INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE

Occupational Safety in Field-Based Projects

Field-based projects are necessary for collecting information outside of a laboratory setting. With such activities come risks that would not normally be encountered in the laboratory, such as being in remote locations far from immediate medical care; being potentially exposed to zoonotic or infectious agents; and being exposed to adverse physical conditions. Knowledge of their surroundings and potential risk helps to protect individuals conducting field work from possible injury and exposure.

This document is intended to provide general guidance for field work; it is not a comprehensive or inclusive guide. Each principal investigator/instructor is required to provide proper and thorough training for all of their personnel in the field.

General Safety Precautions

Proper preparation is a must before going out into the field. This includes ensuring field personnel have the appropriate Personal Protective Equipment (PPE), understand the tasks to be conducted, and have the necessary skills and knowledge to not only conduct field work, but conduct it in a safe manner. Proper preparation requires consideration of the following:

- **Heat and cold stress:** Overexposure to temperature extremes can represent significant risks to field workers if simple basic precautions are not observed. Be aware of the forecast and prepare accordingly. Control measures designed to prevent heat stress include dressing properly, drinking plenty of fluids, and establishing an appropriate work/rest regimen. Control measures to prevent cold stress also include dressing properly, establishing an appropriate work/rest regimen, and include having access to a source of heat (such as a vehicle).

- **Method of communication:** Communication channels must be established prior to conducting field-based projects in the event that emergencies arise. Having a fully charged and operating cell or satellite phone, knowing your surroundings to direct emergency personnel if necessary, and ensuring field personnel inform others of their daily activities are ways to prepare for field related tasks.

- **Personal Protective Equipment (PPE):** PPE must be provided to ensure field personnel are protected against hazards to which they could be potentially exposed. PPE could include protective/chemical resistant gloves, protective foot wear, coveralls, respiratory protection, personal flotation devices if working on or in proximity to water, and/or head protection.
• **First aid kits**: First aid kits should be part of all field work equipment. They should contain basic first aid devices such as band aids, anti-bacterial ointments, and ice packs, which can assist with protecting minor injuries that can occur in the field until more proper treatment can be attained.

• **Emergency training**: Training should be conducted prior to field work activities. This would include informing field personnel about what to do in the event of an emergency, discussing any medical conditions that could create a potential risk (such as anyone with allergies), working in pairs (the “Buddy System”), and reviewing communication methods as described above.

**Interaction with Wildlife**
Wildlife (all animals and plants) can represent a significant source of disease transmission. Field workers should take precautions to ensure that contact with wildlife and animal droppings is conducted in a safe manner and to minimize exposure to infectious agents. Some animals can inflict painful bites that can become infected, and, in some cases, can be poisonous. Proper immunizations, the use of personal protective equipment, and awareness of the habitat and surrounding areas and indigenous species can assist with minimizing risks associated with contact with wildlife.

**Poisonous Plants**
The possible presence of poisonous plants should be anticipated for field related activities in wooded or heavily vegetated areas. Poison ivy is a climbing plant with alternate green to red leaves (arranged in threes) and white berries. Poison oak is similar to poison ivy and sumac but its leaves are oak-like in form. The leaves of these poisonous plants produce an irritating oil which causes and intensely itching skin rash and characteristic blister-like lesions. Contact with these plants should be avoided.

**Insects**
As insects represent a significant source or disease transmission, precautions to avoid or minimize potential contact should be considered prior to all field related activities. Disease or harmful effects can be transmitted through bites, stings, or through direct contact or ingestion of foods contaminated by certain insects. These insects include, but are not limited to, mosquitoes, ticks, and flies. Stinging insects such as bees and wasps are prevalent throughout the country, particularly during the warmer months. Stings can be painful, and can cause life threatening allergic reactions in susceptible individuals.

**Infectious/Zoonotic Diseases**

• **Tetanus**: Tetanus (lockjaw) is an acute, often fatal disease caused by the toxin of the bacillus, *Clostridium tetani*. The bacterium usually enters the body in the spore form, often through a puncture wound contaminated with soil, dust, or animal feces, or through lacerations, burns, and minor unnoticed wounds. The organism is commonly found in the intestines of animals where it causes no negative effects. Humans infected...
through a wound or lesion frequently develop muscle rigidity and painful muscular contractions. Infection may be fatal.

All field workers working with animals should be immunized against tetanus at least every ten years. All animal bite or scratch wounds should be thoroughly cleansed and evaluated by a physician.

Additional information regarding tetanus can be found at:  
http://www.cdc.gov/vaccines/vpd-vac/tetanus/default.htm

- **Rabies:** Bats, raccoons, skunks, foxes, and coyotes are the mammals most often infected with rabies. Individuals whose research involves exposure to these species are strongly advised to seek medical advice about receiving pre-exposure vaccination and have their titer checked regularly. The aforementioned animals should never be handled by untrained and/or unvaccinated personnel.

  Rabies post-exposure prophylaxis is recommended for all persons with bite, scratch, or mucous membrane exposures to such wildlife. Post-exposure prophylaxis should be initiated as soon as possible after personnel are exposed. Post-exposure prophylaxis might be appropriate even if a bite, scratch, or mucous membrane exposure is not apparent when there is reasonable probability that such exposure might have occurred.

  Small rodents and lagomorphs (e.g., rabbits and hares) are almost never found to be infected with rabies and have not been known to transmit rabies to humans.

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If a person is bitten by an animal with unknown vaccination status, the person should immediately clean the wound and seek medical attention.

Additional information regarding rabies can be found at:  
http://www.cdc.gov/rabies/  ;  
or http://www.cdc.gov/ncidod/diseases/submenus/sub_rabies.htm

- **Tick Borne Illnesses:** Protective clothing and insect repellent are recommended, especially during seasons when ticks are active. To prevent tick bites when outdoors in tick-infested areas, field workers should wear full-length pants and long-sleeved shirts. Shirts should be tucked into pants, and pant legs into boots or socks. Insect repellent should be applied to clothing and bare skin areas. Wearing light colored clothing will make noticing ticks easier. When returning from the field, a thorough check of the body should be performed to assure that no ticks remain.

  If a tick is allowed to embed into the skin of its host, the transmission of a pathogen occurs when the tick bites into the skin in pursuit of its blood meal. Individuals who find an embedded tick in their skin should carefully remove it with tweezers and save the tick for analysis at a laboratory.
✓ **Lyme Disease**: Lyme disease is spread by the bite of black-legged ticks (also known as deer ticks in the eastern United States) and western black-legged ticks infected with the bacterium *Borrelia burgdorferi*. Symptoms appear from three days to one month after tick exposure and include a red macule at the bite, joint pain, fever, chills, headache, and malaise. Untreated Lyme disease can appear to go away, only to return in more serious form later. Secondary stages can include heart complications and meningitis-like symptoms. Months or years later, arthritis can appear, and the later stages can involve chronic neurological manifestations. Visit [http://www.cdc.gov/niosh/topics/lyme/](http://www.cdc.gov/niosh/topics/lyme/) for more information.

✓ **Tularemia**: Tularemia is a rare infection caused by the bacteria *Francisella tularensis*, which is widely distributed in nature. This bacterium resides in many animal species and is transmitted by direct contact, or by a bite from a tick or deer fly. The illness can also be contracted through direct contact with an infected animal carcass, especially rabbits. The symptoms of tularemia include an ulcerative lesion at the site of inoculation or contact, regional lymph node swelling, pneumonia, fever and chills, headache, muscle pain and joint stiffness.

✓ **Anaplasmosis**: Anaplasmosis is caused by the bacterium *Anaplasma phagocytophilum*. Anaplasmosis is transmitted to humans by tick bites primarily from the black-legged tick (*Ixodes scapularis*) and the western black-legged tick (*Ixodes pacificus*). Of the four distinct phases in the tick life-cycle (egg, larvae, nymph, adult), nymphal and adult ticks are most frequently associated with transmission of anaplasmosis to humans. Typical symptoms include fever, headache, chills, and muscle aches. Usually, these symptoms occur within 1-2 weeks of a tick bite.

Anaplasmosis is initially diagnosed based on symptoms and clinical presentation, and later confirmed by the use of specialized laboratory tests. The first line treatment for adults and children of all ages is doxycycline. More information can be found at: [http://www.cdc.gov/anaplasmosis/](http://www.cdc.gov/anaplasmosis/).

- **Mosquito Borne Illnesses**: The easiest and best way to avoid mosquito borne illnesses is to prevent mosquito bites. When outdoors, field workers should use insect repellent containing an EPA-registered active ingredient and follow the directions on the package. Many mosquitoes are most active at dusk and dawn. Be sure to use insect repellent and wear long sleeves and pants at these times when in the field. If possible, avoid mosquito breeding sites such as areas of standing water.

✓ **Eastern Equine Encephalitis**: Eastern equine encephalitis virus (EEEV) is transmitted to humans through the bite of an infected mosquito. Human EEEV cases occur relatively infrequently, largely because the primary transmission cycle takes place in and around swampy areas where human populations tend to be limited. All residents of and visitors to areas where EEEV activity has been identified are at risk of infection. People who engage in outdoor work and recreational activities in endemic areas are at increased risk of infection. Persons over age 50 and under age 15 seem to be at greatest risk for developing severe disease when infected with EEEV. Overall, only about 4-5% of human EEEV
infections result in EEE. EEEV infection is thought to confer life-long immunity against re-infection.

- **West Nile Virus**: For young and healthy individuals who are not immunocompromised, West Nile Virus (WNV) is unlikely to cause much more than a mild illness – typically “flu-like symptoms.” A more serious case of WNV in humans results in fever, disorientation, muscle weakness, neck stiffness, headache, and nausea. Persons over 50 years of age are at an increased risk of severe disease.

  According to the Centers for Disease Control and Prevention (CDC):
  - Most mosquito bites will not lead to a WNV infection.
  - Most people who are infected with WNV do not develop any type of illness.
  - It is estimated that 20% of the people who become infected will develop West Nile fever: mild symptoms, including fever, headache, and body aches, occasionally with a skin rash on the trunk of the body and swollen lymph glands.
  - About 1 of each 150 infected persons becomes seriously ill with central nervous system infection (encephalitis and/or meningitis).

- **Leptospirosis**
  Leptospirosis is caused by exposure to urine of infected animals, or water, food, or soil containing urine from infected animals. Symptoms of leptospirosis include high fever, severe headache, chills, muscle aches, and vomiting, and may include jaundice (yellow skin and eyes), red eyes, abdominal pain, diarrhea, or a rash. If the disease is not treated, kidney damage, meningitis, liver failure, and respiratory distress may develop; in rare cases death occurs.

Source: *Occupational Hazards of Field Research (November 2008)*, University of Michigan (www.oseh.umich.edu/pdf/AnimalHandler/AHFieldResearch.pdf)

**Additional Resources**

USGS - Zoonotic Diseases (Mammalian): Work Smart, Stay Safe (www.nwhc.usgs.gov/outreach/MammalianZoonoticDiseases2009b.pdf)

USGS - Zoonoses and Travel (www.nwhc.usgs.gov/publications/disease_emergence/Chapter4.pdf)

AVMA - Disease Precautions for Hunters (www.avma.org/public/Health/Pages/Disease-Precautions-for-Hunters.aspx)