

BioSide Lines

April 2001

The Newsletter of the UW Office of Biological Safety

Posting Biohazard Signs on Laboratory Doors

The biohazard symbol communicates the potential risk of infection to humans and that strict containment practices are used for exotic animal and plant pathogens. The primary message sent by posting the sign on a door is that a person entering the room puts him/herself at risk of acquiring an infection. Thus, there are situations where the signs must be used, situations where use is optional, and others where it would be inappropriate.

Required usage: Laboratory doors must be posted with this symbol when work is conducted with pathogens that can cause disease in healthy humans. In typical laboratory practice, the area where the pathogen was manipulated is decontaminated after use. Thus, the sign need only be posted when work is in progress. Within the laboratory, biohazard stickers should always be used on equipment that has come into contact with pathogens (e.g., centrifuges) and equipment that is used for incubation or for storing pathogens.

Optional usage: Door signs also may be used to indicate that a laboratory works with serious animal or plant pathogens and with potentially infectious materials including human blood and tissues.

Inappropriate usage: Excessive use of door signs may cause them to lose their impact. The signage should not be used simply as a message that serves to limit access. An example is a laboratory concerned about environmental contamination of cell/tissue culture that employs containment practices equivalent to biosafety level 2.

In addition to the biohazard symbol, door signs should indicate the appropriate biosafety level, the emergency contact names and phone numbers, a list of the pathogens, personal protective equipment to be worn in the laboratory, required immunizations, and any procedures required for exiting the laboratory. Signs and stickers are available from OBS.

New Staff at OBS

Margy Lambert accepted the Assistant Biological Safety Officer position and joined OBS early in February. She comes to us with a strong background in molecular biology, genetics, toxicology, biochemistry and microbiology. Margy also has extensive teaching experience. She received her Ph.D. in Environmental Health Sciences from University of California at Berkeley in 1999. You can reach Margy at 263-9013 or mlambert@fpm.wisc.edu.

Effective Use of the Autoclave

There is more to effective sterilization than simply loading and running the autoclave. Numerous factors affect efficacy. Since autoclaves are high-pressure steam vessels, there also are safety considerations. Laboratory staff should be trained in proper and safe autoclave operation. Always refer to the manufacturer's operating manual for the specific recommendations on proper autoclave operating procedures.

Time, temperature, and steam penetration are the main factors contributing to autoclave effectiveness. Whenever possible, you should use a verification process to determine the run time for your typical load. Ultimately, the best method to assure proper function of your autoclave is empirical testing.

Temperature: Chamber temperature is at least 121°C (250°F).

Time: Autoclaving time is determined by the nature of the load and the intended outcome. Biohazardous waste should be autoclaved for a minimum of 1 hour, timed after the temperature of the material reaches 121°C and 15 psi pressure, to ensure that no pathogens remain viable. Several days may be required to sterilize a large dense load. Therefore, it is important to pack the autoclave loosely.

Penetration: Steam saturation of the load is essential for effective decontamination. Air pockets or insufficient steam supply will prevent adequate contact with steam. Leave autoclave bags partially open during autoclaving to allow steam to penetrate inside. Add a small amount of water to the bag to help ensure heat transfer to the items being decontaminated, but do not add water if it could cause biohazardous materials to splash out of the bag. Note that it will take longer for liquids than solids to reach the desired temperature.

Secondary Containers: Place plastic biohazard bags in leak-proof containers to contain liquids that could spill out. Plastic or stainless steel trays are appropriate secondary containers. Make sure plastic bags and pans are autoclavable, to avoid having to clean up melted plastic.

Indicators: Some indicators will tell you only that the normal operating temperature was reached whereas others indicate that the process was sufficient to kill hardy microbial spores. The performance chart on the autoclave should be monitored with each load to ensure that the autoclave is functioning properly. Most chemical indicators, like autoclave tape, change color after being exposed to 121°C, but cannot measure the length of exposure or whether decontamination was achieved. Recognizing its limitations, autoclave tape is useful to simply indicate that the surface reached a minimum temperature.

Biological indicators (such as *Bacillus stearothermophilus* spore strips) and certain chemical integrators (such as Sterigage™) verify that the autoclave reached a high temperature and pressure for a long enough time to kill microorganisms. Such indicators should be buried in the center of the load. Keep a logbook to record the results.

The frequency of testing with a biological indicator depends on the purpose for which the autoclave is used. From the perspective of biological safety and with the understanding that no infectious waste may be discarded in a landfill, we recommend that autoclaves used to disinfect biohazardous waste be tested at least once a month using a biological indicator.

Autoclave Safety: Autoclaves are classified as pressure vessels, and should be inspected regularly. If you find a problem, notify your Building Manager or CARS (3-3333). Repairs to most autoclaves on campus are done by Physical Plant. Do not operate an autoclave that is in need of repair.

Because autoclaves use saturated steam under high pressure, proper use is important to ensure operator safety. Prevent injuries when using the autoclave by observing the following rules:

- Wear heat resistant gloves, eye protection, and a lab coat, especially when unloading the autoclave.
- Prevent steam burns and shattered glassware by making sure that the pressure in the autoclave chamber is near zero before opening the door at the end of a cycle. Slowly crack open the autoclave door and allow the steam to escape gradually.
- Allow items to cool for 10 minutes before removing them from the autoclave.
- Never put sealed containers in an autoclave. They can explode. Large bottles with narrow necks may also explode if filled too full of liquid.
- Never put solvents, volatile or corrosive chemicals (such as phenol, chloroform, bleach, etc.), or radioactive materials in an autoclave. Call Safety at 262-8769 if you have questions about proper disposal of these materials.

Autoclave efficacy indicators can be purchased from many laboratory and safety suppliers.

Disposal of Waste from Biological Research Laboratories

The policy for discarding biological waste on the main campus was revisited last summer. We've learned that our efforts to get the word out fell short of the mark. Most of the questions we still receive concern whether sharps need to be autoclaved.

Sharps are instruments that are intended to cut or penetrate skin. Examples include needles and syringes with needles, lancets, and razor blades. They require special handling and may not go directly to the landfill. Sharps should be placed in a rigid plastic box that has a lid that locks down. These containers, when $\frac{3}{4}$ full, are to be taken by staff to a collection container. MERI (Madison Energy Recovery Inc) will pick up these collection containers for treatment. Material that is picked up by MERI need not be disinfected, unless it comes from a BL3 facility. If you intend to autoclave the sharps box, make sure it is designed to be autoclaved.

Pathogens and sharps cannot go to the landfill without appropriate processing. Please review the full policy, which is posted on our website, www.fpm.wisc.edu/biosafety (see Waste Disposal). Call Jan Klein (3-9026) or John Wendt (5-5517) if you have any questions.

Shipping Infectious Substances and Other Biological Materials

The Office of Biological Safety will provide training and certification for shipping infectious substances and other biological materials, with a focus on safety and regulatory compliance for research laboratories. The Department of Transportation requires that persons involved in shipping hazardous materials in commerce be trained and certified in proper handling of these materials.

Tuesday, May 15, 2001
Union South 1 to 3 p.m.
Refreshments will be served.

Registration is required.

Contact Margy Lambert at 3-9013 or mlambert@fpm.wisc.edu.

Staff approaching their two-year expiration for certification will receive a notice in advance of that date. You are welcome to attend the class. Computer-based training is now available as an alternative, but only for those who have attended the class for their original certification.