Application for 2014 University of California Larry L. Sautter Award for Innovation in Information Technology

Project Title: Occupational Health Surveillance System (OHSS)

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Project Leaders

• Roger M. Belcourt, MD, Director, Occupational Health Services
• Alan Ekstrand, IACUC administrator, Institutional Animal Care and Use Committee (IACUC)
• Phillip Barruel, Biological Safety Officer
• Safa Hussain, Executive Director, Information Technology Services, UC Davis

Project Team Members

The Occupational Health Surveillance System’s success has been dependent on the support of IT Services, Occupational Health Services, Institutional Animal Care and Use Committee Office and the Biological Safety Office. As part of the development process at IT Services, staff and end users provided guidance, feedback, expertise, and insight contributing to the success of the project.

The team members listed below made up the core application development team:

• Steve Barton, Developer
• Andie Cheung, Developer
• Mira Kaloper, Developer
• Eric Pereira, Quality Assurance Analyst
• Christine Romero, Project Coordinator
• Alex Zangeneh, Graphic Designer
• Ryan Mosely, Scrum Master
• Walter Syslo, Developer
• Yashpal Singh, Developer

The team members listed below made up the functional workgroup:

• Dr. Roger Belcourt, UC Davis
• Alan Ekstrand, UC Davis
• Philip Barruel, UC Davis
• Dr. Warner Hudson, UCLA
• Stacey Kramer, UCLA
• Amanda Ogden, UCLA
• Janice Yoo, UCLA
• Jennifer Perkins, UCLA
• KariAnne Terry, UCSC
• Caitlin Deck, UCSC
• Lisa Wissel, UCSC
• Jamie Bishop, UCSB
• Melodie Blakemore, UCSB
• Bruce Hanley, UCSB
• Manny Garcia, UCSB
• Bobbi Sawtelle, UCSD
• Lance Scott, UCSD
• Marisa Jolstead, UCSD
• Marilyn Torchia, UCSD
• Kristen Anderson-Vicino, UCSD
• Steve Bergem, UCSD
• Debbie Durand, UCSD
• Monica Lurtz, UC Merced
• Roy Hoglund, UC Merced

Summary

Occupational Health Surveillance System (OHSS) is a UC wide system that was developed to address some of the requirements for AAALAC accreditation of research that involves the use of animals. Institutions that maintain AAALAC
accreditation gain a competitive advantage when applying for research grants that involves research with animals and attract more prestigious faculty and talented students interested in higher education in the animal program. The system also addresses the need to provide a more safe research environment by providing screening for all employees who conduct research that involves animals or biological agents or other workplace hazardous exposures. These goals are accomplished by requiring all Principal Investigators and their team of researchers to complete a risk assessment, health evaluation and be cleared by a medical professional before they can be begin working on a research project. OHSS is a web-based application that expedites this process by providing an electronic mechanism to capture the health screening, routing to the medical professional and updating the relevant electronic systems (IACUC system for animal protocols and BIO system for biological protocols) with the clearance for the research protocol.

**Project Description**

**How It Works**

The Occupational Health Surveillance process begins when a supervisor or Principal Investigator (PI) logs into OHSS and completes a Risk Assessment (RA) for the employee they wish to add to a new or existing protocol. This then begins a chain of events that is detailed in Figure 1 below.

![Figure 1 OHSS Process flow](image)

There are three major components that make up the Occupational Health Surveillance System:

1. **Risk Assessment**
   
   The Risk Assessment form is completed by the supervisor and verified by the participant. The form provides medical professionals with information on risks within the participant’s work environment, such as: exposures, animal contact, biological agents, chemical agents, physical agents, animal exposures and general safety.

   Once the Risk Assessment has been completed, the participant will be notified via email that it is time for them to review the Risk Assessment and complete the Health Questionnaire.

2. **Health Questionnaire**
   
   The Health Questionnaire provides medical professionals with participant’s medical history, such as: vaccines, medical conditions (i.e. Tuberculosis), exposures, prescription medications, allergies and health status changes.
The information contained in the Health Questionnaire (HQ) is confidential and can only be viewed by the medical professional and the participant. The supervisor does not have access to the Health Questionnaire. Once the HQ is complete, the medical professional is notified.

3. Medical Assessment
The Medical Assessment is performed by the medical professional and reviewed by the participant. Through the online system, the medical professional reviews the Risk Assessment and Health Questionnaire to determine whether a participant is cleared for work or needs an office visit for additional required treatments.

The participant will receive a conformation via the system that their medical evaluation has been completed and what the status is. The process is not considered complete until the participant reviews and acknowledges the Medical Assessment confirmation.

The system also has the capability to automatically add individuals to their IACUC protocols for the campuses that have an online protocol system.

OHSS URLs
Test Environment: http://ohss-dev.uctechnology.ucdavis.edu:8080/OHSS/welcome.htm
Note that this is a demo site and any information entered should be considered temporary.

Production link: https://ohss.uctechnology.ucdavis.edu/welcome.htm

Project Benefits

Research Competitiveness
By supporting the process of maintaining AAALAC accreditation, OHSS helps UC in attracting the best faculty and researchers who are involved in the use of animals or biological agents. This helps to attract more research grants for this type of research.

Improves Research Safety
By providing electronic health screening and monitoring tools for researchers involved in research with animals or biological agents, OHSS helps provide a safer research environment by preventing exposure to those researchers that have medical conditions that may be negatively impacted with exposures associated with this type of research.

Innovative
OHSS has a web interface that is implemented using a responsive-design platform that accommodates the increasing trend towards the use of mobile devices (tablets and smartphones). OHSS is platform agnostic, which allows it to be scalable for any type of operating system (Windows, Linux, iOS, and Android) and any type of device (desktops, laptops, tablets and smartphones).

Operational Efficiencies
OHSS replaced a labor intensive and paper based process to screen and provide medical clearance for researchers. It also added visibility to the compliance for critical research requirements that impacted the health and safety of the researchers at University of California. The process was paper heavy, time consuming and resulted in a lot of superfluous doctors’ appointments. Supervisors and Principle Investigators (PIs) were required to provide a risk assessment and each employee was required to meet in-person with the occupational health doctor to review the assessment for clearance. This often resulted in a significant delay for new employees to begin their research.
OHSS has streamlined this process, providing all the steps in one convenient location. Implementation of the system has greatly reduced the amount of time involved for both the researchers and the occupational health professionals through its improved communication mechanisms. The built-in notifications and real-time tracking of the assessments and questionnaires allow the process to be transparent and move in a timely manner despite multiple parties across multiple departments being involved in the process.

Another outcome of deploying this system systemwide came about recently when working with UCSC. With OHSS the health screening process can now be done 90% online. As a result, smaller campuses that contract out their occupational health services to a general physician have inquired about using the system for their employees, but contracting with an occupational health doctor at another campus to perform the medical review. This would save the smaller campuses money, increase the level of patient care (since occupational doctors are better suited to understand the risks in research) and increase collaboration.

**Shareable**

OHSS uses UC Trust for authentication. It is set up to allow anyone with UC Trust log in/credentials to be able to access the system. The only setup required for a campus wanting to use the system is updating the campus specific phone numbers, policies and links.

This quick turnaround is illustrated by recent events. The system was demoed in April 2014 systemwide to Occupational Health, IACUC and Biosafety leaders which resulted in five campuses wanting to adopt the system as-is as soon as possible. Those campuses were: UCSD, UCLA, UCM, UCSC and UCSB. The turnaround time was less than three weeks before the system is available to use for those five campuses.

**Interoperable**

OHSS is integrated with the Core Services application at IT Services which is integrated with the systemwide PPS feed. It was developed so it could be integrated with any type of person feed, so other universities could easily adopt the system. Research facilities, as well as other universities outside of UC, have requested demos of the system so they can evaluate how closely it fits their need.

**Assessable Success Criteria**

The success of the system is easily measurable through two metrics: 1) The time it takes for an employee to be added to the protocol 2) the number of individuals using the system.

For some employees, medical clearance can occur within the same day, meaning they can begin their important work less than 24 hours after entering their health information into the system. For others, the time is also reduced because the medical professional is able to communicate exactly what is needed to begin work and the patient can come prepared to the office visit--something that before did not exist.

In just one year of the system being live at UC Davis, over 600 individuals have entered risk assessments and been medically cleared, up 75% from the previous year. This illustrates that more people are following the process than before, which was an expected outcome of rolling out the system.

**Technology Used**

List the backend technology stack:

- Java
- JQuery
- Hibernate
- Bootstrap
Explain the benefits of the technology used.

**Project Timeline**

OHSS was developed using an iterative Agile software environment with new functionality being delivered and reviewed bi-monthly. Using this approach allowed the development team to gather quick feedback from the product owners and make adjustments to the system that would benefit the product owners.

Development of Phase 1 of OHSS began July 2012 and launched November 2013.

**Customer Satisfaction Data**

The responses to OHSS have been positive from both the occupational health staff and IACUC faculty. Since it has been rolled out at UC Davis, many researchers have commented on the improved process. Feedback is collected through the product owners and improvements to the system have been implemented over the past year, improving the experience for the customer.

**Testimonials**

“The program is simple and intuitive for the end user (PI’s and supervisors) to use. Easy to follow instructions assist the user to initiate a highly logical and well documented process leads to medical clearance of personnel at risk for acquiring disease in the research environment. Every step in the process is identified, which greatly simplifies the troubleshooting process.”

Roger Belcourt MD, Director of Occupational Health, UC Davis

“Automated process makes system run more efficiently and smoothly for all involved.”

Melissa Brown, Practice Manager, Occupational Health, UC Davis