Management of Emergencies

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Laboratory Emergencies

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“RIGHT TO KNOW” DENTAL HAZARDOUS SUBSTANCE LIST

This is a partial list of the main hazardous substances found in a dental office that you may be exposed to.

You are entitled (under law) to be informed of any material(s) or chemical(s) you work with that may be hazardous to your health or the environment. Employers must make available to employees, Material Safety Data Sheets, (MSDS) supplied by manufacturers. MSDS must explain in detail, the hazardous associated with the material; preventative measures to avoid danger, and the first aid measures to be taken.

The following substances are used in the Dental Assisting program.

I _____, have read the Hazardous substance data presented to me and recognize my responsibility to protect myself and others.

_____ _____ _____

Student signature Date Instructor Initials

Products Utilized and Stored in Dental Lab

Palomar College Dental Assisting - Room HS 109

INFORMATION	TAB INDEX
Lysol (phenol)	A
Bleach (Sodium Hypochlorite)	B
Glutaraldehydes/Iodophors	C
X-ray Developer	D
X-ray Fixer (acetic acid)	E
Cavity Varnishes	F
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Acrylic Monomer (methyl methacrylate)	J
Mercury	K
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WEAR GLOVES, MASK AND GLASSES

Product	Warning	Protocol:
Lysol (phenol)	Flammable, avoid eye and food contact	Flush eyes (remove contact lenses) Flush 15 minutes
Bleach (Sodium Hypochlorite)	Skin and lung irritant. Don't mix with any other cleanser.	Flush skin or eyes
Glutaraldehyde	Avoid skin and eye contact	Flush
X-ray Developer	Avoid skin and eye contact	Flush
X-ray Fixer	Can cause eye, skin or respiratory irritations. Avoid contact inhalation	Flush
Acid Etch Gel	Avoid eye, skin or mucous membrane contact.	Flush
Cavity Varnishes	May contain acetone, ether or chloroform. Flammable. Avoid Inhalation.	Keep away from open flame. Use in well Ventilated area
Gypsum products	Eye and lung irritant	Wear protective shields
Curing light	Blind spot or retina damage. Do not look at light.	Wear special glasses
Acrylic Monomer (Methyl Methacrylate)	Flammable. Avoid Inhalation. Avoid skin contact.	Do not use near heat source or flame. Work in well-ventilated area.
Mercury ("N")	Avoid inhalation and skin contact. Avoid heating amalgam. May cause damage to nervous system, eyes, kidneys, and/or skin	Do not wring in squeeze cloth. Clean up spills with special "spill kit". Store scrap amalgam in special container.
Oxygen	Flammable	Keep away from heat or flame.

X-ray Radiation	(C*), (M*), (T*)	Follow radiation safety practices. Wear lead apron. Campus facility

(N*) – Neurotoxic (C*) – Carcinogenic

(M*) – Mutagen (T*) – Teratogen

INTRODUCTION TO THE LABORATORY SAFETY PROGRAM

The **Laboratory Standard** was enacted by the Occupational Safety and Health Administration (OSHA) in order to better protect laboratory employees from the unique hazards associated with the use of chemicals on a laboratory scale. Typically, "laboratory scale" means quantities of chemicals easily manipulated by one person, and not part of a production process. The purpose of Palomar College's Laboratory Safety Program is to meet the requirements set forth by the **Laboratory Standard** and to assist laboratory employees in maintaining a safe working environment.

The objectives of the Laboratory Safety Program are as follows:

- *To reduce injury and illness in the laboratory*
- *To increase the employee's awareness of laboratory hazards*
- *To provide for medical attention if needed*
- *To complement **Hazard Communication***

COMPONENTS OF THE LABORATORY SAFETY PROGRAM

1. Information and training to insure that employees and students are prepared for laboratory work involving hazardous chemicals and processes.

2. Standard operating procedures for routine laboratory hazards and guidelines for writing more detailed standard operating procedures necessary for extremely hazardous substances and operations.

3. A System for accurate recordkeeping and documentation for:

    - Laboratory safety training records

- ❖ Employee medical surveillance records
- ❖ Exposure assessment records
- ❖ Ventilation measurement records
- ❖ Standard operating procedures.

4. A written program, referred to as the Chemical Hygiene Plan, whose purpose is to set forth procedures that will protect the employees' health around chemicals and conform to the requirements set forth in the regulations.

DEFINITION OF "HAZARDOUS CHEMICALS"

For the purpose of the Laboratory Safety Training Program, a "hazardous chemical" may be defined as any chemical which is a physical or health hazard.

The term health hazard includes chemicals which are:

- ❖ Carcinogens
- ❖ Toxic & highly toxic agents
- ❖ Reproductive toxins
- ❖ Hepatoxins
- ❖ Neurotoxin
- ❖ Irritants
- ❖ Corrosives
- ❖ Senitizers
- ❖ Nephratoxins
- ❖ Agents which damage the lungs, skin, eyes, or mucous membranes

The term physical hazard includes chemicals which are:

- ❖ Combustible liquids
- ❖ Explosives
- ❖ Organic peroxides
- ❖ Pyrophorics
- ❖ Water-reactives
- ❖ Compressed gases
- ❖ Flammables
- ❖ Oxidizers
- ❖ Unstable or reactives

MATERIALS SAFETY DATA SHEETS (MSDSs)

The Hazard Communication Standard requires that employers make MSDSs available to employees for all hazardous materials presents in the workplace. MSDSs are the best reference source for health and safety information on any particular chemical. Each department is responsible for maintaining up-to-date files of MSDSs for every hazardous substance used or stored in the Department. If you do not have an MSDS for any chemical, you cannot use that chemical.

The following outline describes the nine sections that are required in any MSDS, and although not all MSDSs are written the same way, should provide the necessary information to interpret any MSDS.

Section I – Manufacture and Substance Information

Manufacture's Name and Address, or the MSDS Generator

Emergency Telephone Numbers: May be used for additional guidance in the event of a large spill or to obtain clean-up information.

Chemical Name and Synonyms: The lists known synonyms and may provide names in other languages such as German and Russian.

Chemical Family: Identifies the general chemical class to which the substance belongs, e.g., ketone, alcohol, aromatic, etc.

Formula: Provides the chemical formula for the substance.

Section II – Components

Hazardous Components: Breaks down a mixture of chemicals into the percentages of various chemicals making up the mixture.

Exposure Limits: Most MSDSs provide exposure limits such as TLV and PEL.

Section III – Physical Data

Describes the following properties:

Boiling Point, Melting Point, Specific Density, Vapor Pressure, Vapor Density, pH, Odor Threshold, Physical State, Appearance/Odor

Section IV – Fire and Explosion Data

Threshold Limit Value (TLV): This value can be used as a guide in identifying the relative hazard. TLV may be expressed in three ways: Time Weighted Average (TWA) is based on exposure during an 8 hour workday, over a 40 hour work week; Short-term

Exposure Limit (STEL), the maximum concentration for an exposure of 15 minutes or less; Ceiling Limit, the level that should never be exceeded under any circumstances. TLVs will be discussed in more detail later.

Effects of exposure: Provides information on the symptoms of exposure by inhalation, ingestion and skin contact; for example, dizziness, respiratory distress, or irritation to the substance.

Emergency First Aid Information: Gives First Aid procedures to treat a victim suffering, from an acute exposure to a hazardous chemical.

Section VI – Reactivity Data

Will list the following properties:

Stability, Incompatibility, Conditions to Avoid, Decomposition Products, Hazardous Polymerization

Section VII – Spill or Leak Procedures

Steps to be Taken Following a Spill or Leak: Provides information on how to deal with spills of varying size. Any special equipment necessary will be covered here. Most MSDSs provide the substance's RP (Reportable quantity), the quantity which would necessitate informing regulatory agencies if this volume or particular substance were spilled.

Waste Disposal Methods: Usually describes acceptable and prohibited disposal methodology.

Section VIII – Personal Protective Equipment (PPE)

PPE provides details on the PPE that should be utilized when working with the substance or cleaning up a spill. Detailed information is provided concerning respiratory protection (types of respirator and necessary cartridges if required), protective gloves and eye protection. PPE is substance specific and will not work with all chemicals.

Section IX – Special Precautions and Information

Storage Information: Provides detailed storage and use information.

Preparation Date: Indicates the month and year the information was compiled.

Transportation: Most MSDS sheets provide transportation information, referencing the appropriate DOT regulations.

CHEMICAL LABELING AND WARNING REQUIREMENTS

Personnel using chemical are responsible for ensuring that:

1. Labels on incoming containers are not defaced. Unless the label becomes unreadable, all hazardous substances should be stored with the original vendor-supplied label.

2. Labels that become unreadable are replaced with labels that clearly state chemical name, and a warning sign describing the primary hazards.
3. New containers into which chemicals are transferred are labeled as above, with name and warning.
4. Containers in which chemicals are transported outside of the immediate work area are labeled with chemical name, hazard warning, concentration, date prepared, and the initials of the person who prepared the container.

Labels on non-hazardous substances (such as distilled water or sand) are just as important as labels on hazardous chemicals – labeling helps to avoid confusion over which materials are hazardous and which are not.

TOXICOLOGY

Following are some basic concepts of toxicology:

1. Definition of "toxicity"
   - ❖ Toxicity is the science that studies the harmful effects of chemicals on living things.

2. Dose/Response relationship:
   - ❖ The principle that a larger dose of a substance causes a more severe response is called the dose/response relationship. An important part of the dose/response relationship is that no significant toxic effect will occur if the dose is small enough.

3. Degree of toxicity versus the toxic effect:
   - ❖ The greater the toxicity, the lower the dose which gives the same toxic effect.

4. Principal routes of entry:
   - ❖ Inhalation
   - ❖ Ingestion
   - ❖ Skin Contact (absorption)
   - ❖ Injection (possibly from hypodermic or perhaps broken glass)

5. Remote effects:
    - ❖ When a toxic effect occurs at the body part some distance from the point of contact, the substance is said to have a remote effect.

6. Local effects:
    - ❖ When a toxic effect occurs directly at the point of contact, the material is said to have a local effect.

7. Acute effects:
    - ❖ Effects that occur immediately after a single exposure are known as acute effects. The corrosive action of nitric acid splashing on the hand is an example of an acute effect.
    - ❖ Seven types of acute effects:
        - o **Simple Asphyxiation** – Occurs when the body does not receive enough oxygen and the person suffocates.
        - o **Chemical Asphyxiation** – Caused by substances that interferes with the body's ability to use oxygen.
        - o **Anesthetic** – Substances which can cause impaired judgment, dizziness, drowsiness, headache, unconsciousness, even death.
        - o **Neurotoxic** – Chemicals which have the potential of slowing or reducing the brain's ability to control the various parts of the body.
        - o **Irritant** – Substances which can cause temporary discomfort or pain to the eyes, skin or respiratory system.
        - o **Corrosive** – Substances that have a severely damaging effect when they contact skin, eyes or mucous membranes.
        - o **Allergic response** – A toxic effect such as that caused by poison ivy. It is caused by a massive over-reaction of the body's immune system, with effects varying in degree from individual to individual.

8. Chronic Effects:
    - ❖ Chronic effects are those that occur months or years after the original exposure. Black lung disease in coal miners is an example of a chronic effect.

    - ❖ Five types of chronic effects:
        - o **Carcinogenicity** – A response to a substance which leads to malignant tumors in laboratory animals. Human carcinogens are substances known to produce cancer in humans.
        - o **Mutagenicity** – A response to a substance which may cause changes in future generations by altering the genetic material.
        - o **Teratogenicity** – A response caused by materials that can be absorbed into a pregnant woman's body and pass into her unborn child resulting in deformity.

- **Reproductive toxin** – These chemicals, unlike teratogens, can affect the male and female reproductive systems. As a result, the ability to have children may be impaired.
- **Specific organ toxicity** – Chronic overexposure to some substances can damage specific organs. Carbon tetrachloride, for example, can cause liver damage.

9. Factors determining the degree of the hazard:

- ❖ The toxicity of the substance to be handled.
- ❖ The extent of the worker's contact with the substance (time of exposure, concentration of toxin)
- ❖ Condition of the exposed individual
- ❖ Route of exposure
- ❖ Exposure conditions (temperature and humidity)

10. LD50:

- ❖ This term refers to one aspect of acute effect testing where groups of laboratory animals are given doses of the material being tested. These tests are repeated until a quantity is established that kills 50% of the test animals. This quantity of toxic materials is then established as the LD50 for that substance. The important thing to remember when you see an LD50 is that the smaller the quantity, the more toxic the substance.

11. "Safe exposure limits"

- ❖ There are a variety of terms used but they all represent airborne concentrations of toxic substances to which nearly all workers may be repeatedly exposed day after day, without harmful effects.

12. **Threshold Limit Values** – Time-weighted averages for a normal 8-hour workday to which nearly all workers may be repeatedly exposed without adverse effect. Produced by the American Conference of Governmental Industrial Hygienist (ACGIH) for common laboratory chemicals and are meant to be guides.

13. **Permissible Exposure Limits** – OSHA regulations limiting workers exposure to hazardous chemicals. OSHA bases these regulatory limits on ACGIH's TLVs. While TLVs are guidelines, PELs are THE LAW.

14. ***YOU can protect yourself from toxic effects in the workplace by***

1. *Knowing the toxicity of the materials you work with*
2. *Referring to the established Standard Operating Procedures*
3. *Using adequate engineering controls*
4. *Using the proper protective equipment and following safe work procedures*
5. *Using common sense*

6. *Washing up before eating, drinking, or smoking*

BASIC LABORATORY SAFETY PRACTICES

Because few laboratory chemicals are without hazards, general precautions for handling all laboratory chemicals must be taken. Even for substances of no known significant hazard, exposure must be minimized. All laboratory personnel have the basic responsibility to themselves and their colleagues to plan and execute laboratory operations in a safe manner.

GENERAL PRECAUTIONS IN THE LABORATORY

Laboratory workers should observe the following rules:

1. Know the safety rules and procedures that apply to the work that is being done. Determine the potential hazards and become familiar with established standard operation procedures before beginning new operations. Ask your supervisor or refer to the MSDS.

2. Know the types of protective equipment available – **use the proper type for each job.**

3. Do not consume food or beverages or smoke in areas where hazardous substances are used or stored. Food should be restricted to areas free from chemicals.

4. Follow proper chemicals labeling practices. Post warning signs where unusual hazards (radiation, lasers, biological hazards, etc.) exist.

5. Wash hands before leaving the laboratory area-especially before eating or applying cosmetics.

6. Follow accepted waste disposal techniques. Old or expired chemicals should be disposed of through the Safety Department.

7. Keep work areas clean and free from obstructions. Clean up should follow the completion of any operation or at the end of the day.

8. Be alert to unsafe conditions and call attention to them so that corrections can be made.

9. **THINK, ACT AND ENCOURAGE SAFETY UNTIL IT BECOMES A HABIT!**

PERSONAL PROTECTIVE EQUIPMENT

A. EYE PROTECTION

The primary considerations for laboratory workers concerning eye protection are impact and chemical splash protection. Eye protection should be worn at all times in the laboratory. Eye protection should:

- Be adequate for the hazards at hand
- Fit snugly yet comfortable
- Be kept clean
- "Breathe", i.e., the wearer should not overheat and perspire in them.

1. **Contact Lenses** should not be worn in the laboratory. They provide no chemical or physical protection for the eye, and could trap contaminants under the lens. Where it is absolutely necessary for individuals to wear contact lenses (for medical reasons), chemical splash goggles should be worn at all times as a bare minimum in the laboratory. Under conditions of risk, a face shield should also be utilized.

2. **Chemical Splash Goggles** have splash-proof sides and should be worn where danger of splashing chemicals or flying particles exist.

3. **Safety Spectacles** provide protection against flying glass; however, offer very limited protection against splashes.

4. **Impact-Resistant Goggles** have screened areas on the sides and offer the best protection against flying objects; however, this screen limits the amount of protection against chemical splashes.

5. **Face Shields** offer maximum protection to the face and neck against splashes and flying particles. A face shield should be worn whenever using highly corrosive liquids or for operations with a high explosion potential. For full protection, safety glasses should be worn with face shields.

B. **GLOVES** – Skin contact is a potential source of exposure to toxic materials and proper steps should be taken to prevent such contact. Gloves must be worn whenever it is necessary to handle corrosive or toxic materials, or to protect the hands against physical hazards such as; sharp objects, or hot or cold temperatures. In order to offer the proper degree of protection, gloves should:

- ❖ Be chemical resistant
- ❖ Resist tears, punctures and abrasions
- ❖ Allow ease of movement
- ❖ Maintain protective capacity at temperature extremes
- ❖ Select gloves on the basis of the material being handled, the hazard involved, and the suitability for the operation conducted.
    - Leather gloves for protection against broken glass, when chemical protection is not needed.
    - Insulated gloves for protection against temperature extremes. Kevlar can be used briefly up to temperature of 1000 degrees F.
    - See attachment for chemical degradation information on chemical resistant gloves
- ❖ Periodically inspect gloves for discoloration, puncture and tears.
- ❖ Replace gloves periodically, depending on frequency of use and permeability to the substances used. Gloves are eventually permeated by chemicals.

C. **PROTECTIVE CLOTHING** – Advisable for most laboratory work; can offer some protection against chemical splashes or spills.

1. **Laboratory Coats** will protect your clothing and skin from minor chemical contacts. However, they do not significantly resist penetration by organic liquids, and they may be treated upon by corrosive liquids. In case of a significant chemical contact they should be removed immediately.

2. **Plastic or Rubber Aprons** provide better protection from corrosive or irritating liquids.

D. OTHER PERSONAL PROTECTIVE EQUIPMENT

1. **Foot Protection**: Sandals or other types of open shoes should not be worn in the laboratory.

2. **Respiratory Protection**: The primary method for the protection of laboratory personnel from airborne contaminants should be to minimize the amount of such material entering the laboratory air. When effective engineering, controls are not possible, suitable respiratory protection should be provided. The choice of appropriate respirator to use in a given situation will depend on the type of contaminant and its estimated or measure concentrations, known exposure limits, and hazardous properties (provide proper training and fit testing of personnel when respiratory protection is required).

CHEMICAL STORAGE

Users of hazardous chemicals are required by federal, state and local regulations to store their chemicals in a manner that minimizes potential harm to people and the environment. Improper chemical storage practices can directly or indirectly result in injury or death. A storage system based on alphabetizing one's chemicals may result in dangerous incompatible mixtures. Chemical storage must be based on hazard classes. The hazard classes include the following: flammable, corrosive, reactive, and toxic. These are further divided into the following:

Flammables	Corrosives	Reactives	Toxics
	-Acids -Caustics -Mineral -Organic	Oxidizer	

Problems related to chemicals storage will be alleviated by adhering to the following principles:

1. Store flammables in a ventilated cabinet. Areas with a quantity of Class A flammables greater than 10 gallons must utilize an approved flammables storage cabinet.

2. Extremely volatile materials such as ethyl ether should be stored in approved flammable storage refrigerators, or in a continuously running fume hood.

3. Segregate incompatibles!

4. Store substances with multiple hazard characteristics based on their primary hazard. (e.g., methanol is both flammable and toxic; however, its primary hazard is flammability).

5. Utilize secondary containment when storing corrosives.

6. Post storage areas with signs indicating the type of chemicals or hazards present such as, acids or flammables.

FLAMMABLE AND COMBUSTIBLE MATERIALS

Flammable and combustible materials as a group make up the most common hazard present in your laboratory. Many of the solvents, including alcohols, ethers, ketones, alkanes and aromatics

used in a laboratory are flammable. Some organic acids are flammables as well (i.e., acetic acid).

A flammable liquid does not itself burn; it is the vapors from the liquid that burn when mixed in the proper ratio with air. Important characteristics when evaluating flammability hazards:

Flash Point – the temperature at which a substance will produce vapor of sufficient concentration to allow the substance to ignite. It is dependent on the substance's vapor pressure. The vapor pressure increases with an increase in temperature.

Flash point < 100 degrees F – Flammable

Flash point > 100 degrees F – Combustible

Ignition Temperature – The temperature at which the vapors of a substance will spontaneously ignite.

Vapor Density – Indicates if the vapors will rise or sink in air as they are evolved.

Three components must be present for combustion to occur: Fuel, Oxidizer (air), and Ignition source.

Removing any one of these will put out a fire (or stop it from starting).

Handling Flammable Materials:

1. Eliminate ignition sources from area where flammables are used or stored.
2. Minimize the quantity kept in work area.
3. Minimize working volumes. The rate of vapor formation will increase as surface area is increased.

4. Store in approved flammable liquid containers (safety cans) and storage cabinets or in a special storage room designed for that purpose. Store away from oxidizers and strong acids.

5. Refrigerators and freezers used for storage of flammables must be explosion-proof.

6. Assure proper bonding, and grounding when transferring or dispensing flammable from one container to another.

7. Contain a spill of flammable liquids with absorbents. Use non-sparking (such as, plastic) tools when picking up the absorbed material. Contact EH&S in the event of a large spill.

8. Ventilation is one of the most effective ways to prevent the accumulation of flammable vapors. A fume hood should be used whenever appreciable quantities of flammable substances are transferred from one container to another, allowed to stand in open containers, heated in open containers or handled in any other way.

9. Know where fire protection equipment (such as, fire extinguishers) is located, and know how to use it.

CORROSIVE MATERIALS

Corrosive are chemicals that will react with a variety of substances, including metals and plastics. They cause destruction or irreversible alterations of living tissue by chemical action at the site of contact resulting in serious burns. Inhalation of corrosive vapors can cause extreme burning of the respiratory epithelium, mouth and throat.

Type of Corrosive Chemicals	
Strong Acids (Hydrochloric, Sulfuric, Nitric) - These can inflict serious injuries to eyes and skin. In case of personal contamination, immediately flush with water (at least 15 minutes), followed by medical attention. - Use these materials only in fume hoods. - Wear splash goggles, rubber gloves and protective clothing.	Bases (Ammonia, Sodium Hydroxide) - Extremely damaging to the eyes. Immediately flushed with water (at least 15 minutes). - Wear splash goggles, rubber gloves and protective clothing

Handling Corrosive Materials:

1. All procedures involving corrosive materials should be conducted in a fume hood.

2. Wear adequate PPE; chemical splash goggles, rubber gloves, and lab coat. For operations that may involve splashing corrosives, include a face shield and apron. Never wear contact lenses.

3. When diluting acids always pour the concentrated acid into water.

   Never pour water into acid!

4. Wipe the outside of reagent bottles containing corrosives before and after use.

5. Wash lands promptly after using corrosives.

6. In case of small spill, initiate neutralization before clean-up. For large spills notify the Safety Department.

7. Post labels on storage cabinets for corrosive reading **CORROSIVE** and **DANGER**.

8. Reactions utilizing acids and bases are often very exothermic; use only heat resistant glassware.

9. Study the standard operation procedures for each substance in your work area.

First Aid

1. Immediately remove any contaminated clothing

2. Wash the exposed area with water **Know where the safety shower and eyewash stations are located.

3. Seek medical attention.

OTHER LABORATORY HAZARDS

A. Reactive and Unstable Chemicals

Reactive chemicals are friction – or shock-sensitive, or react with water or air. Explosive substances or mixtures decompose or burn rapidly when subjected to shock or an ignition source.

1. Limit the quantity of these materials on hand to the minimum amount required.

2. Avoid friction, grinding, and all forms of impact near shock sensitive chemicals. Storage containers for shock sensitive chemicals should be made of polyethylene.

3. Smoking, open flames and other sources of heat should not be permitted near reactive or unstable chemicals.

4. Peroxides are classified as low-power explosives. Certain compounds are known to form peroxides.

B. Irritants

Within the general range of toxic response, irritant contact dermatitis is the most common skin injury. Irritants can elicit a variety of responses such as, hives, blistering, rashes, callouses, skin dryness and roughness.

Some laboratory irritants:

- Alkalis – Hydroxides, ammonium compounds
- Acids – Tend to be less damaging than alkalis
- Organic solvents – especially aromatics
- Oxidants – peroxides, cyclothexanone
- Reducing agents

C. Compressed Gas Cylinders

Compressed gases are stored in heavy-walled metal cylinders which are especially constructed, maintained and tested for such use. Actual cylinder contents may be liquefied gas, compressed gas, a gas dissolved in a liquid or solid, or a gas mixture.

1. **Handling Compressed Gases:**
   a. Always use a hand truck for transport. Chain cylinders to the hand truck.

   b. Cylinders should be secured at all times, preferably with a chain. Keep caps in place when cylinders are not in use.

   c. Ground all cylinders containing flammable gases.

   d. Never use oily fittings with compressed oxygen.

   e. Store cylinders in a well-ventilated area.

   f. Discontinue using a high-pressure cylinder when the pressure approaches 30 psi.

   g. Use cylinders only in the upright position.

   h. Store oxidizing gases well away from flammable gases.

   i. Know the chemical hazards of the gases you are working with.

D. Cryogenic Liquids

Cryogenic liquids have boiling points from about -100 to -270 degree C. All of them are liquefied under pressure and frequently used at atmospheric pressure. Thus, they are continually boiling during use.

1. Contact with tissues can result in frostbite or actual freezing. For short exposures, flush with large quantity of water. For any exposure, seek medical attention.

2. Store in well-ventilated areas to prevent build-up of flammable gases or displacement of air.

3. Always wear eye protection, preferably a face shield.

4. Protect Dewer flasks with tape to prevent flying glass in case of an implosion .

5. Select working material carefully since cryogenic materials may alter the physical characteristics of many materials.

WASTE DISPOSAL

Laboratory personnel are responsible for determining if their wastes are hazardous and for properly labeling and packaging them so that they may be deposed of in a safe and environmentally sound manner. Since laboratory personnel generate the waste, they are in the best position to identify, segregate, and assist the hazardous waste technicians in collecting the waste.

1. General Waste Streams

   Because each of the following waste streams is disposed of in a different manner, care must be taken to ensure different wastes are not mixed together.

   - ❖ Radioactive waste
   - ❖ Chemical waste
   - ❖ Medical waste

2. **Waste Collection and Proper Labeling**
   a. Containers holding hazardous waste must be non-leaking and compatible with the contents. Each container must be labeled using the following guidelines:

      - ❖ Labeled as “Hazardous Waste” with an accumulation start date

- ❖ List of contents and their approximate concentrations
- ❖ Chemicals in original containers with intact labels need no further labeling

b. Keep different waste streams separated

c. Containers must be sealed airtight with a proper lid – rubber stoppers, cords, and parafilm are not allowed.

d. Solid Chemicals waste can be collected in plastic bags, five boxed or plastic containers.

e. Needles, syringes and razor must be disposed of in Sharps containers.

Paper Work and Documentation

Each generator must complete the appropriate hazardous waste record forms in order for their wastes to be collected. The following information is required on each form:

1. Name of department contact
2. Department name, room number, phone number and date
3. For chemical waste: chemical name(s), concentration(s), quantity, and physical form

Unknowns

The Safety Department will not collect unknown wastes because regulations specifically prohibit transportation, storage or disposal of unknowns.

<u>Waste Containers</u>

General Specifications:

1. Containers and cap compatible with waste.
2. Container and cap in sound condition
3. Cap must be screw type
4. Proper headspace: 1.5” for flat top containers: 3.0” for tapered containers
5. Outside of container clean and uncontaminated
6. Container labeled properly

Type of Waste	Type of Container
Flammable liquids	Glass bottles, steel cans, high density

Concentrated acids & bases	2.5 liter “acid” bottles
Trace contaminated solid waste	Double bagged using polyethylene bags
Aqueous Solutions	Glass bottles, plastic bottles, plastic cans
Broken Thermometers	Broken thermometer with free mercury with a tight cap.

Collecting and Commingling Hazardous Waste

As much as possible, avoid mixing different chemicals. If different chemical wastes are mixed together in single container for disposal, the following rules apply”

1. The same type of chemicals must be mixed together within segregation groups.
2. Only compatible chemicals may be mixed together within segregation groups.

Segregation Groups

Keep these types of hazardous wastes separated from each other:

a. Halogenated Hydrocarbons (chloroform, methylene chloride)
b. Hydrocarbons (xylene, ether, hexane, acetone)
c. Nitrogenous (trimethylamine, diisopropylamine)
d. Sufurous (dimethlysulfoxide, dimethylsulfate)
e. Corrosive (sulfuric acid)
f. Aqueous Solutions (ethidium Bromide, heavy metals)
g. Oils (pump oil, motor oil)

BE SURE THAT COMMINGLED CHEMICALS ARE COMPATIBLE! IF YOU HAVE QUESTIONS, THEN CALL THE SAFETY DEPARTMENT.

INCOMPATIBLE CHEMICALS

Avoid contact between right- and left- column chemicals in storage and handling.

This Chemical…..	**Is Incompatible With…..**
Acetic Acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides, permanganates

Acetylene	Chlorine, bromine, copper, fluorine, silver, mercury
Acetone	Concentrated nitric an sulfuric acid mixtures
Alkali and alkaline earth metals	Water, carbon tetrachloride or other chlorinated hydrocarbons, carbon dioxide, halogens
Ammonia (anhydrous)	Bromine, chlorine, iodine, hydrofluoric acid, mercury, calcium hypochlorite
Ammonium Nitrate	Acids, powdered metals, flammable liquids, chlorates, nitrates, sulfur, finely divided organic combustible materials
Aniline	Nitric acid, hydrogen peroxide
Arsenical materials	Any reducing agent
Azides	Acids
Bromine	See Chlorine
Calcium Oxide	Water
Carbon (activated)	Calcium hypochlorite, all oxidizing agents
Carbon Tetrachloride	Sodium
Chlorates	Ammonium salts, acids, powdered metals, sulfur, finely divided organic or combustible materials
Chromic acid & chromium	Acetic acid, naphthalene, camphor, glycerol, trioxide alcohol, flammable liquids in general
Chlorine	Ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gases), hydrogen, sodium carbide, benzene, finely divided metals, turpentine
Chlorine dioxide	Ammonia, methane, phosphine, hydrogen sulfide
Copper	Acetylene, hydrogen peroxide

Cumeme hydroperoxide	Acids
Cyanides	Acids
Flammable liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Fluorine	All other chemicals
Hydrocarbons	Fluorine, chlorine, bromine, chromic acid, sodium, peroxide

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This Chemical…..	**Is Incompatible With…..**
Hydrocyanic acid	Nitric acid, alkali
Hydrofluoric acid (anhydrous)	Ammonia (aqueous or anhydrous)
Hydrogen peroxide	Copper, chromium, iron, most metals or their salts, alcohol, acetone, organic materials, aniline, nitro-methane, combustible materials
Hydrogen sulfide	Fuming nitric acid, oxidizing gases
Hypochlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqueous or anhydrous), hydrogen
Mercury	Acetylene, fulminic acid, ammonia
Nitrates	Sulfuric Acid
Nitric Acid (concentrated)	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases, cipper, brass, any heavy metals
Nitroparaffins	Inorganic bases, amines

Oxalic acid	Silver, mercury
Perchloric acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood, grease, oils
Phosphorus (white)	Air, oxygen, alkalis, reducing agents
Potassium	Carbon tetrachloride, carbon dioxide, water
Potassium Chlorate	Sulfuric and other acids
Potassium perchlorate	Sulfuric and other acids
Potassium Permanganate	Glycerol, ethylene glycol, benz-ldehyde, sulfuric acid
Selenides	Reducing agents
Silver	Acetylene, oxalic acid, tartaric acid, ammonium compounds, fulminic acid
Sodium	Carbon tetrachloride, carbon dioxide, water
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium peroxide	Theyl or methyl alcohol, glacial acetic acid, acetic anhydride, benz-aldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfide	Acids
Sulfuric Acid	Potassium Chlorate, potassium perchlorate, potassium permanganates (and similar compounds of light metals, such as sodium or lithium)
Tellurides	Reducing agents

Spills and Emergency Procedures

Before attempting any clean-up operations, make sure that you have the proper level of PPE and that you fully understand the hazards posed by the spilled material.

In the event of a chemical spill:

1. Notify others in the immediate area
2. Evacuate personnel from the spill area
3. Eliminate all ignition sources
4. Care for any injury or contaminated persons
5. Notify your supervisor and the Safety Office
6. Avoid breathing vapors of spilled material
7. If it is safe to do so, then established some sort of exhaust ventilation
8. Don the appropriate protective equipment
9. Assemble the necessary clean-up supplies

The following should be considered when equipping for spills:

1. Clean-up capabilities – do not attempt to clean up a large spill alone
2. Hazardous properties – toxicity, flammability, corrosiveness
3. Physical properties – powder, crystal, liquid, plume, mist, gas, etc.
4. Spill location
5. Personnel contamination or injury

TOXINS AND CARCINOGENS

Any chemical which "when ingested, inhaled, or absorbed, or when applied to, injected into or developed within the body in relative small amounts, by its chemical action may cause damage to structure or disturbance to function" is by definition a toxic chemical (Dorland's Medical Dictionary).

Toxic substances may cause injury by damaging biological structure and/or disturbing biological function. Some examples of chemicals that exhibit one or both of these types of effects are:

Damage to Structure:	**Disturbance of Function:**	**Both effects:**
Sulfuric Acid, 50% Sodium Hydroxide and other corrosive that inflict burns on contact	Carbon monoxide decreases the ability of hemoglobin to transport oxygen to body tissues. Parathion is a cholinesterase inhibitor, and thus blocks the transfer of nerve impulse in the synapses.	Chlorine damages the lungs; this damages lung capacity and reduces the rate of oxygen exchange.

Review of Basic Toxicology Concepts

Parameter Affecting Toxicity

1. **Mode of entry** – Inhalation, absorption, etc.
2. **Physical condition** – Are you ill? Has your body been damaged by previous assault?

3. **Dose** – The amount of chemical assaulting your system
4. **Exposure duration** – length of time exposed to the chemical
5. **Sensitivity** – How sensitive are you to the chemical (may vary between individuals)?
6. **Combined effects** – What other chemicals were you exposed to?
7. **Stress** – Were you under any physical or mental stress during the exposure?
8. **Other** – Sex, race, temperature, altitude, etc.

Threshold Limit Value (TLV): Established by the American Conference of Governmental Industrial Hygienists

- Provide a guide that can be used in identifying the relative of a substance

- Time-weighted average concentrations for a normal 8-hour workday to which nearly all workers nay be repeated exposed without adverse effect – Also known as TLV-TWA or just TWA

- Short Term Exposure Limits (STEL) are the maximum average concentrations for an exposure of 15 minutes or less

- Ceiling Limits are the concentration levels that should never be exceeded under any circumstances

Permissible Exposure Limit (PEL)

OSHA regulations limit workers exposures to hazardous chemicals. OSHA bases these regulatory limits on the TLV established by the ACGIH.

LD**50**

In the animal studies, the dose was found to have killed 50% of the test subjects.

- The smaller LD**50** is, the more toxic the substance and vice-versa
- LD**50** from animal studies are extrapolated to determine lethal doses in humans

Types of Toxic Responses

Toxic materials cause local or systemic effects in an organism.

- Local toxicity may be defined as the effect of a substance on the body area that has been exposed to the substance.
- Systemic toxicity is the effect of a substance on body tissues after absorption into the bloodstream.

Exposure to toxic material does not always result in death, although that is possible and of immediate concern. The types of toxic hazards resulting from any exposure to a toxic substance are categorized based on the physiological response of the organism to the substance. More than one type of response is possible.

Systemic Poisons

Systemic poisons are chemicals which act on a specific target organ or organ system. Included in this group are the anesthetics and narcotics. These substances can impair judgment and depress the central nervous system resulting in a loss of sensation or stupor. If the concentrations are large enough, then coma and death can occur.

Asphyxiant

Asphyxiant are agents which deprive the tissues of oxygen, a condition called anoxia. This group is divided into simple and chemical asphyxiant. The simple asphyxiant acts by diluting or displacing atmospheric oxygen, which lowers the concentration of oxygen in air. The chemical asphyxiant acts by disrupting biological process related to the transport, exchange or use of oxygen by the body.

- Simple Asphyxiant: Aliphatic hydrocarbons, helium, nitrogen, hydrogen, nitrous oxide, carbon dioxide, methane
- Chemical Asphyxiant: Aniline, methyl aniline, cyanogen, hydrogen cyanide, toluidine, carbon monoxide.

Irritants:

Irritants are materials that cause inflammation of membranes, either by corrosive action or by drying. Irritants may affect the eyes, skin, respiratory epithelium or gastrointestinal tract. The irritant must come in direct contact with the tissue to cause an inflammation reaction.

- **Skin Irritants:** Acids, alkalis, solvents, metallic salts, detergents
- **Respiratory Irritants:** Aldehydes, ammonia, hydrogen chloride, ozone, nitrogen dioxide

Skin exposure to irritating materials in high enough concentrations may result in contact dermatitis, characterized by redness, itching and drying of the skin. Dermatitis causing chemicals are called primary irritants. Organic solvents are examples of primary irritant, eliciting a response in hours.

Secondary irritants produce no irritation at the site of contact, but produce systemic effects from absorption (i.e. phosgene).

Sensitizers produce little or no response from the initial contact; however, subsequent contacts produce extreme reaction.

Strong irritants are the acids and the alkalis, producing observable effects within minutes. Extremely corrosive agents can cause skin ulceration and destroy tissues.

Mutagens, Teratogens, Carcinogens

Definitions:

Carcinogen: A substance that causes malignant (cancerous) tumors – a tumor is considered to be either cancer, or a precursor to cancer.

Mutagen: A substance that causes a heritable change in the gene structure.

Teratogen: A substance that can cross the placenta and produce malformation in a developing embryo or fetus.

Reproductive Toxin: A substance that affects the male or female reproductive systems. As a result, the ability to have children is impaired.

An agent that can cause cancer in an organism is called a carcinogen. Exposure to the carcinogen results in the onset of cancer. This differs from a mutagen, which changes a gene in a sperm or egg cell of the parent. The parent is not affected, but the future progeny suffer the consequences. Teratogenesis differs from mutagenesis in that it results from exposure of the embryo or fetus to the agent itself. While it has been possible to identify some teratogens and carcinogens, it has been not possible to conclusively identify mutagens because of the difficulty in observing mutagenesis in cells.

Although the list of "carcinogens" is extremely large and continually growing as epidemiological studies and animal testing are conducted, the list of chemicals that are absolutely, positively known to cause cancer in humans is very small.

Confirmed Human Carcinogens: A substance that has been shown by valid, statistically significant epidemiological evidence to be carcinogenic to humans. These substances are the "Regulated Carcinogens" of 29 CFR 1910 Subpart Z.

Regulated Carcinogenic Materials:

Asbestos

4-Nitrobiphenyl

a-Napthylamine

Methyl chloromethyl ether

3,3' – Dichlorobenzidine (and its salts)

Bis-chloromethyl ether

B-Napthylamine

Benzidine (and its salts)

4-Aminodiphenyl

Ethyleneimine

B-Propiolacetone

2-Acetylaminofluorene

4-Dimethylaminoazobenzene

N-Nitrosodimethylamine

Vinyl Chloride

Inorganic Arsenic

1,2-Dibromo-3-chloropropane

Acrylonitrile

Ethylene Oxide

Benzene

Suspected Carcinogen: a substance suspected to be capable of inducing cancer based on limited epidemiological evidence or demonstration of carcinogenesis in one or more animal species. These substances are found on the "California List" of carcinogens created in response to Prop. 65.

Neurotoxins

Neurotoxins are diverse compounds that may be toxic to specific regions, specific cell types and specific cell functions in the nervous system, and as a whole are poisons to the nervous system.

Neurotoxins may selectively impair:

Protein synthesis,

Propagation of electrical impulses along nerve axons,

Neurotransmitter activity, or

The maintenance of the myelin sheath.

Some neurotoxins are capable of fairly selective injury and may damage only hearing or sight, or specific portions of the brain or peripheral nerves.

Examples of Neurotoxins

Demyelinating neurotoxins: Lead, Cyanate, Tellurium, Thallium, Diphtheria Toxin

Peripheral motor neurotoxin: Acrylamide, Arsenic, Azide, Carbon Disulfide, Ethylene glycol, Formate, Hexane, Methanol, Methyl mercury, Phosphorous, Tetraethyl lead, Vincristine, Dinitrobenzen, Iodoform, Dinitrotoluene

Acute and Chronic Effects

An acute effect is usually defined as that effect manifested on "short exposure" on single contact, ingestion or inhalation.

A chronic effect is that effect observed when a toxicant acts on body tissues over a "long" period of time (i.e. days to years). A Chronically toxified subject may not observe effects until an advanced stage is reached and permanent damage is done.

Two substances may have about the same toxicity on a single (acute) exposure; however, their effect on prolonged or repeated exposure may be quite different. In other words, the toxic nature of a substance must be related to the duration of exposure. The following example describes both the acute and chronic effects of benzene which is a systemic poison.

TLV-TWA 10 ppm

Acute: Irritation, aromatic hydrocarbon poisoning

Chronic: Anemia, leukemia, death

Principle Routes of Exposure

In the laboratory, the principal routes of exposure are absorption (after contact with skin or eyes), inhalation, ingestion and (rarely) injection. Of these, inhalation is usually of the most concern due to high volatility of laboratory solvents and the presence of compressed gases. Absorption is also of concern because many laboratory chemicals can readily pass through the skin, and may laboratory operations offer the potential for skin contact.

Skin Contact/Absorption

The skin acts as a barrier against the entry of foreign material. Chemicals can enter the body if this barrier is overcome. Organic solvents can increase the permeability of the skin and will readily pass through into the bloodstream, and can often carry other chemicals that otherwise might not pass through.

- ❖ The skin is the most frequently exposed body tissue due to its large surface area.
- ❖ The most common response is irritation.
- ❖ Man compound are readily absorbed through the skin, enter the bloodstream and produce systemic effects

Skin points of entry: **hair follicles, sweat glands, open wounds**

Pain sensations do not necessarily accompany an assault on the skin.

Eye Contact

Very few substances are safe or innocuous when in contact with the eyes. The sensitivity of eyes to chemicals in general is such that irritation, pain, impairment of vision, or even loss of vision can result.

- ❖ Chemicals are readily absorbed into the eye through the lens, when they can act on the eye itself or pass into the bloodstream.
- ❖ Most chemical contact with the eye will induce a chemical change in the mucous membranes or fluids surrounding the eyeball, producing some degree of irritation and discomfort.

Inhalation

The surface area of the lungs is estimated to be greater than 100m2, providing the means for rapid absorption of toxicants into the bloodstream, where they can be quickly carried to all parts of the body.

- ❖ The rate of absorption is related to the exposed individual's level of activity – a high level of activity results in an increase in the rate of respiration and resulting increase in the rate of absorption

The presence of toxicants in the air can often be indicated by pain sensations or smell, and allow for immediate remedial action to be taken (such as evacuation the room, or turning on ventilation). However, the senses may not become aware of the danger until after the damage has been done, or the senses may not become aware of the danger at all.

Olfactory fatigue may prevent the observation of toxic quantities of ozone or hydrogen sulfide; or the pain caused by HF vapors may not be noticed until several hours have passed.

- ❖ Sensory warning is a useful back-up, but should not be relied on as a first defense
- ❖ Odor threshold is the lowest airborne concentration of a substance that can be detected by an individual
    - Varies from individual to individual
    - Toxic levels may be reached without warning

- Substances with color thresholds much less than their TLVs are said to have good warning properties.

Ingestion

As a route of exposure ingestion is of lesser concern than absorption or inhalation; however, ingestion of chemicals is possible by swallowing contaminated air or by contaminating food items. Laboratory exposure through this route can be eliminated through strict observance of hygienic practices related to eating, drinking and smoking.

Injection

The equivalent of purposeful injection can occur through mechanical injury with contaminated glass or metal – a laceration of penetration.

Target Organ Effects		
Toxin	**Signs & Symptoms**	**Chemicals**
Hepatoxins – Chemicals which produce liver damage	Jaundice; liver enlargement	Carbon Tetrachloride, nitrosamines
Nephrotoxins – Chemicals which produce kidney damage	Edema; proteinuria	Halogenated hydrocarbons, uranium
Neurotoxins – Chemicals which exhibit their primary toxic effects on the CNS	Narcosis; behavioral changes	Mercury, carbon disulfide
Hematopoietic Toxins – Agents which act on the blood or blood forming systems. Decrease hemoglobin function and deprive the body tissues of oxygen.	Cyanosis; loss of consciousness	Carbon monoxide, cyanides
Agents which damage the lungs – Chemicals which irritate or damage the pulmonary tissue	Cough; tightening in chest; shortness of breath	Corrosive, asbestos
Reproductive Toxins – Chemicals which affect the reproductive organs	Birth defects; sterility	Lead, alcohol, organophosphates

Cutaneous Hazards – Chemicals which act on the derma layer of the body	Defatting of the skin; rashes	Ketones; chlorinate compounds
Eye Hazards – Chemicals which act on the eye or affect vision	Conjunctivitis; corneal damage	Acids, bases, organic solvents

Medical Emergencies

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When working in dentistry field it is not common to be involved in attending serious emergencies although dental team must be aware and informed of how to react and what to do in medical emergency. When an emergency occurs in the office there are three main steps to be followed: first check the victim, then call 9-1-1 or the local emergency number and finally take care of the victim. Some medical emergencies will require assisting the victim before contacting any medical experts such as Emergency Medical Services (EMS) or 9-1-1 therefore, it is important to know to assist the victim by having good knowledge of how to put in practice cardiopulmonary resuscitation (CPR) and how to check the Airway, Breathing and Circulation (ABCs) of the victim. The most common medical emergencies encounter in a dental office are choking, syncope, postural hypotension, pregnant patient, cardiac emergencies cerebrovascular accident, hyperventilation, asthma attach, allergic reactions, epileptic seizure, and diabetes mellitus.

Choking

Choking occurs when an object gets stuck in the throat and partly or completely blocks the air way. Breathing becomes difficult or even impossible. There is much can be done to provide aid to choking victim to dislodge an object from the victim's air way, including using abdominal thrusts, chest thrust, and back blows. Choking victims can be in a conscious or unconscious state. In the dental office, risk can be minimized by preventing the patient from swallowing dental objects.

Chocking Symptoms:

- Victim points his or her throat or grasps it.
- Victim has difficulties speaking and breathing is difficult and something noisy.
- Coughing, red face that can later turn blue, and convulsions.
- Victim sometimes becomes unconscious.

What to Do and Not to Do in Case of Choking:

- Conscious victim. If the victim can talk, coughs effectively, and appears to be making good breathing efforts.

1. Encourage the victim to cough to try to get rid of the object. Do not help the victim get rid of the object by, for instance, slapping his or her on the back.
2. Give 5 back blows between the person's shoulder blades with the heel of your hand.
3. Give 5 abdominal thrusts (also known as the Heimlich maneuver).

    - Stand behind the victim and wrap your arms around his waist, without touching the ribs.

- With one hand, make a fist and put the thumb side just above the navel and well about the middle of the abdomen. Grasp the fist with your other hand.
- Keeping your elbows pointing out, give five thrusts, pressing your fist inward with a quick, upward motion as if trying to lift the victim up.

- Alternate between 5 blows and 5 thrusts until the blockage is dislodged.

o Unconscious victim. If the victim loses conscious, send someone to call 911.

1. Open the victim's airway.
    - Lower the person on his or her back onto the floor.
    - If there is a visible blockage at the back of the throat or high in the throat, reach a finger into the mouth and sweep out the cause of the blockage. Be careful not to push the food or object deeper into the airway.
    - Begin cardiopulmonary resuscitation (CPR) if the object remains lodges and the person does not respond after you take the above measures. The chest compressions used in CPR may dislodge. Remember to re-check the mouth periodically.
2. After successful removal of the obstruction, a physician or a paramedic should evaluate the patient because internal bleeding and other complications may occur even with a properly employed open airway.

Syncope

Syncope is a temporary loss of consciousness due to the sudden decline of blood flow to the brain. Syncope is commonly called fainting or "passing out". As victim loses consciousness it drops to the floor. After fainting, an individual may be unconscious for a minute or two, but will revive and slowly return to normal. Syncope can occur in otherwise healthy people and affects all age groups, but occurs more often in the elderly.

Syncope Symptoms:

1. Victim's skin may be cold and clammy.
2. If an individual is about to faint, he or she will feel dizzy, lightheaded, or nauseous and his or her field of vision may "white out" or "black out."
3. Victim has fallen unconscious and he or she can appear ashen gray.
4. Victim is bathed in sweat and may twitch or convulse.

What to DO in case of Syncope:

1. Place the victim in supine position and check if he or she responses.
2. Establish patient airway with chin lift and check breathing.

3. Monitor pulse, respiratory rate and check blood pressure.
4. Administer ammonia vaporole under nose.
5. Apply cold towel in forehand and/or blanket if cold or shaking.
6. Do not continue treatment and keep victim in supine position even if trying to sit up.
7. Allow to recover and slowly upright victim to prevent collapse.

Postural Hypotension

Postural hypotension occurs when blood pressure during and after heartbeat is much lower than usual. Hypotension can be caused by alcohol, anti-anxiety medications, certain antidepressants or diuretics.

Hypotension symptoms:

1. Blurry vision, confusion, dizziness
2. Fainting or syncope, light headedness
3. Sleepiness and weakness.

What to do in case of hypotension:

1. Vital signs need to be checked frequently (temperature, pulse, rate of breathing, and blood pressure).
2. Victim should immediately sit or lie down and ask him or her to raise feet above the heart level.
3. If the hypotension causes a person become unconscious, seek immediate medical treatment.
4. Call 9-1-1 or the local emergency number.
5. If the victim is not breathing nor has no pulse, begin CPR until medical help arrives.

Hypotension can usually be treated with success.

Pregnant Patient

During a patient's first trimester, initiate a preventive care program consisting of plaque control and oral hygiene instructions. Simple scaling and prophylaxis may be accomplished, but no elective treatment should be started. The baby's organs develop during this time and are most sensitive to radiation and chemicals. Proper radiograph technique such as digital and using a lead shield can be performed. Emergency dental treatment should be provided, as mother's severe pain, infection, or both can cause problems to the baby. Also, it is important to know how

to handle a choking in a pregnant patient (Hupp).

If the patient is choking:

- Conscious Pregnant:
  1. Stand behind the victim and wrap your arms under the victim's armpits.
  2. Pale a fist in the middle of the victim's breastbone at an imaginary line that runs between the nipples. Grasp the fist your other hand.
  3. Keeping your elbows pointing out, give five chest thrusts, pressing you fist inward with a quick, upward motion as if trying to lift the victim up.
- Unconscious Pregnant:
  1. Place the victim on his or her back. Do not straddle the victim. Work from the side instead, placing yourself at the right angles to the victim.
  2. Place the heel of one hand on the center of the breastbone in the middle of an imaginary nipple line. Put your other hand on top and intertwine your fingers.
  3. Positions your body over your hands, with your arms straight and elbows locked.
  4. Give five firm thrusts. Each thrust should be done firmly and separately.

  5. After successful removal of the obstruction, a physician or a paramedic should evaluate the patient because internal bleeding and other complications may occur even with a properly employed open airway.

NOTE: The most common drugs used by dentists have been shown that to be safe of ruse in pregnancy with a few exceptions.

1. Lidocaine with epinephrine is safe but as with any patient, proper aspiration to avoid intravascular injection is necessary for effective anesthesia and to avoid the cardiovascular side effects.
2. Penicillin, clindamycin, and cephalosporins are safe antibiotics and should be prescribed when indicated.
3. Tetracyclines of any type should be avoided during pregnancy.
4.

Cardiac Emergencies

Two common cardiac emergencies are a heart attack and cardiac arrest. Heart attack occurs when the blood flows to some part of the heart muscle is compromised and the heart begins to die. If enough part of the heart dies, the heart cannot circulate blood effectively. Heart arrest is mean when the heart stops beating. A victim that is not breathing and has no sign of circulation needs cardiopulmonary resuscitation (CPR).

Heart Attack Symptoms:

1. The most prominent signal of a heart attack is persistence chest pain or discomfort.
2. The victim may describe pain as an uncomfortable pressure, or a heavy sensation in the chest.
3. The victim is conscious but quit uncomfortable, perhaps short of breath, perspiring but cold, and in intense discomfort.
4. The pain may spread to the shoulder, arm, neck or jaw.
5. The victim may be breathing faster than normal.
6. The victim's skin may be pale, ashen or bluish, particularly around the face. The skin may also be moist for from perspiration.

What to Do and Not to Do if a Heart Attack:

1. Try nitroglycerin spray translingual.
2. Send someone to call 9-1-1 or the local emergency number.
3. Have the victim rest so it is easy for him or her to breathe better.
4. Administer nitrous oxide and oxygen, which serves as analgesic, sedative, and ambient oxygen.
5. Monitor the victim closely until EMS personnel arrive. Note any change in appearance and behavior.
6. Be prepared to perform CPR or use an AED if the victim stops breathing and has no longer other sign of circulation.
7. If unconscious use positive pressure oxygen and CPR.
8. Do not try to drive the victim to the hospital.
9. Once medical assistance arrives, the victim will be stabilized and transferred to the emergency department of a nearby hospital.

Heart Arrest Symptoms:

1. The absence of signs of circulation is the primary signal of cardiac arrest.
2. The victim will be unconscious, not breathing and will not have pulse.
3. The victim's skin may be pale, ashen or bluish, particularly around the face. The skin may also be moist for from perspiration.

What to Do if Heart Arrest:

1. Check the victim.
2. If the victim is unconscious, send someone or call 9-1-1 or the local emergency number.
3. Check for breathing. If the victim is not breathing give two rescue breaths.
4. Check for signs of circulation. If no signs of circulation, perform CPR.

Cerebrovascular Accident

Also known as a stroke occurs when blood supply to part of the brain is dislocated, causing a brain cells to die (Wedro).

Cerebrovascular symptoms:

1. Sudden numbness or weakness of the face, arm or leg. Loss of voluntary movements or sensation may be complete or partial.
2. Sudden confusion or trouble speaking or understanding.
3. Sudden trouble seeing in one eye or both eyes.
4. Trouble walking, dizziness, loss of balance or coordination, severe headache.

What to Do if cerebrovascular accident:

1. The first priority is ensuring the ambulance arrives as soon as possible.
2. Victim should lie flat to promote an optimal blood flow to the brain.
3. If drowsiness, unresponsiveness, or nausea is present, victim should be placed in the rescue position on their side to prevent choking should vomiting may occur.
4. Aspirins play a major role in preventing strokes.
5.

Hyperventilation

Hyperventilation occurs when a victim is feeling out of breath and increases the rate at which he breaths. You can treat and reverse hyperventilation with a few simple steps.

Hyperventilation Symptoms:

1. Rapid, deep breathing, shortness of breath, dizziness or faintness.
2. Tingling, numbness, or cramping of the hands and feet, numbness around the mouth, anxiety.

What to Do and Not to Do:

1. Calm the victim.

2. Encourage the victim to slow his breathing. Using his abdominal muscles, the victim should inhale through the nose, hold his breath for a few seconds, and then slowly exhale through pursed lips.
3. If that doesn't work, the victim can try breathing in and out the paper bag for a short time, while you reassure him.
4. If the symptoms continue, seek medical attention.
5.

Asthma Attack

Asthma is a condition that affects the ability of airways to carry air to and from the lungs. When an asthmatic is exposed to some irritants, his or her airways become swollen and inflamed, blocking the flow of air and making breathing difficult. Many asthma attacks develop slowly, so medication can be taken.

Asthma Attack Symptoms:

- Moderate Attack:
  1. Breathing that is difficult and fast than usual.
  2. Reduced ability to exhale, wheezing, tightness in the chest, and flaring nostrils.
  3. Increased pulse, anxiety, and vomiting.
- Severe Attack:
  1. Breathing becomes more difficult, bluish tinge in the skin.
  2. Rapid pulse, inability to cough.

What to Do and not do if Asthma Attack:

- Moderate Attack:
  1. Check the victim airway, breathing, and circulation.
  2. Calm the victim and place him or her in an upright sitting position. Loosen any tight clothing, and remove rings and nay other constricting jewelry.
  3. Ask the victim if he or she has an action plan. If so, follow the instructions.
  4. Ask the victim about asthma medication. If available, give four puffs of the victim's bronchodilator, then one puff per minute to relieve symptoms.
  5. If the medication does not relieve the attack, then call EMS.
  6. Avoid giving any medication that has not been prescribed by the victim's doctor.
  7. While waiting for EMS, continue to calm the victim.
  8. Try to determine what triggered the attack. This information is important to help prevent future asthma attacks.
- Severe Attack:
  1. Do not delay getting help. Call 9-1-1 immediately.
  2. Inject the victim with epinephrine. It is usually found in the emergency aid kit.
  3. Employ the same procedures as in moderate attack.

Allergic Reaction

When our bodies come into contact with a foreign substance, our natural defense system work to protect us and destroy the substances. But in people with allergies, it mistakenly attacks these substances, causing an allergic reaction. The good news is that quick action can save a life.

Allergic Reaction Symptoms:

1. Itchy, watery eyes, runny nose with clear nasal discharge.
2. Sneezing, rash
3. Flushing in the face, neck, hands, feet, or tongue, tongue and lip swelling, tightness in the chest or throat.
4. Rapid breathing, skin around the mouth and lips in blue, nausea, and/or vomiting, abdominal pain, pale, damp skin, anxiety.

What to do and not to do:

1. Itchy rash may be relieved by cold compresses.
2. Check the victim's ABCs and treat as necessary.
3. Call 911. Look for card or identification bracelet that contains information about the victim's allergies.
4. If an epinephrine kit is available, inject epinephrine according to instructions. More than one dose may be needed to reverse the anaphylactic shock.
5. Place him in a sitting position instead. AVOID moving the victim if a spinal cord injury is suspected.
6. Comfort the victim and help him stay calm while you're waiting for EMS.
7. AVOID giving the victim food and drink until you have consulted a doctor.

Epileptic Seizure

A seizure (convulsion) occurs when brain cells are stimulated in abnormal way. In some cases, severe seizures, or those of an unknown origin, will require immediate medical care. Your main role is to help prevent injury during the event and to comfort the victim when it's over.

Seizure Symptoms:

1. Hearing strange sounds, taste sensations such as, metallic taste in mouth, hallucinations.
2. Body stiffness, jerky movement of face and limbs, eyes roll upward.
3. Drooling, loss of bladder of bowel control, breathing difficulties, loss of consciousness.

What to do and not to do:

1. If you suspect the victim is having a non-motor seizure, seek medical attention.
2. Have him or her sit or lie down to prevent a fall.
3. If the victim is not already lying down, place him or her on the floor. Ask unnecessary bystanders to leave.
4. Loosen any tight clothing, especially around the victim's neck.
5. Try to protect the victim from injuring himself or herself during the seizure, but DO NOT hold him or her down.
6. DO NOT place anything between the victim's teeth.
7. DO NOT give the victim anything to eat or drink. But if the victim has diabetes, put a sugar cube under his tongue.

Diabetes Mellitus

Diabetes mellitus is a group of metabolic characterized by high blood sugar level, which result from defects in insulin secretion, or action, or both. Diabetes mellitus commonly referred to as diabetes.

Diabetes Mellitus Symptoms:

1. Dehydration causes increased thirst and water consumption.
2. Weight loss despite an increase in appetite.
3. Complain of fatigue, nausea and vomiting, blurred vision.

What to do:

1. This kind of emergency is mainly treated with a physician or medical doctor for life treatment.

NOTE: Some medication such insulin, glucagon, and glucose can be taken.

Palomar College San Marcos Campus Emergency Procedures Guide

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THIS GUIDE

This Guide has been prepared for you as a quick reference during emergency conditions on campus. You will be most effective in an emergency when you are prepared. Please take a few moments to review the material. This document is not meant to cover every emergency situation that may arise. If you are unsure of what you need to do in a particular emergency, please ask your supervisor or contact Campus Police by dialing extension 2289 or 760-744-7753. Be sure to check with your supervisor for emergency guidelines and policies that are specific to your building (example: Chemistry, DRC, etc.).

In the event of an emergency, faculty, staff, and supervisors have the responsibility to give instructions to students and staff, close and lock doors, and provide other required safety and first aid measures unless otherwise directed by Campus Police or other properly identified emergency personnel. (See 2nd to last page, for The Quick Reference Guide for Emergencies.)

EMERGENCY PHONE NUMBERS FOR PALOMAR COLLEGE

If calling from a campus phone:

Fire	9-911
Medical	9-911
Poison Control	1-(800) 876-4766
Campus Police	2289 or (760) 744-7753
Environmental Health & Safety	2772 or 2266
Health Services	2380
Facilities	2629

When calling, calmly state:

- Your full name.
- Exact address or building, floor, and area or department of emergency.
- Whether any injuries have occurred.
- Hazards present which may threaten persons on the scene or those responding (chemical storage, compressed gases, etc.).
- The telephone number and location at the scene where you can be reached.
- **Don't hang up!!** Let the person you are talking to end the conversation; other information may be needed.

BEHAVIORAL CONCERNS

Contact Campus Police, at extension 2289 or 760-744-7753, in the event of crisis situations such as the following.
Campus Police **WILL MAKE** the appropriate contacts and referrals:

- Alcohol and other drug use emergencies
- Disruptive behavior
- Discipline issues
- Mental health/behavioral incidents or concerns
- Physical injuries
- Sexual assault
- Threats to public welfare

If you see behaviors that may lead to a crisis, contact Campus Police by dialing extension 2289.

CIVIL DISTURBANCE OR DEMONSTRATION

Most campus demonstrations will be peaceful;
everyone should attempt to carry on business as normally as possible.

1. Avoid provoking or obstructing the demonstrators.
2. Avoid the area of the disturbance.
3. Continue with your normal routine.
4. If the disturbance is outside, stay away from doors or windows.
5. If a class or lecture is disrupted, the offending persons (s) should be requested to leave. **If they refuse, call Campus Police at ext. 2289 or (760) 744-7753.**

SUSPICIOUS MAIL

ANY PERSON WHO RECEIVES OR IDENTIFIES SUSPICIOUS MAIL SHOULD LEAVE THE ITEM ALONE AND NOT MOVE IT.

The person should immediately contact Campus Police at extension 2289 or 760-744-7753.

Tips for identifying suspicious packages:

- Addressed to someone no longer with your organization or otherwise outdated.

- City or state in the postmark that does not match the return address
- Excessive postage
- Excessive securing material, such as masking tape, string, etc.
- Excessive weight
- Handwritten or poorly typed address
- Incorrect titles
- Item has been opened and a suspicious substance is visible leakage
- Lopsided or uneven envelope
- Misspellings of common words
- No return address
- Protruding wires and/or tin foil
- Other irregularities that arouse suspicion on the part of the recipient.
- Restrictive markings, such as confidential, personal, etc.
- Rigid envelope
- Stains or discoloration
- Titles but no names
- Unusual odor

EXPLOSION/AIRPLANE CRASH

If you have information about the incident which may be useful to investigators:

- Contact Campus Police at extension 2289 or 760-744-7753 to give the officer on-the-scene details along with your full name, location and nature of the emergency.

If inside the building:

- Immediately take cover under tables, desks, or other such objects providing protection against flying glass and debris.
- Remain inside the building until safe to exit.
- Everyone must follow the directions of emergency
- Response personnel when they arrive.
- If evacuation is in order, take personal items such as car keys, purse, medication, glasses.
- Seek out and assist injured and disabled persons in evacuating the building.
- Once outside, move at least 150 feet away from the building. Keep roadways and walkways clear for emergency vehicles.

DO NOT RE-ENTER the building until instructed to do so.

If outside the building:

- Follow drop and cover procedures.

- Move quickly away from the building.
- Everyone must follow the directions of emergency response personnel when they arrive.
- Notify emergency personnel on the scenes, if you suspect someone ***may be trapped*** inside the building.
- As a precaution, make sure you are aware of the safety equipment in your building and report potential hazards to Campus Police at extension 2289 or 760-744-7753.

IF AN EXPLOSION OF ANY TYPE OCCURS,
Immediately Call Campus Police at ext. 2289 or (760) 744-7753.
Give all information to the dispatcher and stay on the line for emergency directions.

VIOLENCE OR CRIME IN PROGRESS

IF YOU OBSERVE A CRIME OR BEHAVIOR THAT YOU SUSPECT IS CRIMINAL, immediately notify Campus Police at extension 2289 or 760-744-7753. DO NOT approach or apprehend the person(s) involved.

DO NOT TAKE UNNECESSARY CHANCES ***(do not interfere with the following):***

- Persons committing the crime/creating the disturbance.
- Law Enforcement Authorities on the scene.

If you are the victim of, are involved in, or witness any on-campus violation of the law such as assault, robbery, theft, overt sexual behavior, etc.
CALL Campus Police at Extension 2289 Or 760-744-7753 IMMEDIATELY.

WITH THE FOLLOWING INFORMATION:

- Nature of incident
- Location of incident
- Description of person (s) involved
- Location of person (s) involved
- Are weapons involved?
- Has anyone been injured?
- Your full name, location, department and extension number

OBTAIN A GOOD DESCRIPTION OF THE CRIMINAL, IF PERSONAL SAFETY ALLOWS:

- Note height, weight, sex, color, approximate age, clothing, method and direction of travel, name (if known).

- This process only takes a few seconds but can be of vital assistance to investigating police officers.
- Should a criminal attempt or accomplish to get away in a vehicle, on a bicycle, etc., note the make and model, license number (if possible), color, outstanding characteristics, and direction of travel (if known).
- **Remain where you are** until a police officer arrives.

BOMB THREATS

BOMB THREATS are usually received by telephone, sometimes by e-mail, note or letter. Most bomb threats are made by callers who want simply to create an atmosphere of anxiety and panic – all such calls must be taken seriously as a legitimate danger to the Palomar College community. If you receive a threat of any kind, **IMMEDIATELY CALL Campus Police AT EXTENSION 2289 OR 760-744-7753.** If possible, get a co-worker to do this while you continue talking with the caller.

Permit the caller to say as much as possible without interruption. Then, ASK A LOT OF QUESTIONS:

- Where is the bomb?
- When is the bomb going to go off?
- What kind of bomb is it?
- What does the bomb look like?

***USE THE BOMB THREAT REPORT ON THE NEXT PAGE.**
Take notes on everything said and on your observations about background noise, voice characteristics, caller's emotional state, etc.

- Notify your supervisor, department chairperson, or director.
- Campus Police will determine if evacuation is necessary. If you do evacuate, move a safe distance from the building (a minimum of 300 feet). If weather conditions warrant, it may be preferable to move to another building.
- Do not return to area until instructed to do so by emergency personnel.

SUSPICIOUS PACKAGE/OBJECT:

- If you receive or discover a suspicious package or foreign device, DO NOT touch it, tamper with it, or move it under any circumstances!
- Immediately call Campus Police at extension 2289 or 760-744-7753.

BY WRITTEN COMMUNICATIONS:

- If you receive a bomb threat through the mail, avoid handling the postage material.

- Immediately call Campus Police at extension 2289 or 760-744-7753.
- Turn the material over the Campus Police upon their arrival.
- Keep track of the following information:
- Who found it?
- Who else was present?
- Where was it found or delivered?
- Who touched it?
- Have any previous threats been received?

DO NOT USE 2-WAY RADIOS OR CELL PHONES IN THE AREA UNTIL POLICE HAVE CLEARED THE AREA!

BOMB THREAT REPORT

Most bomb threats are made by callers who want simply to create an atmosphere of anxiety and panic; however, all such calls must be taken seriously. If you receive a threat of any kind, immediately **CALL 9-911.** If possible, get a co-worker to do this while you continue talking with the caller.

QUESTIONS TO ASK:	TAKE NOTE:

Caller's Voice:	Background Sounds:

BUILDING EVACUATION PROCEDURES

Certain emergencies may require evacuation of the building.
DO NOT USE ELEVATORS.

Notify others in the immediate vicinity.

PREPARE: Determine in advance the nearest exit from your work location and the route you will follow to reach that exit in an emergency. Establish an alternate route to be used in the event your route is blocked or unsafe.

IN THIS EVENT:

- Fire alarm or verbal notice will be used to sound the evacuation
- Remain calm and orderly; walk quickly --
  DO NOT RUN, DO NOT PUSH OR CROWD.
- Upon exiting the building, maintain a safe distance from the building
- If time permits, turn off the power to electrical equipment and close doors
- Seek out and give assistance to any persons with disabilities in the area.
-

PROCEED TO YOUR DESIGNATED ASSEMBLY AREA (see campus map)

Rooms 501, 502, 503, 504, 5602, 606, 607, 704, 705, 706 **LOT 3**

Rooms 103, 104, 105, 204, 205, 206, 207, 301, 302, 303,
304, 402, 403, 404, 405A, 405B, 505 **LOT 2**

Rooms 101, 102, 200, 201, 201A, 202, 203, 401, 500, 601,
603, 604, 605, 700, 701, 702, 703, HEALTH SERVICES,
LIBRARY, STUDENT SERVICES, ADMIN OFFICES, CHILD
DEVELOMENT CENTER and EME **LOT 1**

IF RELOCATING OUTSIDE THE BUILDING:

- Move quickly away from the building, DO NOT RETURN until notified by emergency personnel that it is safe to do so.
- Watch for falling glass and other debris.
- Do not attempt to go to your vehicle unless a campus evacuation has been ordered. Traffic evacuation will proceed as directed by Campus Police.

EVACUATION OF DISABLED PERSONS

NON-AMBULATORY PERSONS Evacuation may not be necessary or advisable. Many stairwells are designed to provide temporary protection from fire or other danger. An able-bodied volunteer should stay with a wheelchair user in the platform area of the stairwell while a second person notifies emergency personnel or paramedics of the exact location of the wheelchair user:

If immediate evacuation is necessary, be aware of the following considerations:

- Wheelchairs have many moving parts; some are not designed to withstand stress or lifting.
- You may need to remove the chair batteries. Life support equipment may be attached.
- In a life-threatening emergency it may be necessary to remove an individual from their wheelchair. Lifting a person with minimal ability to move may be dangerous.
- Wheelchairs should not be used to descend stairwells, if at all possible.
- Non-ambulatory persons may have respiratory complications. Remove them from smoke or fumes immediately and determine their needs and preferences.

Always consult with the person in the chair regarding how best to assist them.

- The number of people necessary for assistance.
- Ways of being removed from the wheelchair.
- Whether to extend or move extremities when lifting because of pain, catheter leg bags, spasticity, braces, etc.
- Whether to carry forward or backward on a flight of stairs.
- Whether a seat cushion pad should be brought along if the wheelchair is being left behind.
- In lieu of a wheelchair, does the person prefer a stretcher, chair with cushion/pad, or car seat?
- Is paramedic assistance necessary?

VISUALLY IMPARED PERSONS

Most visually impaired persons will be familiar with their immediate work area. In an emergency situation:

- Described the nature of the emergency and offer to act as a "slighted-guide" – offer your elbow and escort him/her to a safe location.
- As you walk, describe where you are and advise of any obstacles.
- When you have reached safety, orient the persons to where you are and ask if further assistance is needed.

HEARING IMPAIRED PERSONS

Because persons with impaired hearing may not perceive emergency alarms, an alternative warning technique is required. Two methods of warning:

- Write a note describing the emergency and the nearest evacuation route: ("FIRE, Go out rear door to the right, and down, now!")
- Turn the light switch off and on to gain attention, and then indicate through gestures what is happening and what to do.

IN MOST INCIDENTS Evacuations will not be necessary or advisable. **DO NOT** evacuate unless instructed to do so by emergency personnel, the fire alarm has been activated or danger is imminent.

- All persons should proceed toward the nearest safe emergency exit.
- If assistance is not immediately available, individuals with impairments should stay in the exit corridor and call for assistance. If the exit corridor should become dangerous, proceed into the stairway. If the stairway should become unsafe, proceed to a safe area away from smoke and fire, closing doors behind you to isolate the smoke.
- **CALL 9-911 and advise the operator of your situation.**
- **DO NOT** open the window unless smoke is entering the room. If possible, place a wet cloth material around and under the door to prevent smoke from entering.
- Persons who cannot speak loudly should carry a whistle or other means of attracting assistance.
- Drink bottled, stored water, not water from the tap.

HAZARDOUS MATERIALS INCIDENTS

Personnel Exposures/Contamination

1. Remove exposed/contaminated individual(s) from area, unless it is unsafe to do so because of:
   (1) Medical condition of victim(s) or
   (2) Potential hazard to rescuer(s).
2. **Call 9-911 AT ALL TIMES, if immediate medical attention is required.**
3. If incident occurs during normal working hours, **notify Environmental Health & Safety (EH&S) (ext. 2772 or 3677)**. If after hours, call **Campus Police at ext. 2289 or (760) 744-7753.**
4. Administer First Aid as appropriate.
5. Proceed to nearest emergency eyewash/shower station to flush contamination from eyes skin.
6. Remove contaminated clothing.
7. Stand-by to provide information or assistance (including MSDS) to emergency personnel (in cases where they are dispatched).

Contamination of Equipment/Facilities

- **DO NOT attempt any clean-up or decontamination procedures alone or without wearing proper protective attire, ,** including appropriate respiratory protection where

airborne hazards may exist (personnel MUST BE trained and certified before using respiratory protection).

- **Avoid spreading contamination by restricting access** to the equipment/area only to individuals who are properly protected and trained to deal with the type of hazard which exists.
- **Report details and/or request assistance from Environmental Health & Safety at extensions 2772 or 3677 during normal working hours.**
- If the incident occurs after hours, call Campus Police at extension 2289 or 760/744-7753.
- **If a liquid spills, attempt to contain it** by using the appropriate absorbent material.
- **Attempt to decontaminate the equipment/area** using appropriate methods.
- Approach spills from: Uphill, Upwind, and Up Stream.

Release to the Environment (Air, Water, Soil)

- **Stop the release,** if it is safe to do so.
- **Follow the procedures described above** for contamination of equipment/facility.
- **Notify Environmental Health & Safety at extensions 2772 or 3677.**

FIRE SAFTEY

PREPARE IN ADVANCE:

Know the locations of alternate exits from your area. If your work station is located within an office, know exactly how many doors you will pass along your evacuation route before you reach the nearest exit door—in heavy smoke, exit signs may not be visible, or may be obscured. Even in heavy smoke, you can count the number of doors you pass, so you will know when you reach the exit door. **ALL EMPLOYEES SHOULD LEARN TO USE FIRE EXTINGUISHERS.**

FIRE EXTINGUISHER INSTRUCTIONS: PASS

- **PULL Safety pin from handle.**
- **AIM (Nozzle, cone, horn) at base of fire.**
- **SQUEEZE the trigger handle.**
- **SWEEP from side to side(watch for re-flash).**

IF YOU DISCOVER A FIRE IN YOUR AREA, DESIGNATE SOMEONE TO CALMLY AND QUICKLY:

- Be sure to use the proper extinguisher for the type of fire you are fighting.

- Know the location of the closest fire extinguisher.

IF TRAPPED IN A ROOM:

- Place cloth material around/under door to prevent smoke from entering.
- Retreat. Close as many doors as possible between you and the fire.
- Be prepared to signal from window but **DO NOT BREAK GLASS** unless absolutely necessary (outside smoke may be drawn in).

IF CAUGHT IN SMOKE:

- Drop to hands and knees and crawl or crouch low with head 30" to 36" above floor, watching the base of the wall as you go.
- Hold your breath as much as possible.
- Breathe shallowly through nose using blouse or shirt as filter.

IF FORCED TO ADVANCE THROUGH FLAMES:

- Hold your breath. Move quickly, covering head and hair.
- Keep head down and close eyes as often as possible.

IF CLOTHING CATCHES ON FIRE

STOP…..DROP….ROLL

WHEN A FIRE ALARM IS ACTIVATED:

- Follow emergency personnel's directions.
- Walk—**DO NOT RUN**; proceed to the nearest exit (remove high heels to avoid tripping).
- Alarm may not sound continuously. If alarm stops, continue evacuating.
- Feel door, top and bottom, for heat (use back of hand). **IF HOT, DO NOT OPEN**. If door is not hot, open slowly. Stand behind door and to one side; be prepared to close it quickly if fire is present.
- Provide assistance to disable persons (see "evacuation of disabled persons").
- Notify emergency personnel if you suspect someone may be trapped inside the building.
- Use stairwell for exit (if applies); **DO NOT USE ELEVATOR**. Close stairwell door behind you.
- Stay low when moving through smoke; proceed to assigned evacuation area (at least 300 feet from the building).
- DO NOT interfere in any way with actions of emergency personnel.
- DO NOT return to area until instructed to do so by emergency personnel.

UTILITY FALURE

NOTIFY FACILITIES OFFICE at extension 2629 between the hours of 7:30 am – 4:30 pm

After hours, Call Campus Police at extension 2289 or 760/744-7753.

Be prepared to provide the following information:

- Your full name
- The building and room location of the outage

- Nature of the incident
- Floor or area affected

If evacuation of the building is required, use flashlights or light sticks to evacuate to your designated assembly area (see campus map). Assist any disabled persons.

UTILITY PROBLEMS GENERAL ACTION GUIDE

Gas Leaks:
CALL Facilities Operations (ESCONDIDO CENTER) at extension 8104 between the hours of 7:30 am
– 4:30 pm. AFTER HOURS, CALL Campus Police at extension 2289 or 760/744-7753. VACATE AREA.

Be prepared to provide the following information:

- Your full name
- The building and room location of the outage
- Nature of the incident
- Floor or area affected
- Type of incident
- Name of chemical or gas

If it is an explosive gas (i.e. natural gas),

- DO NOT use or activate items that can generate a spark in the general vicinity. Light switches, fire alarm pull stations, phones, elevator cars, etc., can all initiate a spark with resultant explosions.
- Confine any fire or fumes to the extent that you can by closing any doors to the affected area if you can safely do so. This will help limit the impact of the leak or fire.

Notify others in immediate vicinity, if you can safely do so.

Ventilation:
CALL Facilities Operations (ESCONDIDO CENTER) at extension 8104 between the hours of 7:30 am
– 4:30 pm. AFTER HOURS, CALL Campus Police at extension 2289 or 760/744-7753. If personal safety allows, shut of electrical equipment and VACATE AREA.

In the event of water leaks, try to contain the leakage in a container to minimize damage or safety hazards. If it is a significant water leak, avoid the areas where water has accumulated, and wait for help. Water makes an excellent conductor of electricity and, therefore, electric shock is possible. ***Immediately cease use of all electrical equipment.***

Electrical failure:
CALL Facilities Operations (Escondido) at extension 8104 between the hours of 7:30 am – 4:30 pm. AFTER HOURS, CALL Campus Police at extension 2289 or 760/744-7753. For the safety of all occupants and visitors, buildings with minimal or no natural lighting should be evacuated immediately.

DO NOT RE-ENTER THE BUILDING UNLESS TOLD IT IS SAFE TO DO SO.

EARTHQUAKE

DURING A MAJOR EARTHQUAKE:

IF YOU ARE INSIDE A BUILDING, STAY INSIDE: FALLING DEBRIS COULD CAUSE INJURY.

- Take cover beneath a desk or table or shelter in a doorway. If that's not possible, seek cover against an interior wall and protect your head and neck with your arms.

DUCK, COVER & HOLD until the shaking stops!

- **PROTECT YOUR HEAD AND NECK.**
- **DO NOT RUN OUTSIDE!** Falling debris can cause major injuries.
- Keep away from overhead fixtures, windows, filing cabinets, bookcases and other objects that could fall on you.
- Assist disabled persons in the area and find a safe place for them.

IF YOU ARE IN CLASSROMS AND LABS, STAY INSIDE. Do not evacuate or go outside; falling debris could cause injury.

- If you are with students, shout, "Earthquake! Take cover!" Tell students to drop between the rows of classroom seats or under tables. If possible, take cover under a desk or table, and hold on.
- If you are in a hallway, drop to the floor and cover your head and neck.
- Stay covered until the shaking has clearly stopped.
- Restore calm among your students. Keep them together.
- Evacuate everyone to the appropriate assembly point.
- **DO NOT USE THE ELEVATORS.**
- Wait at your assigned assembly point for help and further instructions. Report to authorities any missing or trapped persons or hazardous conditions.

IF YOU ARE OUTSIDE, STAY OUTSIDE. Move quickly to an open area away from buildings, trees, power lines, roadways.

- Drop to your knees in a fetal position with head bending to touch the ground. Close eyes and cross arms over back of head and neck for protection.
- Stay in that position until the shaking stops.

IF YOU ARE IN A VEHICLE, PULL TO THE RIGHT SIDE OF THE ROAD AND STOP.

- If near an overpass, power lines, or structures, proceed away from these risks and then stop.
- Stay inside until the shaking stops.

AFTER THE EARTHQUAKE:

Check for injuries, give or seek first aid. **DO NOT MOVE INJURED PERSONS UNLESS NECESSARY.**

- Alert emergency responders (police, fire, and medical) to situations requiring their attention.
- Assist any disabled persons in the area and find a safe place for them.

- Turn on a battery-powered radio, if you have one, to learn about what has happened (the three San Diego AM stations required to broadcast emergency information are KOGO/AM 600, KPOP/AM 1360, and KSDO/AM 1130).
- Replace telephone handsets that have been shaken off.
- **DO NOT** try to use the telephones except to report fires or medical emergencies.
- Gather home and office keys, identification and easy-to-carry critical work-in-progress.
- Check doors for heat before opening.
- Walk—do not run. Do not push or crowd.
- Keep noise to a minimum so that you can hear emergency instructions.
- Move to your assembly point by safest route available unless otherwise instructed.
- Wait for and follow instructions from your building safety coordinator and/or emergency personnel. Be prepared for aftershocks and be prepared to evacuate to lower floors (if applies), when necessary.
- If away from your workplace at the time of the quake, **DO NOT** return to your workplace unless instructed by the emergency personnel.

IF ON CAMPUS, BUT NOT IN A BUILDING?

- Move to your assembly point by safest route available unless otherwise instructed.
- Move quickly to an open area away from buildings, trees, power lines and roadways.
- Follow directions of emergency personnel.

WHEN TO GO HOME?

- Be prepared to stay on campus overnight and perhaps longer. You should not try to get home until campus authorities say it is safe, which will be when the worst fires are under control and streets are cleared for travel.
- This may happen quickly, or may take some time (72 hours or longer). Do not risk becoming a casualty by acting independently of emergency personnel.

CONTACT WITH LOVED ONES

- Be sure you know the number of your out-of-state family contact (or carry it at all times).
- Payphones should be operating (reference campus map).

WHAT CAN I DO TO BE BETTER PREPARED?

Keep on hand such personal items as:

- Medications (must be properly safeguarded)
- Flashlight and batteries
- Books, pack of cards, etc.
- Some food items such as nutrition bars
- Water in bottles or other containers
- Sweater, change of clothes, comfortable shoe

The Employee Quick Reference Guide for Emergencies

As a Palomar College employee, you may find yourself in charge of a class or work group when an emergency occurs. This quick reference guide focuses on actions you should take within the first few minutes of an emergency. Tasks may vary depending upon the situation. During the first few minutes, there will likely be confusion. It is important for someone to step forward and take charge. Emergency Services may be initially overwhelmed and your actions could have a significant impact on saving lives, reducing injuries and stabilizing the emergency.

HERE IS HOW YOU CAN HELP:

GATHER INFORMATION

- Determine the impact on the people in your immediate environment. **Ask Questions**.
- What is the number and extent of injuries?
- Do people need to be rescued?
- Will immediate evacuation of the building or work area be necessary?
- Are there any fires, chemical or electrical hazards?
- Do the telephones work?
- The responding Emergency Services (police, fire, and medical) will require this information.

KEEP A RECORD

Establish from the onset a method to gather and record information concerning your activities. ASSIGN SOMEONE TO HELP YOU.

INVOLVE OTHERS

Involving others helps to establish a calmer atmosphere. In a classroom setting, ask for volunteers. Things others may be able to help you with:

- Keep a written record.
- Put together a plan for evacuating the building. (Is your assembly site accessible or do you need to identify another assembly point?)
- Determine the safest way out of the building.
- Assist the injured with first aid.
- Check the area for fires or other hazards.
- Check to see if the telephone works.

TAKE STEPS TO REDUCE HAZARDS

- Direct people away from hazards. Items to consider include:
- Windows and broken glass.
- Downed power lines or exposed electrical outlets.
- Fires and chemical spills.
- Damaged walls and ceilings.

REPORT TO AUTHORITIES

In all emergencies, contact Campus Police by dialing extension 2289 or 760/744-7753. Eighteen (18) **pay telephones** are available at the San Marcos Campus (refer to the enclosed

campus map). Fifteen (15) **emergency phone extensions** are available at the San Marcos Campus (refer to enclosed campus map).

WHEN CALLING:

- Give your name.
- Give your extension number.
- Give building name and room number or other specific location.
- Describe the condition clearly and accurately.
- **Don't hang up.** Other information may be needed.

The following numbers are provided for non-emergency situations. Use of these numbers will still provide a prompt response from the responsible agency and keep the 9-911 lines free for emergencies.

Campus Police. 2289
Health Services. . . . 8105 or 2380
Facilities Office. . . . 8104 or 2629

If the phones do not work:

- **At the Escondido Center,** send a person to the Campus Police in the storefront office in the 600/700 wing off Parking Lot 1.
- You should attempt to contact your superiors and apprise them of the situation.

PALOMAR COLLEGE San Marcos Campus

1140 West Mission Road • San Marcos, CA 92069-1487