Bloodborne Pathogen and Biosafety Training

Office of Lab Safety
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“A safe, healthy, and secure environment for scholarship and research.”
Executive Summary of the Training

Administrative Controls
Laboratory acquired infections.
Blood-borne pathogens [OSHA/CDC/NIH policy]
rDNA research-NIH-OBA policy

Hazard communication & Needle Safety [OSHA].
PPE and other Engineering controls
Disinfection & spill cleaning procedures.
Waste disposal: Biohazard waste and chemical waste

Select Agents, Biotoxin and Dual Use of research policy
Safety working with DEA-control substance: Toxicology
Exposure Control Plan
Work practices & golden rules of Biosafety

The standard code of Practice for Biosafety
Laws and Regulations

- Hazardous Waste Operations and Emergency Response (Hazwoper)—29 CFR 1910.120
- Emergency Response Plan—29 CFR 1910.120(q)(l)
- Decontamination [1910.120(q)(2)(viii)]
- Emergency medical treatment and first aid [1910.120(q)(2)(ix)]
- PPE and emergency equipment [1910.120(q)(2)(xii)] Training—
- 29 CFR 1910.120(q)(6)
- Refresher Training—29 CFR 1910.120(q)(8)
- Hazardous Material Regulations, Department of Transportation (DOT)—49 CFR Subchapter C
Biological Safety Program Management

Effectiveness of Biosafety Management:

- improved compliance and reduced incidents and liability,
- improved safety performance, and
- Increased integration of biosafety issues into the organizational culture.
- Training, awareness, and competence

The IBC is standing. NIH mandates that the committee report to the Vice President for Research. At GW the committee is responsible for reviewing all research and training proposals involving:

- Possession OR use of microorganisms
- Experiments involving rDNA or synthetic DNA
- Human-derived biologics like blood, body fluids etc.
- Unfixed tissues and cells
- Animal-derived materials
- Bio toxins with an LD50 of less than 100 μg.kg of the body weight in vertebrates
## Administrative Controls

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Responsibility of person(s) with role[^1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigator/PI</td>
<td></td>
</tr>
<tr>
<td>Lab Manager</td>
<td></td>
</tr>
<tr>
<td>Lab Staff</td>
<td></td>
</tr>
<tr>
<td>Biosafety professional</td>
<td></td>
</tr>
<tr>
<td>Biosafety Committee</td>
<td></td>
</tr>
<tr>
<td>Identify risks associated with hazardous and/or regulated materials or work scenarios.</td>
<td>R, AU, AC</td>
</tr>
<tr>
<td>Establish work practices and procedures appropriate for protection against identified risks.</td>
<td>R, AU, AC</td>
</tr>
<tr>
<td>Perform assigned tasks in accordance with training, policies, and procedures</td>
<td>R, AU, AC</td>
</tr>
</tbody>
</table>

[^1]: R, responsibility (the person is expected to act on his or her own accord to follow established and prudent procedures); AU, authority (the person has power to take actions and make decisions); AC, accountability (the person has control over authority delegated to subordinates).
Laboratory acquired infections-How are laboratory infections acquired?

Main routes of entry and transfer of toxic materials through the body.

Routes of Laboratory Infection

The five most predominant routes of LAIs are:
- parenteral inoculations with syringe needles or other contaminated sharps;
- spills and splashes onto skin and mucous membranes;
- ingestion or exposure through mouth pipetting or touching mouth or eyes with fingers or contaminated objects;
- animal bites and scratches (research laboratories or activities); and
- inhalation of infectious aerosols.
Laboratory acquired infections

Important factors to consider when assessing the risks for staff working in R&D, production or microbiology laboratory are the following:

- Mode of transmission
- Infectious doses for human
- Another useful information is the persistence or viability of infectious agents in the environment
In choosing an in vitro model system, a number of fundamental questions with direct relevance to the safety of the system of choice must be answered:

• Does an appropriate system already exist?
• What hazards may the source materials (cells and reagents) represent?
  • If obtainable from an external source, have the cells been tested for quality, e.g. authenticity, function and microbial contamination?
• What level of containment will be required for any hazards identified?

A decision-making process leading to risk assessment of in vitro systems using animal cells.

Carry out risk assessment to include:
- genetic manipulation
- reagents and biological agents other than the cells
- procedures and equipment
- the cell type, animal of origin and source
A Bloodborne Pathogen is a pathogenic microorganism that is present in human blood and can cause disease in humans. Includes:
- Blood
- Blood components
- Other Body fluids
- Unfixed Human Organs and Tissues
- Human cell lines

The important question to ask yourself is “Will I be potentially exposed to human blood, human body fluids, or unfixed tissues or cells during my time in research labs? If YES, please get in touch with your PI/supervisor to follow the SOP for decontamination/spills and risk towards exposure.
What are some common Bloodborne Pathogen diseases?

- Malaria
- Brucellosis
- Syphilis
- Hepatitis B (HBV)
- Hepatitis C (HCV)
- Human Immunodeficiency Virus (HIV)
Human Immunodeficiency Virus (HIV)

- HIV is the virus that leads to AIDS
- HIV depletes the immune system
- HIV does not survive well outside the body
- No threat on contracting HIV through casual contact
Hepatitis B (HBV)

**Symptoms include:**
- Jaundice
- Fatigue
- Abdominal pain
- Loss of appetite
- Nausea

**May lead to chronic liver disease, liver cancer, and death**
- Vaccination available since 1982
- HBV can survive for at least one week in dried blood
- Symptoms can occur 1-9 months after exposure
Hepatitis C (HCV)

- Hepatitis C is the most common chronic bloodborne infection in the United States
- Symptoms include: jaundice, fatigue, abdominal pain, loss of appetite, intermittent nausea, vomiting
- May lead to chronic liver disease and death
What body fluids can contain Bloodborne Pathogens?

- Skin tissue
- Any other bodily fluid
- Blood
- Saliva
- Vomit
- Urine
- Semen or vaginal secretions
How is it passed from one person to another?

- Contact with another person’s blood or bodily fluid that may contain blood
- Mucous membranes: eyes, mouth, nose
- Broken skin
- Contaminated sharps/needles
How can you be Exposed to a Bloodborne Pathogen?

- Administering first aid
- Post-accident cleanup
- Janitorial or maintenance work
- Improper handling of infected waste products
What Precautions should you take to avoid infection?

• Wear Personal Protective Equipment
  • Gloves, mask, CPR mouth-to-mouth barriers
• Treat all blood and bodily fluids as if they are contaminated
• Wash thoroughly during cleanup and decontamination
• Properly dispose of all contaminated material
Agent risk group & biosafety level classification is established to emphasize the potential risk and consequences of exposure and infection for the laboratory worker or the release into the environment with subsequent infection of the general population.
Biological Risk Assessment and Biosafety Guidelines

No one standard approach or correct method exists for conducting a risk assessment; however, several strategies are available, such as using a risk prioritization matrix, conducting a job hazard analysis; or listing potential scenarios of problems during a procedure, task, or activity. The process involves the following five steps:

1. Identify the hazards associated with an infectious agent or material.
2. Identify the activities that might cause exposure to the agent or material.
3. Consider the competencies and experience of laboratory personnel.
4. Evaluate and prioritize risks (evaluate the likelihood that an exposure would cause a laboratory-acquired infection [LAI] and the severity of consequences if such an infection occurs).
5. Develop, implement, and evaluate controls to minimize the risk for exposure.
### Blood-borne pathogens [OSHA/CDC/NIH policy]

<table>
<thead>
<tr>
<th>Risk Group 1</th>
<th>Minimal</th>
<th>Microorganisms that usually do not cause human disease, such as Escherichia coli K12 or Lactobacillus.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Group 2</td>
<td>Moderate risk</td>
<td>Microorganisms that cause treatable or self-healing diseases and are difficult to contract via aerosol in a laboratory setting, such as salmonella or measles virus.</td>
</tr>
<tr>
<td>Risk Group 3</td>
<td>High risk</td>
<td>Highly contagious microorganisms that cause serious diseases, such as TBE virus or M. tuberculosis</td>
</tr>
<tr>
<td>Risk Group 4</td>
<td>Very high risk</td>
<td>Highly contagious microorganisms that cause serious diseases, even epidemics, with high mortality rate, such as Ebola virus or Lassa fever virus.</td>
</tr>
</tbody>
</table>
Biosafety Level 2 builds upon BSL-1. BSL-2 is suitable for work involving agents that pose moderate hazards to personnel and the environment. It differs from BSL-1 in that:

- laboratory personnel have specific training in handling pathogenic agents and are supervised by scientists competent in handling infectious agents and associated procedures;
- access to the laboratory is restricted when work is being conducted; and
- all procedures in which infectious aerosols or splashes may be created are conducted in BSCs or other physical containment equipment.
Office of Biotechnology Activities

OBA promotes science, safety and ethics in the development of public policies in three areas: Biomedical Technology Assessment, Biosafety, and Biosecurity. By monitoring research and through consultation, coordination, and analysis, the office develops policies related to:

- The conduct of clinical trials using recombinant and synthetic nucleic acids,
- Biosafety for NIH-supported research,
- Biosecurity, including oversight of dual use research, and
- Registration of new stem cells lines for NIH-funded research.

Specific activities include optimizing the conduct and oversight of gene transfer research, updating and interpreting biosafety policies under the NIH Guidelines for Research with Recombinant and Synthetic Nucleic Acids, providing critical input on Governmental policies regarding dual use research, the NIH Stem Cell Registry.

- Adenovirus
- Adeno-associated virus (AAV)
- Epstein-Barr virus (EBV)
- Retroviruses
- Vaccinia virus
HAZARDOUS SUBSTANCE SAFETY

Identifying and Evaluating Hazardous Substances

- Determine hazardous properties including toxicity and health hazards.
- Identify purpose, quantities, and locations using the substance.
- Implement proper storage procedures including flammable material locations.
- Make SDS readily available for each substance.
- Adhere to compliance and regulatory requirements of OSHA, DOT, and EPA.
- Develop written plans as required by compliance agencies and accrediting organizations.
- Require use of PPE handling hazardous materials.
- Evaluate possible use of less hazardous substances.
- Create detailed spill containment plans and train proper response teams.
- Conduct and document personal/area monitoring as required by standards.
- Provide education and training for all workers with any potential exposures.

Healthcare Reproductive Hazards

- Nitrous oxide
- Ethylene oxide
- Toluene
- Xylene
- Some aerosolized drugs
- Cadmium
- Ionizing radiation
- Lead
- Solvents
HAZARDOUS SUBSTANCE SAFETY

Characteristics of Hazardous Substances

- Corrosiveness: Any substance with the ability to degrade the structure or integrity of another substance, object, or material. Examples include acids and alkalis.
- Ignitability: Any material that can too readily burn or ignite including some chemicals that can autoignite upon contact with the air.
- Reactivity: Any substance with the ability to readily combine with other chemicals to produce a sudden or violent release or heat/energy.
- Toxicity: Any material with the capability of causing illness or death in man, animals, fish, plants, or damage the environment.

Hazardous Material Management Suggestions

- Conduct an inventory and control of all materials used, stored, or generated.
- Provide adequate space and equipment for handling and storing hazardous materials.
- Monitor and document correct disposal of hazardous gases and vapors.
- Develop work area and emergency response procedures to address specific hazards.
- Use protective equipment when responding to hazardous materials spills or releases.
- Maintain hazardous wastes manifests, permits, and licenses.
- Ensure proper labeling of all-hazardous materials and wastes.

Exposure Considerations

- Concentration of hazardous substance
- Duration of exposure
- Available ventilation
- Temperature of the chemical
- Temperature of the surrounding air
Which are then further classified by numbers, which denote the risk of each hazard. The scales is from 0-4. "0" means there is no risk, while "4" signifies the material is extremely hazardous.
Hazard Communication

- Provides critical information
  - 24-hr Contact Information
  - Specific Lab Hazards
  - Required PPE
- Posted on/at the lab door
- Updated annually
- Intended to inform emergency response personnel
- Conveys safety info. to all lab visitors
Hazard communication & Needle Safety [OSHA].

Needle stick Safety & Prevention Act

When Needlestick injuries occur:

- **40%** During use
- **40%** After use and before disposal
- **15%** During disposal
- **5%** Other

Sources: Needle Devices Magazine, Industry advertising, and Chronicle research

Steve Kearsley / San Francisco Chronicle
NEVER DO IT

Right way to DO IT
Hazard communication & Needle Safety [OSHA].

Biohazard Labeling
Personal Protective Equipment (PPE) is any safety equipment workers wear to prevent injury in the workplace when engineering and administrative controls fail to eliminate the hazard.

Training is required by OSHA regulations contained in 29CFR 1910.132-140.

Use of PPE
Before using any forms of PPE, workers must be instructed and trained in its correct use as well as checking PPE before use. Any defects in PPE should be reported before removal from use. In summary, PPE needs to be the following:
• appropriate
• complaint with legal standards (CE marking)
• ergonomic
• correctly fitting
• compatible with other forms of PPE used
• compatible with substances being used
• maintained
• having specified storage
• assessed before each use.
Personal Protective Equipment

- Head protection (if needed)
- Eye protection (safety glasses or goggles)
- Face shield (if needed)
- Closed-toed shoes
- Gloves
- Lab coat
Different types of disposable glove used for laboratory work

Summary
PPE should be considered as a last resort when undertaking a risk assessment. When all other options have been discarded, then PPE should be considered. Workers need to be appropriately trained in its use. Remember, PPE only protects the wearer and if used incorrectly the protection afforded may be considerably reduced.

FFP3 (filtering face piece) dust mask.
Aerosol-generating procedures

Avoid aerosol-generating procedures if possible

Wear a respirator (FFP2 or EN certified equivalent or US NIOSH-certified N95) if any procedures that stimulate coughing or promote the generation of aerosols is planned to be performed

- aerosolized or nebulized medication administration, diagnostic sputum induction, bronchoscopy, airway suctioning, endotracheal intubation, positive pressure ventilation via face mask

For Fit testing of N95 mask get in touch with Office of Health & Safety: Phone: 202-994-4347 Email: safety@gwu.edu
Disinfection and Decontamination

Decontamination decision tree
Disinfecting surfaces after conducting work at BSL2 containment is important.

**Things to Remember:**
- **Always follow product instructions**
- **Leave disinfectant on surface wet for the recommended contact time.**

**Chemical Decontamination**

**Time of Contact**

Time of contact may have an influence on the activity of a disinfectant. In the case of heat inactivation, this depends largely on the temperature used. Some disinfectants may be quite corrosive and for this reason, contact time may be limited in order not to deteriorate the surfaces or materials to which it is applied.
Physical Decontamination

Wet heat
Wet heat is the most dependable method of sterilization.

Autoclaving, sometimes called steam sterilization, is the most convenient method of rapidly achieving destruction of all forms of microbial life. Autoclaves use saturated steam under pressure of approximately 15 pounds per square inch to achieve a chamber temperature of at least 250°F (121°C) for a prescribed time—usually 30–60 minutes.
Irradiation Decontamination

Ionizing
Ionizing radiation will destroy microorganisms, but is not a practical tool for laboratory use.

Non-ionizing
The UV-C band of ultraviolet (UV) radiation contains wavelengths (250-270 nm, 265 is optimum) that effectively destroy most microorganisms in air and water and on surfaces. Organisms must be directly exposed to the UV light; dirt, dust, and shadows can shield organisms, limiting UV lamp effectiveness.

Typical uses: Ultraviolet radiation is typically used to reduce levels of airborne microorganisms and maintain good air hygiene in air locks, animal holding areas, ventilated cabinets, and laboratory rooms. UV is also used in biological safety cabinets (BSC) and in some laboratory rooms to reduce surface contamination.

EH&S Biosafety strongly discourages UV lamps in BSCs. See Biosafety Cabinets: Usage Guidelines.
Precautions: UV can cause burns to the eyes (photokeratitis) and skin of people exposed for even a short period of time.
Disinfection & spill cleaning procedures

How do you Clean a Spill?
Disinfection & spill cleaning procedures

Spills inside a Biological Safety Cabinet

1. Keep the cabinet running.
2. Clean-up as per directions above, making sure to wipe down back and side walls of cabinet.
3. If material has spilled into the catch basin beneath the work surface, add a volume of disinfectant equal to the quantity in the basin, wait 20 minutes, and absorb with paper towels.
4. After completion, allow cabinet to run for ten minutes before resuming work.

Spills inside a centrifuge

1. Shut centrifuge off and do not open the lid for 20 minutes to allow aerosols to settle.
2. Put on PPE.
3. Use a squeeze bottle to apply disinfectant to all contaminated surfaces within the chamber, taking care to minimize splashing.
4. Allow 20 minute contact period and then complete clean-up of the chamber.
5. Remove buckets and rotors to nearest Biological Safety Cabinet; disinfect and clean as per manufacturer's instructions.
Red Bag Waste - Paper towels, plastic pipettes, animal waste, cultures and stocks, and human blood and blood products.

Pathological - animal and human parts
Any liquid (i.e., blood, sera, I.V. saline, etc, liquids other than chemical solutions) greater than 20 cc’s must be placed in a container that is labeled as to its contents, capped tightly, then placed directly into the red liner.

Biohazard Waste

Place waste in a red biohazard bag.
DO NOT mix Sharps, Red Bag, or Pathological Waste in one bag or box. They must be bagged/boxed separately.
Specimens should be drained of liquid and then placed into the red liner.

1. Tie/tape the biohazard waste bag closed.
2. Place bag in cardboard biohazard box.
3. Complete 1st biohazard label and place on bag (labels available through the Office of Health & Safety)
4. Seal the cardboard box with tape on all sides.
5. Label the outside of the box with the 2nd biohazard label.
Sink Disposal of Waste

Approved for:

• VERY diluted acids or bases
• Water miscible, non-toxic chemical solutions

Prohibited for:

• Flammable or reactive chemicals
• Concentrated acids or bases
• Toxic, carcinogenic, mutagenic or teratogenic chemicals
• Unknown or unidentified chemicals
• Oils and greases
Sharps Container Disposal

Step 1 - Place needles, razor blades, or sharps into red puncture-resistant biohazard container. Lab Supervisors are responsible for providing the laboratory’s container.

Step 2 - Identify on the label the contents of the container (Labels are provided by Environmental Health and Safety)

Step 3 - Place the label on the biohazard container.

Step 4 - Place full closed container into a red biohazard bag and seal the bag.
Select agents and toxins have been determined to have the potential to pose a severe threat to both human and animal health, to plant health, or to animal and plant products. An attenuated strain of a select agent or an inactive form of a select toxin may be excluded from the requirements of the Select Agent Regulations.

Work with Select Agents and Toxins

- Require restriction to agents
- Background checks
- Rigorous inventory
- Reporting of loss, Theft, or release

www.selectagents.gov
Biotoxin

- Biological toxins with a mammalian LD50 100 micrograms per kilogram of body weight must be registered with the IBC. While unable to replicate, biological toxins present special hazards that must be taken seriously.

- Care should be take when reconstituting of stocks. Especially when performed in BSC or chemical fume hood.

- Accidental spills of toxic chemicals
Dual Use of Research policy

- Enhances harmful consequences
- Disrupt immunity of effectiveness of immunization
- Advises of biological agent resistance to medical intervention
- Increases stability, transmissibility, or ability to disseminate
- Alters host range or tropism (ex. Non-zoonotic---zoonotic)
- Produces a novel or eradicated agent

Office of Biotechnology Activities
Examples of Research with Dual Use Potential

**Synthesis of infectious poliovirus.** Researchers sought to resolve the unusual nature of poliovirus, which behaves as both a chemical and a “living” entity. They succeeded in recreating the virus by chemically synthesizing a cDNA of its genome. Some critics assert that the publication of their methods provided a recipe for terrorists by showing how one could create any virus from chemical reagents purchasable on the open market.

**Development of “stealth” viruses that could evade the human immune system:** These viruses are being developed to serve as molecular means for introducing curative genes into patients with inherited diseases. However, the research has raised questions about whether they could potentially be induced to express dangerous proteins, such as toxins.

**Development of new technologies for delivering drugs by aerosol spray in individual doses:** Some have expressed concern that this development, intended to improve the ease of use and rate of compliance among diabetic users of insulin, could be adapted to allow aerosol sprays to cover wider areas in an attack.
A controlled substance is:

- “… a drug or other substance, or immediate precursor, included in schedule I, II, III, IV, or V …” (CSA, Title 21, Section 802, (6))

The five schedules (I-V) range from

- Schedule I - the most stringently controlled (primarily illegal drugs)
- Schedule V - the least restrictive
USE OF CONTROLLED SUBSTANCES AN OVERVIEW FOR RESEARCHERS

DEA

♣ Regulation: Title 21 CFR, Part 1300-1399

♣ Law: Title 21 USC, Controlled Substances Act
Drugs or substances are assigned to schedules based on their current acceptable medical use and abuse/dependency potential.

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Medical Use in U.S.?</th>
<th>Abuse Potential</th>
<th>Dependency Potential (physical/psychological)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>No</td>
<td>High</td>
<td>Lack of accepted safety for use</td>
<td>heroin, cannabis, mescaline</td>
</tr>
<tr>
<td>II</td>
<td>Yes</td>
<td>High</td>
<td>Severe</td>
<td>morphine, pentobarbital (Fatal Plus), fentanyl</td>
</tr>
<tr>
<td>III</td>
<td>Yes</td>
<td>&lt; schedule I or II</td>
<td>Moderate</td>
<td>buprenorphine, ketamine, barbituric acid derivatives</td>
</tr>
<tr>
<td>IV</td>
<td>Yes</td>
<td>&lt; schedule III</td>
<td>Limited (&lt; schedule III)</td>
<td>barbital, butorphanol, chloral hydrate</td>
</tr>
<tr>
<td>V</td>
<td>Yes</td>
<td>&lt; schedule IV</td>
<td>Limited (&lt; schedule IV)</td>
<td>&lt;200 mg codeine/100 mL, pyrovalerone</td>
</tr>
</tbody>
</table>
USE OF CONTROLLED SUBSTANCES: AN OVERVIEW FOR RESEARCHERS

- The main components are:
  - Record of Receipt
  - Record of Use (including disposal)
  - Inventory

- Records for schedules I and II drugs must be kept separate from all other records

- All records must be kept for 5 years from the date of the last transaction

- Records must be “readily retrievable”
A laboratory director needs to assume the responsibility for

- Establishing and enforcing a policy for a culture of safety within the laboratory;
- Identifying as many hazards as possible and specifying practices and procedures that will minimize or eliminate those hazards;
- Ensuring that all personnel are instructed in and engaged in performing risk assessments and demonstrating that they can identify laboratory hazards in their individual work environments;
- Ensuring that all personnel are trained and competent in the standard practices and techniques that minimize identified workplace hazards;
- Providing an avenue for personnel to identify hazards and to present risk-mitigation strategies to management; and
- Educating clinicians and nurses about safe specimen procurement and transport to ensure their safety and that of the laboratory personnel who receive the clinical samples.
A medical surveillance program must be programmatically defined and must include all appropriate testing given the agents being handled. Baseline serum sample requirements, immunization schedules, and incident reporting follow-up must all be defined in this program element.

**Baseline Sera:** Laboratory personnel must receive appropriate immunizations or tests for the agents potentially present.

**Sharps:** All personnel sustaining sharps injuries must be reported and referred to the facility infection control or occupational health staff for medical surveillance.

**Dermal Hazards:** If the outer skin surface is breached or mucous membrane is exposed to biological contaminants, emergency procedures are required.

**Immunoprophylaxis Programs:** Immunization programs should be offered to workers as needed. When bloodborne pathogen exposures are anticipated, HBV immunizations are to be offered to workers per 29 CFR 1910.1030; however, workers may decline the immunization using a written declination statement.
Researche Dies After Lab Fire

UCLA research assistant burned in incident with tert-butyl lithium

Jyflan Kemsley

A research assistant in the University of California, Los Angeles, department of chemistry and biochemistry died on Jan. 16 from injuries sustained in a laboratory fire that occurred in December, the university has confirmed.

UCLA officials declined to provide C&EN with specific details of the incident, pending an investigation. But according to a Dec. 29, 2008, e-mail to C&EN from department chair Albert J. Courrey, university investigators believe that on Dec. 29, Shahrabano Sangi, 29, was drawing tert-butyl lithium (t-BuLi) from a bottle into a syringe when the plunger came out of the syringe barrel. The chemical, which ignites spontaneously in air, splashed onto Sangi’s clothes and set them on fire. Sangi was burned on her hands, arms, and upper torso, for a total of 40% of her body. After initial treatment at Ronald Reagan UCLA Medical Center, she was transferred to the Grossman Burn Center in Sherman Oaks, Calif., where she died.

An unconfirmed description of the accident was posted Jan. 7 to the ACS Division of Chemical Health & Safety e-mail list by Debbie M. Decker, a member of the division and a UC Davis chemical safety officer. It says that Sangi was wearing safety glasses, a sweater made of synthetic material, nitrile gloves, and no lab coat and that the t-BuLi ignited her sweater and gloves.

KANSAS CITY, Mo. -- An explosion experiment at a University of Missouri lab injured four people on Monday.

The explosion was ignited by a free hydrogen tank, according to the university. The building’s sprinkler system put out the flames, however, 17 third-story windows were broken. Officials believe human error was to blame.

Three of the victims have already been released from University Hospital. The fourth victim is in stable condition at the hospital’s burn unit.
Fatality adds further momentum to calls for a shake-up in academic safety culture.

• In the early hours of 13 April, undergraduate students working at Yale University's Sterling Chemistry Laboratory made a shocking discovery. There in the lab's machine shop was the dead body of 22-year-old undergraduate student Michele Dufault, her hair tangled in a lathe. She had apparently died of asphyxiation in an accident.

• In late 2008, 23-year-old research assistant Sheharbano Sangji sustained horrific burns in a lab fire at the University of California, Los Angeles (UCLA), and died of her injuries 18 days later.

“Changing the lab culture is really going to be a long-term challenge.”
Work practices & golden rules of Biosafety
Biosafety in Microbiological and Biomedical Laboratories (BMBL)

U.S. Department of Health & Human Services
Public Health Service
Centers for Disease Control & Prevention & the National Institutes of Health


Establishes criteria for:

- Biological Risk Assessment
- Principles of BioSafety
- Laboratory BioSafety Level (BSL) Criteria
- Laboratory BioSecurity Criteria
- BioHazard Containment
- Decontamination & Disinfection
- Transportation of BioHazards & Infectious Materials
- Select Agents & Toxins...
Promoting Health Security

Raising awareness

Preparedness for intentional release: Pathogen Control

National Biosafety Strategy

Legislative (Regulations)

Guidelines

Education & Training

Biosafety specialists

Developing risk assessment methodologies

Capacity-building for risk management

Partnering and Cooperation
Thank you

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