UTSA
The University of Texas at San Antonio™

Animal Worker Safety for Research Personnel

Presented by: UTSA Laboratory Animal Resources Center

Animal Worker Safety

for

Research Personnel

Did you know?

AWS is part of the
UTSA – IACUC Animal User Training Requirements

Completion of ***ALL*** **IACUC required training** is necessary for:

- **Addition** to **approved research protocol**
- **Gain access** to **LARC** animal facilities
- **Safely handle/manipulate** research animals

Contact **IACUC office** for **complete list of training requirements**: **iacuc@utsa.edu**

IMPORTANT!

Completion of this presentation ***and*** **submission** of the **AWS Acknowledgement form** to the LARC is **required** to schedule and participate in the LARC hands on Training.

Animal Worker Safety (AWS) for Research Personnel

Let's get started…..

The purpose of this presentation is designed to promote a safe work environment by:

Educating you on the health risks associated with research animals and their environment

Discuss practices to minimize risks to you

Animal Worker Safety (AWS) training for **all personnel** in **contact** with animals in a research environment in **compliance with NIH requirements**

Animal Research Environment – presents unique safety considerations

Animal related hazards

- Allergens
- Animal waste
- Zoonosis

Awareness of the risks in research/lab environment is "key" to safety

Research related hazards

- Chemicals & lasers
- Biohazardous materials
- LARC Facility hazards – steam, equipment, chemicals, etc…

Risk Categories

An individual's risks are also based on type, frequency of direct/indirect contact with live animal, tissues or waste

TABLE OF RISK CATEGORIES BASED ON CONTACT

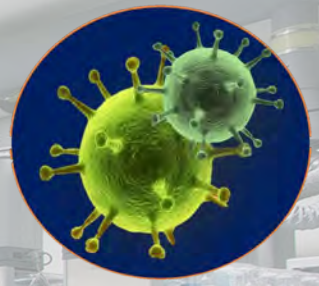
CAT	CONTACT	EXAMPLE
A	No direct/infrequent entry	Vendors, Visitors, visiting scholars, trainees
B	Regular indirect	Facilities, IACUC member, EHSRM, Police, Custodial
C	Frequent direct	LARC, Research Staff, Facilities working with HVAC

Health Risk Topics

Listed below are the health risk topics, along with how to mitigate the that will be discussed in the following slides that may be encountered in the laboratory animal research environment

ANIMALS
(ANIMAL ALLERGENS AND WASTE)

ZOONOSIS

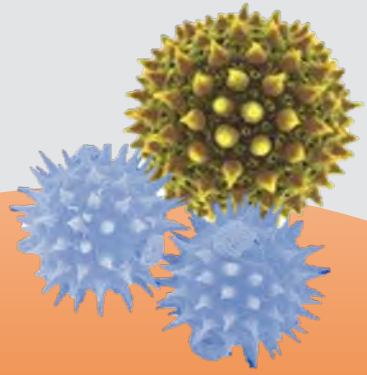


BITES/SCRATCHES

LATEX ALLERGIES

SHARPS/NEEDLES

PROTOCOL RELATED HAZARDS



ANIMAL ALLERGENS

The following slides discuss engineering solutions and practices to minimize allergen exposure

Animal Allergens

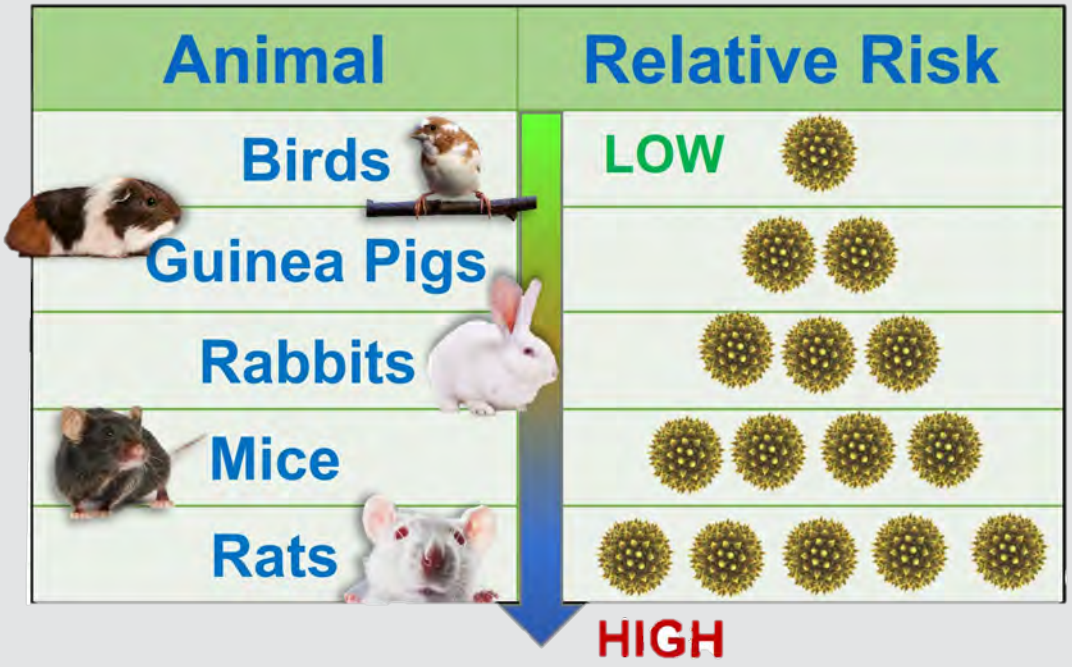
impact to health

Allergies are by far the most important occupational health issue

- Prevalence of allergic symptoms in regularly exposed personnel ranges from ***10 - 30%***
- Estimated ***5 - 10%*** of laboratory animal workers will develop ***occupation-related asthma***

Animal Allergens - II

Major Allergens



You may be sensitive because you…

- **Have hay fever/allergies**
- **Smoke**

Contact OHP

if you have allergy problems/questions before entering animal facilities

Allergen Sources: ***Urine, soiled bedding, dander, fur, saliva, feces, serum, feathers, etc.***

Animal Allergens - III

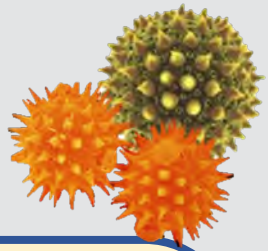
Reactions to Allergens

Symptoms can range from minor to severe. Questions? Consult OHP or personal physician.

Disorder	Symptoms
Urticaria	Redness, itchy skin, welts, hives
Allergic Conjunctivitis	Red, itchy, swollen, and watery eyes.
Allergic Rhinitis	Sneezing, itchiness, clear nasal drainage, nasal congestion
Asthma	Cough, wheezing, chest tightness, shortness of breath
Anaphylaxis	Itching, hives, throat tightness, dizziness, fainting, nausea, vomiting, diarrhea, cardiopulmonary arrest

Seek immediate medical care for severe symptoms!

Animal Allergens - IV



Rodent allergens are present in the highest quantities on bedding particles.

The following solutions and practices will minimize aerosolization of bedding particles to reduce your exposure

Animal Allergens - V

Engineering Solutions -

Minimize your allergen exposure

Cage Changing Stations

Animal holding rooms have:

- **A Min of 10 – 15 Air Changes/Hour (ACH)**

Rodent Housing – Individually Ventilated Cage (IVC) systems:

- **60-70 ACH (*inside cages*)**
- **HEPA filtered *exhaust* - *minimizes allergen exposure***

Animal Allergens - VI

Engineering Solutions - II

Cage Changing Stations

To reduce or remove exposure to animal allergens –

Animal cage changing and manipulations are performed inside a Biosafety Cabinet (BSC) or Animal Transfer Station (ATS)

Biosafety Cabinet (BSC)

Animal Transfer Station (ATS)

BSC/ATS training provided during LARC Facility Orientation

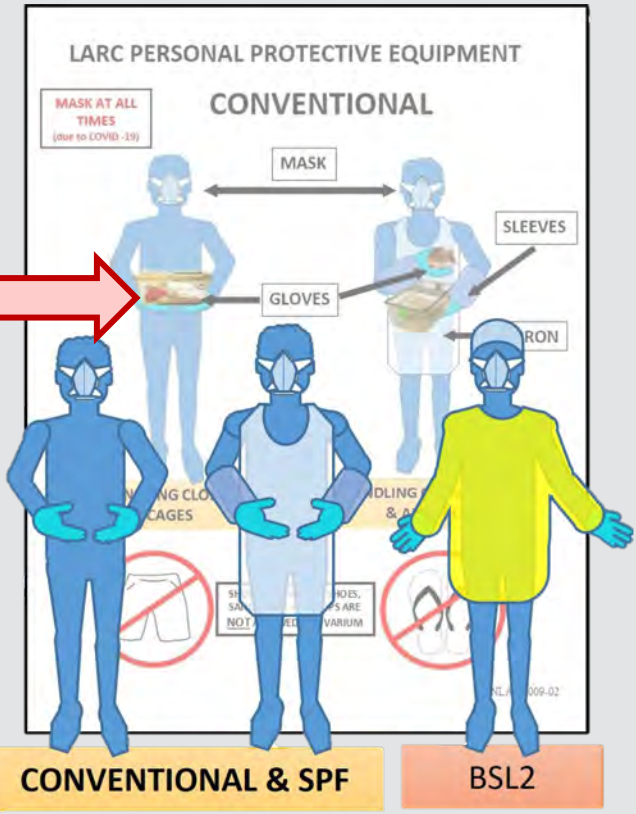
Animal Allergens - VII

Personal Protective Equipment (PPE)

Minimize your allergen exposure by wearing appropriate PPE

PPE requirements based on biosafety level.

Wear PPE according to posted LARC signage



PPE located in LARC hallway cabinets & animal rooms

Location and instruction for PPE will be provided during ***LARC Facility Orientation***

LARC Personnel will assist you with appropriate PPE

Animal Allergens - VIII

Reduce Inhalation Exposure

- Masks or respirators offer protection from inhaling allergens
- Type based on ***individual need*** OR ***required level of protection***
- Respirators ***require*** annual fit testing by OHP

Animal Allergens - IX

Reduce Exposure during movement of Animals

Minimize** the **transportation** and **movement** of animals **outside facility** to **reduce exposure

- **Cages *must* have *lid* & *cover* when moving/transporting between facilities and labs**
- **Cage cover should be *on-see-through* plastic (bag)**

Animal Allergens - X

Reduce Exposure during movement of Animals

Must use *freight elevator (only)* to move animals between floors

- **Reduces exposure of animal allergens to non-animal research personnel**

IMPORTANT!

- **To avoid suffocation/overheating:**
  Do not leave animals covered >10 minutes
  ***plan your activities**

Reminder! Animals **must be covered** during transport

Animal Allergens - XI

Reduce Exposure during movement of Animals

Passenger elevator may be used only when freight elevator is out of service
Must follow procedures to minimize exposure when utilizing passenger elevator

Reducing Allergen Exposure Summary I

Engineering Controls:

Rodent Housing Equipment: IVC – is a HEPA filtered system design to protect users and animals

Cage Handling Stations: ATS / BSC = in LARC facility always open cages inside hoods

PPE: Follow signs and procedures. PPE requirements based on the use of hoods and pathogens while manipulating animals in LARC areas

Discuss with Lab Safety PPE requirements while working with animals in the lab outside of ATS/BSC.

Reducing Allergen Exposure Summary II

Engineering Controls (cont'):

Masks and Respirators: When manipulating animals in the lab and if outside of hoods, a mask should be worn. ***Contact OHP for mask fit testing and discussion.***

Animal Movement: Cover cages with opaque plastic bags. Use only the freight elevator, if required and be sure plastic cage cover does not remain on cage for more than 10 minutes. ***Animals depend on your care and attention***

Reducing Allergen Exposure Summary III

If Allergy Develops...

Consult a physician

- Pulmonary function test may be performed
- Changes in procedures/practices may include:
  - Minimizing exposure time
  - Additional PPE
  - Respiratory protective equipment
- Medications
- Ongoing reassessment may be needed

LATEX ALLERGIES

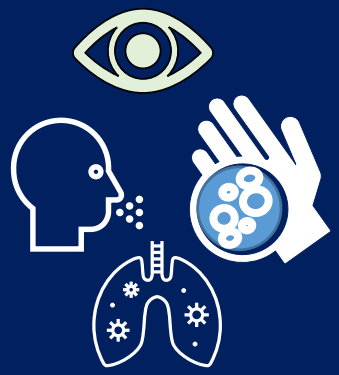
Non – Animal Allergens: Latex gloves

Individuals can have *or* develop sensitivity or allergies to latex

Latex gloves are tan or yellowish in color

Allergy can manifest as:

- Skin rashes, hives, nasal, eye or sinus symptoms
- Asthma
- Acute anaphylactic shock (rare)



Contact OHP: utsaohp@utsa.edu or Ext:5304 for more information

Non-latex - nitrile gloves are utilized in LARC facilities

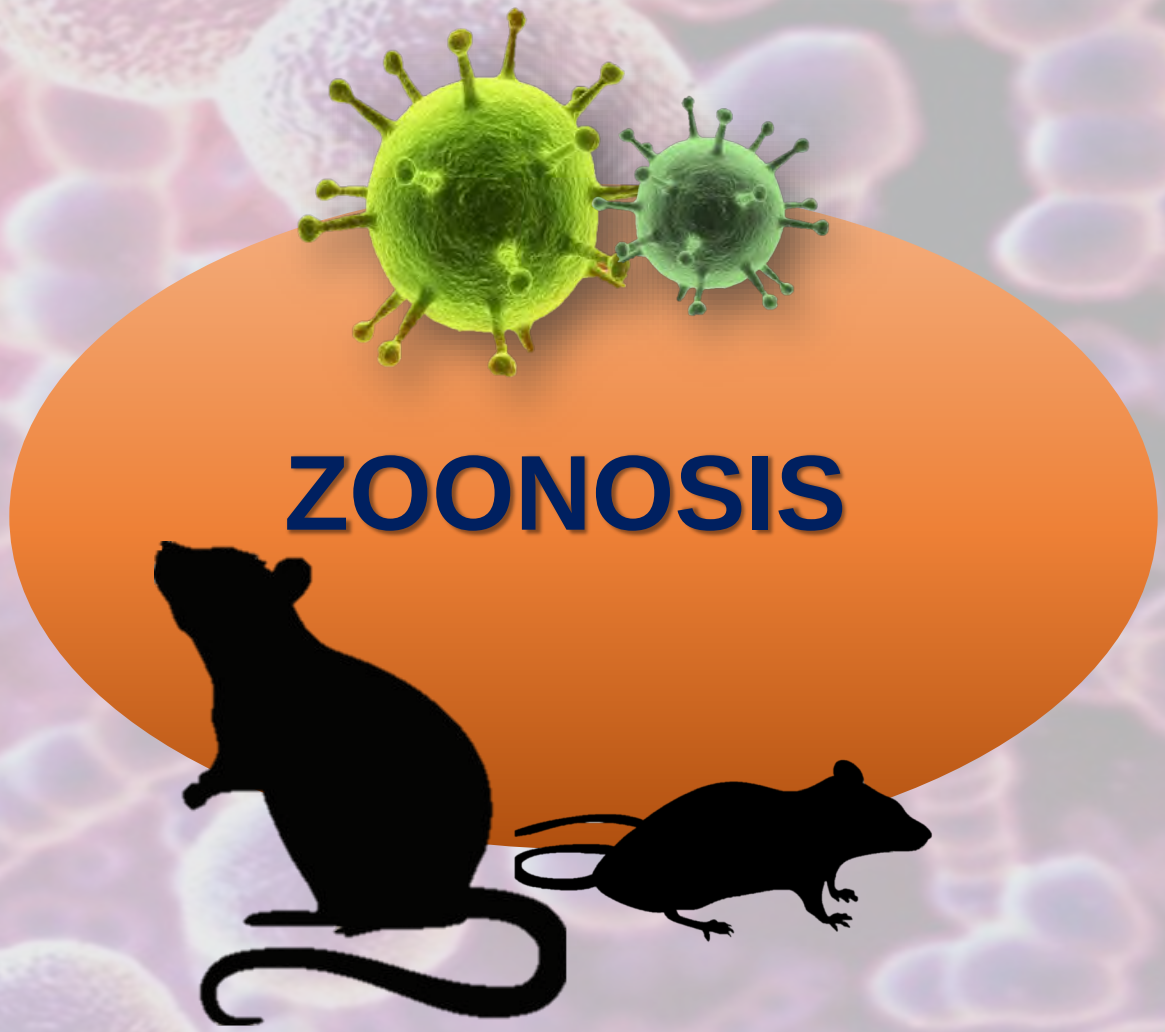

SHARPS

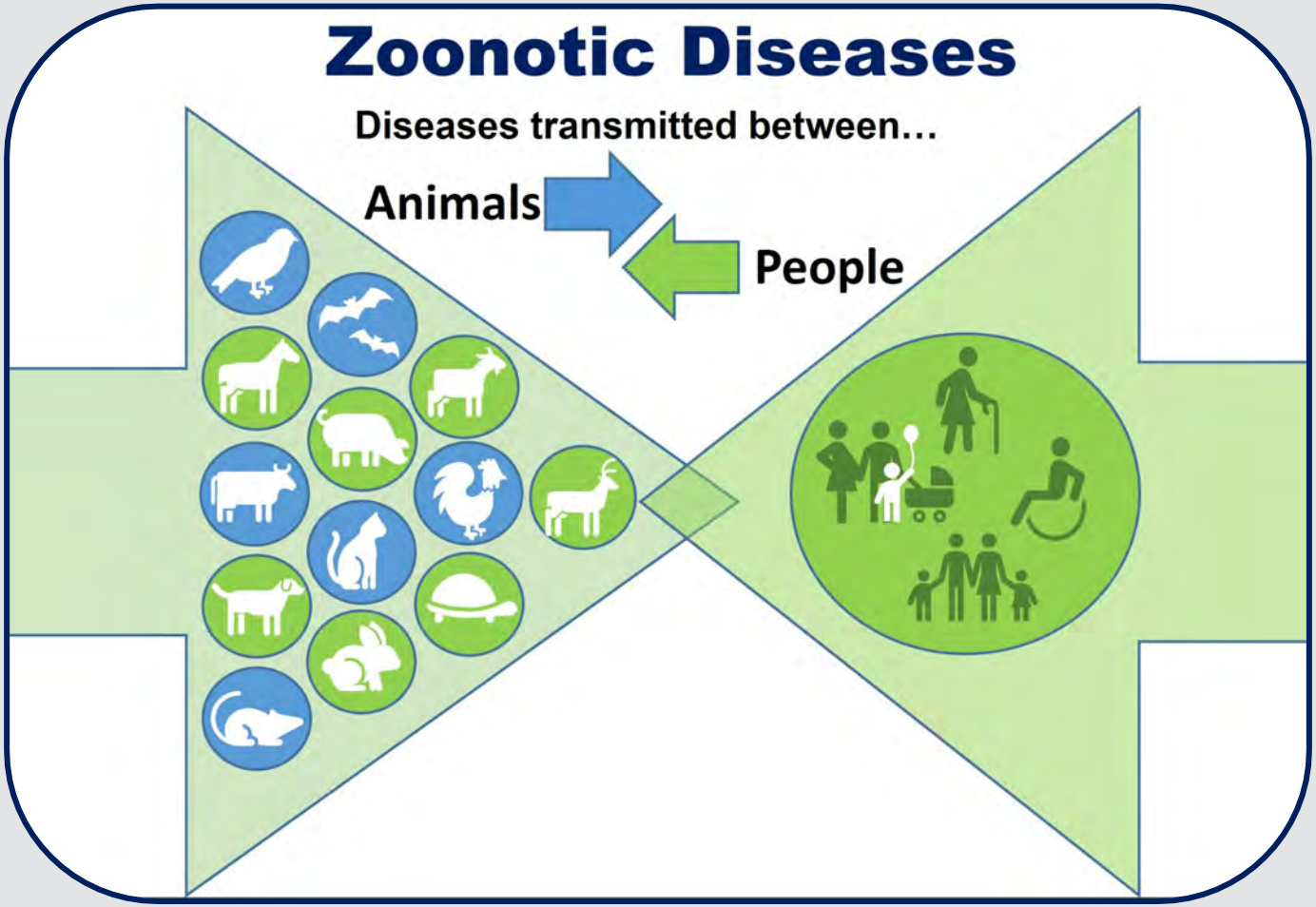
Sharps – What are They?

- **Ex: Needles, razor/scalpel blades, lancets, broken glassware, glass and hard plastic pipettes and pipette tips**
- **Disposed in sharps container**
- **Should be considered a *potential bio-hazard* even if you are not working with infectious agents**

Available in every animal housing and procedure room

More Information? Contact UTSA Hazardous Waste Management for specific procedures


ZOONOSIS



The following slides provide some examples of zoonotic risks associated with current UTSA research

ZOONOTIC DISEASES - Rodents

Examples:

- **Lymphocytic Choriomeningitis (LCM)**
- **Hantavirus**
- **Rat-Bite Fever (*Streptobacillus moniliformis*)**
- **Leptospirosis**
- **Salmonellosis**
- **Campylobacteriosis**
- **Dermatomycosis (Ringworm)**

ZOONOTIC DISEASES: Non-Human Primates

Examples:

- **Monkey B-Virus**
- **Tuberculosis**
- **Hepatitis virus group**
- **Shigellosis**
- **Salmonellosis**
- **Campylobacteriosis**
- **Dermatomycosis (Ringworm)**

Currently ***no primate work is done at UTSA***, however, **some research staff may participate** in **offsite** or **field** primate **research.** ***For more information on your risks contact*** **OHP**

ZOONOTIC DISEASES: Aquatic Species

Examples:

- **Mycobacterium**
- **Salmonella**
- **Aeromonas spp.**
- **Cestodes**
- **Protozoa**

Research work with aquatic species does occur at UTSA and offsite (field study). When working with these species whether on campus or in the field, it ***requires special considerations handling and/or housing****.* For more information contact **LARC & OHP.**

ZOONOTIC DISEASES: Wild Species

Examples:

- **Rabies**
- **Salmonella**
- **Coccidioidomycosis**
- **Lyme Disease**
- **Rickettsia rickettsia**
- **Dengue Fever**
- **Malaria**
- **Hantavirus**

Currently **UTSA** research staff participate in **offsite** or **field research** within **domestic** and **international wildlife areas**. The dynamic nature of field environments **may present risks due** to your **research activities** as well as from the **physical, political, social, cultural**, or **economic environment of the location** you are working.

Much of the **risk can be greatly reduced** through **careful planning**, **awareness of potential hazards**, and **exercising good judgement**. It is **important** to **discuss** these **issues** with your **PI** , **wildlife agencies**, **officials for the area** and **UTSA OHP**

ZOONOTIC DISEASES: ROUTES OF TRANSMISSION

- **INGESTION** – ex. Salmonella, Toxoplasmosis
- **PENETRATION MUCOUS MEMBRANES / BROKEN SKIN** – ex. Brucellosis, Rat Bite Fever, Cat Scratch Fever, Rabies, Herpes B Virus
- **PENETRATION THROUGH INTACT SKIN** – ex. Ringworm
- **INHALATION** – ex. Tuberculosis, Q-fever

ZOONOTIC DISEASES - Prevention

***DO NOT*:**

- Eat, drink, smoke, apply cosmetics or insert contact lenses in the lab or animal facility/areas
- Wear open-toed shoes in the lab or animal facility
- Recap used needles
- Pipette by mouth

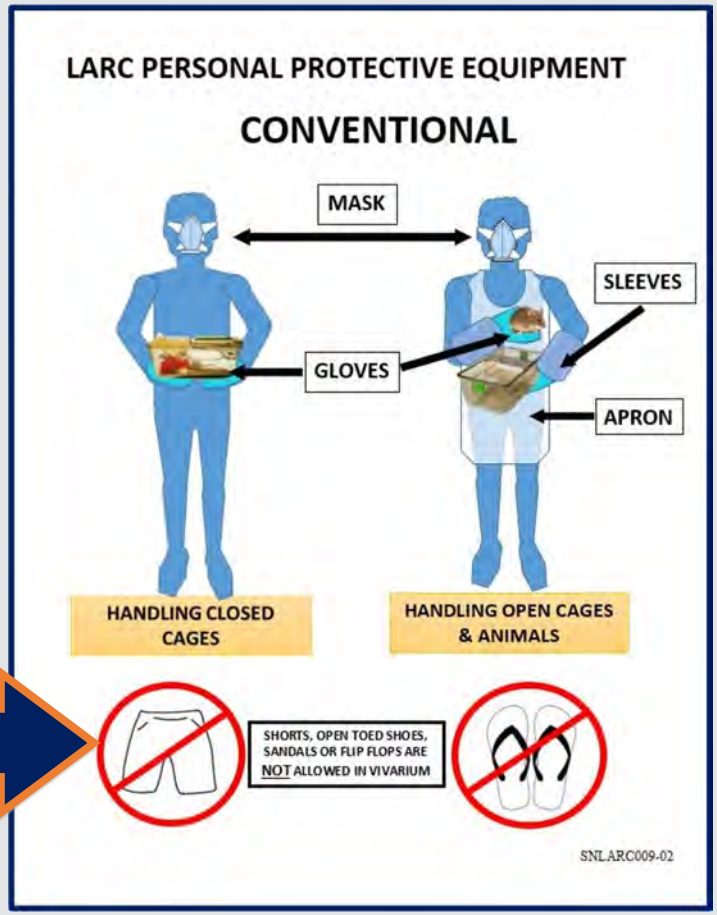
ZOONOTIC DISEASES – Prevention - II

***DO*:**

- Follow universal lab safety precautions
- Follow LARC PPE and animal handling procedures by **using**:
  - **Lab coats in the lab and provided PPE in LARC facilities**
  - **Proper animal handling and restraint**
  - **Proper protective and containment equipment and devices**
- Wash hands after handling animals, even after wearing gloves

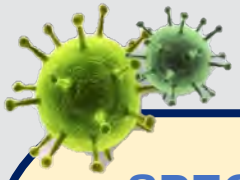
ZOONOTIC DISEASES – Prevention - III

Wear PPE according to signage posted in LARC facilities-



REDUCING ZOONOTIC DISEASE EXPOSURE

SUMMARY



- **SPECIES: Be aware of potential zoonotic diseases associated with species and environment you are working in (i.e. field studies)**
- **ROUTES OF TRANSMISSION: Be knowledgeable on routes of exposure [mucous membranas, mouth, skin, etc..]. Protect yourself from exposure by following universal lab safety procedures**
- **PPE: Wear appropriate PPE according to LARC signs and procedures. Use engineering controls when applicable [biosafety hoods, etc..]**

Concerns? Questions? Contact Lab Safety and/or OHP

ANMAL RELATED INJURIES

ANIMAL RELATED INJURIES

Bitten, Scratched or Injured while working with animals?

Potential for receiving a bite or scratch is an ever-present hazard with lab animals

Prevention

depends on proper training of personnel in animal behavior, handling and restraint

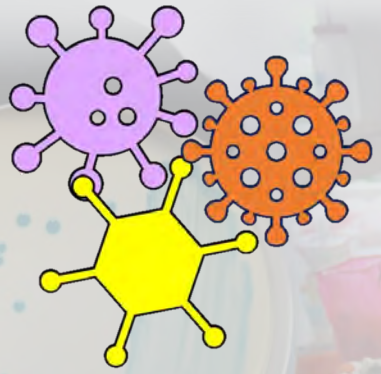
What to do…….

- **Secure your animal**
- **Skin breaks: *Clean wound thoroughly***
  - ***Wash with antibacterial soap (X3)***
- ***Seek immediate medical attention at closest Emergency clinic if following symptoms appear:***
  - **Swelling of wound area, face, mouth or tongue**
  - **Burning and/or ascending pain**
  - **Difficulty breathing**
  - **Dizziness hives or rash**
- **Contact Supervisor Immediately**

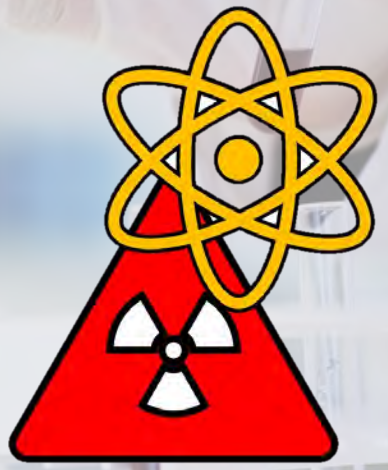
……even if injury is minor

More information? Contact OHP

***First Aid Kits** located in LARC facilities*



PROTOCOL RELATED HAZARDS



Protocol Related Hazards explained

Defined as those specifically associated with either **routine operational** or **experiment-specific protocols**. *(**Example -** studies involving the use of an infectious agent.)*

UTSA safety committees; **Institutional Biosafety Committee, Radiation Safety Committee and Chemical Safety Committee** perform **review** of the description of **protocol-related hazards** prior to the start of the experiments to **identify best practices** and **work with the labs to create procedures** to **work safely** with these hazards by **ensuring proper facilities, equipment, training and awareness to the staff involved in the study.**

IMPORTANT: **Read** and ***understand*** the **protocol related procedures** and **hazards** ***before starting the experiment.***

The following slides discuss the various types of protocol related hazards

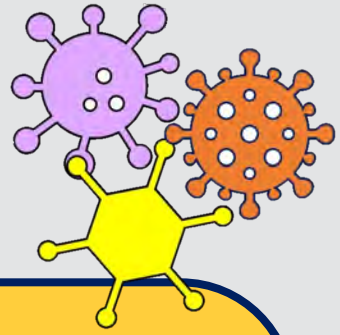
Infectious Diseases

Infectious disease research work:

- Protocol related
- Requires containment dictated by agent type
- Requires special training for containment & use
- Federal regulations apply
- Most are BSL2 and BSL3 containment
- **BSL3 access & training through:** Laboratory Safety Division

Infectious Diseases I

Defined as illness or condition caused by pathogenic organism and can be one of the following types:



- **Virus**
- **Mycoplasma**
- **Bacteria**
- **Prion**
- **Fungal**

It is important to understand how to safely handle and contain these agents when working with animals.

The following slides define the different Animal Biosafety Levels (ABSL) in relation to the hazards of the agents

ABSL1

AGENT TYPE:

- **Well-characterized ag**ents
- Not known to cause disease in immunocompetent adult humans
- **Minimal potential hazard** to personnel and the environment.

PRACTICES:

Standard animal care and management practices, including appropriate medical surveillance programs

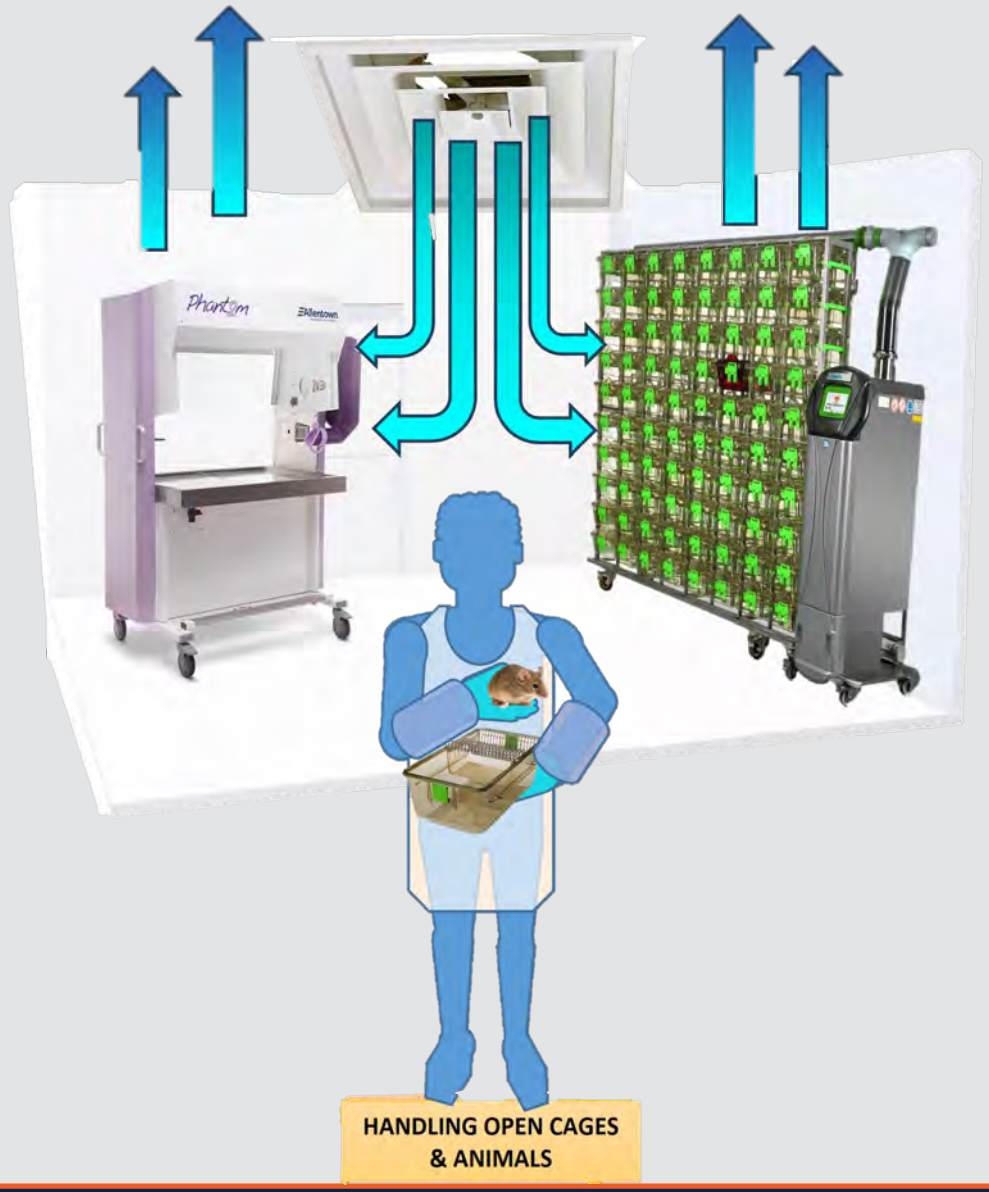
SAFETY EQUIPMENT:

Standard animal care and management practices, including appropriate medical surveillance programs

FACILITIES:

Standard animal facility

- Non-recirculation of exhaust air
- Directional air flow recommended



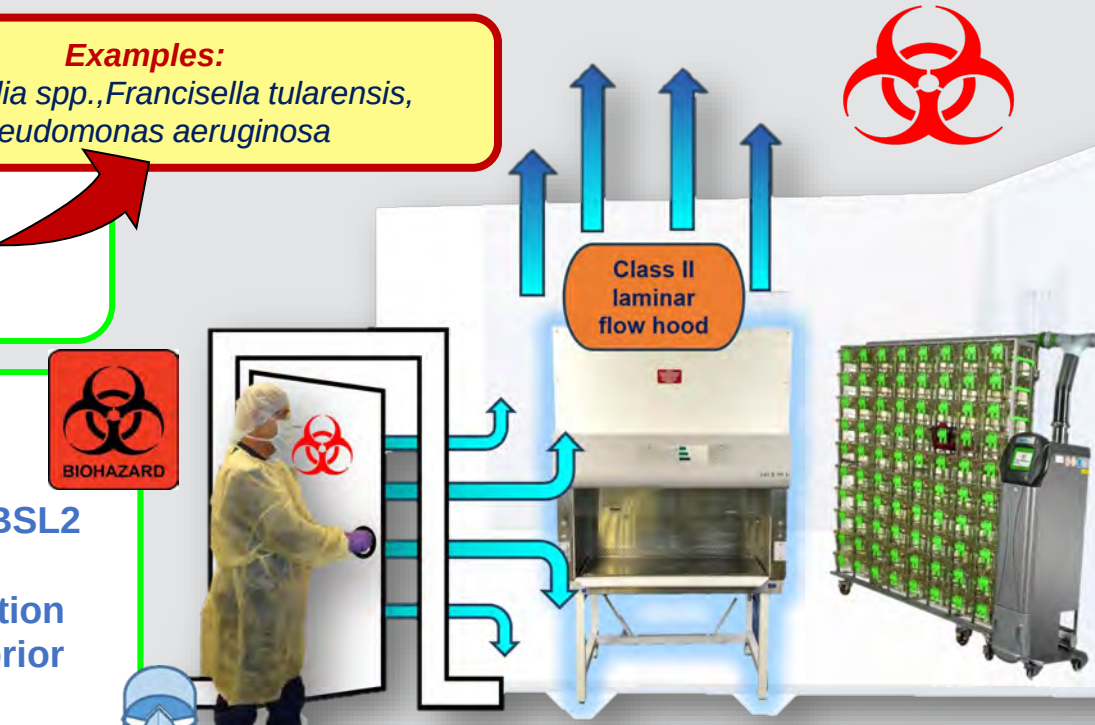
ABSL2

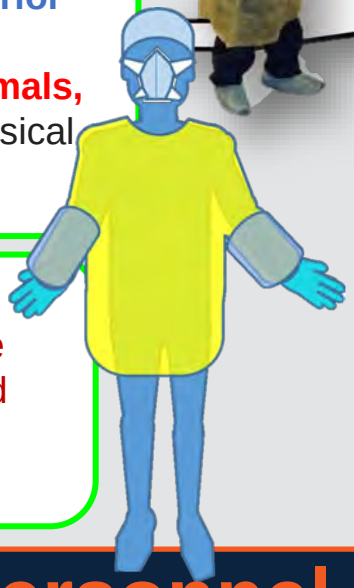
Examples:
Chlamydia spp.,Francisella tularensis, Pseudomonas aeruginosa

AGENT TYPE:
- **Agents associated with human disease**
- **Pose moderate hazards to personnel & environment**

PRACTICES:
- **Limited Access.**
- Personnel must have **specific training** in **BSL2 animal facility procedures, handling.**
- **Biohazard warning signs. Decontamination** of all **infectious wastes** & **animal cages prior to washing**
- **Manipulation of infectious materials/animals, conducted in BSCs** or by use of other physical containment equipment

SAFETY EQUIPMENT:
- Appropriate PPE must be utilized to reduce exposure to infectious agents, animals, and contaminated equipment.
- Class II laminar flow hood/BSCs





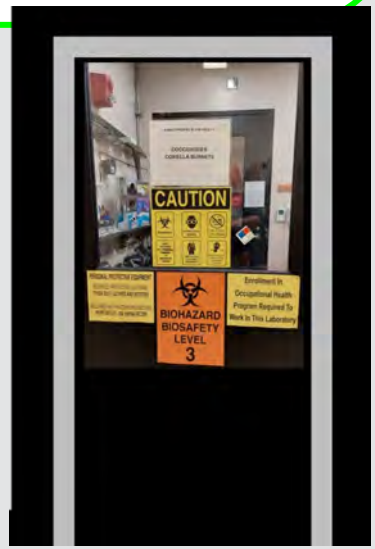
FACILITIES:
- Separate facility with **NEGATIVE** airflow.
- Autoclave available to process waste.

ABSL3

AGENT TYPE:
- **Indigenous or exotic agents with potential for aerosol transmission**
- **Disease may have *serious or lethal consequences***

Examples:
Coccidioides spp., Y. pestis, SARS-CoV2, Avian influenza, Francisella tularensis

SAFETY EQUIPMENT:
- **PPE: mandatory at all times** - appropriate respiratory protection (**PAPRs** & **Tyvek suits**)
- Hands free wash sinks
- **Containment equipment for housing animals and cage dumping activities**
- **Class II biosafety cabinets for all manipulative procedures that may create infectious aerosols.**



PRACTICES:

- RESTRICTED ACCESS
- Users must go through **FBI background check**
- Cages decontaminated/autoclaved before bedding removed
- **Special training for access and manipulation of agents**.
- Participate in annual training

FACILITIES:
- Physical separation from access corridors with **NEGATIVE** airflow.
- Self-closing, double door access
- Sealed penetrators
- Autoclave within facility

CARCINOGENS

Agents with potential to cause genetic/cellular changes:

- **Carcinogen** - a substance that can cause cancer
- **Mutagen** - a substance that can cause chromosomal damage
- **Teratogen** - a substance that can produce birth defects

IONIZING RADIATION

- **X-rays**
  - Pregnant women especially should avoid x-ray exposure
- **Radioisotopes**
  - Risk depends on isotope, chemical form & dose
  - Use appropriate shielding, maximize distance and minimize time of exposure

Maximum permissible dose = 500 mrem / 9 mos
(1/10 non-pregnant exposure limit)

Questions? Training? Contact Lab Safety

RECOMBINANT DNA (rDNA)

- **Recombinant DNA technology is an extremely important research tool Involves using enzymes and various laboratory techniques to manipulate and isolate DNA segments of interest.**
- **Safety issues in recombinant DNA technology include: *" Gene pollution"* of the environment resulting in *"superweeds," and antibiotic-resistant microbes***

Questions? Contact Lab Safety

- **All rDNA and sDNA safe handling/use at UTSA follows procedures in protocol, UTSA Biosafety plans, and lab SOPs – following NIH official guidelines.**
- ***Use at UTSA REQUIRES IBC & IRB approval***

WASTE ANESTHETIC GASES

ISOFLURANE [Inhalant Anesthesia used for animal surgeries/procedures]

- **Stable, non-explosive inhalation anesthetic**
- **Potential adverse health effects from long-term exposure to low concentration of waste gases**
- ***CAUTION:*** **Planning *or* currently pregnant (especially 1st trimester) Important to discuss these risks with your physician**

EXPOSURE CONTROL/PPE

- **Use in chemical fume hood and/or with gas scavenging equipment**
- **Wear appropriate gloves**
- **Avoid inhalation**
- **Do not get in eyes, on skin or clothing**
- **Wash thoroughly after handling**
- **Read and follow: *IACP 020 – Isoflurane Waste Anesthetic Gas***

Use care when refilling vaporizer

Scavenging Cannisters

LASERS

Lasers have many research uses and applications. Observe laser safety signs and warning labels in LARC facilities and research areas

- **DO NOT enter area/room where "LASER IN USE" sign posted.**
- **Direct or indirect exposure to lasers can lead to irreparable damage to eye**
- **Pay attention to signs indicating lasers in use**
- **Requires - Specific shielding and wear protective eye ware.**

Questions? Training? Contact Lab Safety

TOXIC CHEMICALS

HAZARDS

- **potentially carcinogenic, toxic, etc.**
- **Readily absorbed through skin**

EXPOSURE CONTROLS / PPE

- Use **downdraft table** or a **chemical fume hood**, whenever possible
- Wear appropriate **gloves, lab coat and safety glasses**
- **Wash your hands** thoroughly after handling
- ***READ LABELS***
- ***Follow LAB SAFETY TRAINING AND HANDLING PROCEDURES***

Examples:

- **Formaldehyde**
- **MS – 222**
- **Urethane**
- **Other solvents**
- **Phenols**
- **Sevoflurane**
- **Isoflurane**
- **Acetone**
- **Ethanol**
- **Biological agents**

Prior to starting work - contact Chemical Safety to confirm practices.

WORK WITH HAZARDOUS AGENTS?

IMPORTANT: ***Prior to starting work*** ***- read and understand*** the ***protocol related techniques, risks and safe handling of hazardous agents***

Committee contacts per agent:

- **Infectious Diseases & Recombinant DNA: IBC – irb@utsa.edu**
- **Radioisotopes: R & LSC – RSLC@utsa.edu**
- **Carcinogens & Toxic Chemicals: Lab Safety – LabSafety@utsa.edu**

ADDITIONAL SAFETY TOPICS & REMINDERS

SAFETY REMINDERS

SAFETY REMINDERS I:

Building Emergencies & Animal Facilities

Pay attention to building ALARMS! You are to follow UTSA policy when an EMERGENCY ALARM SOUNDS and *exit building promptly*

Working with an animal and alarm sounds?

- Cease work, **secure animal in cage** and return to room/rack if possible
- Turn off any equipment
- Leave facility and exit building

EMERGENCY CONTACT INFORMATION POSTED INSIDE LARC FACILITY

SAFETY REMINDERS II:

Security:

When working in LARC Facilities:

DO NOT:

- **Prop perimeter doors open**
- **Bring unauthorized individuals without LARC approval**
- **Share** personal **UTSA ID and PIN**
- **Do Not Allow tailgating - *Each person MUST use their UTSA ID card and PIN – 'do not open doors for others'***

Questions? Contact **LARC** X6692 or **larc@utsa.edu**

OCCUPATIONAL HEALTH PROGRAM

Ensuring a safe and healthy animal research environment

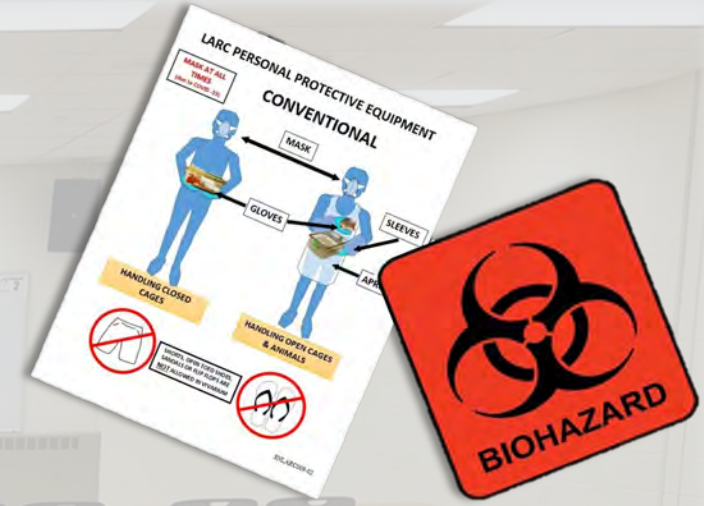
Did you know??

- OHP Enrollment ***mandatory*** for all animal users.
- Provide guidance promoting healthy work environment & opportunity to discuss health concerns and strategies to reduce your risks working with animals in a research environment.
- **Must be completed for approval to protocol(s) and begin animal related work.**
  - **Contact the IACUC office: iacuc@utsa.edu if you have questions.**

INFORMATION – Contact **OHP**: utsaohp@utsa.edu

Final thoughts….

- ✓ ***Follow*** **SOP's, procedures and signage within LARC facilities and labs**
- ✓ ***Wear*** **appropriate PPE**
- ✓ ***Understand*** ***risks*** **based on** ***your animal exposure, health status*** **and** ***work environment***
- ✓ ***Know*** **the** ***study related risks*** **as identified in the animal care and use protocol before starting animal work**



REMINDER

ACKNOWLEDGE YOU HAVE READ AND UNDERSTAND THIS PRESESENTATION

By completing and submitting -
AWS Acknowledgment Form to:
larc@utsa.edu

AWS Acknowledgment Form ***must be received to schedule LARC hands-on training (biomethodology, facility orientation and surgery (if required)***

ONE MORE FINAL REMINDER…

Before beginning any animal work, you MUST COMPLETE….

ALL IACUC required training as listed/instructed by the IACUC office

AND

be listed on approved protocol(s)

Questions on training requirements?

Contact IACUC office: iacuc@utsa.edu

Questions??

If you have questions or need additional assistance you can reach out to the following contacts below

Contact Information:

- LARC: larc@utsa.edu (ext. 6692)
- LAB SAFETY: labsafety@utsa.edu (ext. 5250)
- OHP: ohp@utsa.edu (ext. 5304)
- HAZARDOUS MATERIALS MANAGEMENT: HMM@utsa.edu (ext. 5808)

Finally, Thank You!!!

The **LARC** appreciates the **hard work and dedication** each of you **puts into research**.

LARC is proud to be part of the "Research Team!"

Updated: 26 FEB 25
Author: L. Long

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