



Ada County Sheriff's Office
Forensic Crime Lab
Health and Safety Manual
Version 2.0

Ada County Sheriff's Office Crime Lab

- 1.0 [Scope](#)
- 2.0 [References](#)
- 3.0 [Terms and definitions](#)
- 4.0 [Management Requirements](#)
 - 4.1 Organization/ Responsibilities
- 5.0 Technical Requirements
 - 5.1 [General Lab Safety Procedures](#)
 - 5.2 [Safety Training](#)
 - 5.3 [Personal Protective Equipment/Safety Equipment](#)
 - 5.4 [Chemical Storage and Handling](#)
 - 5.5 [Additional Chemical Precautions](#)
 - 5.6 [Emergency Procedures](#)
 - 5.7 [Medical Monitoring](#)
 - 5.8 [Hazardous Waste Disposal](#)
 - 5.9 [Firearms](#)

1.0 Scope

The purpose of this manual is to promote safety in the laboratory. The goal of this manual is to ensure procedures are set in place to allow employees to work in a safe environment where recognized hazards are common.

2.0 References

Material Safety Data Sheets (MSDS) are available online at the following website: <http://hazard.com/msds/>

Ada County Sheriff's Office Crime Lab

3.0 Terms and definitions

3.1 AIRBORNE SUBSTANCES

Airborne substances include dusts, sprays, mists, smokes and fumes. Airborne substances are associated with classical widespread occupational lung diseases.

3.2 ANALYTICAL AREAS

Any area in the lab that is linoleum or tile will be considered an analytical area.

3.3 BIOLOGICAL MATERIALS

3.3.1 Human blood, human blood components, and products made from human blood.

3.3.2 Semen, vaginal secretions, cerebrospinal fluid, synovial fluids, pleural fluid, peritoneal fluid, pericardial fluid, amniotic fluid, and concentrated HIV and HBV viruses. Care should also be taken with other biological materials such as body parts, tissues, saliva, urine, feces, and blood typing reagents.

3.4 BLOOD BORNE PATHOGENS

Pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immuno-deficiency virus (HIV).

3.5 CARCINOGEN

Any substance or agent that tends to produce a cancer.

3.6 CAUSTIC

Caustics have the ability to burn or corrode organic tissue when exposed to chemical.

3.7 CHEMICAL EXPOSURE

To come into contact with, or be exposed to, a chemical by one of the following routes; inhalation, ingestion, contact with skin and/or eyes, or injection.

3.8 CORROSIVE

A chemical or substance capable of deterioration or consummation of organic or inorganic material on contact.

3.9 DECONTAMINATION

The use of physical or chemical means to remove, inactivate, or destroy blood borne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

3.10 EMBRYOTOXINS

A noxious or poisonous substance adversely affecting normal embryonic development; in humans this usually occurs during the first trimester or prenatal

Ada County Sheriff's Office Crime Lab

life.

3.11 EMERGENCY

A sudden, urgent, usually unexpected occurrence or occasion requiring immediate action.

3.12 FLAMMABLE

Capable of being easily ignited and of burning with extreme rapidity.

3.13 FUME HOOD

A device located in a laboratory enclosed on five sides with a moveable sash or fixed partial enclosed on the remaining side; constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory; and allows chemical manipulations to be conducted in the enclosure without insertion of any portion of the employee's body other than hands and arms.

3.14 HAZARDOUS MATERIAL

A chemical for which acute or chronic health effects may occur in exposed employees. The term 'health hazard' includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems, and agency which damage the lungs, skin, eyes, or mucous membranes.

3.15 HBV

Hepatitis B virus.

3.16 HIV

Human immunodeficiency virus.

3.17 INFECTIOUS MATERIALS

The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids.

3.17.1 Any unfixed tissue or organ (other than intact skin) from a human (living or dead).

3.17.2 HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissue from experimental animals infected with HIV or HBV.

3.18 INORGANICS

Compounds or substances that do not contain carbon.

3.19 IRRITANT

A substance that causes physical irritation (i.e. roughening, reddening, or inflammation).

3.20 MATERIAL SAFETY DATA SHEETS (MSDS)

Provides employees with procedures for handling or working with chemicals in a safe manner, and includes information such as physical data, toxicity, health effects, first aid, reactivity, storage, proper disposal, protective equipment, and spill-handling procedures.

3.21 MUTAGEN

An agent or substance that tends to increase the frequency or extent of genetic mutation.

3.22 NEUTRALIZE

Applying an opposite force or effect to render something ineffective or harmless.

3.23 ORGANIC COMPOUND

Gaseous, liquid or solid chemical compounds whose molecules contain carbon.

3.24 OXIDIZER

A chemical other than a blasting agent or explosive that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

3.25 PEROXIDE

The oxide of any element that contains more oxygen than any other.

3.26 PERSONAL PROTECTIVE EQUIPMENT

Specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

3.27 PHYSICAL HAZARD

A substance for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

3.28 POISON

Any substance which, when ingested, inhaled or absorbed, or when applied to, injected into, or developed within the body, in relatively small amounts, by its chemical action may cause damage to structure or disturbance of function.

3.29 REPRODUCTIVE TOXINS

Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis).

3.30 SAFETY OFFICER

An employee who assists in the evaluation of employee complaints, suggestions, and concerns regarding possible hazards and in helping to maintain a safe laboratory working environment.

3.31 SENSITIZER

A substance that makes a person more sensitive or hypersensitive (as to an allergen).

3.32 TARGET ORGAN SYSTEMIC TOXICITY

Toxic effects as a result of absorption and distribution of a toxicant to a site distant from its entry point. Systemic effects are those that require absorption and distribution of the toxicant to a site distant from its entry point, at which point effects are produced. Most chemicals that produce systemic toxicity do not cause a similar degree of toxicity in all organs, but usually demonstrate major toxicity to one or two organs.

3.33 TERATOGENS

A substance or agent capable of causing developmental malformations and monstrosities.

3.34 TOXIC

Relating to or caused by poison.

3.35 UNIVERSAL PRECAUTIONS

An approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other blood borne pathogens.

4.0 Management Requirements

4.1 Organization/Responsibilities

Various levels of responsibilities, from the Lab Manager to each employee, exist for the implementation, oversight, and continuous improvement to laboratory safety.

4.1.1 Lab Manager

- 4.1.1.1 Responsible for safety within the Ada County Crime Lab and will provide continuing support for safety training, inspections, equipment and audits. This manual will be reviewed annually by the staff.
- 4.1.1.2 Ensure that the laboratory complies with departmental standards relating to health and safety and the use, storage, and disposal of chemicals.
- 4.1.1.3 Appoint a Lab Safety Officer to oversee and monitor health and safety in the laboratory.
- 4.1.1.4 Ensure that all staff members have completed appropriate safety training; including annual training in blood borne pathogens and chemical hygiene.
- 4.1.1.5 Maintain emergency contact information, vaccination records, first aid and CPR training, and blood borne pathogen training for all employees.
- 4.1.1.6 Provide post-exposure follow-up for work related accident and illness reporting.

4.1.2 Safety Officer

- 4.1.2.1 Ensure employees know and follow all health and safety policies.
- 4.1.2.2 Ensure protective apparel and safety equipment are available and in working order.
- 4.1.2.3 Conduct regular, formal laboratory safety inspections.
- 4.1.2.4 Provide training to other employees on safe laboratory practices related to non-chemical hazards.
- 4.1.2.5 Assist with employee complaints, suggestions, and concerns regarding possible hazards.
- 4.1.2.6 Monitor the laboratory purchase, storage, and disposal of chemicals.
- 4.1.2.7 Ensures that all laboratory hoods, eyewash stations and fire extinguishers are functioning properly and are tested on a regular basis.
- 4.1.2.8 Ensure Material Safety Data Sheets (MSDS) are available in a location accessible to all employees.

4.1.3 All Laboratory Employees

- 4.1.3.1 Conduct work in a safe manner within the limits of their scientific knowledge, training, and experience.
- 4.1.3.2 Prepare for actions that will be taken in the event of an accidental spill or other emergency situations.
- 4.1.3.3 Develop good personal hygiene habits and use appropriate personal protective and safety equipment.
- 4.1.3.4 Use universal precautions by treating all blood and body fluids as infectious for Human Immunodeficiency Virus (HIV), Hepatitis B virus (HBV) or other blood borne pathogens.
- 4.1.3.5 Treat all chemicals as potentially hazardous.
- 4.1.3.6 Report unsafe work conditions and other safety concerns to the Safety Officer.
- 4.1.3.7 Know when personal protective equipment is required and wear it. Warn other personnel if they are entering a hazardous area and provide them with appropriate protective equipment if needed.
- 4.1.3.8 Know the physical properties and potential health hazards of the chemical(s) and biological materials being used.

5.0 Technical Requirements

5.1 General Lab Safety Procedures

- 5.1.1 Eating and drinking shall not be permitted in the analytical areas or evidence handling areas of the laboratory. Food shall not be stored in the analytical areas or in evidence storage refrigerators and freezers.
- 5.1.2 When dealing with any biological or chemical material, the analyst shall use universal precautions and avoid skin contact, use adequate ventilation, and treat all unknowns with extreme care to reduce the risk of injury.
- 5.1.3 All glassware shall be disposed of in glass waste.
- 5.1.4 Work areas should be kept free from chemicals and any equipment/instruments not being used. Chemicals, equipment, and instruments should be returned to their proper storage area clean and ready for the next user.
- 5.1.5 All items of evidence must be safely packaged in appropriate packaging/containers before submission to the laboratory.
- 5.1.6 Report all accidents and injuries to the lab manager as soon as possible.
- 5.1.7 Wash hands frequently. Hands should be washed before leaving the laboratory. Protective apparel shall be removed prior to leaving areas where evidence is analyzed.
- 5.1.8 All laboratory areas should be maintained in a clean and sanitary condition.
- 5.1.9 Eyewash stations and safety showers shall be available. It is recommended that all passageways to the eyewash station and safety shower are clear of any obstacle. Eyewashes and showers shall be checked annually to be certain that water flows through them and to eliminate bacterial growth.
- 5.1.10 For proper ventilation, hood design and function shall be compatible with the materials in it. Work should be done as far inside the hood as possible. Fume hoods should be cleaned periodically. Fume hood air flow will be checked annually with an anemometer (should be capable providing approximately 60 - 120 linear feet per minute of airflow).

5.2 Safety Training

- 5.2.1** This manual will be reviewed annually to ensure knowledge of chemical hazards and blood borne pathogens.
- 5.2.2** Training on blood borne pathogens or chemical hygiene shall be completed annually. The Safety Officer will retain documentation of the completion of these trainings.
- 5.2.3** The Safety Officer shall provide safety briefings to the staff on topics such as the location and use of all protective apparel and safety equipment in the laboratory.

5.3 Personal Protective Equipment/Safety Equipment

- 5.3.1** The laboratory will provide and maintain a first aid kit, spill clean-up equipment, fire extinguisher, emergency eye wash station, emergency shower, lab coats, gloves, safety glasses and particulate masks.
- 5.3.2** Wear adequate protective equipment (gloves, goggles, face shield, etc.) at all times while working in the laboratory.
- 5.3.3** Appropriate eye protection should be worn at all times while working in the laboratory.
- 5.3.4** Promptly wash if skin contact is made with any chemical or biological hazard.
- 5.3.5** Fume hoods shall be used to prevent exposure to airborne substances.
- 5.3.6** All chemical spraying will be done in fume hoods.
- 5.3.7** Flammables will be stored in specified cabinets.
- 5.3.8** Hand trucks with a securing chain shall be used when moving compressed gas cylinders. The cylinders must be secured and stored in an upright position.
- 5.3.9** Avoid inhalation of chemicals. Do not "sniff" test chemicals, or evidence samples.

5.4 Chemical Storage and Handling

- 5.4.1** Hazard and precautionary statements are included on all chemical labels from manufacturers. These statements provide the hazard class and information on prevention, response in cases of accidental spillage or exposure, storage, and disposal.
- 5.4.2** Identifiers shall be listed if the chemical contains ingredients that contribute to acute toxicity, skin corrosion or serious eye damage, germ cell mutagenicity, carcinogenicity, reproductive toxicity, skin or respiratory sensitization, or Target Organ Systemic Toxicity.
- 5.4.3** Be aware of chemical hazards as determined from the MSDS or other appropriate references.

The nine pictograms used for hazards are given below:

Corrosion



Skin corrosion
Eye damage
Corrosive to metals

Exclamation Mark



Irritant (skin and eyes)
Skin sensitizer
Acute toxicity (harmful)
Narcotic effects
Respiratory tract irritant
Hazardous to ozone layer

Exploding Bomb



Explosives
Self-Reactives
Organic Peroxides

Skulls & Crossbones



Acute toxicity (fatal or toxic)

Flame



Flammables
Pyrophorics
Self-heating
Emits flammable gas
Self-reactives
Organic peroxides

Gas Cylinder



Gas under pressure

Ada County Sheriff's Office Crime Lab

Environment



Acute toxicity

Health Hazard



Carcinogens
Mutagenicity
Reproductive toxicity
Respiratory sensitizer
Target organ toxicity
Aspiration toxicity

Flame Over Circle



Oxidizers

5.4.4 The Safety Officer is responsible for making sure there is a MSDS or SDS readily available for every chemical found in the laboratory.

5.4.5 MSDSs may contain the following information:

- Identity of product used on the label
- The chemical and physical characteristics
- Physical hazards (fire, explosion, and reactivity)
- Health hazards
- Permissible Exposure Limit or Threshold Limit Value
- Carcinogenicity
- Safe handling procedures
- Control measures
- Emergency and first aid procedures
- Date of preparation or last change

5.4.6 All chemicals from the manufacturer shall be dated on arrival.

5.4.7 The Safety Officer shall ensure that the appropriate hazard warning information is on the container and that the container is stored appropriately.

5.4.8 Chemicals transferred to a secondary container shall be labeled with the identity of the chemical, the appropriate hazard warning, the preparation date and lot number (if applicable) .

Ada County Sheriff's Office Crime Lab

5.4.9 Chemicals shall be stored according to their chemical properties.

5.4.9.1 Color-coding is used for labeling and storage, the following colors and hazard codes will be seen.

5.4.9.2 Striped labels (red, yellow, and white) indicate chemicals that are incompatible with chemicals labeled with the respective solid color. For example, a red-striped label indicates a flammable chemical that is incompatible with other flammables and must be stored separately.

COLOR	STORAGE HAZARD
Blue	Health
Red	Flammability
White	Corrosive
Yellow	Reactivity
NUMBER CODE	DEGREE OF HAZARD
4	Extreme
3	Severe
2	Moderate
1	Slight
0	None

5.4.10 An updated inventory of all current chemicals shall be maintained. This will be accessible to all employees. The Safety Officer is responsible for adding new chemicals and removing consumed or expired chemicals from the inventory list.

5.4.11 Inventory should be completed by the Safety Officer annually.

- 5.4.12** Corroded, or leaking chemical containers shall be repackaged in a proper container with appropriate chemical labeling
- 5.4.13** Chemicals shall not be returned to the original container.
- 5.4.14** Before use of an unfamiliar chemical, the user shall read the MSDS/SDS to be advised of the chemical hazard and disposal.
- 5.4.15** The use of chemicals should always be performed in a fume hood. Treat any mixture of chemicals as if it is more hazardous than the most dangerous component.

5.5 Additional Chemical Precautions

5.5.1 Acids

Acids are known to be very corrosive. Corrosiveness may affect containers, cabinets, equipment, and personnel.

Check equipment compatibility before working with acids (i.e., gloves, pumps, containers, etc.).

Always add acid to water when making dilutions.

Corrosive vapors can cause severe eye irritation or damage.

Acids shall be segregated from strong bases, active metals, and from chemicals which could generate toxic gases upon contact (e.g., sodium, cyanide, etc.).

Acids shall be maintained in acid storage cabinets. Store away from sunlight and rapid temperature changes.

5.5.2 Caustics

Caustics are extremely corrosive to human tissue.

When exposed skin comes in contact with caustics, the skin will develop a slippery feel. The skin should be flushed with a large quantity of water.

Inorganic hydroxides shall be stored in polyethylene containers.

Caustics shall be segregated from acids.

5.5.3 Flammables

Flammable liquids are hazardous because of the vapors evolved. If these vapors are allowed to combine with air there is the possibility of ignition and burning.

Ada County Sheriff's Office Crime Lab

Flammable liquids shall be handled only in areas free of ignition sources.

Flammable liquids shall never be heated using an open flame.

If possible, substitute solvents that are not as flammable or toxic.

Flammable solvents, in excess of daily needs, shall be kept in flammable cabinets, safety cans, or storage rooms.

Flammables shall be stored with compatible materials and away from oxidizers and oxidizing acids.

5.5.4 Toxic Substances

Toxic hazards include carcinogens, mutagens, teratogens, poisons and embryotoxins. Exposure to toxic chemicals can be from skin or mucous membrane absorption, ingestion, injection and inhalation.

Toxic chemical containers shall be properly labeled or color-coded to denote the toxic hazards.

Chemical containers containing toxins shall be opened for a minimum amount of time to limit exposure.

Wipe up work area when work is completed to eliminate the possibility of small amounts of toxic substances.

Dispose of hazardous waste in appropriate hazardous waste receptacle.

Store cancer-causing chemicals in a vented and secured location.

The following are tables of known toxic substances that may be encountered in the laboratory:

Antimony compounds	Ethylene dibromide
Arsenic compounds	Formaldehyde
Benzene	Hydrazine
Benzidine	b-Naphthylamine
Beryllium	Nickel carbonyl
Cadmium compounds	Nickel compounds

Ada County Sheriff's Office Crime Lab

Chloroform	Chromates (salts of)
Dioxane	

Teratogens	
Aniline	Mercury
Benzene	Nitrobenzene
Carbon disulfide	Phosphorous
Carbon monoxide	Radioactive substances
Chlorinated hydrocarbons	Toluene
Lead	Turpentine
Formamide	

5.5.5 Gas Cylinders

Compressed gas cylinders are potentially both chemical and mechanical hazards.

For safety reasons, all compressed gas cylinders shall be treated as if they are full.

Cylinder caps shall be in place during movement or storage of cylinders.

Compressed gas cylinders shall be clearly labeled with the identity and hazards of the contents.

Connecting lines should be of adequate construction and of adequate strength for the pressures used.

A color coding system is listed below:

Gas Cylinder	Color Code
Hydrogen	Red
Nitrogen	Green
Air	Yellow
Helium	Blue

All gas cylinders shall be firmly secured to fixed, rigid structures so they cannot fall or be knocked over. Cylinders shall be stored upright.

All gas cylinders shall be protected against unwanted heat sources.

Ada County Sheriff's Office Crime Lab

Oxygen cylinders shall never be stored within 25 feet of highly combustible materials.

Cylinders shall not be exposed to corrosive chemicals.

5.5.6 Oxidizers

Oxidizers are chemical compounds that may react violently with organic compounds and other oxidizable compounds.

Water should be easily accessible from point of use.

Oxidizers shall be labeled or color-coded to bring notice to this hazard.

Store oxidizers as a class together, away from other chemicals.

Peroxide formation

Exposure to air, as occurs in opened and partially emptied containers, accelerates formation of peroxides.

Exposure to light encourages peroxide formation. Recommend storing in dark-colored containers. Glass containers of any size should be avoided whenever possible.

Store away from heat sources in airtight containers.

No attempt should be made to open containers of uncertain age or condition, or with caps or stoppers tightly stuck (since peroxides have been known to form in the cap threads).

Isolate from other reactive compounds.

Peroxide-forming chemicals that may be encountered in the laboratory include:	
Acetaldehyde	Ethyl ether
Cyclohexane	Potassium
p-Dioxane	Tetrahydrofuran

5.6 Emergency Procedures

5.6.1 Chemical Spills

- 5.6.1.1** If necessary, use the safety shower or eyewash station to decontaminate eyes and skin.
- 5.6.1.2** Clear other employees from the area. Be sure to remove all sources of ignition if chemical is flammable.
- 5.6.1.3** Clean liquid spills using absorbent material. Prevent any liquids from traveling into sewage systems.
- 5.6.1.4** Place spilled waste and absorbent material into a leak-proof closable container. Double, heavy duty plastic bags are sufficient for most spills.
- 5.6.1.5** Decontaminate area where spill occurred. Neutralize acid and base spills.
- 5.6.1.6** Notify lab manager as soon as possible.

5.6.2 Evacuation

- 5.6.2.1** An evacuation plan will be posted in the laboratory for fires, bomb threats, hazardous materials and other emergencies. Building evacuation plans are posted in the hallway outside of the laboratory.
- 5.6.2.2** In the event of an emergency involving highly toxic materials, only trained clandestine responders shall take action to contain or clean the spill.
- 5.6.2.3** No employee should return to the evacuated area until the Lab Manager or Safety Officer has established that it is safe to return to the area.

5.7 Medical Monitoring

5.7.1 The Lab Manager or designated appointee shall maintain a list of emergency contact information, vaccination records, first aid and CPR training, and blood borne pathogen training for all employees.

5.7.2 .

5.7.3 Hep B vaccinations for employees are available (voucher can be obtained from HR in order to get vaccination at no cost to the employee).

5.8 Hazardous Waste Disposal

- 5.8.1** Many chemicals cannot be disposed of by drain disposal.
- 5.8.2** Small quantities (not more than few hundred milliliters) of organic chemicals can be disposed of by drain disposal (examples of organic chemicals include: alcohols, aldehydes, amides, amines, carboxylic acids, esters, ketones, nitriles and sulfonic acids).
- 5.8.3** Flush any hazardous waste disposed of in the drain by neutralizing it with at least a 100-fold excess of water.
- 5.8.4** Wastes shall be placed in the appropriate waste storage containers on a daily basis.
- 5.8.5** Waste containers shall have an operable lid which remains closed except when adding or removing hazardous wastes.
- 5.8.6** Wastes shall be stored only in designated containers.
- 5.8.7** Incompatible chemicals shall not be mixed or stored together.
- 5.8.8** Waste containers shall be labeled as to components and date started.
- 5.8.9** Any waste generated will be taken to the Ada County Household Hazardous Materials Facility. The laboratory cannot have more than 2.2 lbs of acute hazardous wastes and no more than 220 lbs of hazardous waste generated in a month (to qualify for conditionally exempt small quantity generators).

5.9 Firearms

- 5.9.1** All firearms being submitted or handled shall be treated as if they are loaded and shall assume that it is loaded until verifying that it is unloaded.
- 5.9.2** A safety inspection shall be performed after the weapon is received into the laboratory to ensure it is unloaded.
- 5.9.3** Safety training shall be provided to any individual who handles firearm evidence.

Ada County Sheriff's Office Crime Lab

Health and Safety Manual History Issuing Authority: Quality Assurance Manger

SECTION & COMMENTS	DATE ADOPTED	AUTHOR	REVIEWER(S)
Numbered definitions. Deleted open toed shoe sentence. Quarterly to annually for safety checks. Removed expiration date on chemical label. Formatted tables. Removed medical records section. Waste accumulation record deleted.		KB	NW, HC, LK, EH