




Occupational Health and Safety for Animal Handlers

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DRAFT

	<p style="text-align: center;">NEW JERSEY INSTITUTE OF TECHNOLOGY University Heights, Newark, New Jersey 07102</p>
	<p>Document Control No.:</p>
	<p>Document Title: Occupational Health and Safety for Animal Handlers</p>

1.0 Introduction


New Jersey Institute of Technology (NJIT) animal research program is administered through the Office of Research with the support of the Environmental Health and Safety Department (EHS) and Rutgers University’s Institutional Animal Care and Use Committee (IACUC). NJIT has an inter-institutional collaboration with Rutgers University-Newark (Rutgers) that permits NJIT to operate as a unit under the accreditation of Rutgers’ Animal Care and Use Program. Therefore, NJIT faculty, staff, and students who use any live vertebrate animals for research, teaching, testing or production purposes are required to conform to Rutgers’ Animal Welfare Policy and Animal Care and Use Program. Animal handlers should also be familiar with administrative procedures adopted by the Institute to ensure compliance with the principles of humane animal care and use, and with pertinent laws and regulations.

Although Rutgers’ IACUC has oversight responsibilities of the overall program for the care and use of live vertebrate animals, NJIT is required to establish and maintain an occupational health and safety program for all its animal handlers. The occupational health and safety program (OHSP) is developed in accordance with regulatory requirements and institutional policies, and based on the facilities, research activities, hazards, and animal species at NJIT. An effective OHSP requires coordination and collaboration between the research staff, NJIT Office of Research, NJIT Environmental Health and Safety, Rutgers University-Newark (Rutgers) Institutional Animal Care and Use Committee (IACUC), and the contracted occupational healthcare provider to provide a safe and healthy workplace. This program applies to all animal use on NJIT campus except those covered under the Rutgers Animal Care and Use Program.

2.0 Animal Experimentation Involving Hazards

A committee approach is the primary means of determining exposure risk to hazards associated with animal studies. Projects involving animals in experiments are reviewed by IACUC. The Institutional Biosafety Committee (IBC) performs conducts an additional review for health and safety if biologicals are used. During the IACUC and IBC reviews, biological, chemical, radiological, sharps, physical, and animal associated hazards are addressed. Therefore, animal use protocols are required to be completed and submitted by the faculty/principle investigator to IACUC for review. The faculty/principle investigator is required to identify hazardous materials and operations that may be used in the study protocol. All recombinant/synthetic nucleic acids, infectious agents, biological toxins, and human derived materials projects must be registered with and approved by the Institutional Biosafety Committee (IBC) prior to commencement of the experiment.

EHS conducts hazard analysis and provides safe handling and use information to the committees and researchers. EHS verifies the IBC approval and the containment level required for biological work.

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EHS also evaluates risk for the use of potentially hazardous substances such as chemicals, anesthetic gases, pharmaceutical drugs, controlled substances, etc. Thereby establishing and ensuring the control measures used to minimize worker exposure to these hazards and animal-associated waste are adequate. All waste generated during animal research is handled and disposed of in accordance with Rutgers' Animal Care and Use Program and the university procedures of the research location.


In addition to adhering to the policies and procedures established by NJIT, Rutgers, and their committees, the following documents must be adopted and reviewed by research staff to assure regulatory compliance. The documents below provides safety information and includes templates needed to make them lab-specific plans.

- [Chemical Hygiene Guide](#) for all laboratories that use hazardous chemicals for research purposes.
- [Biological Safety Guide](#) for all facilities that use infections agents or recombinant DNA at a Biosafety Level 2 or higher. The Exposure Control Plan is required for all labs using human derived materials, and is a section within the Biological Safety Guide.
- [Standard Operating Procedure \(SOP\) Templates](#) for baseline requirements for handling a hazardous chemical or class of chemicals.

Ultimately, it is the faculty/principal investigator responsibility to enforce these policies and procedures, and develop effective safety procedures in consultation with EHS and other applicable administrative departments or committees. It is recommended that faculty/principal investigator designate an individual(s) to be responsible for preparing, reviewing, and updating these guides/plans/procedures whenever there are changes or new hazards are identified, and ensuring staff is aware of these changes.

3.0 Hazard Identification and Risk Assessment

There are various risks associated with the experimental use of animals such as physical, biological, chemical, and/or radiological hazards. These hazards must be identified and addressed prior to and when conducting animal-based research. The identification of the hazards can reduce the associated risk to minimal or acceptable levels by performing a risk assessment. The risk assessment process is an ongoing process involving the principal investigator/faculty, EHS, and the IACUC and IBC as required. The risk assessment process can begin by utilizing the [NJIT Hazard Assessment Form](#). Below is a table of some animal and experimental hazards that can be encountered when conducting animal-based research. Field studies including work with wild/non-laboratory animal species can also present their own unique hazards and risks in addition to those listed below.

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Hazards Associated with Animal-Based Research				
Animal	Biological	Chemical	Physical	Radiological
Allergens	Bloodborne Pathogens	Cleaning Agents	Equipment	Lasers
Bites	Human-derived Materials	Chemical Agents	Ergonomic Hazards	X-ray Equipment
Scratches	Recombinant/Synthetic Nucleic Acids	Carcinogens / Mutagens	Noise	Radionuclides
Zoonosis	Infectious Materials	Toxins	Slips, Trips & Falls	Sealed Sources
	Toxins	Waste Anesthetic Gases	Environmental Hazards	


3.1 Animal Hazards

Laboratory-based experimentation with animals requires knowledge of the animal species, experimental procedures, and the research environment. Therefore, an evaluation of potential inherent and associated hazards must be performed, both separately and together, to ensure the appropriate safeguards are in place. Inherent hazards, like natural infections, zoonosis, susceptible host, size, mobility, allergens, and animal shedding, shall be considered to determine the occupational health needs for the animal handlers and containment level for the animals. Associated risks, ranging from physical handling, physical/chemical restraints, experimental procedures, level of worker training/experience, and equipment use, must be assessed to define the probability and consequences of exposure. A thorough assessment of both hazards and other potential hazards are vital in establishing training/competency needs and an appropriate risk mitigation strategy.

Currently, NJIT animal research mainly focuses on experimental investigations of animal behavior including muscular and neural activities, biomaterials, and therapeutic treatments. Please review the appendices for recommended containment levels and a list of zoonotic diseases.

3.2 Biological Hazards

The Institutional Biosafety Committee (IBC) must review and approve all animal work with infectious materials, biological toxins, bloodborne pathogens, human-derived materials, and/or recombinant/synthetic nucleic acids prior to initiation. NJIT IBC has been recognized and approved by the National Institutes of Health (NIH) to review research protocols and specify biosafety practices and containment principles for constructing and handling, but not restricted to, recombinant/synthetic nucleic acids. The IBC ensures that research involving

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biological materials comply with biological safety and BBP exposure control principles, practices, and guidelines set forth by the CDC-NIH Biosafety in Microbiology and Biomedical Laboratories (BMBL); the NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (NIH Guidelines); and the OSHA Bloodborne Pathogens (BBP) Standard.


Research proposals are submitted to the IBC for review via the [Registration Document for Biohazards](#) form. This document is a critical part of the risk assessment process that helps to identify hazards, and ensure university oversight of research and proper safety measures are in place. Hazard identification and safeguards are primarily based on the BMBL, NIH Guidelines, and BBP Standard in conjunction with the Office of Research, EHS, the Biosafety Officer, responsible faculty/scientists and other reputable experts and resources as needed.

3.3 Chemical Hazards

EHS assesses all chemical hazards in accordance with OSHA’s Occupational Exposure to Hazardous Chemicals in Laboratories (Laboratory Standard), beginning with the review of purchase order requisitions. All chemicals including cleaning agents shall be used with caution, adequate ventilation, and the recommended protective equipment. Hazardous chemicals and chemical toxins shall be used inside a chemical fume hood or with an appropriate exhaust system that ensures adequate capture of fumes. Animal handlers, both female and male, that are pregnant or contemplating pregnancy with potential exposure to chemicals or toxins with reproductive risks must be notified of this hazard.

An SOP must be submitted to EHS for any hazardous materials or toxins that is considered a particularly hazardous substance (PHS). The SOP is also a vital part of the risk-based assessment, and helps to ensure additional and/or more stringent precautions are established for the use, storage, and disposal of PHSs when necessary. The Principal Investigator, laboratory supervisor, and/or designee are responsible for monitoring the use of hazardous chemicals in their laboratories. Additional information on the proper use, storage, and disposal of hazardous chemicals including generic SOP templates for hazardous chemicals can be found in the [Chemical Hygiene Guide](#).

NOTE: Studies that use drugs and therapeutics, including but not limited to penicillin, non-steroidal anti-inflammatory drugs, latex, and anesthesia, should adopt procedures that minimize airborne release and skin contamination as people with sensitivity may experience an allergic reaction or anaphylactic shock. Only licensed users are authorized to possess and use controlled substances.

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3.4 Physical Hazards

The physical environment surrounding laboratory animals must be maintained to ensure the environmental conditions are appropriate for the animal species to acclimate with minimal stress and physiologic alterations. The environment is characterized by many factors, including illumination, noise, temperature, humidity, and gaseous/particulate composition in air. Therefore, animal facilities in addition to animal handling can present a variety of physical risks for workers such as noise exposure, thermal stressors, lifting and repetitive stress as well as other work site hazards.


Animal handlers should be aware of any specific environmental conditions and procedures that may present a risk to their safety and health. Environmental housing requirements may affect the workers' health or ability to conduct tasks such as working in facilities with elevated temperature and/or humidity levels or lower illumination levels. These environmental conditions may be required for the animals' well-being, but may have an adverse impact on the worker like heat stress or visibility issues. Animal handlers may also encounter ergonomic risks from lifting and moving heavy, awkward shaped items such as cages, metal washtubs, and bags of food and bedding.

Therefore, it is vital that animal workers are aware of and trained on the general and specific hazards associated with animal research and facilities. The principal investigator, lab supervisor or designee must ensure animal handlers/researchers are provided adequate training and the appropriate personal protective equipment in accordance with the risk assessment results. Good housekeeping is also essential in preventing falls and the spread of contamination as well as avoiding potential electrical/fire hazards especially in aquatic facilities where there is excessive amounts of water and electrical equipment.

3.5 Radiological Hazards

Use of radiological materials, ionizing radiation generating machines (e.g. x-ray machines, scanning electron microscopes, etc.), and sealed sources require prior approval from EHS, and may require registration with New Jersey Department of Environmental Protection (NJDEP). Radiation can pass through soft tissue, and potentially causing skin burns to irreversible cell damage. The severity of the exposure depends on the type of radiation, dose, duration of exposure, and route of exposure. Therefore, workers must understand the nature of the material they are handling and the exposure and health risks to properly protect themselves.

Various lasers are used in research settings from imaging (confocal microscopes) to skin phototherapy (low-level lasers) to applications in forensic science and semiconductors (laser spectroscopy). Improper use of laser devices can lead to a range of injuries from mild skin burns to irreversible injury to the skin and eye. The severity of the damage is dependent upon

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several factors, including exposure duration, wavelength of the beam, energy of the beam, and the area and type of tissue exposed to the beam. Therefore, all lasers shall be registered with EHS using the [Laser Use Registration Form](#) to ensure it is properly classified with the appropriate safeguards. EHS offers Radiation and Laser Safety trainings for potential users of these materials and/or devices.

4.0 Personnel Training


All faculty, staff, students, and visitors working in NJIT laboratories are required to complete Laboratory Safety Training in addition to other relevant safety trainings as identified by the risk assessment process, including but not limited to, Biological Safety, Animal Safety, Materials of Trade, Radiation Safety, and/or Laser Safety trainings. These trainings are offered through EHS, and include an overview of associated topics such as waste management, PPE use, emergency procedures, and good hygiene and housekeeping practices. Project personnel listed on an animal research protocol that require IACUC approval must also complete all trainings mandated by Rutgers' Institutional Animal Care and Use Committee (IACUC) and Comparative Medicine Research (CMR). The trainings mentioned above addresses most of the foreseeable, if not all, potential hazards including but not limited to animal bites/scratches, exposure to allergens/zoonosis, chemical agents, biological agents, physical hazards, ergonomics, and other animal-associated research hazards. Trainings offered by NJIT EHS can be found on the [EHS Training Session Schedule](#) or contact EHS at healthandsafety@njit.edu for more information.

In addition, job-specific training is required and provided by the faculty/PI, lab supervisor, or designee to ensure workers are thoroughly trained to handle animals. Identification and proper management of all hazards not limited to animals, equipment, and hazardous materials shall be discussed during the training process. NJIT Office of Research offers additional web-based training courses to NJIT faculty, staff, and students via [CITI Program](#) to fulfill compliance training needs.

5.0 Facilities, Equipment, and Monitoring

All research facilities have the potential to store hazardous materials within the study environment or animal housing areas. These areas have restricted access from the public, and those housing animals are typically located within isolated areas of the building away from general traffic. The restricted access ensures facility security and prevents accidental exposure of hazardous materials or animal allergens to the public.

EHS reviews all IACUC protocols to ensure the appropriate exposure control measures are available within the laboratory and animal housing areas. In addition, EHS ensures limits are placed on access to and/or activities with hazards of concern not limited to controlled substances and toxins. Based on the hazards presented in the laboratory, EHS posts caution signs on the laboratory doors identifying

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the hazards within the facility, and provide Designated Area signs to be posted where PHSs and/or highly toxic materials are used.


Properly functioning facilities play an important role in maintaining safety in an effective manner. All buildings used in animal research are appropriately designed and expected to accommodate all research and support activities. General ventilation in NJIT animal research laboratories and housing facility uses a single pass air supply with a range of 6 to 12 air changes per hour. The air is continually replaced to prevent heat buildup from equipment, increased air concentrations of animal allergens, and the escape of hazardous substances from the lab. The directional airflow moves from non-laboratory areas and out of the building through the chemical fume hood and general ventilation exhaust.

Other engineering controls and specialty equipment are used to minimize the potential for undue or accidental exposure to anticipated hazards. Pending the anticipated hazards, a biological safety cabinet or chemical fume hood is used primary containment to prevent and contain the release of animal allergens and hazardous materials. Micro-isolator cages for animal housing and animal transfer stations for cage changing controls the release animal allergens such as dander, hair, skin, excrements, etc. If these engineering controls are unavailable or inadequate in controlling the release of aerosol-droplets of these anticipated hazards into the air, respiratory protection may be required. For more information on the Respiratory Protection Program, please contact Mitchell Gayer at gayer@njit.edu.

6.0 Personal Hygiene and Protective Equipment

Due to the interaction of personnel with the animal populations, it is understood that personal cleanliness is of major importance for protecting the employees from allergens and possible zoonotic infections as well as protecting the animals from human-associated illnesses. Therefore, personal hygiene is promoted through good housekeeping; regular cleaning and disinfection of work areas; the removal of personal protective equipment prior to leaving the laboratory/research facility; and frequent handwashing. Practicing good personal hygiene is essential to preventing contamination of work surfaces and the spread of animal allergens and hazardous materials outside of laboratories/animal facilities.

At minimum, researchers wear lab coats, gloves, and eye protection as needed when performing experiments. Anytime gloves are removed, hands must be washed. Lab coats worn in the animal facility should not be worn outside the facility. Upon review of research protocols and risk assessments, EHS, IBC and/or IACUC determines whether additional PPE is required for working with animals or with specific agents. If workers have a high risk of animal allergen exposure, develop an allergy, or become sensitized to animal allergens, use of an N-95 respirator may be required. The use

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of a respirator requires a medical evaluation, training, and fit testing prior to use. For more information on the Respiratory Protection Program, please contact Mitchell Gayer at gayer@njit.edu.

7.0 Medical Evaluation and Emergency

7.1 Medical Evaluation

All faculty, staff, students, and visitors whose work involves any contact with animals for research or instructional purposes on NJIT campus must complete an Animal Use Questionnaire. The Animal Use Questionnaire assesses the risks associated with the study project and work environment to determine if the individual requires medical evaluation by our contract occupational health provider or student health services. Based on the questionnaire and medical evaluation, EHS in consultation with management and the occupational health provider establishes safeguards to protect the health of the worker. These safeguards include, but are not limited to, additional PPE, work modifications, immunizations, and/or exclusion from certain operations/areas of facility if deemed necessary.

It is essential for animal handlers to consider and discuss with a healthcare provider any pre-existing health conditions and the potential risks associated with their work. Additionally, it is recommended that individuals working with animals or within animal facilities be immunized with the Tetanus (Tdap) vaccine, and Hepatitis B vaccine if handling human derived materials. Supplemental PPE such as hearing and respiratory protection may also be required if the noise and inhalation hazards, respectively, cannot be engineered out effectively. Enrollment into the hearing conservation or respiratory protection program may be mandatory pending the risk assessment, and require hazard-specific medical evaluation and training for those with potential exposure.

7.2 Medical Emergency

All occupational injuries, illnesses, exposures, or potential exposures must be immediately reported to the individual's supervisor and EHS, including potential hazardous conditions and near misses found during routine assessment of the work. All work related incidents and accidents must be reported within 24 hours by submitting an [Incident Report Form](#) to healthandsafety@njit.edu. All laboratories and animal research facilities must have a completed [Emergency Response Guidelines](#) poster conspicuously displayed in the area.

Incidents requiring emergency services or assistance must be immediately reported to NJIT Public Safety who will contact EHS and other emergency responders as needed. In the event of an emergency, contact **NJIT Public Safety** by dialing **9-1-1** and provide the following information as applicable.




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- **Location of Incident**
Say "NJIT" then provide building name and room number
- **Your full name with a call back number from a safe location**
- **Nature of Incident**
(ex. Rat bite causing severe damage to hand, Allergic reaction to allergens)
- **Status of Incident**
(ex. spill contained, animal escaped, need EHS assistance)
- **Need for Emergency Medical Services**
(ex. Medical assistance is needed, No injuries or exposures, etc.)
- **Number of Injured Person(s)**
(ex. 2 people exposed to human blood, 1 person was stuck by needle)


If you are exposed to any allergens, potentially hazardous materials, or suffer from any physical injuries from animals or equipment, perform the following first aid measures before seeking medical attention or until medical assistance arrives.

- Immediately cleanse affected area(s) for at least 15 minutes
 - If eyes or face, flush area using emergency eyewash or drench hose.
 - If inhalation, leave the area immediately and get fresh air.
Remember to remove PPE and notify others in the area of the potential airborne hazard prior to exiting the facility.
 - If skin or body, wash area with soap and water and/or use emergency shower.
DO NOT scrub too vigorously or use abrasive cleansers on the wound. This may aggravate wound site and/or cause breaking intact skin, increasing chances of exposure.
- Notify your supervisor or Faculty/PI immediately.

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Appendix A – References


- American Committee of Medical Entomology and American Society of Tropical Medicine and Hygiene. (2019). Arthropod Containment Guidelines, Version 3.2. *Vector Borne and Zoonotic Diseases*, 152-173.
- Centers for Disease Control and Prevention and National Institutes of Health. (2020). *Biosafety in Microbiological and Biomedical Laboratories. 6th Edition*.
- National Institutes of Health. (2019). *NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules*. Bethesda.
- National Research Council. (2011). *Guide for the Care and Use Laboratory Animals*. 8th Edition. Washington, D.C.: The National Academies Press.

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Appendix B – Animal Biosafety Levels

BSL	Agents	Practices	Primary Barriers and Safety Equipment	Facilities (Secondary Barriers)
1	Not known to consistently cause diseases in healthy adults	Standard animal care and management practices, including appropriate medical surveillance programs	As required for normal care of each species <ul style="list-style-type: none"> ■ PPE: laboratory coats and gloves; eye, face protection, as needed 	Standard animal facility: <ul style="list-style-type: none"> ■ No recirculation of exhaust air ■ Directional air flow recommended ■ Hand washing sink is available
2	<ul style="list-style-type: none"> ■ Agents associated with human disease ■ Hazard: percutaneous injury, ingestion, mucous membrane exposure 	ABSL-1 practice plus: <ul style="list-style-type: none"> ■ Limited access ■ Biohazard warning signs ■ “Sharps” precautions ■ Biosafety manual ■ Decontamination of all infectious wastes and animal cages prior to washing 	ABSL-1 equipment plus primary barriers: <ul style="list-style-type: none"> ■ Containment equipment appropriate for animal special ■ PPE: Laboratory coats, gloves, face, eye and respiratory protection, as needed 	ABSL-1 plus: <ul style="list-style-type: none"> ■ Autoclave available ■ Hand washing sink available ■ Mechanical cage washer recommended ■ Negative airflow into animal and procedure rooms recommended
3	Indigenous or exotic agents that may cause serious or potentially lethal disease through the inhalation route of exposure	ABSL-2 practice plus: <ul style="list-style-type: none"> ■ Controlled access ■ Decontamination of clothing before laundering ■ Cages decontaminated before bedding is removed ■ Disinfectant foot bath as needed 	ABSL-2 equipment plus: <ul style="list-style-type: none"> ■ Containment equipment for housing animals and cage dumping activities ■ Class I, II or III BSCs available for manipulative procedures (inoculation, necropsy) that may create infectious aerosols ■ PPE: Appropriate respiratory protection 	ABSL-2 facility plus: <ul style="list-style-type: none"> ■ Physical separation from access corridors ■ Self-closing, double-door access ■ Sealed penetrations ■ Sealed windows ■ Autoclave available in facility ■ Entry through ante-room or airlock ■ Negative airflow into animal and procedure rooms ■ Hand washing sink near exit of animal or procedure room
4	<ul style="list-style-type: none"> ■ Dangerous/exotic agents which post high risk of aerosol transmitted laboratory infections that are frequently fatal, for which there are no vaccines or treatments ■ Agents with a close or identical antigenic relationship to an agent requiring BSL-4 until data are available to redesignate the level ■ Related agents with unknown risk of transmission 	ABSL-3 practices plus: <ul style="list-style-type: none"> ■ Entrance through change room where personal clothing is removed and laboratory clothing is put on; shower on exiting ■ All wastes are decontaminated before removal from the facility 	ABSL-3 equipment plus: <ul style="list-style-type: none"> ■ Maximum containment equipment (i.e., Class III BSC or partial containment equipment in combination with full body, air-supplied positive-pressure suit) used for all procedures and activities 	ABSL-3 facility plus: <ul style="list-style-type: none"> ■ Separate building or isolated zone ■ Dedicated supply and exhaust, vacuum, and decontamination systems ■ Other requirements outlined in the text

Source: CDC-NIH Biosafety in Microbiology and Biomedical Laboratories (BMBL) 5th edition


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Appendix C – Arthropod Biosafety Levels

Arthropod Containment Levels	1	2	3	4
Arthropods Free of Specific Pathogens	<ul style="list-style-type: none"> Indigenous/no change in local fauna Exotic/inviable or transient only 	Exotic with establishment potential or transgenic	N/A	N/A
Infection Status	Up to BSL-1	Up to BSL-2	Up to BSL-3	Up to BSL-4
Practices	ACL-1 standard handling practices	ACL-2 and BSL-2 limited access, training, signage, containment, and disposal	ACL-3 and BSL-3 restricted access, training, appropriate PPE, signage, containment, disposal, record-keeping	ACL-4 with BSL-4 isolation, training, appropriate PPE, signage, containment, disposal, record-keeping
Primary Barrier	Species-appropriate containers	Appropriate PPE, escape-proof containers	Appropriate PPE, escape-proof containers, pesticide available for emergency use	Appropriate PPE, escape-proof containers, pesticide available for emergency use
Secondary Barrier		BSL-2 facilities, breeding sites, and haborage minimized, pest control	BSL-3 facilities, biological safety cabinets, other physical containment devices, pest control	BSL-4 and facility-specific procedures and equipment for arthropod handling while wearing positive pressure containment suit

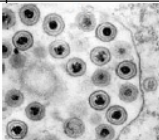

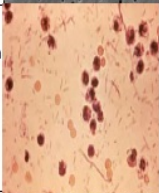
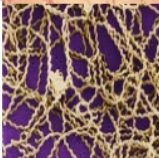
Indigenous species are those species whose current range includes the research location. All others are considered exotic. Uninfected arthropods would be inviable as a result of exposure to unfavorable conditions; transient because conditions vary such that the arthropod would die during typical year climate cycle; or has potential for establishment because escaped arthropods could reasonably be expected to persist through a typical climatic year.

Source: American Committee of Medical Entomology - Arthropod Containment Guidelines, Version 3.2

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Appendix D – Zoonotic Diseases Fact Sheet

ZOONOTIC DISEASES FACT SHEET



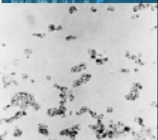

Disease	Pathogen	Genus species	Host Range	Transmission	Symptoms	Incubation	Fact	Treatment	Photo
Brucellosis*	Bacteria	<i>Brucella</i> (<i>B. melitensis</i> , <i>B. abortus</i> , <i>B. suis</i> , <i>B. canis</i>)	Infected animals (swine, cattle, goats, sheep, dogs)	Skin or mucous membrane contact with infected animals, their blood, tissue, and other body fluids	High and protracted (extended) fever. Infection affects bone, heart, gallbladder, kidney, spleen, and causes highly disseminated lesions and abscess	1-15 weeks	Most commonly reported U.S. laboratory-associated bacterial infection in man	Antibiotic combination: streptomycin, tetracycline, and sulfonamides	
Salmonellosis	Bacteria	<i>Salmonella</i> (<i>S. cholera-suis</i> , <i>S. enteritidis</i> , <i>S. typhimurium</i> , <i>S. typhi</i>)	Domestic (dogs, cats, monkeys, rodents, laboratory rodents, reptiles [especially turtles], chickens and fish) and herd animals (cattle, chickens, pigs)	Direct contact as well as indirect consumption (eggs, food vehicles using eggs, etc.). Human to human transmission also possible	Mild gastroenteritis (diarrhea) to high fever, severe headache, and spleen enlargement. May lead to focal infection in any organ or tissue of the body)	6 hours to 3 days	Fatality rate of 5-10%	Antibiotic combination: chloramphenicol, neomycin, ampicillin	
Shigellosis*	Bacteria	All <i>Shigella</i> species	Captive non-human primates	Oral-fecal route	Ranges from asymptomatic carrier to severe bacillary dysentery with high fevers, weakness, severe abdominal cramps, prostration, edema of the face and neck, and diarrhea with blood, mucous and inflammatory cells	Varies by species. 16 hours to 7 days.	Highly infective. Low number of organisms capable of causing infection. Rate of infection in imported monkeys can be high	Intravenous fluids and electrolytes, Antibiotics: ampicillin, amoxicillin, trimethoprim-sulfamethoxazole	
Leptospirosis	Bacteria	<i>Leptospira interrogans</i>	Animal, human urine	Direct contact with urine of infected dogs, mice or rats. Indirect contact with urine contaminated materials. Droplet transmission via aerosols of urine	Phase 1: headache, muscle ache, eye pain with bright lights, chills and fever. Phase 2: fever with stiffness of the neck and inflammation of the nerves to the eyes, brain, spinal column	7-12 Days	Leptospirosis associated with liver and kidney disease is called Weil's syndrome, characterized by jaundice	Doxycycline and penicillin. Severely ill patients may need IV fluids, antibiotics and dialysis	



Through OSHA's Alliance Program, this fact sheet was developed as a product of the OSHA and ABSA Alliance for informational purposes only. It does not necessarily reflect the official views of OSHA or the US Dept. of Labor



ZOONOTIC DISEASES FACT SHEET

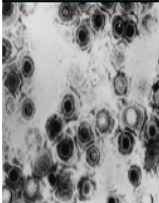
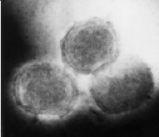


Disease	Pathogen	Genus species	Host Range	Transmission	Symptoms	Incubation	Fact	Treatment	Photo
Relapsing fever	Bacteria	Borreliae spp. [<i>B. recurrentis</i> (louse-borne), <i>B. hemsii</i> (tick-borne)]	Animals	Tick-borne, blood transfusions	Fever, headache and muscle pain that lasts 4-10 days and subsides. Afebrile period lasting 5-6 days followed by a recurrence of acute symptoms	5-15 days	Epidemic relapsing fever (transmitted by lice) is more severe than endemic relapsing fever (transmitted by ticks)	Tetracyclines, chloramphenicol	
Tuberculosis	Bacteria	<i>Mycobacterium tuberculosis</i>	Primarily humans, cattle, non-human primates, other animals (rodents)	Inhalation of aerosol droplets, contaminated equipment, bites	Ranges from fever and fatigue to chronic pulmonary disease (fatal). Lungs, kidney, vasculature (affects all parts of body)	2-5 weeks	Multidrug-resistant TB (MDR TB) is an infection resistant to at least two first-line anti-TB drugs, isoniazid and rifampicin	Isoniazid, rifampin, streptomycin, and ethambutol	
Melioidosis*	Bacteria	<i>Burkholderia pseudomallei</i> (formerly <i>Pseudomonas pseudomallei</i>)	Equines, especially horses and mules; humans are accidental hosts	Transmitted by inhaling dust contaminated by the bacteria and when contaminated soil comes in contact with abraded skin	Cholera-like symptoms (fever, chills, prostration). Skin lesions, swollen lymph glands, abscesses septicemia or pneumonia	2-4 days	Relatively uncommon disease for humans, but when left untreated, has 95% fatality rate	Chloramphenicol, doxycycline, sulfisoxazole, or cotrimoxazole. IV chloramphenicol for bacteremia	
Tularemia*	Bacteria	<i>Francisella tularensis</i>	Isolated from 100 species of wild animals (e.g., rabbits, skunk), 9 domestic mammals, 25 species of birds, frogs, and reptiles	Arthropods, direct or indirect contact, ingestion of contaminated meats, inhalation of dust, materials contaminated with urine, feces or tissues, bites and scratches	High fever, chills, headache, focal ulcers, swollen lymph nodes	1-10 days	Bacterium formerly known as <i>Pasteurella tularensis</i>	Streptomycin, tetracycline	



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ZOONOTIC DISEASES FACT SHEET


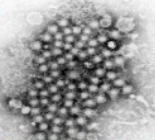

Disease	Pathogen	Genus species	Host Range	Transmission	Symptoms	Incubation	Fact	Treatment	Photo
Herpesvirus	Virus	Herpesvirus Type 1 (fever blister, cold sore) and Type 2 (genital herpes), Herpesvirus hominis, Herpes simiae (Herpes B)	Human, non-human primates	Produce latent infections in host and frequently shed without overt lesions	Frequently asymptomatic. May have vesicular lesions, neurological or flu-like symptoms	5 days to 1 month	Herpes simiae is 100% fatal if untreated; Herpes Types 1 and 2 are not fatal but cause chronic infection from recurrences	Acyclovir or valcyclovir will arrest the virus but will not eliminate virus from the host	
Poxvirus*	Virus	Monkeypox, vaccinia, cowpox, buffalopox, cantagalo, and aracatuba viruses	Non-human primates, swine, cattle, horses, birds	Direct skin contact with lesions on infected animals	Localized lesions, rash, fever, sore throat, malaise, encephalitis	Generally: 5-10 days after infection	Poxviruses are the largest and most complex viruses	smallpox vaccine, cidofovir, and vaccinia immune globulin (VIG)	
Rabies Virus	Virus	Rhabdoviridae, genus Lyssavirus	Natural reservoir: bats. All mammals: wild animals (raccoons, rodents, foxes, etc.) domestic animals (dogs, cats) and humans	Animal bite, contact with infected saliva or tissue	Headache, fever, malaise, nervousness, dilation of pupils, salivation, excessive perspiration, insomnia, paralysis of throat muscles, inability to swallow, convulsions, seizures, generalized paralysis and death	3-8 weeks	Untreated, the fatality rate is 100%; Post-exposure treatment is effective until day 6 post-infection	Antirabies vaccine <u>before</u> clinical onset of symptoms; post-exposure treatment with rabies immune globulin & vaccine	
Viral Hemorrhagic Fever*	Virus	Multiple species: <i>Filoviridae</i> ; Ebola virus, Lassa virus, Marburg virus	Humans, non-human primates (Cynomolgous monkeys)	Contact with blood and body fluids of infected animals	Severe fever, sore throat, cough, diarrhea, vomiting, hemorrhage and death	2-21 days (5-12 days in most cases)	50-90% fatality rate for Ebola virus; 25% mortality rate for Marburg virus; 15-20% mortality for Lassa fever virus	No vaccines; Treatment directed at maintaining renal function, electrolyte balance and combating hemorrhage and shock	



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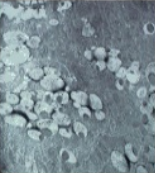


Disease	Pathogen	Genus species	Host Range	Transmission	Symptoms	Incubation	Fact	Treatment	Photo
Arboviral infections*	Virus	Multiple species: <i>Togaviridae</i> , <i>Flaviviridae</i> , <i>Bunyaviridae</i> , <i>Arenaviridae</i>	Ticks, insects, infected animals (deer, birds, rodents, etc.)	Ticks, insects, blood transfusion	Various: viremia, lymphadenopathy leading to systemic infection. Can involve CNS (encephalitis), skin/bone marrow/blood vessels (hemorrhagic fevers)	Multiple Ranges; 14-25 days (Avg. 18 days) post infection	Causes: Rift Valley fever, Dengue fever, Yellow fever; Sandfly (Hantavirus) fever; Omsk hemorrhagic fever, and West Nile virus infections	No vaccines for most (except yellow fever virus), no known antivirals; supportive treatment only	
Viral Hepatitis	Virus	Hepatitis A, B, C, D (delta), E, F, G	Humans, non-human primates (chimpanzee, woolly monkey, gorilla, Celebes ape, some marmosets)	Close contact with infected animals or materials	Fever, anorexia, vague abdominal discomfort, nausea and vomiting, sometimes arthralgias and rash, often progressing to jaundice; fever may be absent or mild	3-6 weeks	Hepatitis A has no carrier state; Hepatitis B 20% chronic; Hepatitis C 85% chronic	Vaccines for Hepatitis A and B only. Treatment with alpha interferon and intravenous immunoglobulins (HBIG)	
Lymphocytic Choriomeningitis (LCM)	Virus	Multiple arenaviruses	Rodents (hamsters, mice, guinea pigs), monkeys and humans	Infected mice excrete virus in saliva, urine and feces; man infected through inhalation of aerosolized particles of (urine, feces or saliva) contaminated with virus	Biphasic febrile illness, mild influenza like illness or occasionally meningeal or meningoencephalomyelitic symptoms, transverse myelitis	15-21 days	46 documented laboratory-acquired cases with 5 deaths; cases also reported arising from contaminated cell lines	No specific treatment; anti-inflammatory drugs may be useful; No known vaccines	



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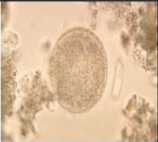
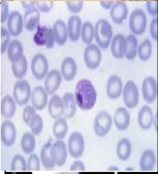


Disease	Pathogen	Genus species	Host Range	Transmission	Symptoms	Incubation	Fact	Treatment	Photo
Vesicular Stomatitis*	Virus	Multiple strains of Vesicular Stomatitis Virus (VSV) <i>Rhabdoviridae</i>	Bovine, equine, porcine animals.	Probably arthropod-borne via the bite of an infected sandfly, mosquito or blackfly; by direct contact with infected animals (vesicular fluid, saliva)	Influenza-like illness, malaise, fever, headache, nausea and vomiting	24-48 hours	Documented hazard to personnel (45 laboratory-acquired infections before 1980) handling infected livestock, tissues and virulent isolates	Virus is self-limiting and illness is short in duration. (3-6 days)	
Sub-viral Agents and Related Diseases (i.e., Scrapie)*	non-RNA/DNA Infectious Protein Virus-like particle	Transmissible Spongiform Encephalopathies (TSE): BSE and vCJD (vCreutzfeld-Jacob Disease)	Adult sheep goats, and cows can infect humans	Ingestion or handling of brain tissue or unfixed brain cells from infected animals	Degeneration of the nervous system, severe variable alteration of the grey matter of the brain	2-5 years	The agent responsible for TSE's is smaller than the smallest known virus and has not been completely characterized	There are no known treatments or vaccines for these TSE's	
Amoebic Dysentery	Parasite (protozoa)	<i>Entamoeba histolytica</i>	Monkeys can readily transmit the agent to humans	Food, water, fomites, insects. Fecal-oral route. Cyst is resistant to drying	Frequent passage of feces/stool, loose stools and vomiting. Variations depending on parasites. Can be frequent urge with high or low volume of stool, with or without some associated mucus and even blood	2 days to several months to even years	Harmless amoebas can live in the intestines for years without causing symptoms. Attacks can last from a few days to weeks	Antiamoebic drugs (Iodoquinol, metronidazole) and antibiotics to treat any associated bacterial infections	
Giardiasis	Parasite (protozoa)	<i>Giardia lamblia</i>	Dogs, monkeys	Drinking contaminated water, person-to-person contact, eating contaminated food, and direct contact with infected animals	Ranges from asymptomatic to nausea, fatigue, anorexia, severe diarrhea and high fever	3-25 days	Most common waterborne diarrheal disease in humans	Quinacrine hydrochloride, metronidazole, tinidazole, albendazole and furazolidone	



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ZOO NOTIC DISEASES FACT SHEET




Disease	Pathogen	Genus species	Host Range	Transmission	Symptoms	Incubation	Fact	Treatment	Photo
Balantadidiasis	Parasite (protozoa)	<i>Balantidium coli</i>	Monkeys, pigs, and other nonhuman primates readily transmitted to humans	Direct contact with feces, person-to-person transmission	Ranges from asymptomatic to severe diarrhea	4-5 days	Cysts survive for long periods in the environment	Tetracycline, Iodoquinol, metronidazole	
Malaria	Parasite (protozoa)	Plasmodium species: <i>P. falciparum</i> , <i>P. vivax</i> , <i>P. ovale</i> , <i>P. malariae</i>	Anopheles mosquito	Mosquito bite	Fever, chills sweating, headache, nausea, vomiting, muscle pain, anemia, bloody stools, jaundice, convulsion, coma	10 days to 4 weeks after infection; symptoms then cycle every 48 days	A malaria vaccine has been developed and is being tested in Africa. Results are promising	Chloroquine, primaquine phosphate, Malorone	
Toxoplasmosis	Parasite (protozoa)	<i>Toxoplasma gondii</i>	Amazing lack of host specificity. Primates, carnivores (felines), rodents, birds, undulates	Consuming under-cooked infected meats; ingestion of oocysts in milk, food or water; inhalation of oocysts; contact with soil containing contaminated cat feces;	Localized lymphadenopathy accompanied with fever, sore throat, rash, pneumonitis, myocarditis, and encephalitis	10-23 days following ingestion of contaminated meats, or inhalation of aerosols	Affects one third of the human race. Especially infective to immunosuppressed individuals	Sulfonamides (sulfadiazene, sulfamerazine, sulfamethazine), pyrimethamine	
Ascariasis (Roundworm)	Nematode	Multiple Ascaris species (<i>A. lumbricoides</i> , <i>A. suum</i>)	Pigs; Humans are the definitive host	Ingestion of contaminated food or water	Lung damage, intestinal symptoms	4 to 8 weeks	<i>Ascaris lumbricoides</i> the largest and, globally, the most widespread of all human intestinal roundworms	Pyrantel pamoate, mebendazole, surgery for removal in lung tissue	



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ZOONOTIC DISEASES FACT SHEET


Disease	Pathogen	Genus species	Host Range	Transmission	Symptoms	Incubation	Fact	Treatment	Photo
Visceral Larval Migrants (VLM)	Nematode	Nematodes of the Toxocara genus (<i>T. canis</i> , <i>T. felis</i>)	Dogs, cats	Ingestion of eggs through direct contact with feces or contaminated materials	Fever, cough, wheezing, itching/irritation associated with migration of nematodes into tissues. Ocular migration may cause blindness	4 to 7 weeks	More than 80% of all puppies in the U.S. are infected with this nematode	Usually a self-limiting disease--treatment only given in severe cases (glucocorticoids and bronchodilators for pulmonary disease)	
Strongyloidiasis	Nematode	<i>Strongyloides stercoralis</i>	Dogs, cats, monkeys	Careless handling of contaminated fecal materials	Abdominal pain, diarrhea, and rash. Less commonly, nausea, vomiting, weight loss and cough. Severe infection can cause severe tissue damage, systemic damage of various tissues in the body and potential death	skin 7 hours; lung 1 week; intestines 2 wks; average 4-21 days	The parasite penetrates the skin and migrates to the lungs. Then it travels up to the mouth and is swallowed into the intestinal tract	Ivermectin with Albendazole as the alternative	
Trichinosis	Nematode	<i>Trichinella spiralis</i>	Generally pigs or cattle	Eating undercooked flesh of animals infected with the larvae	Nausea, vomiting, diarrhea, fever, neurological disorders, possible cardiac involvement	Abdominal symptoms: 1-2 days. Further symptoms 2-8 weeks after infection	Over 100 species of animals may be a host of this parasite	Thiabendazole (Mintezol), Albendazole (Albenza), Mebendazole (Vermox), Prednisone	

*Images were obtained from the U.S. Centers for Disease Control & Prevention Public Health Image Library (PHIL). 08/2008



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 New Jersey Institute of Technology	NEW JERSEY INSTITUTE OF TECHNOLOGY University Heights, Newark, New Jersey 07102
	Document Control No.:
	Document Title: Occupational Health and Safety for Animal Handlers

APPENDIX E – Animal Use Questionnaire

This Questionnaire is used to determine whether medical consultation or evaluation is warranted by a licensed healthcare professional prior to work assignment. Please complete this form with your Faculty/Principal Investigator/Supervisor, and check all the boxes that apply to the animal research. **Return the completed form to [Mitchell Gayer](#), EHS Director.**

Name (<i>Last, First, M.I.</i>)	UCID:
Department:	Title:
Email:	Lab Location:
Faculty / PI / Supervisor:	Department:

WORK ASSIGNMENT HAZARDS (*Supervisor*)


1. Animal Use

- Live Vertebrates
- Live Invertebrates
- Fixed (*preserved*) Animals
- Unfixed Animals

Animal	Species / Strain	Hours per week
Mouse		
Rat		
Dog		
Cat		
Finned Fish		
Other, Specify:		
Arthropod	Species / Strain	Hours per week
Mosquitoes		
Ticks		
Honeybees/Wasps/ Hornets		
Shellfish		
Other, Specify:		

2. Biological Hazards

- Synthetic/Recombinant Nucleic Acids
- Transgenic Organisms
- Genetically Modified Organisms (GMO)
- Human / Non-human Primate Derived Materials (*cell lines, body fluids, tissue*)
- Biological Toxins
- Pathogens (*virus, rickettsia, bacteria, fungi, parasites or other microorganism*)

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Select Agent

List Agents: _____

3. Chemical Hazards

- Hazardous Chemicals
- Chemical Toxins
- Controlled Substances
- Pharmaceutical Drugs
- Other: _____

List Substances: _____

4. Physical Hazards

- Radioactive Materials / Ionizing Radiation (*including radiation-producing devices*)
- Non-Ionizing Radiation
- Lasers
- Loud Noise
- Other: _____

List Class/Type: _____

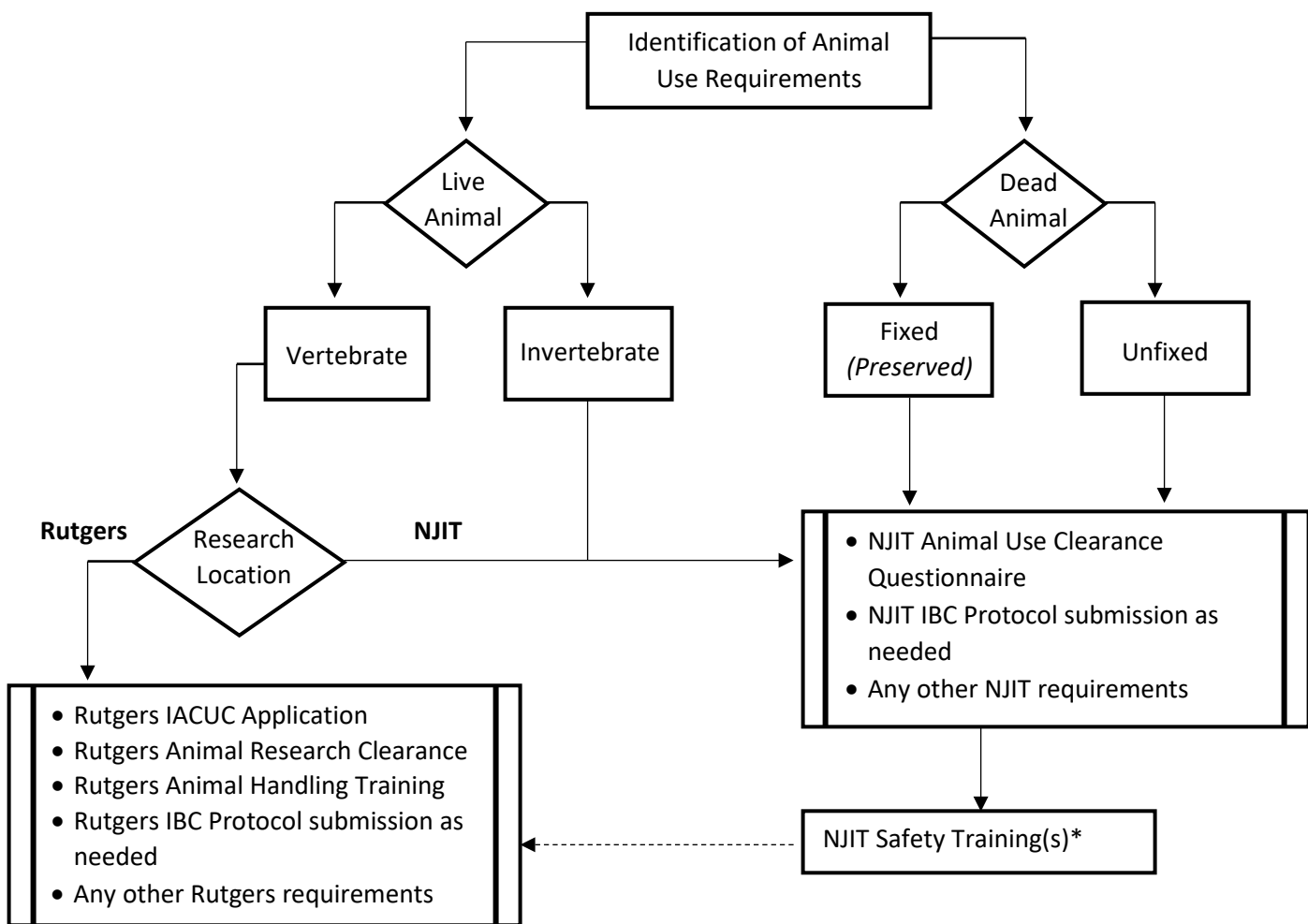
ALLERGY / SENSITIVITY (Worker)

Have you ever experienced sensitivity or signs/symptoms of an allergic reaction to any of the following allergens?
 YES NO

Allergen	Signs / Symptoms
Animals (<i>including finned fish</i>)	<ul style="list-style-type: none"> • Itchy eyes • Runny nose • Sneezing • Wheezing • Shortness of Breath • Asthma • Hives / Rash
Arthropods (<i>i.e. insects, arachnids, crustaceans</i>)	
Chemicals	
Medications (<i>i.e. antibiotics, sulfonamide</i>)	
Latex	
Plant Pollen	
Foods (<i>i.e. nuts, eggs, etc.</i>)	
Metals	
Other	

APPENDIX F – Identification of Requirements for Animal Use


New Jersey Institute of Technology (NJIT) has an inter-institutional collaboration with Rutgers University-Newark (Rutgers) which allows any vertebrate animals produced for or used in research, testing, or teaching to operate under the Rutgers’ Animal Care and Use Program. Thus, giving Rutgers’ Institutional Animal Care and Use Committee (IACUC) oversight responsibilities over the care, use, and ownership of these vertebrate animals at NJIT. Due to this collaboration, Faculty/Principal Investigators should use the diagram below to determine the minimal requirements for getting approval to use animals in research and teaching. [Click or tap here to enter text.](#)



*The dashed arrow reflects Rutgers IACUC acceptance of NJIT’s Safety Training. Both institutions accept Laboratory and Biosafety/BBP Training from the other with proof of completion unless otherwise stated.

Rutgers University IACUC: <https://orad.rutgers.edu/iacuc>

NJIT Animal Research: <https://research.njit.edu/care-and-use-animals-research>

 NJIT New Jersey Institute of Technology	NEW JERSEY INSTITUTE OF TECHNOLOGY University Heights, Newark, New Jersey 07102	
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APPENDIX G – Emergency Contact Poster

Emergency Contact Numbers

For NJIT animal users working in Rutgers RAFs or that have an IACUC approval.

PRINCIPAL INVESTIGATOR / SUPERVISOR		
Name	Office Number	Emergency Number
CAMPUS CONTACTS		
Campus / Department	Non-Emergency Number	Emergency Number
NJIT Public Safety	(973) 596-3120	<div style="font-size: 2em; font-weight: bold; color: red;">9-1-1</div> <p style="color: black; font-style: italic;">State the campus and location (building & room #).</p>
NJIT EHS	(973) 596- 3059	
NJIT Office of Research	(973) 596-5275	
Rutgers Public Safety	(973) 353-5111	
Rutgers EHS	973-972-4812	
Rutgers IACUC	(973) 972-3079	
HEALTH SERVICES		
Employees	Students	
Concentra Medical Center	St. Michael's Primary and Specialty Care Center	
MON thru FRI 7:00 am - 7:00 pm	MON thru FRI 8:30 am - 4:30 pm	
375 McCarter Hwy Newark, NJ 07114 Phone: (973) 643-8601	111 Central Avenue Newark NJ 07102 Phone: (973) 596-3621	
EMERGENCY DEPARTMENTS		
St. Michael's Medical Center	University Hospital	
24 Hours	24 Hours	
111 Central Avenue Newark, NJ 07102 Phone: (973) 877-5500	150 Bergen Street Newark, NJ 07103 Phone: (973) 972-4300	