

Occupational Health and Safety for Personnel with Laboratory Animal Contact



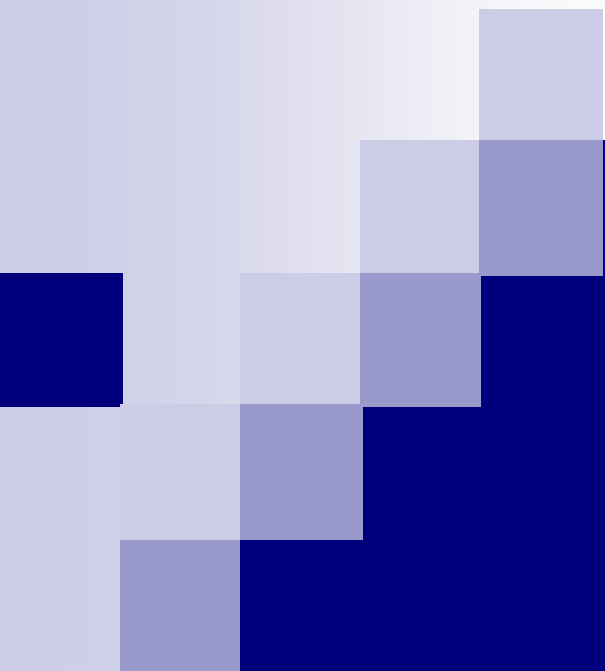
Risk

- The Occupational Health and Safety Program for Personnel with Laboratory Animal Contact is based upon risk-assessment and risk-reduction.
- Risk is assessed using published scientific literature, periodic evaluation of OSHA injury report data, and the professional input of medical, veterinary, and environmental health and safety personnel
- Individual risk determinants vary based upon:
 - Amount and length of time of exposure
 - Species of exposure
 - Type of exposure
 - Preexisting medical conditions

What are the Risks and Why Do I Have to Be Concerned with This?

Personnel working with laboratory animals are exposed to a variety of potentially hazardous agents, some of which may not be clearly evident. Even PASSIVE exposure in the workplace can be a risk. This presentation describes a number of these hazards and how, with your active participation, your risk of injury or disease can be reduced. Potential risks include:

- Allergies
- Bites and Scratches
- Sharps Exposure
- Chemical Exposure
- Strains, Sprains, and other Physical Injuries
- Zoonotic Diseases
- Biologic Agent Exposure



Occupational Health and Safety for Personnel With Laboratory Animal Contact

Part One

Risk of allergies

Laboratory Animal Allergies

- Allergies and the development of allergies are perhaps the most common hazard associated with working with and around laboratory animals.
- It is estimated that as many as 40 to 70% may experience allergic reactions of some type when working with laboratory animals.
- Many of these reactions result in the development of asthma.

The Risk of Allergies

The risk of developing a laboratory animal allergy is related to allergen exposure and individual immune system response.

- Personnel with no history of allergic reactions are unlikely to develop laboratory animal allergies
- Personnel with a history of allergic reactions are much more likely to develop laboratory animal allergies and the incidence increases with increasing exposure

While you have no control over your immune system responsiveness, you **can** control exposure.

Risk of Developing an Allergy to Laboratory Animals

Risk Group	History	Risk	Comments
Normal	No evidence of allergic disease	~10%	Minimal risk even upon repeated exposure
Atopic	Pre-existing allergic disease	Up to 73%	Risk increases with repeated exposure
Asymptomatic	IgE antibodies to allergenic proteins	Up to 100%	Risk of developing symptoms increases with repeated exposure
Symptomatic	Clinical symptoms on exposure to allergenic proteins	100%	33% with chest symptoms; 10% may develop occupational asthma; minimal exposure may lead to permanent impairment

Allergies

Allergic reaction symptoms to laboratory animals include:

- Ocular and Respiratory Signs
 - Rhinitis & Conjunctivitis
 - Asthma

- Skin Contact – Urticaria (Hives)

- Systemic - Anaphylaxis

Allergic Rhinitis and/or Conjunctivitis

- The most common allergic reaction to laboratory animals
- Exposure is usually aerosolized or air-borne allergens although direct contact through rubbing of the eyes is possible
- Symptoms include runny nose, itchy eyes, nasal discharge, sneezing, and nasal congestion, similar to “hay fever”
- Symptoms may be initially mild but progressively worsen with continued exposure
- Symptoms usually occur upon direct exposure (immediate hypersensitivity) although symptoms can reoccur 4-6 hours after initial exposure
- May progress to occupationally-related asthma

Occupational Asthma

- Asthma is a serious chronic respiratory condition characterized by constriction of the airways with resulting difficulty breathing
- 10% of laboratory animal workers developing allergies will, with continued exposure, eventually develop occupation-related asthma
- Personnel with known asthmatic reactions to laboratory animals should avoid exposure
- Rescue inhalers, anti-inflammatory drugs, and other medications may be prescribed to reduce symptoms and provide relief during an asthmatic episode

Contact Urticaria

- Requires allergen contact with the skin. An example would be handling rodents without gloves, or your bare skin coming in contact with urine, bedding or the animal.
- Itching, redness, swelling, welts, hives, etc. are all classic signs of contact allergic reaction
- May occur to a variety of animal allergens and other allergens including latex, cornstarch glove powder, etc.
- Does not require aerosolization of the allergen

Anaphylaxis

- Can be compared to bee sting or penicillin allergic reactions
- Usually requires systemic exposure such as through bite, sting, accidental injection, etc.
- Extremely rare and extremely serious
- Usually starts with generalized flushing, throat tightness, and generalized hives
- Progresses to difficulty in breathing, dizziness, stupor, and loss of consciousness and death
- Requires immediate medical attention

Summary of Allergic Reactions to Laboratory Animal Allergens

Disorder	Symptoms	Clinical Signs
Contact Urticaria	Redness, itchiness of skin, welts, hives	Raised, circumscribed erythematous lesions
Allergic Conjunctivitis	Sneezing, itchiness, clear nasal drainage, nasal congestion	Conjunctival vascular engorgement, cheminosis, clear discharge (usually bilateral)
Allergic Rhinitis	Sneezing, itchiness, clear nasal drainage, nasal congestion	Pale or edematous nasal mucosa, clear rhinorrhea
Asthma	Cough, wheezing, chest tightness, shortness of breath	Decreased breath sounds, prolonged expiratory phase or wheezing, airway hyperresponsiveness
Anaphylaxis	Itching, hives, throat tightness, dizziness, fainting, nausea, vomiting, diarrhea	Flushing, urticaria, angioedema stridor, hypotension

Examples of Allergen Sources

- Rats and mice are the primary species responsible for laboratory animal allergies. In both cases the allergen is a urinary protein that is dried on and aerosolized with fine bedding particles.
- The saliva, fur, and sebaceous secretions of rabbits and cats contain strong allergens that are often responsible for contact allergies.
- Exposure to allergens from other species is either by direct contact (urine, saliva, hair, etc.) or by exposure to airborne particulates (hair, dander, etc.) Anything that minimizes exposure minimizes the potential exposure.

Procedures to Reduce Exposure

- ALWAYS wear gloves when handling laboratory animals or materials soiled by laboratory animals. The use of respiratory protection is recommended if at high risk.
- Wear laboratory coats whenever working with laboratory animals.
- Do not wear laboratory coats used during animal work outside of the animal facility.
- Minimize transportation and housing of animals outside of the animal facility.
- Personnel with allergies should be especially careful not to transport allergens into areas where they may be inadvertently exposed (lab, office, lounge, home, etc.). The use of disposable laboratory wear or dedicated laboratory wear while in the animal facility is recommended.

Transporting Animals

- If animals must be removed from the animal facility, minimize potential exposure to all personnel, including the public moving throughout the hospital and clinic areas.
- Cover the cage(s) entirely to minimize air currents, reduce stress on the animals, and reduce possible aerosolization of allergens.
 - Cage with a filter-top or approved transport container
 - NEVER use the passenger elevators, use the freight elevators
 - Cage or container without bedding
 - New cage with fresh bedding
 - Transport animals during pedestrian traffic lull if possible

If Allergy Develops...Then What

- Consultation with the Occupational Health Physician is necessary for an accurate diagnosis.
- Pulmonary function measurements are often performed to assess asthma severity and to establish a baseline.
- Exposure reduction and avoidance measures will be undertaken which may include:
 - Minimizing exposure
 - Respiratory protective equipment
 - Modification of animal housing
- Medications will often be prescribed to reduce clinical symptoms.
- Ongoing reassessment of pulmonary function and allergic responsiveness may be necessary.

Respiratory Protection



The severity of the allergic symptoms and the duration, amount, and type of exposure all factor into the type of respiratory protection recommended. The use of half-masks and full-face masks (left) require that the person be evaluated by an Occupational Health Physician to make sure they are capable of wearing the mask without undue stress followed by fit-testing and training on the proper use and care of the respirator.



The University of Kentucky has an on-line Respiratory Program Training module that must be completed prior to the actual respirator fit testing by Environmental Health and Safety. It can be found at the following url;



Respiratory Protection



NIOSH approved N-95 respirators offer the least amount of protection but are often a comfortable and effective alternative for many individuals with allergies. The mask must have a double strap and the best have an efficiency rating of 95, an exhalation valve, and an adjustable noseclip.

Surgical masks, are not designed to protect the wearer from allergens. They are designed to protect the animals and surgical sites from being contaminated.

Personnel with allergies should be especially careful not to transport allergens to areas where they may be later inadvertently exposed (lab, office, lounge, home, etc.) The use of disposable laboratory wear or dedicated laboratory wear while in the animal facility is recommended.



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Part Two

Other Potential Hazards

Potential Risks for Women Who are Pregnant or May Become Pregnant

- Women of child-bearing age should be aware of the potential risks to themselves and their unborn fetus that may be present working in an laboratory environment. Zoonotic diseases associated with laboratory animals such as “Q” fever, Toxoplasmosis, Lymphocytic Choriomeningitis virus (LCMV) are a concern as are some hazardous chemicals and compounds. Should you be pregnant or plan to become pregnant, it is strongly advised that you inform your supervisor and seek advice from your obstetrician or physician. This should be done as soon as you become aware of the change in your status.



Illness or the Possibility of an Immunocompromised Health Issue

- All precautions should to be taken during pregnancy, illness, or immunosuppression as appropriate to the risk imposed by your environment or workplace.
- Discussion with your supervisor and health professional is your best guide to maintaining and protecting your health.

Bites and Scratches

- Bites and scratches often occur when working with any animal. Sometimes the injuries are inadvertent and accidental while others may be intentional defensive actions of the animal.
- Knowledge, training, experience, and patience, plus the use of appropriate personal protective equipment (PPE) greatly reduces the risk.

Remember, anything with teeth can and will sometimes BITE!

Bites and Scratches

- Bites and scratches from standard laboratory reared rodents rarely require more than standard first aid and wound cleaning.
- Rodent inflicted injuries should be thoroughly cleaned with antiseptic soap as soon as possible after the injury.
- If needed, seek medical attention by either calling Workers Care at 1 (800) 440-6285 or University Health Services (859)323-2778.

Bites and Scratches

While rarely encountered in a laboratory animal facility, it should be mentioned that the potential exists of exposure to rabies if dealing with or working in a field study involving wild-caught animals. Personnel working at University farm facilities or cooperator farms should be especially mindful of potential exposure to rabid indigenous animals.

As with all animal inflicted injuries, prompt and thorough cleaning of the wound with antiseptic soap is a crucial first step. Additional treatment for rabies exposure and potential wound infection may be required and an examination by the occupational health physician or your personal physician is strongly recommended.

Bites and Scratches

Any and all bites and/or scratches from nonhuman primates present a serious potential for exposure to disease or infection. *Cercopithecine Herpesvirus* (Monkey B virus) carried by Macaques poses a particular risk.



All nonhuman primate inflicted injuries should be thoroughly cleaned with antiseptic soap and water as soon as possible. Detailed instructions on further procedures and activities are available in the macaque bite kit. Notification of Workers Care (1-800-440-6285), and the DLAR Veterinarian is mandatory.

Needlesticks



The Potential for Exposure to Fatal
Zoonotic disease is nature's way of
saying

DO NOT RECAP NEEDLES

SHARPS – WHAT ARE THEY?

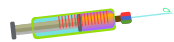
- Needles, razor/scalpel blades, lancets, broken glassware, glass and hard plastic pipettes and pipette tips, and syringes with and without needles are considered to be sharps.
- All these materials must be accumulated immediately into an approved sharps container.
- Hypodermic needles and syringes used in the laboratory animal facility and posing a definite puncture hazard must be placed into approved red plastic sharps containers for disposal.



- If needles are used, needles are not to be purposely bent or broken by hand, removed from disposable syringes or otherwise manipulated by hand. The used needle and syringe should be directly discarded into an appropriate sharps container.
- Needles should not be recapped unless absolutely necessary. If needles must be recapped, a single-handed technique should be used.
- In work involving infectious agents or high risk species (i.e. nonhuman primates) the use of safety needles with automatic recapping is critical.



**NEVER
THROWN
SHARPS IN A
REGULAR
TRASHCAN**



SHARPS INJURIES

- If an occupational injury results from a sharp, it must be reported to UK Workers Care

1-800-400-6285



- For items that pose a minimum puncture potential, such as hard plastic and glass pipettes and pipette tips, syringes without needles, or broken glassware; a cardboard box lined with a plastic bag meets the EPA's definition of an approved sharps container.
- These broken glass boxes should not be used as common trash receptacles. You must label the box as "SHARPS".



Strains, Sprains, and Other Injuries

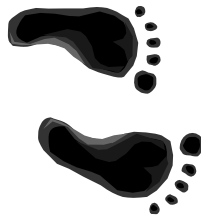
Personnel working in laboratory animal facilities are exposed to a variety of situations where they may incur strains, sprains, burns, falls, abrasions, etc. Personnel working in a laboratory animal facility should be aware of potential occupation-related injuries that are common to many work areas and not specific to laboratory animal facilities.

Attention to ergonomics, the use of appropriate PPE, and a general safety first attitude is essential in minimizing potential work-related injuries.



To Avoid Foot Injuries or Falls

Do not wear sandals, shoes with unstable heels, or open-toed shoes in the laboratory or animal facilities.





Chemical Hazards

- Chemicals and reagents
- Anesthetics
- Cleaning and disinfectant agents
- Study related chemicals

Formaldehyde

(Formalin, Paraformaldehyde, etc.)

Formaldehyde is a gas available as a saturated 37% solution in water (Formalin) and as a 4% solution in 10% Neutral Buffered Formalin. Formaldehyde can be used as both a general sterilant and as a cross-linking fixation agent for tissue.

Formaldehyde is:

- Toxic
- Potential Cancer Hazard
- Readily absorbed through skin
- Volatile
- Extreme eye irritant

Anesthetic Agents

Isoflurane



- Isoflurane is a stable, non-explosive inhalation anesthetic.
- There are few significant side effects, except for anesthesia and, at high doses, death.
- May cause damage to the cardiovascular system and central nervous system.

Halothane

- Halothane is a stable, non-explosive inhalation anesthetic.
- Possible carcinogen, mutagen
- Target Organs: Central Nervous system, cardiovascular system.



Nitrous oxide and Carbon dioxide

These gases are routinely used for anesthesia, immobilization, or euthanasia.

Ether

- Explosive and flammable
- Irritating to mucous membranes
- Slow induction of anesthesia
- Can not be used in any DLAR facility

DO NOT USE WITHOUT
EXPRESS WRITTEN
PERMISSION FROM THE UK
EHS, IACUC AND DLAR

Sterilants, Disinfectants, and Cleaning Agents


Animal facilities use a wide variety of sterilants, disinfectants, and cleaning agents to maintain the microenvironment of the laboratory animals and minimize potential disease transmission.

- ❑ Strong alkalis and acids are used for cage cleaning.
- ❑ Quaternary ammonium agents are present in nearly all animal rooms.
- ❑ Chlorine-based disinfectants may be used in instances where quaternary ammonium compounds are less effective. Never mix chlorine bleach and ammonia together. It creates a toxic gas.
- ❑ Iodine, alcohol, and chlorhexidine compounds are used in surgical skin disinfection and occasionally for general disinfection.
- ❑ Ethylene oxide gas, glutaraldehyde, and activated hydrogen peroxide compounds are used as sterilants for heat sensitive material.
- ❑ Toxic fumes from cleaning and sanitizing chemicals can be potential health hazards as well.

OTHER CHEMICALS

In addition to the chemicals used in the laboratory animal facility for animal care, a wide variety of study-related chemicals may be present in the facility. These chemicals may include:

- Acetone
- Ethanol
- Other solvents
- Phenol
- Biological reagents
- And many others



If you do bring chemicals into the facility for your study, make sure the container is appropriately labeled and potential hazards (flammable, carcinogen, etc.) are clearly identified as to whom they belong and be certain to include an expiration date if applicable. If in doubt as to required information, please contact DLAR veterinarians or Environmental Health and Safety for assistance.

Working With Chemicals, Inhalants, and Potential Allergen Risk Factors

- Use a downdraft table, laminar flow work station, biological safety cabinet, or a chemical fume hood, whenever possible.
- Be certain that the sash is positioned at the recommended safe height and do NOT disable the alarm. It is alarming because the sash height is not correct for safe operation.
- When working with inhalation anesthetics, a scavenging system is required



Personal Hygiene

- ALWAYS wear gloves, lab coat or disposable gown (or other PPE as required) when working with or around animals and equipment to prevent possible exposure or biocontamination
- Wash your hands thoroughly after handling animals, biologics and equipment, or use hand sanitizers



If An Emergency Occurs Involving Spills and Splashes



- Know where the eye-wash stations are located **BEFORE** you need one (if you have liquids, blood, or chemicals splashed into your eyes you will not be able to go look for it).



Zoonotic Diseases

Zoonotic diseases are diseases transmitted between animals and humans under natural conditions.

The vast majority of laboratory animals used in research are animals bred and raised under extremely controlled conditions. These animals generally pose little hazard of zoonotic disease.

Zoonotic Diseases

Random source, wild-caught, and non-traditional laboratory animals, however, may harbor a variety of potential pathogens that:

- Vary from species to species.
- Vary by animal source.
- Vary in severity.

Although University of Kentucky may not house these animals, it is important for all personnel to be aware of potential diseases that may be transmitted from the following commonly used species and groups of animals. If you are interested in additional information for a specific disease please click the associated link.

Zoonotic Diseases Rodents

The vast majority of mice and rats used in research are bred in controlled environments under exacting microbiologic controls with frequent monitoring. These animals are generally free of any diseases transmissible to man. Wild caught rodents and rodents from facilities lacking standard practices may present a wide variety of zoonotic diseases including:



- Lymphocytic Choriomeningitis (LCM) [More information](#)
- Hantavirus [More information](#)
- Plague (*Yersinia pestis*) [More information](#)
- Rat-Bite Fever (*Streptobacillus moniliformis*) [More information](#)
- Leptospirosis [More information](#)
- Salmonellosis [More information](#)
- Campylobacteriosis [More information](#)
- Dermatomycosis (Ring-Worm) [More information](#)



Zoonotic Diseases - Birds

Birds, such as pigeons and quail, present unique challenges when it comes to zoonotic disease. Many people exposed to zoonotic disease from birds may not be aware that they have been exposed and since the majority of the symptoms are respiratory, may tend to pass the symptoms off as something less serious. Individuals with asthma or compromised immune systems are at a higher risk.



- Aspergillosis [More Information](#)
- Histoplasmosis [More Information](#)
- Cryptococcus [More Information](#)
- Psittacosis [More Information](#)



Zoonotic Diseases – Dogs and Cats

As with rodents, the vast majority of dogs and cats used in research are animals purposely bred and raised for research and are generally free of zoonotic diseases, but “field studies” may result in exposure to non-laboratory raised dogs and cats (feral canids {fox, coyote} and felids {bobcats}) or other wild animals. Potential zoonotic diseases include:

- **Rabies** [More information](#)
- **Toxoplasmosis (Cats)** [More information](#)
- **Pasteurella & Capnocytophaga (Bite wounds)** [More information](#)
- **Cat-Scratch Fever (*Bartonella henselae*)** [More information](#)
- **Brucellosis** [More information](#)
- **Leptospirosis** [More information](#)
- **Salmonellosis** [More information](#)
- **Campylobacteriosis** [More information](#)
- **Dermatomycosis (Ring-Worm)** [More information](#)



Zoonotic Diseases – Sheep, Goats, and Cattle

Farm ruminants may carry a number of zoonotic diseases. Of these, Q-fever is the most problematic with many sheep and goats carrying the organism *Coxiella burnetti* and shedding high numbers of the organism in fetal tissues during delivery. Major zoonotic diseases associated with cattle, sheep, goats, and other ruminants include:



- Q-fever (*Coxiella burnetti*) [More information](#)
- Orf [More Information](#)
- Rabies [More information](#)
- Tuberculosis [More information](#)
- Brucellosis [More information](#)
- Leptospirosis [More information](#)
- Salmonellosis [More information](#)
- Campylobacteriosis [More information](#)
- Dermatophytosis (Ring-Worm) [More information](#)

Non-human Primates

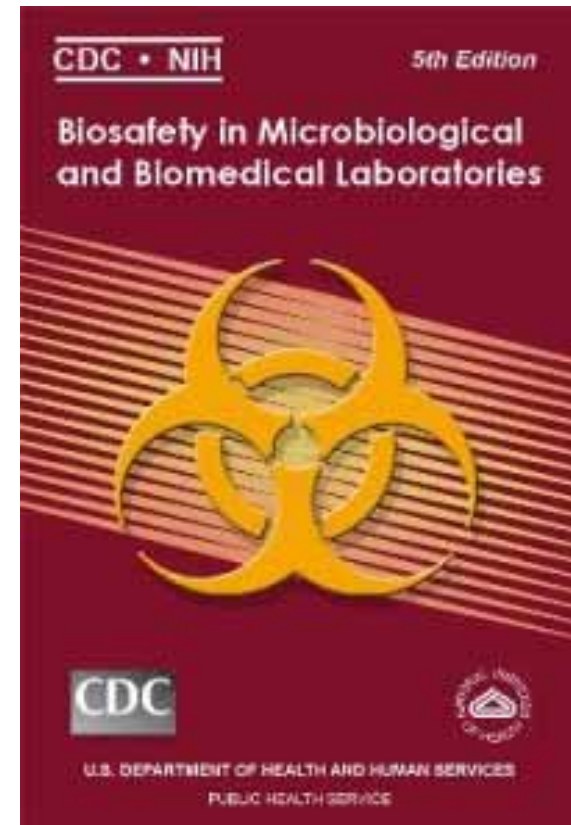
Nonhuman primates are phylogenetically closely related to humans and may carry a wide variety of potentially serious infectious diseases that can be transmitted to exposed personnel. In addition, a number of typical and common human diseases are easily transmissible from human workers to nonhuman primates. Personnel working with nonhuman primates are required to participate in the Occupational Health Program. Major zoonotic diseases transmissible between nonhuman and human primates include:



- **Cercopithecine Herpesvirus 1 – Monkey B-Virus**
[More information](#)
- **Tuberculosis** [More information](#)
- **Hepatitis A & E** [More information](#)
- **Shigellosis** [More information](#)
- **Salmonellosis** [More information](#)
- **Campylobacteriosis** [More information](#)
- **Dermatomycosis (Ring-Worm)** [More information](#)

Biologic Agents

Research protocols may use a variety of other biologic agents as a component of the study. These agents may be potential human health hazards, requiring additional safety precautions. Rooms housing animals exposed to biologic agents will be clearly labeled as Biohazard rooms. The specific agent and the entrance requirements will be posted on the biohazard sign on the door.



[CDC-OHS- Biosafety in Microbiological and Biomedical Laboratories \(BMBL\) 5th Edition](#)



Irradiation Use

- Special training is required for use of the Cesium source irradiators

The use of radioisotopes and whole body irradiation is permitted in DLAR after training is completed and approval is granted by the Radiation Safety Committee.

- Training is available from the Radiation Safety group at the following url:

<http://ehs.uky.edu/classes/radiation/radtraining.html> or

contact the **Radiation Safety Officer**

(859) 323-6308

Reducing Risks Requires Your Participation

- Understand the risks
- Alter your procedures and practices to reduce the risk
- Wear the appropriate Personnel Protective Equipment to reduce your risk from the hazard
- Make sure everyone is fully trained

Reporting Risk

All occupational injuries must be reported to UK Workers Care and the Department of Environmental Health and Safety

It is important to report all occupational injuries, even those that do not require medical attention.

Reporting occupational injuries permits risk assessment and provides you with benefits that may not otherwise be available.

Employee Accident, Injury, or Illness

- Any employee accident, injury, or illness that requires medical attention, must be reported by the supervisor to UK Workers' Care by calling 1-800-440-6285. The Form IA-1 (Workers' Compensation First Report of Injury) may be completed at the time of the call by UK Workers' Care or by the employee's supervisor. The original Form IA-1, if completed by the supervisor, is to be sent to UK Workers' Care. Forms are available from UK Benefits at 115 Scovell Hall.
- If an employee is injured and **DOES NOT SEEK MEDICAL ATTENTION** at that time, please report the injury to UK Workers' Care at 1-800-440-6285 and please complete the [Accident-Occupational Injury/Illness](#)

Take The Quiz

There are 2 quizzes associated with this presentation.

They appear as a separate file and are indicated as

Questions for Part 1
and
Questions for Part 2

