

**SPECIAL TRAINING ISSUES**

EH&S is continually looking for ways to provide safety training in an effective manner. We must meet the training requirements of the various regulatory agencies, while minimally disrupting your research schedules. This year, we plan to utilize the EH&S Safety Update newsletter to support training directly. There will be two special editions focused on training - one in June and one in July. In order to comply with the regulations, each employee should read the entire newsletter and sign the back stating they have read the material. At a time convenient for your group, your Department Safety Advisor will answer any questions, provide any laboratory specific information, and assist you as needed in implementing the training concepts. We hope that this will be an effective method for providing training material, and would appreciate your feedback.

**BIOSAFETY RETRAINING**

Laboratory safety is a big deal at UCSF. With over 1500 laboratories operated by over a thousand Principal Investigators (PIs) and their staffs, it has to be! Add to this the thousands of individual local, state and federal regulations that govern our laboratories, and the concerns of all of the individuals who routinely handle biohazardous agents, and the importance and complexity of the campus Biosafety Program becomes obvious.

The new 1997 UCSF Biosafety Manual, the first major rewrite of the 1982 version, is the guiding document of the Biosafety Program. All PIs and laboratory managers should read the body of the manual carefully since that information represents campus biosafety policy. The appendices are intended to provide reference information on a wide range of laboratory safety-related topics. The manual will be available soon in searchable format on the EH&S Web page at <http://www.ehs.ucsf.edu>.

The Biosafety Program is administered largely through the Biological Use Authorization (BUA) process. The BUA is a document describing a PI's research

and, when approved by the Biosafety Committee (BSC), authorizes the PI to conduct that research at UCSF. PIs doing recombinant DNA research, using infectious agents or toxins, or human, sheep or Old World primate source materials, or generating medical or sharps waste, must have a valid BUA. The Biosafety Manual explains the requirements and process in detail.

Each department is assigned a Department Safety Advisor (DSA) who serves as the single point-of-contact for all EH&S issues and as advisor, consultant and partner in ensuring safe lab operations and compliance with policies and regulations. Under the new Comprehensive Laboratory Audits for Safety (CLAS) program, DSAs audit labs quarterly with a concurrent focused biosafety audit in the fourth quarter of 1997. PIs and lab managers should take immediate action to abate any conditions that a DSA indicates are unsafe or illegal.

Of special importance are laboratories conducting research with Risk Group (RG) 2 or RG3 agents, which require handling at Biosafety Level (BSL) 2 or BSL3, respectively. Laboratories must

meet specific requirements to be certified as BSL2 or BSL3 facilities. These requirements as well as agent/Risk Group tables are available in the CDC/NIH Biosafety in Microbiological and Biomedical Laboratories, 3rd Edition, and in the NIH Guidelines for Research Involving Recombinant DNA Molecules. These publications can be accessed online at [www.orcbs.msu.edu/absa/resource/Guides.html](http://www.orcbs.msu.edu/absa/resource/Guides.html).

Engineering controls are tools or devices that provide protection from exposure to hazardous agents. One of the most important engineering controls in UCSF laboratories is the biosafety cabinet, or tissue culture hood. Improper hood usage is frequently seen at UCSF and can significantly degrade a hood's protective performance.

At UCSF, there are two main options for processing solid medical (including laboratory) waste. Such waste (excluding sharps waste) can be autoclaved and then discarded as solid waste (trash), or it can be picked up by Facilities for incineration by the UCSF hazardous waste processing

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## BLOODBORNE PATHOGEN RETRAINING

Anyone who works with or otherwise comes in contact with human blood or blood components or products, or other human source material referred to as Other Potentially Infectious Materials (OPIM), including certain human body fluids, unfixed tissue or cell lines of human origin, is considered at risk for infection by bloodborne pathogens. The major bloodborne pathogens are human immunodeficiency virus (HIV) and hepatitis B virus (HBV) but hepatitis C virus (HCV) has joined them as a major threat; others include hepatitis D virus, HTLV, syphilis, malaria and other blood parasites, hemorrhagic fever viruses, etc.

There are four basic requirements for personnel handling human blood or OPIM: (1) use of universal precautions at all times; (2) initial bloodborne pathogens training and annual retraining, both through EH&S; (3) hepatitis B vaccination or declination with completion of the Hepatitis Vaccine Compliance Form and retention of the form by PI; and (4) post-exposure follow-up, treatment and counseling.

Protection from exposure to blood or OPIM requires careful attention to task performance and use of good technique. Such practices as never removing or recapping needles, using sheathed syringes when possible, not using syringes when pipettes will suffice, and handling sharps and sharps waste safely offer significant protection. Gloves should always be worn when handling potentially infectious materials. Blood and OPIM spills or smears must be disinfected with 10% bleach before being cleaned up and discarded. Adherence to the UCSF Medical Waste Management Plan will prevent exposures to those who handle infectious waste during the process of treatment and disposal.

The UCSF Blood and Body Substance Exposure Hotline, also known as the Needlestick Hotline, is the immediate response agency for UCSF bloodborne pathogen exposures. Accidental

needlesticks, splashes and lacerations represent most of the exposures at UCSF. During 1996, the Hotline received 65 exposure reports and 13 exposures have been reported so far this year. All bloodborne pathogen exposures at UCSF, no matter how seemingly insignificant, must be reported to the Hotline at the 24-hour pager 719-3898. This not only helps meet the regulatory requirements for tracking such exposures but also provides access to the free post-exposure follow-up process. The Hotline also accepts emergency reports of Q-fever, vaccinia and Herpesvirus simiae exposures; research personnel with other types of infectious agent exposures should seek emergency treatment at the Emergency Room.

Maintaining a safe laboratory environment is everyone's responsibility. The UCSF Biosafety Program provides sound guidelines but the rest is up to each individual. Please, every day and in every way, practice safe science.

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## HAZARD COMMUNICATION

The Hazard Communication Standard was a landmark regulation in which Federal OSHA, and subsequently Cal-OSHA, embarked on a new era of standards making. Up to that time OSHA had focused on hazard identification and correction. When a piece of unsafe equipment or a hazardous situation was identified, employers were given prescriptive orders to abate. Unfortunately, very little direction was provided on how to correct the conditions. Unsafe acts were thought to be inevitable, employee protection was believed to be the consequence of hazard abatement. Also the OSHA jurisdiction was limited to the employer-employee relationship, and they did not regulate manufacturers or service providers whose products or services had a negative impact on the workplace. Hazard Com-

munication changed this forever! OSHA took a new direction to each of these issues:

- Regulations moved from giving employers limited direction to specifying in excruciating detail the actions necessary to satisfy the regulatory mandate.
- Training came to the forefront, unsafe acts were no longer accepted as inevitable. OSHA adopted the idea that unsafe acts were largely due to employee ignorance.
- Jurisdiction was extended beyond the employer, who is responsible to manage the employee, to those who had a duty to the employee, even if indirectly.

Although the employee was the primary beneficiary of this approach, the agency also gained a valuable enforcement posture. Much of the burden shifted from the agency (OSHA) to the employer. It can be difficult to prosecute a citation that alleges that some action is not effective, adequate, or reasonable; but it is much easier to demonstrate failure to label or provide a Material Safety Data Sheet (MSDS). Also, the sheer number of required components in a new regulation almost assures that the employer may be out of compliance with some aspect of the safety order.

Let's examine how the Hazard Communication regulation embraced each of these issues. First, employers have

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is distributed by the  
Office of Environmental Health and Safety.*

*Please direct all responses, letters, comments to:  
EH&S Safety Update  
UCSF-EH&S  
Box 0942  
476-1300  
email:  
EH%rec@ccmail.ucsf.edu*

*Printed by UCSF Reprographics 476-5900  
Printed on 100% recycled paper.*

*(Hazard, continued)*

very specific duties to perform, they must:

1. Determine the identity of the hazardous substances in the workplace.
2. Evaluate employee exposure or potential for exposure to these substances, including during foreseeable accidents.
3. Obtain and make available to employees an MSDS for every hazardous substance in the workplace.
4. Develop and implement a written hazard communication program.
5. Insure that all containers of hazardous chemicals are properly labeled.
6. Provide information and training to employees that covers:
  - The regulation's content.
  - The employers program (how to obtain an MSDS, company labeling system, etc.).
  - Where hazardous substances are in the workplace and how to identify them.
  - Actions that the employer has initiated to protect employees.
  - How to obtain a copy of the company's written program.
  - The physical and chemical hazards of the hazardous substances.
  - Their rights under the regulation.

In delineating the employer's specific duties mandated by the Hazard Communication regulation, the training components have also been listed. Ignorance is replaced with knowledge. Employees, who usually lack a knowledge of either the chemicals or the content of the regulations, are to be trained sufficiently to deal with the hazardous substances in the workplace. In addition, the fact that employees are made aware of their rights, and the responsibilities of the employer, is an added pressure for compliance.

The last issue was the most contentious, in fact it took OSHA several years to complete the regulation. Manufacturers, importers and distributors of chemicals bitterly resisted OSHA's right to

regulate their actions outside their own place of employment. But eventually OSHA prevailed, the manufacturer must prepare and disseminate the MSDS. OSHA reasoned that the manufacturer had the understanding and information about the chemicals and their safe use that was vital to employee protection. Indeed most employers actually have limited knowledge of chemicals and without the authority to require manufacturers to provide the necessary information the standard would have been weak at best.

The Hazard Communication Standard remains the most important regulatory tool for protecting employees from chemical hazards. In addition, the thinking that went into the Hazard Communication Standard helped shape the standards setting process for years to come. The consequences can be seen in subsequent standards, such as the Laboratory Standard, the Injury and Illness Prevention Program regulation and the recent efforts to have Cal-OSHA enforce Proposition 65.

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## UCSF LOW-LEVEL RADIOACTIVE WASTE (LLRW)

A DSA's Guide to Common Problems in the Laboratory

Common Problems with laboratory handling of LLRW:

1. Incomplete documentation or labeling. All relevant information must be included on the LLRW Disposal Form. In addition, each waste container must be traceable, identifiable and labeled. EH&S technicians will not collect waste that is not completely documented.
2. Erroneous documentation or labeling. Waste may be mis-identified or labeled incorrectly. A common error is the incorrect reporting of waste volume, whether too high or too low. This can result in an un-anticipated in-

crease or decrease in disposal costs for the laboratory.

3. Vague or unclear documentation or labeling. This is often the result of illegible handwriting on forms or the use of non-standard terms or units.
4. Mixing waste categories in one container. Waste categories must be kept segregated from one another. Each category of waste is disposed of utilizing a different process, and the mixing of categories often makes disposal very difficult and very expensive.
5. Leaking containers. Leaking containers pose a contamination risk for everyone.
6. SHARPS exposure. Improperly packaged sharps can pose a serious health risk to waste handlers. All sharps must be packaged for disposal in hard sided containers and properly identified as sharps waste.

### Categories of Radioactive Waste

Radioactive waste must be segregated into one of the following general categories:

1. Dry Solid
2. Liquid Effluent
3. Aqueous Liquid
4. Liquid Bulk Organic Solutions
5. Liquid Scintillation Vials
6. Biological Materials
7. Clinical Waste (from nuclear medicine and radiation oncology)
8. Bactec vials
9. Beta plates
10. Uranium compounds
11. Contaminated equipment and articles
12. Sealed sources
13. Miscellaneous, e.g., non-infectious sharps, non-radioactive lead, etc.

If a waste does not fit into one of these categories, contact EH&S for guidance. Definitions and specific packaging requirements may be found in the UCSF Radiation Safety Manual.

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*Environmental Health and Safety*  
50 Medical Center Way  
San Francisco, California 94143

What's Inside:  
*Special Training Issues*  
*Biosafety Retraining*  
*Bloodborne Pathogen Retraining*  
*Hazard Communication*  
*UCSF Low-Level Radioactive Waste*

*(Biosafety, continued)*

contractor. Sharps waste is incinerated, not autoclaved. While awaiting pickup, closed red bags must be kept within the laboratory in a rigid container with a lid. Never place red-bagged waste in a hallway or any other publicly-accessed space. Infectious liquid waste not requiring special decontamination procedures (see Biosafety Manual) can be made non-infectious by mixing it with 10% household bleach and allowing it to stand for thirty minutes after mixture; it can then be poured down the sanitary sewer. Free liquid should never be placed in a red bag. The 1997 UCSF Medical Waste Management Plan will be available soon on the EH&S Web site.

The guideline in making a laboratory safe is consideration. No one wants to work in a messy and possibly hazardous space. Practicing consideration for those who share lab space makes practicing safe science easy.

**BY SIGNING HERE I CERTIFY THAT I HAVE READ AND UNDERSTAND ALL MATERIALS IN THIS NEWSLETTER:**

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