Integrated Training for High-Containment BSL-3 Laboratories". Under Director Gary Landucci, the program was created in 2006 and received nine years of continuous grant support from the National Institutes of Health (NIH) Pacific Southwest Center of Excellence (PSWRCE) program. The UCI training program developed and delivered specialized training courses for all BSL-3 laboratory associated personnel groups: laboratory workers, operations and maintenance staff, biosafety professionals and emergency first responders. As of January 2017, over 1,300 people have received training through the UCI program including personnel from federal and state governments, the military, public health, NIH, Centers for Disease Control and Prevention (CDC) and over 25 universities and academic institutions nationally and internationally.

The UCI BSL-3 Training Program is currently the designated training provider for the CDC and United States Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS) Select Agent Program lab inspectors as well as the Department of Homeland Security (DHS) lab inspectors. In March 2016, the UCI program was selected by the US Army to provide re-training to laboratory staff of its Dugway Proving Grounds facility. The program is also a required training for several universities nationally.

Training can be provided on-site at institutional locations or at UCI's new training facility that includes a fully functional and equipped BSL-3 laboratory with sophisticated engineering and HVAC system. The facility will only be used for training, allowing for practical hands-on training in a real-life setting without the risks of hazardous materials. The multi-million dollar training facility was made possible by funding from NIH, UCI School of Medicine, and over $1 million in corporate sponsorship. It is the first of its type in the nation and allows the UCI training program to expand and fulfill the growing need for highly qualified personnel in support of national and international infectious disease research goals. The training facility was formally dedicated in 2016 and received the NIH prestigious "National Training Center" designation.

The UCI training program was named a UC Center of Excellence (CoE) in 2015. As a CoE, the program now provides training support to all personnel involved with UC BSL-3 facilities. Training courses are provided at no cost to UC personnel at UCI's training facility or at individual campus locations for large groups.

For more information or to schedule training for laboratory workers, facilities management personnel, administrative staff or first responders, contact Director Gary Landucci, g.landucci@uci.edu (949) 824-4612, Assoc. Dir. Erick Guandique, eguandiq@uci.edu (949) 824-0251, or Program Admin. Tran Phan phantb@uci.edu (949) 824-9536.

CONNECT

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UCLA • UC Merced • UC Riverside
UC San Diego • UC San Francisco
UC Santa Barbara • UC Santa Cruz
UCOP • UC ANR

RESOURCES

UC Safety Suite: https://ehs.ucop.edu/myboard/splash

Risk & Safety Solutions: http://riskandsafetysolutions.com

Center for Laboratory Safety: https://cls.ucla.edu

FEEDBACK PLEASE

Send an email to safetyspotlight@ucdavis.edu to submit your comments on the August issue or to suggest content ideas for future issues. We look forward to hearing from you!

This publication is produced and maintained by the Communications Team at Risk & Safety Solutions. For more information regarding our products and services, please email service@RiskandSafetySolutions.com.

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