

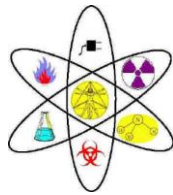
Urinalysis and Body Fluids

Unit 1 A

Safety in the Clinical Laboratory

Types of Safety Hazards

- Physical risks
- Sharps hazard
- Electrical hazard
- Radioactive hazard
- Chemical exposure risk
- Fire / explosive hazards
- Biological exposure risk



Types of Safety Hazards

- Physical Hazards - falls, heavy boxes, patients, etc.



Types of Safety Hazards

- Sharps Hazards - such as needles, broken glass



Types of Safety Hazards

- Electrical - ungrounded or wet equipment



Electrical Safety

Using electrical equipment

- Do not use power cords that are frayed
- Always unplug before maintenance performance
- Avoid using extension cords
- Use three-prong "hospital-grade" electrical plugs
- Actions for liquid spills on electrical instrument



Types of Safety Hazards

- Radioactive hazards - equipment and isotopes
- Some chemistry procedures used to use radioactive-tagged reagents
- But now other tags, ie enzymes, etc. are common, so little chance of radiation exposure exists



Types of Safety Hazards

- Chemical Hazards - preservatives and reagents



Chemical Safety

Common laboratory chemicals

- Require regulatory labels



Example of OSHA-mandated labeling

Chemical Hazards

- Chemical Spills
 - Cleaned immediately using appropriate materials
- Chemical Handling
 - Safety first - use appropriate PPE, be sure others in the area know your intentions, remember the basics.
- Chemical Hygiene Plan
 - Detailed plan addressing work practices, standard operating procedures, PPE, physical / engineering controls such as fume hoods and safety cabinets.
 - Employee training plan and medical consultation guidelines also included.

Chemical Safety

Protective measures

- Safety Showers and the Eyewash Station
 1. The victim of a chemical accident must immediately rinse for at least 15 minutes after removing contaminated clothing.
 2. In case of a chemical splash in the eye, the victim should rinse their eyes at the eyewash station for a minimum of 15 minutes.
 3. Contact lenses must be removed prior to the rinsing in order to thoroughly cleanse the eyes.
 4. The victim should not rub the eyes.
 5. Take the victim to the emergency department for treatment after his or her eyes have been rinsed for 15 minutes.

Laboratory Safety

- 'Hazard Communication'
 - Must keep workers informed of hazardous conditions
 - Included is signage (some general signs, some very specific)
 - "Right to Know" stations & MSDS sheets.



Chemical Safety

Right-to-Know law and MSDSs

- Required for any chemical with a hazard warning label.
- An MSDS lists general information, precautionary measures, and emergency information.

Chemical Safety

Material Safety Data Sheets (MSDS)

- Covered in first lab.
- In addition to manufacturer's contact info, contain:
 - Physical and chemical characteristics
 - Fire and explosion potential
 - Reactivity potential
 - Health Hazards
 - Methods for safe handling



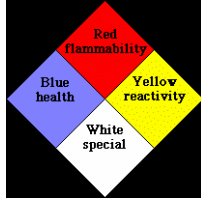
Types of Safety Hazards

- Fire / Explosive Hazard



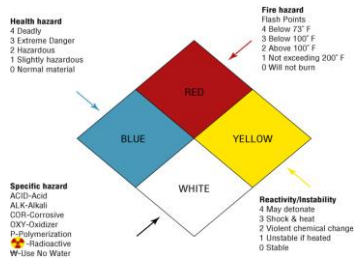
Fire / Explosion Hazards

- National Fire Protection Association (NFPA)
- Standard System for Identification of Fire Hazards of Materials



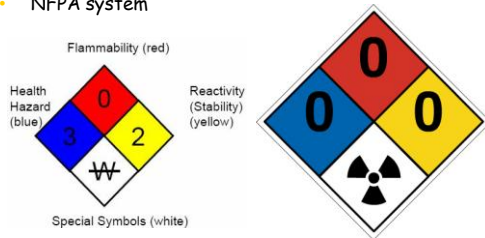
Fire / Explosion Hazards

- NFPA system



Fire / Explosion Hazards

- NFPA system



NFPA signage by Ron Rinehart



NFPA 'Diamond for Dummies' by Ron Rinehart



Fire Safety

Classification of fires

1. Class A fires
 - Occur with ordinary combustible material, such as wood, rubbish, paper, cloth, and many plastics.
2. Class B fires
 - Occur in a vapor-air mixture over flammable solvents, such as gasoline, oil, paint, lacquers, grease, and flammable gases.
3. Class C fires
 - Occur in or near electrical equipment.
4. Class D fires
 - Occur with combustible metals, such as magnesium, sodium, and lithium.

Fire Safety

Location and use of fire extinguishers



Fire Safety

RACE

- Rescue
- Alarm
- Contain
- Extinguish



Types of Safety Hazards

- Biological Hazards - from infectious agents
 - Non-disease (nonpathogenic) microorganisms
 - Pathogenic (disease causing) microorganisms



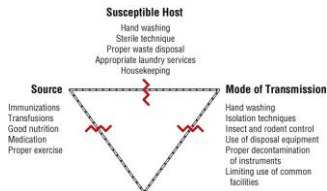
Pathogens and Infections

Overview of Protective Measures - required of all healthcare workers, especially those with significant patient contact:

- Following all Standard Precautions
 - Recall: Standard Precautions dictates that we treat *all* patients and their specimens as if they are infectious.
 - Use of PPE (Personal Protective Equipment)
 - Identify some of them used in medical lab world
 - Follow aseptic techniques including surface disinfection
 - Hand hygiene - will spend a lot of time on this...

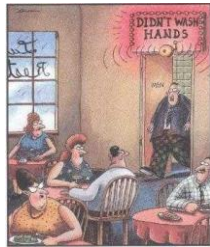
Protective measures

- Standard Precautions
 - Requires basic understanding of 'chain of infection'.
 - Source
 - Mode of transmission
 - Susceptible host



Protective measures

- Proper handwashing
 - Number 1 way of preventing infection



Protective Measures

- **So - When should you wash your hands?**
 - Before preparing or eating food
 - After going to the bathroom
 - After changing diapers or cleaning up a child who has gone to the bathroom
 - Before and after tending to someone who is sick
 - After blowing your nose, coughing, or sneezing
 - After handling an animal or animal waste
 - After handling garbage
 - Before and after treating a cut or wound"

Preparation for Lab 1

- UA / BF first lab will include a handwashing exercise.
- The following slides are a reminder of the procedure.
- As you go through the slides, make note of any questions you may have.

Handwashing



Wet Hands with Water

Handwashing



Dispense a Small Amount of Soap to the Hands

Handwashing



Rub Hands Together Vigorously for at Least 15 Seconds

Handwashing



Rinse Hands in a Downward Motion with Water

Handwashing



Turn Off the Water with a Dry Disposable Towel

Transmission-based Precautions

- The transmission-based precautions cover three sets of precautions based on the routes of transmission. (also covered in lab)
 - Airborne precautions
 - Reduce the spread of airborne droplet transmission of infectious agents, such as rubeola, varicella, and *Mycobacterium tuberculosis*.

Transmission-based Precautions

- Droplet precautions
 - To reduce transmission of diseases spread by larger droplets that occur through sneezing, coughing, or talking.
 - Examples: pertussis, meningitis, rubella

Transmission-based Precautions

- Contact precautions

- Reduce the risk of transmission of serious diseases such as respiratory syncytial virus (RSV), herpes simplex, wound infections and others through direct or indirect contact.

Reverse Isolation

- Who is infectious?
- Who must be protected?

Disposal of Biological Waste

- All biological waste (except urine) must be disposed of in appropriate containers, and labeled as 'Biohazardous'
 - Biological waste is then incinerated, autoclaved, or picked up and transported by company licensed to dispose of bio-waste.
- Urine can be safely discarded into lab's sink and flushed with cold water.
 - Container is rinsed and discarded into regular trash.
 - Sinks decontaminated with 10% bleach solution daily.

Disposal of Biological Waste 'Biohazard signs'



Hazard signs

CAUTION

Radioactive RADIOACTIVE RADIOACTIF	BIOHAZARD	BIOHAZARD LEVEL 2	TOXIC GAS	TOXIC CHEMICALS	CANCER HAZARD
CANCER SUSPECT AGENT	Reproductive Hazard	Food & Beverage Prohibited			

4 2
OXY

Legend

- Blue: Health Hazard
- Red: Flammable
- Yellow: Oxidizing
- White: Corrosive
- Green: Environment
- Black: Other

Special Notes

Accumulated plastic: from 100 ml to 1000 ml

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