

These guidelines are for preparation of travel away from LSU for the purpose of “research using animals in the field.” They are also for training of faculty, staff and students and as a resource tool.

FIELD
RESEARCH
SAFETY
GUIDELINES
1ST EDITION

Louisiana State University (LSU)
Institutional Animal Care and
Use Committee (IACUC)

Office of Environmental Health & Safety



LSU

Field Research

Safety Guidelines

1st Edition

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INTRODUCTION

These safety guidelines are for preparation of travel away from LSU for the purpose of “research using animals in the field.” They are also for training of faculty, staff and students and as a resource tool.

It is essential that those responsible for overseeing a field research study have prepared and follow appropriate safety plans. It is equally important that those participating in a field research study fully understand and agree to risks and responsibilities involved. Some field research may require preparation beyond the scope of these guidelines. Examples would be parachuting to a destination, driving a boat or scuba diving. In these types of situations, an appropriately certified professional should be involved.

Fieldwork: includes any work, study or research approved by LSU and conducted by faculty, staff or students at a site other than LSU campus.

For field studies of free-living animals, the IACUC recommends and strongly supports the use of the following four guidelines:

Sikes, R. S., William L. Gannon and the Animal Care and Use Committee of the American Society of Mammalogists. 2011. Guidelines of the American Society of Mammalogists for the use of wild mammals in research. Journal of Mammalogy, 92(1):235–253.
<http://www.mammalsociety.org/uploads/Sikes%20et%20al%202011.pdf>

The Ornithological Council. 1997. Guidelines to the Use of Wild Birds in Research. Third Edition 2010. Edited by Jeanne M. Fair, Editor-in-Chief, Ellen Paul, Jason Jones, (Associate Editors)
http://www.nmnh.si.edu/BIRDNET/documents/guidlines/Guidelines_August2010.pdf

American Fisheries Society, American Institute of Fishery Research Biologists, American Society of Ichthyologists and Herpetologists. 2004. Guidelines for the Use of Fishes in Research.
http://fisheries.org/docs/policy_useoffishes.pdf

Guidelines for use of Live Amphibians and Reptiles in Field and Laboratory Research. Second edition 2004 Revised by the Herpetological Animal Care and Use Committee (HACC) of the American Society of Ichthyologists and Herpetologists (ASIH).
<http://www.uaf.edu/iacuc/professional-standards/AmphibiansReptilesGuidelines.pdf>

RESPONSIBILITIES⁶

Principal Investigator (PI)

The principal investigator holds the overall responsibility for the field research program. They have the primary responsibility to develop safety plans, provide participant training, ensure compliance, and maintain all documentation. The PI's responsibilities are:

1. Complete the Field Research Safety Plan template;
2. Identify and assess the health and safety risks associated with the field research plan;
3. Developing appropriate interventions to manage the risks identified;
4. Determine the composition of the field team and team leadership;
5. Determine, acquire and assemble equipment, supplies and first aid kits needed for the research trip;
6. Confirm that all team members have appropriate equipment and training, including training and/or needed licensure for special equipment and vehicle operation;
7. If applicable confirm that all team members have received appropriate vaccinations and medical evaluation (normally 3 months in advance of trip);
8. Confirm that all team members are covered by insurance;
9. If applicable obtain repatriation insurance for transportation/evacuation to a medical facility or home for each team member;
10. Ensure that team members understand the risks, risk control procedures, and lines of authority;
11. Develop emergency plans;
12. Obtain informed written consent from team members (or parents/guardians for participants under age 18);
13. Ensure that your research has been reviewed and approved as required by the following LSU institutional research risk committees as appropriate:

- Institutional Animal Care and Use Committee (IACUC) review of animal research: more information is available at;

<http://www1.vetmed.lsu.edu/DLAM/IACUC%20Resources/item45952.html>

- Institutional Biosafety Committee (IBRDSC) review of research involving biohazards: more information is available at; <https://sites01.lsu.edu/wp/ehs/biological-safety/>
- Institutional Review Board (IRB) review of research involving human subjects: more information is available at; <http://sites01.lsu.edu/wp/ored/institutional-review-board/>
- Radiation Safety Committee more information is available at; <http://appl037.lsu.edu/dir/dirdept.nsf/ListingView/000747?OpenDocument>
- Chemical Safety at LSU Office of Environmental Health & Safety: 225-578-4314

Team Member

Each member of the field research team is responsible for:

1. Fulfilling their research responsibilities under the direction of the team leader;
2. Following all safety procedures established by the Principal Investigator;
3. Working safely;
4. Reporting any identified hazards to the Principal Investigator/team leader;
5. Provide evidence of an acceptable state of health and required immunizations;
6. Inform the Principal Investigator of any health concerns, i.e., allergies, diabetes, muscular dystrophy, claustrophobia etc.

INSURANCE

LSU Office of Risk Management
South Stadium Road
Baton Rouge, LA 70803
Telephone: (225) 578-3297
Fax: (225) 578-3577
<http://sites01.lsu.edu/wp/riskmgt/>

Inquire about:

- ▶ Health Insurance
- ▶ Repatriation insurance (Insurance to cover travel to medical care and/or travel home in case of injury.)

GENERAL FIELD SAFETY GUIDELINES

A copy of your safety plan should be submitted along with your IACUC protocol.

A. BEFORE YOU LEAVE ^{1,3,7}

Before you leave one of the most important phases of your fieldwork is planning and preparation. Prepare a written safety plan of your trip. Provide a copy to IACUC, your Department, a family member or friend and take a copy with you to provide to responsible parties at your destination. It should include the following;

- **Purpose:** A brief synopsis of the objective of the travel.
- **Itinerary:** Locations; arrival and departure dates; names, addresses, and phone numbers of all fieldwork participants.
- **Local Contacts:** Names of people at or near to your fieldwork site who can reach you if needed. The local contact should also be aware of any special medical conditions of the field team members. In addition, a team member should inform someone of any changes in field plans, locations and a time of return. The locally designated contact should be provided with a home office contact to call if the field team does not return within a pre-determined time.
- **Personal Contacts:** The home office contact should also have the name and phone number of family to contact in case the researcher is injured or taken ill. Field- workers should check in with their group office regularly and should advise the group office of any changes in schedule or points of contact.

B. MEDICAL CARE

- Injuries/Illnesses:
If a staff member or student suffers a job-related injury or illness during a field research exercise seek medical attention as soon as possible. The supervisor must be notified immediately so that it can be properly reported.
- Carry photo identification with you at all times in case of accident or injury.
- Ask your health insurance provider how your coverage applies to medical treatment in the fieldwork locale, should that become necessary.
- Emergency Medical Care:
 1. A first aid kit should be maintained at all times during the activity or exercise (see information below).
 2. At least one employee who is trained in first aid and one employee trained in CPR should be present when an infirmary, clinic, hospital, or emergency medical service is not close to field activities.
 3. At permanent University field stations, written arrangements should be made in advance with local facilities for emergency medical treatment.
 4. Each department has its own procedures for obtaining insurance coverage for emergency medical treatment. Field-workers should know what these are before they leave.
 5. If a University employee suffers a job-related injury or illness, his or her supervisor must be notified within hours and must fill out Risk Management Forms. Contact Risk Management at:

Office of Risk Management
Louisiana State University
Baton Rouge, LA 70803-7907
Phone: 225/578-3297
Web page: <https://sites01.lsu.edu/wp/riskmgmt/>
Email: riskmanagement@lsu.edu

C. FIRST AID KITS

First aid kits are encouraged for all off-campus activities. Campus departments purchase and maintain first aid kits. Contact EHS for advice on the contents. EHS can also give you advice if you need special equipment or medication. Kits and refills may be ordered from safety supply companies. EHS can supply a list of vendors.

Environmental Health & Safety
2nd Floor, Copy & Mail Center
Corner of South Stadium Drive and Ceba Lane
Phone: 225-578-5640
Web page: <https://sites01.lsu.edu/wp/ehs/>

Supplies in a typical first aid kit are listed below. Additional items can be stocked within the first aid kit based on the needs within the department purchasing the kit. Keep contents in a waterproof metal or plastic container. Keep medicines tightly capped. Check periodically and replace any medication which has expired. First Aid kits can be purchased from any laboratory safety supply company such as Grainger, http://www.grainger.com/Grainger/www/search.shtml?op=search&N=14275&in_dim_search=1.

Description	Use
Antiseptic or antibacterial/pain reliever spray (2 ounces or more)	spray on minor abrasions/cuts
Antibiotic cream (individual packs 10/box)	apply to abrasions/cuts
1/2" by 5 yard roll of adhesive tape	tape wounds
CPR face-shield and glove set	PPE to perform CPR
scissors (angled)	
1x3 inch bandage(100/box)	small cuts/abrasions
3"x3" sterile Gauze pads (10/pack)	apply to wounds
4"x4" sterile Gauze pads (25/pack)	apply to wounds
2"x 6 yards gauze non-sterile roll (10/pack)	apply over large wounds
Trauma Pad 5" x 9"	apply over large wounds
Elastic Bandage 3"x5 yards	support for sprain/strains
2"x 4" plastic Bandage (5 per pack)	for large abrasions
Pair Disposable nitrile gloves	Personal Protection Equipment

Possible additional items:

first aid handbook
tweezers
knife
thermometer
splint
ice / heat packs
snake bite kit
baking soda
antibacterial soap
assortment of safety pins

Medicines applied externally:

hydrogen peroxide
calamine lotion
betadine
sun block
lip balm
antifungal cream
ergophine or “drawing salve” which brings splinters to surface
eye drops
ear drops
nose drops
rubbing alcohol

Medicine taken internally:

aspirin or acetaminophen
antacids
cough medicine
sore throat lozenges or spray
laxative
anti-diarrhea medicine
allergy medicine
ipecac syrup

D. SAMPLE EMERGENCY KIT

- water
- First Aid Kit
- waterproof flashlight
- extra batteries

- emergency blanket
- emergency food
- hand sanitizer
- allergy treatments (i.e., cortisone cream and anti-histamine for poison ivy)
- sunscreen
- insect repellent
- mosquito netting
- water purification tablets or filter
- flares
- 2-way radio
- battery-operated radio
- personal protective equipment (PPE, i.e., safety glasses/goggles, gloves, hard hat)
- work boots
- fluorescent distress flag
- waterproof matches
- cellular phone
- fire extinguisher
- work gloves
- shovel, hand saw, axe, work knife
- tarps, hammer, duct tape, nails
- inflatable raft

E. TRAVELING OUT-SIDE THE COUNTRY: for additional information refer to Appendix A

If your trip involves travelling outside the country, you should contact the LSU Student Health Center for a medical evaluation and immunizations. Call for an appointment in advance because you will need to see a provider. Vaccinations are provided 8:30-11:00 AM and 1:00-3:30 Monday through Thursday and 8:30-11:30 AM on Friday. If your Department is paying for this service, you must bring a letter from your Department with you. The Clinic will also charge private insurance companies. Additionally, remember to bring your LSU ID number.

LSU Student Health Center
 corner of Infirmary Road and Chimes Street
 Phone: 225-578-6271
<http://www.shc.lsu.edu/>

Determine any special requirements of the foreign government where you will be traveling. Many countries require proof of vaccinations prior to entry. See a medical provider 3 months prior to your travel. Some vaccines are given as a series over a six- month period. Vaccination deadlines are typically within three (3) months of travel.

F. INTERACTING WITH THE PUBLIC

Field crews can take several steps to promote positive encounters with members of the public. Crews should always clearly identify their affiliation with LSU or LSU's research partner. All relevant permits, permissions, and supporting documentation should be readily accessible to provide as requested. Vehicles and boats should be labeled. When possible, clothing also should identify affiliation. It is advisable to contact fish and wildlife agents, wardens, or other local law enforcement, if public lands or waters will be sampled. Crews should always defer to the public in potential bottleneck situations like boat launches. Crews should strive for polite and courteous interactions with the public. Deployed sampling gear should be labeled with LSU or LSU's research partner's logo, contact information for the PI or team leader, and, if space allows, a brief description of the research effort. Deployed gear should minimize conflicts and encounters with the public (e.g., avoid deploying a mist net across a hiking trail). Lastly, deployed gear should be covered or camouflaged in such a way to ensure that the public has a good experience."

Private property rights are important in the US and abroad. It is the responsibility of the field team to always know their location and property boundaries. In many places, private property owners are not required to post their boundaries. Ensure that written permission is obtained prior to accessing properties and copies of the permission are kept with the field team at all times. It is recommended to periodically contact landowners to ensure permission is still valid. It is also recommended to follow all landowner requests, such as avoiding sampling during hunting seasons. Lastly, states and countries vary in their interpretation of publically accessible land, wetlands, water, and these interpretations change over time. It is always the crew's responsibility to know their boundaries."

Recreational users often have limited times to access their pursuit. Be mindful to not take too much time at boat launches and potentially defer to recreational users. Avoid times of high traffic at boat launches (e.g., weekends, opening days of various hunting and fishing seasons) whenever possible.

Some data collection may involve interactions with people (e.g., hunting or fishing creel measurements or sampling tissues at wildlife check-in stations). Remember that these persons are voluntarily cooperating and may not be compelled to cooperate. You are contacting them during their recreation or employment. Be courteous of their time and cooperation.

Cultural Sensitivity

If your field research will take you to another country, a very practical suggestion is to enroll the research team in cultural sensitivity training for the location where the research will occur. This type of training reduces cross-cultural misunderstandings and encourages positive cultural working relationships. Understanding cultural values and attitudes (time, space,

group dynamics, authority, tasks) would strengthen relationships for times when real assistance is most needed. Many types of commercial packages are available on the web.

G. MOTOR VEHICLE SAFETY

Employees must be authorized by their department, if an employee will drive on university business. An authorization form must be completed annually for the employee (Form 2054-LSU - <http://www.fas.lsu.edu/purchasing/PDFs/da2054.pdf>). According to State requirements, if serious citations on their driving record occur, the employee may not be authorized to drive. Safe Driver's Training must be completed to drive on university business. On-line training is available on the EHS website: www.ehs.lsu.edu. Employees are to know and obey all traffic laws and understand that vehicle accidents require immediate reporting to the supervisor. Vehicle inspection logs need to be maintained for University vehicles.

When an individual is renting a vehicle outside the US the LSU travel regulations recommend that appropriate Insurance (liability and physical damage) be purchased from the rental company. With the approval of the Department Head or his/her designee, insurance costs may be reimbursed for travel outside the US only. Given that costs of insurance are reimbursable as long as the rules are followed, there is no reason not to buy the insurance. Should there be an accident with no insurance purchased the LSU employee may incur some significant and unnecessary personal expense.

FYI: the LSU/state of Louisiana insurance policy does "cover "accidents" and "losses" occurring in the territories and possessions of the United States of America; Puerto Rico; Canada; and Anywhere in the world if: "A covered "auto" of the private passenger type is leased, hired, rented or borrowed without a driver for a period of 30 days or less; and the "insured's" responsibility to pay damages is determined in a "suit" on the merits, in the United States of America, the territories and possessions of the United States of America, Puerto Rico or Canada or in a settlement we agree to".

H. WORKING ALONE

Whenever possible, fieldwork activities should be performed in teams of at least two people. Solitary field research is strongly discouraged, particularly when it involves remote or hazardous locations or high-risk activities. When solitary work is unavoidable, the PI should enforce competence with additional training, regular reporting, appropriate emergency procedures, and other precautions.

PREPARE A FIELD SAFETY PLAN ⁵

Complete an electronic copy of the Field Research Plan and submit as an addendum to your IACUC animal care and use protocol.

FIELD RESEARCH SAFETY PLAN TEMPLATE

Department: _____ Principal investigator: _____

Phone number: _____ E-mail: _____

Location of Fieldwork:

Nature of Research:

FIELDWORK TEAM:

Name	Trained in CPR	Trained in First Aid	Employee	Student	Volunteer	Team Leader
	<input type="checkbox"/>					
	<input type="checkbox"/>					
	<input type="checkbox"/>					
	<input type="checkbox"/>					
	<input type="checkbox"/>					
	<input type="checkbox"/>					
	<input type="checkbox"/>					
	<input type="checkbox"/>					
	<input type="checkbox"/>					
	<input type="checkbox"/>					
	<input type="checkbox"/>					
	<input type="checkbox"/>					
	<input type="checkbox"/>					
	<input type="checkbox"/>					

PHYSICAL DEMANDS: What physical demands will the fieldwork entail?

<input type="checkbox"/>	Climbing	<input type="checkbox"/>	Extreme Heat	<input type="checkbox"/>	Manual lifting, carrying or handling heavy loads
<input type="checkbox"/>	High Altitude	<input type="checkbox"/>	Extreme Cold	<input type="checkbox"/>	Working on, near, or over water
<input type="checkbox"/>	Hiking	<input type="checkbox"/>	Sun Exposure	<input type="checkbox"/>	Other: _____
<input type="checkbox"/>	Not Applicable				

ORIENTATION:

Yes No N/A

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has any participant reported a condition that may require exceptional medical, physical or emergency accommodations? If yes, describe special arrangements and attach to form.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have arrangements been made to provide participants with: <input type="checkbox"/> Potable water <input type="checkbox"/> Personal washing/hygiene <input type="checkbox"/> Toilet facilities or procedures
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are participants aware of suitable clothing, footwear and personal supplies required (e.g. boots, hat, raingear, sunglasses, sunscreen, insect repellent)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have arrangements been made to provide participants with, and train them in the safe use of, appropriate personal protective equipment such as: <input type="checkbox"/> Safety Glasses <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Coveralls <input type="checkbox"/> Protective Footwear <input type="checkbox"/> Protective Headwear <input type="checkbox"/> Hearing Protection <input type="checkbox"/> Gloves <input type="checkbox"/> Face Shield <input type="checkbox"/> Waders (Hip, Chest) <input type="checkbox"/> Knee/shin Guards <input type="checkbox"/> Flame Retardant Clothing <input type="checkbox"/> Other:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are participants familiar with LSU's Policy on the use of alcohol and drugs?

Other Hazards/Protective Measures/Comments:

WORKING ALONE: (Not Recommended)

Yes No N/A

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Will any participant be working alone?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has an effective communications system been established
radio		<input type="checkbox"/>	
walkie-talkies		<input type="checkbox"/>	

cell phones	<input type="checkbox"/>
satellite phones	<input type="checkbox"/>
whistles	<input type="checkbox"/>
air horns	<input type="checkbox"/>
scheduled contacts	<input type="checkbox"/>

Describe Communication System:

WHAT PROCEDURES HAVE BEEN ESTABLISHED IN THE CASE PARTICIPANT(S) BECOME LOST?

<input type="checkbox"/>	Participant training on remaining at location, use of emergency signals, use of emergency survival gear
<input type="checkbox"/>	Provision of survival gear
<input type="checkbox"/>	Procedure for organized search
<input type="checkbox"/>	Precautions against fire
<input type="checkbox"/>	Precautions in the event of extreme weather conditions
<input type="checkbox"/>	Other Hazards/Protective Measures/Comments: <hr/> <hr/>

WILDLIFE: (Non-Target):

Yes No N/A

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Will participants be administering drugs/anaesthetics or obtaining biological samples? If so, have they been trained in techniques appropriate to the species and in how to manage disposal of waste or surplus materials?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have participants been instructed on techniques to avoid unexpected encounters with potentially dangerous wildlife?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are participants familiar with the methods of contraction of disease from wildlife in the area?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have participants been made aware of the signs/ symptoms of potential zoonoses that may be present in wildlife in the study area?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have participants been made aware of potential vegetation hazards and the identification of toxic plants such as Poison Oak / Poison Ivy?

Other Hazards/Protective Measures/Comments:

CHEMICALS AND HAZARDOUS MATERIALS:

Yes No N/A

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is each hazardous material properly identified with a supplier or label?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Will hazardous material be transported to and from the site?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Will Material Safety Data Sheets (MSDS) for each hazardous material used be readily available to participants?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Will samples be collected or preserved in hazardous material, i.e., ethanol, formalin?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Will appropriate materials be available to adequately handle hazardous materials, spills, leaks or releases? Describe materials and attach to form.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Will radioisotopes be transported or used in the field? If so, have participants been trained to safely use, store and transport the material in accordance with legal requirements and license conditions? (see Radiation Safety Policy)

Other Hazards/Protective Measures/Comments:

SAFE USE OF EQUIPMENT AND WORK PROCESSES:

Yes No N/A

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are participants trained to operate the equipment safely and in compliance with regulatory standards?
--------------------------	--------------------------	--------------------------	---

List Hazardous Equipment:

Some equipment and activities to which specific training or certification may be required include:

<input type="checkbox"/>	Chain Saws	<input type="checkbox"/>	Explosives
<input type="checkbox"/>	Compressed Gases	<input type="checkbox"/>	Fall Protection above 6 feet
<input type="checkbox"/>	Confined Space	<input type="checkbox"/>	Hazardous Materials
<input type="checkbox"/>	Diving (Free, SCUBA, Line, NITROX, Tri Gas)	<input type="checkbox"/>	Ladders
<input type="checkbox"/>	Excavation/Trenching/Tunnelling	<input type="checkbox"/>	Lifting Devices and Hoists
<input type="checkbox"/>	Noise exposure above 85dBA _{lex}	<input type="checkbox"/>	Scaffolds
<input type="checkbox"/>	Powered saws, grinders & planers	<input type="checkbox"/>	Travel Un-Improved Roads
<input type="checkbox"/>	Firearms	<input type="checkbox"/>	ATV, PWC, other Water Craft
<input type="checkbox"/>	Fire Extinguisher	<input type="checkbox"/>	Climbing, Rappelling, Rope work
<input type="checkbox"/>	Powered Mobile Equipment (fork lift, tractor, heavy equipment)		
<input type="checkbox"/>	Minimum Distances from exposed energized conductors (e.g. power lines)		
<input type="checkbox"/>	Other:		

REQUIREMENTS:

Travel Immunization/Prophylaxis Requirements:				
<input type="checkbox"/>	Diphtheria	<input type="checkbox"/>	Polio	<input type="checkbox"/> Other (specify below): _____ _____ _____
<input type="checkbox"/>	Hepatitis A	<input type="checkbox"/>	Rabies	
<input type="checkbox"/>	Hepatitis B	<input type="checkbox"/>	Rubella	
<input type="checkbox"/>	Japanese Encephalitis	<input type="checkbox"/>	Tetanus	
<input type="checkbox"/>	Malaria	<input type="checkbox"/>	Typhoid	
<input type="checkbox"/>	Measles	<input type="checkbox"/>	Yellow Fever	

EQUIPMENT:

All equipment to be taken on a field trip must be checked by a qualified person to ensure that it is in good condition, complete and safe (before removal from the campus). Documentation of this pre-trip assessment of the equipment is advised. Individuals operating the equipment must be trained in the proper use of the equipment.

CLOTHING:

Fieldwork participants should be informed of the appropriate clothing to be worn while conducting their work. The appropriate clothing may have to be provided by the University or the worker may have to provide his or her own clothing, depending on requirements.

It should be identified whether or not there is special protective gear to be used while conducting the particular fieldwork. It should also be stated where this protective clothing must be used and the appropriate training provided in the proper use and maintenance of the protective clothing.

When extreme weather conditions can be anticipated or are known, clothing appropriate to the situation should be taken on the fieldwork excursion.

Fieldwork participants must employ common sense in terms of clothing worn on the fieldwork excursion. Participants inappropriately attired or without the correct personal protective equipment (PPE) will not be allowed to participate in the Fieldwork.

FIRST-AID KITS:

First-aid kits are required for all off-campus operations. It is the responsibility of the Primary Investigator to provide and ensure that the kit is maintained. Prior to the departure for fieldwork the Primary Investigator is responsible to document the presence of a first-aid kit for the trip and any other required first-aid supplies.

EMERGENCY PROCEDURES

Emergency Plan for Research Location: include information on communication, equipment; local emergency contacts, emergency OSU contacts, etc. (**attach copy to form**)

University Contact and Phone #	Local Contact and Phone #
1.	1.
2.	2.

3.	3.
4.	4.

EQUIPMENT CHECKLIST:

<input type="checkbox"/>	Specialized Clothing –Describe:		
<input type="checkbox"/>	PPE (respirator, eye/face protection/head protection/footwear/high visibility wear) - Describe:		
<input type="checkbox"/>	Training on safe use procedures for power equipment	<input type="checkbox"/>	Additional First Aid or medical supplies
<input type="checkbox"/>	Other training	<input type="checkbox"/>	Emergency supplies
<input type="checkbox"/>	Communication devices (e.g. whistles, 2-way radios)	<input type="checkbox"/>	Vehicle travel survival kit
<input type="checkbox"/>	First Aid kit	<input type="checkbox"/>	Material Safety Data Sheets
<input type="checkbox"/>	First Aid attendant (see Appendix 12)	<input type="checkbox"/>	Maps
<input type="checkbox"/>	Licenses (e.g. vehicle/boat/diving equipment)		
<input type="checkbox"/>	Other:		

RISK ASSESSMENT: (List risks and precautions or provide narrative):

List identified hazards related to activities or environment (i.e. extreme heat or cold, wild animals, endemic disease, firearms, explosives, violence), and chosen available measures for eliminating or reducing risks to acceptable levels:

RISK	PRECAUTIONS TO BE IMPLEMENTED
EXAMPLE: Extreme Heat	Shade, frequent rest and water provided
1.	
2.	
3.	
4.	
5.	
6.	
7.	

PHYSICAL AND ENVIRONMENTAL HAZARDS

Also refer to tables 1, 2, 3

It is good practice to contact fish and wildlife agents, wardens, or other local law enforcement prior to sampling public waters. In many cases, this may be a requirement of sampling permits.

Many physical and environmental risks will exist wherever you travel. Determine these risks in advance and be prepared.

A. **LIGHTNING** ¹⁰



Each year lightning accounts for over 200 deaths in the United States. Lightning always accompanies a thunderstorm. It is estimated that lightning hits the Earth 100 times each second. That's 8.6 million strikes per day and over three billion strikes each year.

- Remember: if you can hear thunder, you are close enough to the storm to be struck by lightning. Go to safe shelter immediately!

- Move to a sturdy building or car. Do not seek shelter under a tree.
- Get out of boats and away from the water.
- The current associated with a lightning strike can travel through power, cable, and telephone lines. It is advisable to stay off the telephone and avoid using a computer, television, or other electrical appliances during thunderstorms.
- Do not take a bath or shower.
- Turn off air conditioners. Power surges from lightning can overload the compressors.
- Get to higher ground if flash flooding or flooding is possible. Once flooding begins, abandon cars and climb to higher ground. Do not attempt to drive to safety. Note: Most flash flood deaths occur in automobiles.
- If you are outside, crouch down on the balls of your feet when you feel your hair stand on end.

B. STEEP TOPOGRAPHY. Accidental falls are a real risk when hiking in areas of steep topography. Each PI/field leader should exercise caution when taking staff and students hiking where the risk of falls is high. Additionally, care should be taken when frequenting scenic overlooks, observation towers, waterfall, etc. Caution should also be taken not to displace rocks that might injure those at a lower altitude.

C. AQUATIC FIELD STUDIES. Precautions should always be taken for any field research that will take place around water. If there are those who cannot swim they should identify themselves and wear personal flotation devices (PFDs) at all times. When using boats, all regulations must be followed. According to the Center for Disease Control, each year over 3,400 people drown in the United States.

- Take a safe boating course; i.e., <http://www.americasboatingcourse.com/>
- Check your boat for all required safety equipment.
- Consider the size of your boat, the number of passengers and the amount of extra equipment that will be on-board. Do not overload.
- If you will be in a power boat, check your electrical system and fuel system for gas fumes.
- Follow manufacturers suggested procedures BEFORE starting up the engine.
- Wear your life jacket – don't just carry one on board.
- Leave alcohol behind to increase your safety and decrease your risk.
- Check the weather forecast.
- File a float plan with a member of your team.
- Swimming: Most drowning victims had no intention of being in water. Most victims drown within 10-30 feet of safety and therefore it is important that you learn to swim well. Don't take chances, by overestimating your swimming skills and never swim alone.
- Never dive into lakes and rivers.
- Life jackets must be worn while the motor is in operation and should be worn at all times in small watercraft (e.g., canoes, pirogues). This is state law in Louisiana and

- most other states aside from being good practice.
- Dress for the water temperature, not the air temperature. Cold-water immersion causes many boating-related fatalities. It follows four stages, starting with cold shock, followed by swimming failure, then hypothermia and finally post-rescue collapse. Most cold water drowning fatalities are attributed to the first two stages.
- If sampling gear is to be used in the water, crews should be informed of the potential risks of each gear (e.g., electrocution during electrofishing, entanglement in trawls and nets) and steps to minimize risks.
- If special clothing is needed, responsibility to provide clothing, whether PI or worker, should be clear, and PI should take steps to ensure proper clothing is worn (e.g. breathable waders should be avoided for eletrofishing).

D. COLD WEATHER TRIPS ³¹

Hypothermia can be deadly and is caused by cold, wet, or windy weather. The body loses heat faster than it can produce heat and usually occurs at temperatures between 30° F and 50° F. Dress appropriately in layers so layers can be removed before becoming overheated and wet with perspiration. Always carry rain gear and/or dry clothing. Fifty percent of a person’s body heat can be lost from a person’s head so keep your head covered.

Symptoms include uncontrollable shivering, clumsiness due to loss of muscle coordination, slurred speech, inability to think clearly, and eventual unconsciousness and cessation of reflexes including heart and lung functions.



Treatment; Allow the core of the body to warm up before warming the extremities. Keep blood circulating in the core area until it is warm enough to circulate to the extremities. Prevent cold blood from being circulated back to the core. Strip and dry the victim; dress in dry clothing. Re-warm the victim **SLOWLY**; do not warm fast by immersing in warm/hot water. Cover the head and neck with warm clothing or blankets. Provide shelter out of the weather; get victim into a pre-warmed sleeping bag, into blankets, or into whatever is available to provide shelter and warmth. Chest to chest skin contact with another person in a sleeping bag works well. Warm rocks wrapped in clothing or hot water bottles are helpful. **Do NOT give alcohol.**

Carbon monoxide (CO) poisoning¹³ can become a danger if fuel operated heating sources, candles or lanterns are used. Also, if a running vehicle is used to stay warm. The same problem can occur in boats. Therefore, do not sleep in a car, boat or shelter when there is a

possible source for CO. Run vehicles and heaters periodically, not continuously. Insure that your motor vehicle's tail pipe is not clogged with mud or snow. **Treatment;** Get victim to open air quickly. Check respiration and pulse; if both are absent, begin CPR, and continue until breathing begins or help arrives. Transport victim to a hospital as soon as possible. It takes about 24 hours for CO to get out of the bloodstream. Continue observation during this time frame. Administer medical O2 if available.

E. HOT WEATHER TRIPS ^{23, 31} The National Oceanic and Atmospheric Administration (NOAA) reported that 155 people died in 2012 as a result of extreme heat. Avoid heat exhaustion by not engaging in strenuous activity in hot, humid environments; and stay hydrated.

Heat exhaustion: This condition often occurs when people are exposed to high temperatures especially when combined with strenuous physical activities and humidity. Body fluids are lost through sweating, causing dehydration and overheating of the body. The person's temperature may be elevated, but not above 104° F (40° C).



Heat stroke: Heat stroke, also referred to as heatstroke or sun stroke, is a life-threatening medical condition. The body's cooling system, which is controlled by the brain, stops working and the internal body temperature rises to the point at which brain damage or damage to other internal organs may result (temperature may reach 105° F or greater [40.5° C or greater]).

ANIMALS AND PESTS ^{4,6,7} Also refer to Tables 4, 5, 6

Dangerous animals and other pests are present throughout the world. There are some basic rules that can help to protect you from these dangers. Follow these general guidelines to prevent unwelcome encounters.:

1. Keep garbage in rodent-proof containers and stored away from your campsite or work area. Food crumbs and debris may attract insects and animals;
2. Thoroughly shake all clothing and bedding before use;
3. Do not camp or sleep near obvious animal nests or burrows;
4. Carefully look for pests before placing your hands, feet, or body in areas where pests live or hide (e.g., woodpiles or crevices);

5. Avoid contact with sick or dead animals (however, when research protocol or animal welfare dictates the handling of sick or dead animals, appropriate safety measures will be implemented, e.g., use of gloves and snake sticks);
6. Wear clothes made of tightly woven materials and tuck pants into boots;
7. Wear insect repellent;
8. Minimize the amount of time you use lights after dark in your camp or work site because they may attract pests and animals;
9. Use netting to keep pests away from food and people;
10. Carry a first aid manual and kit with you on any excursion so you can treat bites or stings (if the pest is poisonous or if the bite does not appear to heal properly, seek medical attention immediately).

A. STINGS AND BITES FROM VENOMOUS INSECTS, such as spiders, bees, wasps, hornets, and yellow jackets. Medication for immediate relief from stings may be carried in the first aid kit, but students who know they react severely to such stings should be advised to carry any special medication they might need.

Although most stings do not require medical care, remember some stings can be serious or even fatal. If you have the slightest suspicion that someone is having a generalized or allergic reaction, seek emergency medical care immediately.

- Difficulty breathing
- Difficulty speaking
- Swelling in the mouth or throat
- Rash all over the body
- Faintness or decreased level of consciousness



Yellow Jacket

Brown Recluse Spider Bites ²⁴:

Deaths from brown recluse spiders have been reported only in children younger than seven years. Brown recluse spiders are endemic to the Midwestern and Southeastern states. These spiders are not aggressive and bite only when threatened. They seek out dark, warm, dry environments such as attics, closets, porches, barns, basements, woodpiles, and old tires. Most bites occur in the summer months. Brown recluse spider bites often go unnoticed initially because they are usually painless bites.



Symptoms usually develop two to eight hours after a bite. Victims may experience these symptoms:

- severe pain at bite site after about four hours,
- severe itching,
- nausea,
- vomiting,
- fever, and
- myalgia (muscle pain).

Initially the bite site is mildly red and upon close inspection may reveal fang marks. Most commonly, the bite site will become firm and heal with little scarring over the next few days or weeks. Occasionally, the local reaction will be more severe with erythema and blistering, sometimes leading to a blue discoloration, and ultimately leading to a necrotic lesion and scarring. Signs that may be present include:

- blistering (common),
- necrosis (death) of skin and subcutaneous fat (less common), and
- severe destructive necrotic lesions with deep wide borders (rare).

Treatment

- apply ice to decrease pain and swelling.
- Elevate area if possible above the level of the heart.
- Wash the area thoroughly with cool water and mild soap.
- Avoid any strenuous activity because this can spread the spider's venom in the skin.
- Use acetaminophen (Tylenol) for pain relief.
- Do not perform any of the following techniques:
- Do not apply any heat to the area. This will accelerate tissue destruction.
- Do not apply any steroid creams to the area such as hydrocortisone cream.
- Do not attempt to remove the spider venom with suction devices or cut out the

affected tissue.

- Do not apply a tourniquet to the extremity involved.

Black Widow Spider Bites 44

Get Help Immediately

- Call your health care provider or go to a hospital emergency room.
- If possible, kill the spider and take it to the doctor with you.
- Symptoms include target-like marking and slight swelling at wound site, muscle pains and cramps within 2 hours of the bite, weakness, headache, nausea, vomiting, sweating, dizziness, itching, anxiety, and increased blood pressure.

Treat Symptoms

- Apply ice on the way to the health care provider's office or emergency room to relieve pain and swelling.

Follow Up

- The health care provider will examine and clean the wound.
- The person may require a tetanus shot or booster, depending on the date of the last injection.
- A person with severe symptoms -- such as intense pain and cramping or high blood pressure may be admitted to the hospital overnight. Anti-venin may be needed to treat serious bites.



Black Widow

Fire Ant Stings 32

The fire ant sting typically causes red hive-like lesions that burn and itch. Painful pus-filled lesions can also occur. Cold packs, pain relievers, and antihistamines can help relieve the discomfort. A large number of stings may trigger a toxic or severe life-threatening allergic reaction. Get emergency care.



Fire Ant



Fire Ant bites

The Puss Moth Caterpillar, aka the "Asp" or Southern Stinger²¹

The most toxic caterpillar in North America and common to Louisiana is the puss moth caterpillar, *Megalopyge opercularis*, commonly called an "asp". This caterpillar is found in shade trees, shrubbery around homes, schools, and parks. They can cause a severe burn or rash from venomous hairs sticking into the skin. There may be waves of intense pain, fever, vomiting, and muscle cramps. Remove the spines by using cellophane tape or a commercial facial peel. A doctor may need to be consulted



Puss Moth Caterpillar



STING FROM CATERPILLAR

B. BITES FROM VENOMOUS SNAKES^{43, 45} Although far less likely to occur than insect stings, snake bites are a risk. Care should be taken to note and avoid venomous snakes in the field. Leaders should instruct students on field recognition of common snakes. In case someone is bitten, the best plan is to return to the vehicle and seek medical attention immediately. Even if medical assistance is many hours away, such field treatments as tourniquets and cutting should NOT be applied by amateurs.

If you know the snake is **not venomous**, treat as a puncture wound.



Eastern King snake(non-venomous)

Puncture Wound Treatment

Stop the Bleeding

Apply firm, direct pressure with sterile gauze or clean cloth until bleeding stops.
Remove any jewelry.

Clean and Protect the Wound

Rinse the wound under clean water for several minutes. Then wash the area with mild soap and water and rinse again. Apply an antibiotic cream. Use a sterile bandage to protect the puncture wound from dirt or further injury.

Treat Pain

For pain, give ibuprofen (Advil®, Motrin®) or acetaminophen (Tylenol®).

Follow-up

See a healthcare provider for any signs of infection: redness, increasing pain, swelling, or pus at the site. Ask the health care provider if a tetanus shot is needed. Some wounds may need antibiotics. Ask the health care provider.



Cotton Mouth

Venomous or possibly Venomous

1. Note the Snake's Appearance

Be ready to describe the snake to emergency staff.

2. Protect the Person

While waiting for medical help:

- Move the person beyond striking distance of the snake.
- Have the person lie down with wound below the heart.
- Keep the person still to keep venom from spreading.
- Remove jewelry
- Cover the wound with loose, sterile bandage.

Do not:

- Cut a bite wound.
- Attempt to suck out venom.
- Apply tourniquet, ice, or water.
- Give the person alcohol or caffeinated drinks.

3. Follow Up

If you treat the bite at home:

- Contact a health care provider. The person may need a tetanus shot. Tetanus boosters should be given every 10 years. At the hospital, treatment will depend on the type of snake.
- If the snake was venomous, the person will be given anti-venom treatment.

- A tetanus shot may be given, depending on date of last injection.



Copperhead

C. POISONOUS PLANTS²¹ Students should be shown how to identify common poisonous plants and should be instructed to avoid them. This precaution includes plants that can cause contact dermatitis (poison ivy, poison oak, poison sumac) and plants that might be poisonous upon ingestion (some mushrooms and berries). In general, students should be instructed not to eat plants or fruits collected in the field.



Poison Ivy



Poison Oak



Poison Sumac

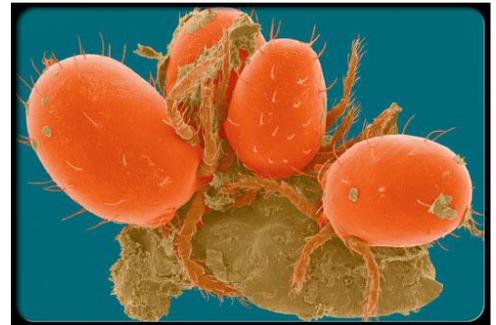
D. ECTOPARASITES (TICKS, MOSQUITOES, CHIGGERS, SCABIES MITES).

Tick-borne diseases constitute a serious threat to individuals conducting field work during warm weather. Students should be instructed to inspect their entire bodies carefully after returning from a day in the field, and to remove any ticks found. It is a good idea for individuals to note the date they found a tick firmly attached, in the event that symptoms of Rocky Mountain Spotted Fever or Lyme Disease appear later. A physician should be consulted if suspicious symptoms (fever, joint aches, swollen glands, reddish flushing of skin) occur in the weeks following a tick bite.



Ticks

Chiggers are annoying, although not likely to threaten health. In areas known to have either ticks or chiggers (practically any wooded or shrubby area in our region), students should be advised on means of avoiding contact (tucking and taping pant legs, using repellents, frequent tick checks, etc.).



Chiggers

Ticks ¹⁴

- 1. Avoid Ticks if possible**
- 2. Direct Contact with Ticks**
 - Avoid wooded and bushy areas with high grass and leaf litter.
 - Walk in the center of trails.
- 3. Repel Ticks with DEET or Permethrin** ²⁵
 - Use repellents that contain 20% or more DEET (N, N-diethyl-m-toluamide) on the exposed skin for protection that lasts up to several hours. Always follow product instructions. Parents should apply this product to their children, avoiding hands, eyes, and mouth.
 - Use products that contain permethrin on clothing. Treat clothing and gear, such as boots, pants, socks and tents. It remains protective through several

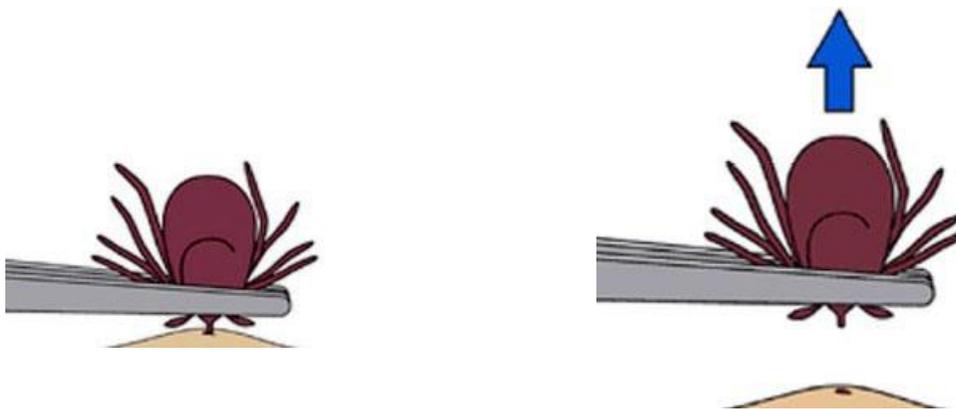
washings. Pre-treated clothing is available and remains protective for up to 70 washings.

4. Find and Remove Ticks from Your Body

- Bathe or shower as soon as possible after coming indoors (preferably within two hours) to wash off and more easily find ticks that are crawling on you.
- Conduct a full-body tick check using a hand-held or full-length mirror to view all parts of your body upon return from tick-infested areas. Parents should check their children for ticks under the arms, in and around the ears, inside the belly button, behind the knees, between the legs, around the waist, and especially in their hair.
- Examine gear and pets. Ticks can ride into the home on clothing and pets, then attach to a person later, so carefully examine pets, coats, and day packs. Tumble clothes in a dryer on high heat for an hour to kill remaining ticks.

5. How to remove a tick ¹⁵

- Use fine-tipped tweezers to grasp the tick as close to the skin's surface as possible.
- Pull upward with steady, even pressure. Don't twist or jerk the tick; this can cause the mouth-parts to break off and remain in the skin. If this happens, remove the mouth-parts with tweezers. If you are unable to remove the mouth easily with clean tweezers, leave it alone and let the skin heal.



- After removing the tick, thoroughly clean the bite area and your hands with rubbing alcohol, an iodine scrub, or soap and water.

- Avoid folklore remedies such as "painting" the tick with nail polish or petroleum jelly, or using heat to make the tick detach from the skin. Your goal is to remove the tick as quickly as possible--not waiting for it to detach.

6. Follow-up

If you develop a rash or fever within several weeks of removing a tick, see your doctor. Be sure to tell the doctor about your recent tick bite, when the bite occurred, and where you most likely acquired the tick.

Mosquitoes ¹²

Avoid Mosquito Bites

- Use insect repellents when you go outdoors. Repellents containing DEET, picaridin, IR3535, and some oil of lemon eucalyptus and paramenthanediol products provide longer-lasting protection. To optimize safety and effectiveness, repellents should be used according to the label instructions.
- When weather permits, wear long sleeves, long pants, and socks when outdoors. Mosquitoes may bite through thin clothing, so spraying clothes with repellent containing permethrin or another EPA-registered repellent will give extra protection. Don't apply repellents containing permethrin directly to skin. Do not spray repellent on the skin under your clothing.
- Take extra care during peak mosquito biting hours. Take extra care to use repellent and protective clothing from dusk to dawn or consider avoiding outdoor activities during these times.



Mosquito-borne Diseases:

Arboviral encephalitides:

- Eastern equine encephalitis
- Japanese encephalitis
- La Crosse encephalitis
- St. Louis encephalitis
- West Nile virus
- Western equine encephalitis

Dengue Fever

Malaria

Rift Valley Fever

Yellow Fever

Scabies 2, 48

- *Scabies* (*Sarcoptes scabiei*) mites are directly transferred by contact, and result in a spreading scabby, exuding, and intensely itchy skin lesion. The mites are microscopic so cannot be seen with the unaided eye.
- The itch mite (*Sarcoptes scabiei*) is a parasitic arthropod which burrows into skin and causes scabies. Animals affected include not only human but also wild and domesticated dogs and cats in which it is one cause of mange. Also affected in the wild are ungulates, boars, bovids, wombats, koalas, and great apes.

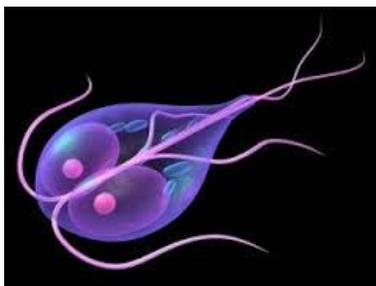


E. ENDOPARASITES 2, 46

Avoid contact with water or soil-borne parasites (Giardia, tapeworms, etc.). Never drink untreated water and avoid going barefooted. Carry enough drinking water for anticipated personal needs. Water obtained from sources in the field must be boiled, filtered, or chemically treated before consumption. Wash hands after handling soil and particularly before eating.



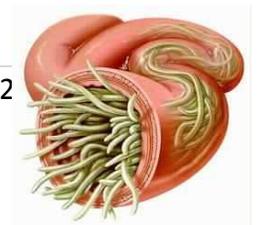
Hook Worm



Giardia



Tape Worm



Roundworms (*Baylisascaris procyonis* & *B. columnaris*) are parasitic nematode roundworm parasites carried by skunks and raccoons. Contact with feces contaminated water or plants can pass the sticky and environmentally durable eggs to humans. Contracting this disease occurs by accidental ingestion of the eggs (i.e., in the absence of hand washing or gloves). Infection of humans can lead to larval parasite migration to the brain with the development of highly variable neurological symptoms.

F. EXPOSURE TO WILD VERTEBRATE ANIMALS ²

When handling a wild animal, its parts, secretions or excreta the risk of acquiring a zoonotic infection increases. The habitat of the animal may also conceal reservoirs of zoonotic disease such as parasites which may be transmitted to humans. For example, ticks, fleas, or mosquitoes. Always take precautions. This might entail the wearing of gloves, a respirator, etc. Also, always wash your hands when you're finished.

Some insect-borne diseases can be acquired by direct contamination of a wound with infected animal blood or tissues. Always clean wounds thoroughly with soap and a disinfectant. Always use insect repellent where mosquitoes are present. If aerosol transmission of disease is a possibility, wearing a properly fitted respirator, i.e., Q-fever and Hantaviruses. The LSU Office of Environmental Health and Safety is available to perform fit testing if needed.

1. WORKING WITH MAMMALS

Hantavirus Pulmonary Syndrome (HPS) ²⁸ results from transmission of aerosolized excreta or saliva of rodents infected with hantavirus. It can also be transmitted from a bite. The mortality rate is high (38% mortality) and therefore deserves a significant prevention effort.

2. WORKING WITH AVIAN SPECIES ²:



West Nile virus (WNV) ¹⁶ is most commonly transmitted to humans by mosquitoes. You can reduce your risk of being infected with WNV by using insect repellent and wearing protective clothing to prevent mosquito bites. There are no medications to treat or vaccines to prevent WNV infection. Fortunately, most people infected with WNV will have no symptoms. About 1 in 5 people who are infected will develop a fever with other symptoms. Less than 1% of

infected people develop a serious, sometimes fatal, neurologic illness. Blue jays and crows can actively harbor and shed the disease without showing any clinical illness. Evidence suggests that virus transmission to humans can occur by handling dead birds or their waste. Therefore, post mortem examinations and museum preparations are considered high risk. Preserving tissues in 1 part tissue: 10 parts universal fixative [Haemo D, Fisher Scientific] by volume) overnight will kill the virus.

Newcastle disease virus (NDV)⁴⁷ is a virus that causes a deadly infection in many kinds of birds. In humans, NDV causes mild flu-like symptoms or conjunctivitis (an infection of the eye that is also called pink eye) and/or laryngitis (an irritation and swelling of the voice box and the area around it). No treatment for NDV exists, but the use of prophylactic vaccines and sanitary measures reduces the likelihood of outbreaks.

3. WORKING WITH REPTILES; i.e., TURTLES (CHELONIANS) ^{2, 17, 39}

Reptiles may carry bacterial diseases. Contact with reptiles for example has been directly implicated in human Salmonellosis outbreaks. Reptiles carrying pathogens may not exhibit any signs of illness. It is important to always wash your hands after handling reptiles. This is particularly important if you have children under 5 years of age, are pregnant, or if you are immunocompromised. Since 1975, the United States has banned the sale of turtles 4 inches and under in size. This ban is a direct result of cases of salmonella poisoning in children linked to pet turtles. Symptoms of Salmonellosis vary from a mild diarrhea to a fulminant dysentery. This can be followed with fever, muscle soreness, and hepatitis.



Salmonella: Salmonellosis is a bacterial disease. There are many types of salmonella and they can make people very sick. Reptiles are known for passing on the disease. It causes intestinal problems and has caused death. An estimated 70,000 people get salmonellosis from contact with reptiles in the United States each year.

Mycobacterium: This can be found in any reptiles and is an important consideration for those doing reptile necropsies or collecting reptile tissues in the field. However this is not a disease that will be commonly encountered in wild reptiles.

Aeromonas Hydrophila: *Aeromonas hydrophila* is found in freshwater and is associated with aquatic animals including reptiles (turtles and alligators), amphibians, and fish. It is known to be transferred to humans through contact. It causes gastrointestinal illness and can be extremely serious for people with compromised immune systems.

4. WORKING WITH FISH AND AQUATIC AMPHIBIANS ^{2, 29}

Aquatic species can carry pathogenic bacteria such as Klebsiella and other gram negative and gram positive bacteria, although these rarely lead to human infections under normal conditions. In addition, *Edwardsiella tarda* and atypical Mycobacteria species, carried by aquatic species are known human pathogens.

Aeromonas Hydrophila (Discussed in Reptile Section)

Mycobacteriosis (Mycobacterium marinum): also called fish tuberculosis, fish tank granuloma, swimming pool granuloma. Related to human TB and leprosy. While it is related as far as it being a Mycobacterium, the clinical signs are quite different from human TB and leprosy. *M. marinum* is typically limited to local skin lesions with infection of deeper tissues being rare and not usually affecting the respiratory system. There are also a number of other Mycobacterium species in aquatic environment that are important zoonotic diseases in particular when working with marine mammals.



- Bacteria are very resistant to treatment. Usually occurs on extremities (hands, feet). Entrance through wounds. Incubation ranges from 2 days to 2 years; usually takes about 2 weeks for granuloma to appear at site of infection. Infected area may be pink to purple in color, may discharge pus, and may be painful to touch.
- People have gotten fish TB from fish spine punctures, cleaning fish/shrimp/crabs, getting scratched on fish tanks, from rose bushes and injuring bare feet in parking lots (infected water transferred via air during storms), mouth-siphoning fish tanks, dolphin bites, diving around reefs, splinters from fish net handles, etc. - Usually not fatal. Can get into joints and mimic arthritis or carpal tunnel syndrome.

Vibrio Infections:

- Several species can infect humans: *V. alginolyticus* (wound infections), *V. damsela* (wound/systemic infections), *V. parahaemolyticus* (gastroenteritis/wound infections), *V. vulnificus* (wound/gastroenteritis/systemic infections).
- Systemic infections with vulnificus or damsela can be rapidly FATAL, or lead to limb amputation.. Systemic infections gotten through wounds.
- Incubation of vulnificus is 1-5 days; median time is 28 hours. Symptoms include high fever, chills, nausea, vomiting, diarrhea, abdominal pain, low blood pressure, seizures, fluid-filled skin lesions, etc.
- Gastrointestinal infections via ingestion of vulnificus (eating raw oysters, etc.) and other species of Vibrio can cause rapid dehydration, and can lead to systemic infections if bacteria enter blood. Vulnificus can multiply so rapidly that blood vessels and organs get clogged, sometimes leading to amputation or death. Antibiotics utilized have been tetracycline, ampicillin, penicillin, gentamycin, etc.

Erysipelothrix rhusiopathiae: also known as erythema migrans, fish-handler's disease, fish poisoning, fish hand, sealer's finger, whale finger, blubber finger, etc.

- Disease primarily occupational. People handling animals or their wastes can get it, e.g.: butchers, meat-processing workers, animal caretakers, farmers, fishermen, veterinarians, cooks/housewives, sewer workers, etc. Can persist in frozen meats.
- Incubation 1-7 days. Fever, malaise, pain in muscles & joints, severe headaches. Infections can go internal to C. nervous system/heart. Most commonly seen on hands-can lead to acute arthritis of finger joints.
- Bacterial infection through break in skin. Carried by many animals, including dolphins, shellfish, and fish. - Also known as "diamond skin disease," where diamond-shaped welts occur on the skin due to infection.
- Effects usually benign, but can be fatal. Systemic treatment is with antibiotics.
- Infection by ingestion. Carried by many types of animals.
- Mild to severe gastroenteritis. Can be fatal thru rapid dehydration, septicemia, fecal infections.

- Incubation is 7-72 hours.

Mad Fish Disease : caused by *Streptococcus iniae*.

- Recently reported from handling tilapia. Infection via puncture wounds.
- Can cause fever, shaking, meningitis, arthritis, and skin/blood infections.
- To protect yourself - do not handle organisms/water/tanks if you have skin breaks; do not dive if you have skin breaks; do not mouth-siphon tank water, do not ingest raw seafood, etc. Wash hands, etc. well after working on tanks, with seafood, and after diving. If punctured, or injured under water, allow the wound to bleed freely for a while to expel injected bacteria, then sterilize and protect wound.

Those people with weakened immune systems are at greater risk for getting the above infections. So people with AIDS, diabetes, liver dysfunction, kidney problems, or undergoing cancer treatment, etc. should be especially careful.

Pfiesteria piscicida: and toxins Produced by RED TIDE Organisms can affect humans in various ways.

- PFIESTERIA exposure can lead to skin sores, memory loss, narcosis ("drugged" effect), reddening of eyes, severe headaches, blurred vision, nausea/vomiting, difficulty in breathing, kidney/liver dysfunction, severe cognitive impairment (can't remember name, address, etc.), etc.
- Relapses have happened 6 years after initial exposure.

5. Working with Marine Animals 26 (entire section)

“Brucella:

In 1999, a researcher suffered headaches, lassitude and a severe sinusitis after exposure to marine mammal strains of Brucella with which the worker was in contact. The symptoms resolved in one week after treatment with doxycycline and rifampin. The researcher had a positive titer for Brucella, and the organism was cultured from blood samples. PCR-RFLP was used to positively identify the isolates as being comparable to marine mammal Brucella (Brew and Staunton 1999).

Organisms

Brucella spp. are gram-negative intracellular bacteria and are a major source of zoonoses worldwide. *B. melitensis*, *B. abortus*, and *B. suis* are some species

commonly recognized to play a role in human and animal health. Nomenclature for marine mammal strains of *Brucella* has not yet been fully developed, but *B. maris* and *B. pinnipedia* have so far been named. Transmission occurs primarily through contact with aborted fetal material, and consumption of contaminated milk.

Clinical disease in marine mammals

The bacteria have been isolated from multiple species of marine mammals, including pinnipeds, cetaceans and otters. Abortion and meningoencephalitis have been reported in dolphins from which the bacteria was isolated, but in the majority of cases, the animals did not demonstrate clinical disease (Godfroid 2002).

Clinical disease in humans

Symptoms can vary depending on the chronicity of the infection, ranging from acute "flu-like" symptoms (headaches, fever, myalgia, and malaise) to more chronic symptoms (arthritis, orchiepididymitis, and fatigue). Neurological symptoms are rare, being seen in less than 5% of cases. Serologic tests for *Brucella* are available, but culture is the most definitive test for diagnosis (Centers for Disease Control 2001).

Treatment

Doxycycline and rifampin are the recommended therapies. Other treatment has been associated with recurrence."

"Erysipelothrix:

In 1975, four students from the Laboratoire de l'Institut Scientifique et Technique des Pêches Maritimes (Scientific and Technical Institute of Maritime Fishing) acquired a cutaneous *Erysipelothrix rhusiopathiae* infection from a beached pilot whale (*Globicephala melaena*). The organism was isolated from both the whale and the affected students (Chastel, Measure et al. 1975).

Organism

Erysipelothrix rhusiopathiae is a gram-positive, facultative anaerobic rod, and is recognized as the causative agent of swine erysipelas.

Clinical disease in marine mammals

Cetacea appear to be more susceptible than pinnipeds and can develop septicemia, endocarditis, and chronic skin abscessation (Couch, Fournie et al. 1993; Kinsel, Boehm et al. 1997). The characteristic rhomboid cutaneous lesions, which are caused by thrombosis of peripheral arteries and local tissue infarction, can also be seen (Sweeney and Ridgway 1975).

Clinical disease in humans

Infection in humans is usually associated with occupational and recreational exposure. The bacteria enter through breaks in the skin and infection can present in three clinical forms:

1. Erysipeloid form: localized, self-limiting cellulitis that develops around site of inoculation.
2. Cutaneous form: a more severe and diffuse infection.
3. Septicemic form: most severe and rare form with or without cutaneous lesions. Associated with arthritis and/or endocarditis with valvular destruction (Artz, Szabo et al. 2001).

Treatment

Erysipelothrix is susceptible to penicillins and cephalosporins.”

Leptospira:

During the course of a 5 year study (1972-1977), three researchers became ill after exposure to California sea lions (*Zalophus californianus*) that were infected with *Leptospira*. The two workers with more severe illness became infected after necropsying a sea lion. All three developed serum agglutinating antibody titers to *Leptospira interrogans* serovar *pomona* (Smith, Vedros et al. 1978).

Organism

Leptospira interrogans serovar *pomona*, is one of 200 serovars within this species of spirochete bacteria. For this and other potentially zoonotic serovars, transmission occurs directly between mammalian hosts and indirectly through exposure to contaminated water and soil.

Clinical disease in marine mammals

Renal disease has been observed in harbor seals (*Phoca vitulina*), and more commonly in California sea lions (*Zalophus californianus*) and fur seals (*Arctocephalus* spp.) (Gulland, Koski et al. 1996; Stamper, Gulland et al. 1998). The disease causes tubular necrosis consistent with interstitial nephritis. Clinical signs include anorexia, dehydration and polydipsia. Cytology and serum chemistry reveals a leukocytosis and high serum phosphorus, urea nitrogen and creatinine levels.

Clinical disease in humans

In the largest outbreak of environmentally-acquired leptospirosis, the most common symptoms reported were chills, headache, myalgia, eye pain, reddened eyes and diarrhea. Clinical signs included those consistent with acute hepatitis and renal failure. Diagnostics revealed elevated liver enzymes, bilirubinemia,

thrombocytopenia, proteinuria, hematuria, and elevated creatinine (Morgan, Bornstein et al. 2002).

Treatment

Leptospira are susceptible to penicillins.”

“Mycobacterium:

There is one reported case of an animal handler acquiring skin lesions similar to the cutaneous mycobacterosis lesions seen on a manatee which the handler was working (Howard 1983).

In 1968, a dolphin trainer working with a bottle-nosed dolphin (*Tursiops truncatus*) was bitten and subsequently developed dermal abscesses. *Mycobacterium marinum* was cultured from aspirates taken from the lesions on the trainer's hands (Flowers 1970).

In 1988, a seal trainer from western Australia was diagnosed with *Mycobacterium bovis* tuberculosis. Diagnosis was made after the trainer developed a dry productive cough, exercise intolerance, and weight loss. Bacterial isolates from the trainer and the seals with which he worked were identical based on gel electrophoresis (Thompson, Cousins et al. 1993).

Organism

Mycobacterium spp. are gram-positive acid-fast rods. *Mycobacterium marinum* is more commonly regarded as a salt- and fresh-water fish pathogen, while *M. bovis* primarily affects cattle and is an important zoonotic agent worldwide.

Mycobacterium marinum;

Clinical disease in marine mammals

The organism causes dermal abscesses when infection is local, and pulmonary tuberculosis or generalized abscessation with spreading infection (Tryland 2000).

Clinical disease in humans

This disease may also be called fish handler's disease or swimming pool granuloma in humans. The organism usually enters through breaks in the skin after host contact with contaminated water. Local infection results in a nodular lymphangitis with or without lymphadenitis. Skin lesions can ulcerate, and spreading infection can cause tenosynovitis, arthritis, and osteitis (Ryncarz 1999).

Mycobacterium bovis;

Clinical disease in marine mammals

Pathological findings in pinnipeds include pulmonary granulomas, lesions in the liver, draining lymph nodes, and tuberculosis meningitis (Forshaw and Phelps 1991). Animals may also have subclinical infections.

Clinical disease in humans

Humans are usually infected with *M. bovis* from drinking contaminated cow's milk. Infection can cause pulmonary tuberculosis, cervical lymphadenopathy, and *Lupus vulgaris* (chronic skin tuberculosis). Urogenital infections have also been reported (Cosivi, Grange et al. 1998).

Treatment

Common treatment for mycobacteriosis is long-term streptomycin and rifampin."

"Mycoplasma: (Seal Finger)

While studying seal behavior at the New England Aquarium in 1979, a psychologist was bitten by a harbor seal (*Phoca vitulina*). Treatment with penicillin and oxacillin resulted in the resolution of symptoms, but the infection reappeared weeks later. The patient was then successfully treated with a 3 week course of tetracycline (Markham and Polk 1979).

In 1980, a graduate student was stabbed with a necropsy knife while working on a sea lion carcass. Clinical symptoms worsened after treatment with dicloxacillin. Radiographs showed periosteal reaction indicative of an osteitis underlying the cutaneous infection. Finally, treatment with tetracycline resolved the infection (Sargent 1980).

In 1990, a wildlife ranger was bitten while returning a seal to the ocean; he subsequently developed a skin infection. A two-week course of treatment with amoxicillin led to a persistent infection, and symptoms continued to persist after a change in antibiotics to flucloxacillin. Radiographs taken of the affected digit showed demineralization of phalanx 2 of the thumb suggestive of an osteitis. Finally a four-week course of treatment with tetracycline cured the infection (Eadie, Lee et al. 1990).

In 1998, a trainer working at the New England Aquarium was bitten by a harbor seal. Treatment was with tetracycline. Cultures taken from the trainers infected

digit and the oral cavity of the seal isolated the same strain of *Mycoplasma* (Baker, Ruoff et al. 1998).

Organism

Mycoplasmas are gram-negative coccobacilli that lack a cell wall.

Clinical disease in marine mammals

M. phocacerebrale, *M. phocidae*, and *M. phocarhinis* were isolated from harbor seals (*Phoca vitulina*) during an epidemic in New England (1980) and in the Baltic Sea (1989) (Baker, Ruoff et al. 1998). Mass mortality due to mycoplasmal pneumonia has been documented; however, pinnipeds likely carry these organisms as part of their normal flora.

Clinical disease in humans

The local infection in humans with *M. phocacerebrale* (possibly other *Mycoplasma* species as well) isolated from marine mammals is commonly referred to as "seal finger". The organism enters through breaks in the skin, and infection can occur after contact with pin-nipped skin and commonly after a bite from seals and sea lions.

Infection causes local erythema and nodules at the site of inoculation, with progressive swelling that can be severely painful. If left untreated (or treated with inappropriate antibiotics), the infection can progress to cellulitis, tenosynovitis, and/or arthritis (Hartley, Pitcher 2002).

Treatment

Mycoplasma are susceptible to tetracyclines and are resistant to penicillins and erythromycins. Treatment of severe cases may include arthrodesis or amputation."

6. VAMPIRES, WEREWOLVES, ZOMBIES, AND VOODOO QUEENS ^{35, 40}

Be careful! There may be blood on the bayou tonight. The mixture of cultures and civilizations in Louisiana make Louisiana the perfect setting



for exploring issues of difference. Creatures of the night are a representation of fears towards what is different.

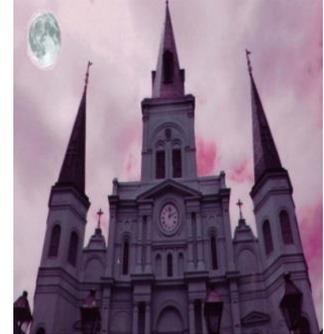


To avoid becoming a Vampire it is recommended not to commit suicide, practice sorcery or witchcraft, eat sheep killed by a wolf, or lead an immoral life. As Louisianans

know, werewolves hailed from France being brought here to Louisiana in the 16th century by the Cajuns immigrating from British Columbia. Ever hear of the Cajun Werewolf of the Plaquemines? Louisiana Voodoo is distinct, not to be confused with Haitian Vodou. A distinction between the two is the Louisiana Voodoo Queen.



Zombie photographed in Louisiana woods



In order to protect yourself from these evil predators it is recommended never to travel alone at night but if you must, always travel in a group. Additionally, always be respectful of those you meet. Others may suspect that you are the supernatural creature and treat you accordingly. Also, it has been determined that wearing purple and gold is helpful. If you are approached by a strange creature chant “Geaux Tigers!” If you don’t receive a positive response, better RUN.

DISEASES & CHEMICALS^{6,37} Also refer to tables 7, 8, 9

Viruses, bacteria, fungi, parasites and chemicals cause disease in every location around the world. The Table’s listings and the discussion below is not meant to be all inclusive . If you have any questions about your personal risk, please seek the advice of a physician.⁶

A. WATER-BORNE PATHOGENS

Before you gulp down a drink of water you must ensure that what you are drinking is clean and safe. Drinking unpurified water damages the body instead of nourishing it. Below are some of the possible dangers of drinking unpurified water?

Infectious Diseases:

Drinking contaminated water is the primary cause of infectious diseases. Harmful organisms, such as bacteria, protozoa, or virus, travel through water sources and reach people upon drinking or food handling.

Severe diarrhea:

More of a symptom of a gastrointestinal infection than a disease, diarrhea means having watery stools more than three times a day caused by *E. coli* or other

pathogens. Constant elimination of body fluid causes severe dehydration that can sometimes result in complications or death.

Hepatitis A:

This condition is acquired when drinking fecal-contaminated water. The symptoms of Hepatitis A include fatigue, fever, abdominal pain, itching, and jaundice. Jaundice is the yellowish discoloration of the skin and eyes because of the high breakdown of red blood cells.

Cholera:

Transmitted by drinking water with the bacteria *Vibrio cholerae* (from feces), cholera is one of the rapidly fatal illnesses ever known. Symptoms include watery stool, vomiting, and a rapid pulse that may result in death after 12-18 hours.

Flukes:

Parasitic worms usually live in stagnant water. If it is ingested, it will infect the blood and will cause disease. The problem with flukes is that it travels all throughout your body and can sometimes reach the brain.

Amoebiasis:

Caused by a protozoa which thrives in sewage or water with flies in it, this condition gives abdominal discomfort, fever, diarrhea, fatigue and possible weight loss to the victim. It is transmitted when contaminated water is used for drinking, handling food, or bathing.

B. VECTOR-BORNE DISEASES

Many other vector-borne diseases may pose a problem when travelling out of the country. Always check with a physician to learn the specific threats of your location of study.

Vector-borne diseases include:

1.  Rocky Mountain Spotted Fever ¹⁹ (RMSF) (*Rickettsia rickettsii*)

Rocky Mountain spotted fever is a disease caused by the bacterium *Rickettsia rickettsii* which is transmitted by the bite of an infected tick species. Rocky Mountain spotted fever can cause a fatal human illness in North and South America. Here in the US these species include the American dog tick (*Dermacentor variabilis*), Rocky Mountain wood tick (*Dermacentor andersoni*), and brown dog tick (*Rhipicephalus sanguineus*). Typically the symptoms include: fever, headache, abdominal pain, vomiting, and muscle pain. A rash may also develop, but is often absent in the first few days, and in some patients, never develops. This can be a severe or fatal illness if it is not treated early when symptoms are being. Doxycycline must be started by the 5th day of symptoms. Initial diagnosis is made based on clinical signs, symptoms, and medical history. It is confirmed by using specialized

laboratory tests. RMSF and other tick-borne diseases can be prevented.

2.  **Lyme disease** ₂ (*Borrelia burgdorferi*) is a bacterium commonly infecting deer, white footed mice, and possibly other species that is transmitted to humans by pin head-sized (or smaller) ticks of the genus *Ixodes*, most commonly the deer tick *I. scapularis*, or occasionally by direct contact with the infected vertebrate. You must have a tick drinking your blood for at least 16 hours to contract this disease. Removal of a tick before that length of time is preventative. A reddish halo (bull's eye ring around the bite) sometimes forms approximately 2-12 weeks following a tick bite, and is the earliest sign of Lyme disease. After this, severe illness may develop including: heart inflammation with arrhythmia, arthritis, and nervous system disorders including peripheral nerve dysfunction.

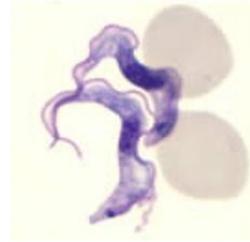
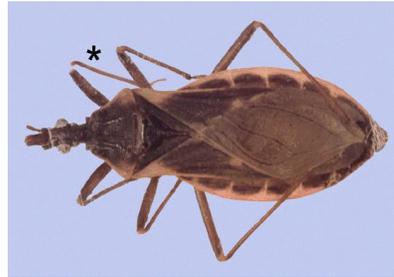
3.  **Babesia** ₂ (caused by the intracellular parasite *Babesia microti*) is a protozoan parasite commonly infecting many species of rodents including mice, rats, and voles. The infection in humans causes flu-like illness that usually lasts for 1 or 2 weeks, that is commonly a self-limiting hemolytic disease transmitted by tick bite, (the deer tick commonly). In its mildest form it causes fever, spleen enlargement and a mild fever. Individuals who have had to have their spleen removed for any reason develop a very serious anemia disease compared to other people.

4. African Sleeping Sickness: carried by the tsetse fly in Africa



African Trypanosomiasis, also known as "sleeping sickness," is caused by microscopic parasites of the species *Trypanosoma brucei*. It is transmitted by the tsetse fly (*Glossina* species), which is found only in rural Africa. Although the infection is not found in the United States, historically, it has been a serious public health problem in some regions of sub-Saharan Africa. Currently, about 10,000 new cases each year are reported to the World Health organization; however, it is believed that many cases go undiagnosed and unreported. Sleeping sickness is curable with medication, but is fatal if left untreated.

5. Chagas Disease ²⁰: transmitted by the reduviid bugs (kissing bugs). Usually occurs in South America but also becoming common in Louisiana.



6. Other Vector-borne Diseases

- Encephalitis: carried by mosquitoes in Asia and eastern Russia
- Leishmaniasis: transmitted by sand flies in the tropics and subtropics
- Filariasis: carried by mosquitoes in the tropics
- Onchocerciasis: causes “river blindness” and is carried by black flies in Africa, Arabia, and Central and South America.

There are other diseases to be aware of when traveling outside the United States. While risk of infection is generally low, it is important to be aware of them, and take the appropriate precautions to guard against diseases such as tuberculosis, HIV/AIDS, SARS, and viral hemorrhagic fevers. Always check with your health care provider to learn more about specific diseases that exist in the region where you will be conducting your research.

C. Chemical Agents

Chemical Contamination:

In urban areas, water can be contaminated by chemicals in different ways. Included are run-offs from farms, domestic house waste, industrial waste, and others.

Pesticides:

Farms, backyards, and golf courses are sprayed with pesticides to keep their plants and grass free from pests. However, these pesticides go through the soil and contaminate groundwater. Once ingested, these pesticides can cause reproductive and endocrinal damage.

Lead:

Pipes and fittings used in household plumbing can contaminate the water with lead. Once ingested, lead accumulates and affects the central nervous system. Pregnant women and children should be careful not to ingest lead.

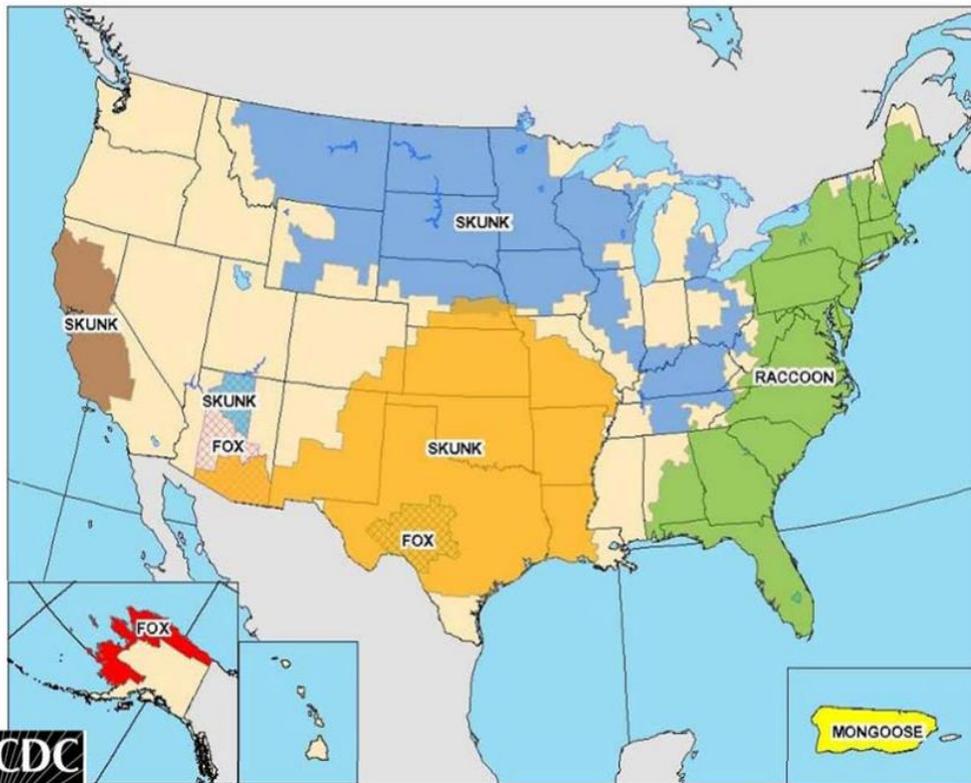
Arsenic and heavy metals:

Arsenic can cause nervous system damage. It can also affect the liver, skin, and blood vessels. Meanwhile, heavy metals affect the metabolic processes of the body.

D. OTHER DISEASES

1. RABIES ^{9,30}

In Louisiana rabies is endemic in wildlife as it is around the world. Rabies is a disease of all warm-blooded animals, but the virus circulates in nature in only a few species, such as bats, raccoons, foxes, skunks, and coyotes. The greatest risk here in Louisiana is with bats and skunks although it can occur in many other mammals. If you plan to do fieldwork with high-risk species (e.g. raccoons, foxes, skunks, or bats), then you should receive vaccination against this disease. A safe vaccine is available. Routine titers should be performed every two years post-vaccination to ensure adequate immunity. Human deaths from rabies virus have occurred in all three states adjoining Louisiana within the past five years.



Animal reservoirs for rabies - United States, 2011

The incidence in domestic dogs has been decreasing since the early 1900 although there was a positive dog infected with the skunk variant identified in Jefferson Davis Parish in 2007 and a rabid dog was also reported from Lafayette Parish in 2010. A cat infected with the skunk variant, was reported from Iberia Parish in 2009

Rodents, squirrels, rabbits, hares and chinchillas are rarely found to be rabid and have not been known to cause human rabies in the United States. For these reasons, these species are not considered vectors of the disease.

The following is a list of important facts about the disease:

What is rabies?

- An acute encephalitis in all warm-blooded hosts, including humans and the outcome is almost always fatal (only seven survivors, all but one had received either pre- or post-exposure prophylaxis).
- All species of mammals are susceptible to rabies, but only a few species are important reservoirs
- Most cases occur in wild animals such as raccoons, skunks, bats and foxes [2000: 7369 cases in animals in U.S., 40% in raccoons]
- Less than 10% of cases occur in domestic animals (prior to 1960, the majority of cases reported were in domestic animals) Cats (twice as many as in dogs and cattle), cattle and dogs are the most commonly affected domestics.

Signs and symptoms

- Early signs (2 – 10 days)
- Fever
- Headache
- General malaise, progressing to: Neurological signs: insomnia, confusion, anxiety, paralysis, excitation, hallucinations, agitation, hypersalivation, difficult swallowing, hydrophobia, death

What about rodents and lagomorphs (rabbits and hares)?

- Never have caused a human case of rabies in the United States
- Should not be considered a risk unless sick at the time of bite or if the area is known to be experiencing an increase in rabies transmission
- Woodchucks and ground hogs (*Marmota monax*) are the only exceptions

Annual incidence of rabies, U.S.

- In the late 1890's, about 100 human cases per year were recorded
- By the 1990's: 1 or 2 cases per year
- Human fatalities usually result from a failure to seek medical assistance usually due to lack of awareness of exposure

Examples of human fatal cases

- A California man removes a bat from his house. He did not recall a bite.
- An immigrant recently arriving to New York dies. He had been bitten by an unvaccinated puppy in Ghana.
- A Georgia man dies after bats from his attic had "landed on him at night" while sleeping.
- A Minnesota man dies after being bit by a bat that lived among other bats in his house. He did not seek medical attention.
- A Wisconsin man dies after ridding his house of bats. He did not remember being bitten, but had asked a friend if one could get rabies from an "insect bite".
- Rabies worldwide
- Exposure to rabid dogs is responsible for over 90% of human exposures worldwide and 99% of human deaths.
- Canine rabies control programs are often too expensive for developing nations
- The highest incidence of human rabies is often in countries with a poor public health infrastructure and therefore, inaccurate reporting of the disease

Entry into the host Mode of transmission

- Infected saliva of a host passed to an uninfected animal
- The virus most often enters through a bite
- However, various other portals of entry have been identified:
- Transfer of saliva to eyes, nose, or mouth
- Aerosol
- Corneal transplant (8 deaths in 5 countries, 1 in U.S.)

Infectious path of rabies in the raccoon

- Raccoon bitten by rabid animal and virus enters through infected saliva
- Virus ascends the peripheral nerves to the spinal cord and brain (3-12 weeks)
- In the brain, the virus multiplies rapidly and is spread to the saliva. The raccoon appears ill at this point.
- The raccoon usually dies within seven days of onset of signs.

Incubation period in the human

- Varies
- Site of bite
- Replication in peripheral nerves or non-nervous tissue
- Typically 1 – 3 months (range few days to several years)
- Pathology of rabies (most learned in late nineteenth century)
- Encephalitis and myelitis with perivascular infiltrates with lymphocytes, pmn's and plasma cells throughout the CNS
- Cytoplasmic inclusion bodies in neuronal cells (Negri bodies), especially pyramidal cells of the hippocampus or Purkinje cells of the cerebellum.

2. TULAREMIA (RABBIT FEVER) (caused by *Franciella tularensis*) is a severe bacterial disease carried by rodents and lagomorphs (rabbits) that is readily transmissible to humans by inhalation of infected aerosol, exposure of mucous membranes (the eyes), ingestion, and inoculation into skin wounds. The disease is most commonly associated with water sources.



There is also some suggestion that it can be transmitted by mosquitoes and other biting arthropods. Field dissection of infected animals is a common cause of exposure, as is contact with contaminated food, water, or hands in the eyes. Also, the bacterium is unusual in that it can penetrate intact undamaged skin. In humans and other species, the agent rapidly grows in the blood, produces high fever, and can lead to death if it goes untreated.



Infection with Tularemia



3. **WEST NILE VIRUS** ¹⁶

West Nile virus (WNV) is most commonly transmitted to humans by mosquitoes. You can reduce your risk of being infected with WNV by using insect repellent and wearing protective clothing to prevent mosquito bites. There are no medications to treat or vaccines to prevent WNV infection. Fortunately, most people infected with WNV will have

no symptoms. About 1 in 5 people who are infected will develop a fever with other symptoms. Less than 1% of infected people develop a serious, sometimes fatal, neurologic illness.

Can You Get West Nile Virus Directly From Birds?

Yes. Several laboratory acquired infections have occurred. Avoid skin contact with dead birds. Gloves or double plastic bags should be used to remove and dispose of carcasses.

4. YERSINIOSIS (caused mainly by *Y. enterocolitica* in people) is an organism carried by wild birds and mammals that concentrates in water bodies under conditions of cold wet weather. Individuals drinking from that water source can be exposed to very high doses. The agent causes diarrhea, enlarged lymph nodes in the gastrointestinal tract and is a cause of appendicitis. Contracted from under cooked meat, unpasteurized milk and contaminated water.

5. LEPTOSPIROSIS ³³ The Most Widespread Zoonotic Disease

Emerging diseases are always a concern for clinicians. But, in addition to new diseases, existing diseases may sometime reemerge as significant public health threats. New information tells us that this may be the case with leptospirosis. Leptospirosis is a bacterial disease that affects humans and animals. Caused by bacteria of the genus *Leptospira*, it is considered the most widespread zoonotic disease in the world and is most commonly found in tropical or temperate climates. The disease is spread through the urine of infected wild and domestic animals, including dogs, cattle, pigs, horses, and rodents. People can get the disease when they are exposed to the urine of infected animals or soil, water, or food contaminated with the urine of infected animals. In humans, leptospirosis can cause a wide range of symptoms, but it usually presents as an acute febrile illness that might be mistaken for other diseases. Some infected persons, however, have no symptoms at all.

Although some diseases can be prevented through vaccination, there is no human leptospirosis vaccine licensed for use in the United States. When infection occurs, however, antibiotics (such as doxycycline or penicillin) can provide effective treatment. For maximum effectiveness, antibiotics should be given early in the course of the disease. Without treatment, leptospirosis can lead to kidney damage, meningitis, liver failure, respiratory distress, and even death.

In addition to increasing incidence, new risk groups have been identified. Although traditional occupational groups remain at risk, infections among people who raft, kayak, and swim in fresh water have become more common.

Disease onset is typically 2 days to 4 weeks following exposure. About 90% of infections are subclinical or self-limited mild disease. Approximately 10% of infections, comprising the majority of recognized cases, are characterized by abrupt onset of fever, headache, muscle aches, vomiting, or diarrhea. Infected patients may experience a biphasic illness, with a short recovery period after the first week of illness followed by more severe symptoms. Approximately 10%-15% of patients with clinical disease experience severe leptospirosis, a high-mortality syndrome with multiorgan involvement, such as kidney failure, liver failure, pulmonary hemorrhage, or meningitis.

RODENT HANDLING 6, 28

Guidelines for those field workers who might be exposed to rodents potentially infected with viruses that may cause Hantavirus Pulmonary Syndrome. Morbidity and Mortality Weekly al. 1995b).

In North America the species most probable to carry HPS are sigmodontine and neotomine rodents, including white-footed and deer mice (*Peromyscus leucopus* and *P. maniculatus*), harvest mice (*Reithrodontomys*), rice rats (*Oryzomys*), cotton rats (*Sigmodon*), and certain arvicoline rodents such as voles (*Microtus*).



Transmission of hantaviruses to humans is believed to result primarily from inhalation of aerosolized excreta, egesta, or saliva from infected mice in mouse-infested structures (cabins, sheds, etc.). Therefore, the recommendations begin with avoiding cabins, sheds and such structures whenever possible while in the field. Detection of high viral titers in the saliva of deer mice suggests that transmission via a bite from an infected mouse also is a probable means of transmission.

Guidelines for working with suspected positive rodents.

Recommendations include:

- use of disposable shoe coverings
- coveralls or surgeon's gowns
- 2 pairs of latex or nitrile gloves
- eye protection
- negative-pressure or powered air-purifying respirator fitted with high-efficiency particulate air (HEPA) filters
- traps being disinfected after every capture (e.g., using Lysol [Reckitt Benckiser, Berkshire, United Kingdom] or dilute bleach) and both washed and disinfected after every trapping session

- traps containing rodents being handled with heavy rubber gloves, placed in doubled plastic bags (tied closed), and processed at a central processing station.

Reasonable guidelines for field biologists not working on disease-related studies but who nevertheless might come into contact with small mammals potentially infected with viruses that cause HPS. 28

1. Field workers should not use a cabin or field bunkhouse that shows evidence of current or prior occupation by rodents until the structure is thoroughly cleaned. Because feces and other sign of rodents known to transmit hantaviruses can be difficult to distinguish from those of non-hantavirus transmitting species, workers should be conservative and assume that small feces and other rodent signs pertain to hantavirus-transmitting species. Because Hantavirus infection is thought to be acquired primarily by inhalation, efforts should be made to minimize aerosolization of dust inside the dwelling; we suggest that workers spray surfaces with disinfectant, use a mop rather than a broom, and use HEPA respirators during initial cleaning if dust is likely to be aerosolized. Once the dwelling is cleaned, workers should maintain a program of removal of small mammals from the structure by live or kill trapping, following the recommendations below. Hantaviruses are readily killed by contact with common disinfectants (e.g., 10% bleach, 3% Lysol) or exposure (30 min) to direct sunlight or heat .60uC.
2. All handling of rodents known to transmit viruses that cause HPS should be done in the open air with the rodent (or trap containing the rodent) held away from the face and positioned such that direct wind (and wind vortices) do not blow aerosolized particles from the rodent toward the investigator.
3. Live traps containing rodents known to transmit viruses that cause HPS should not be transported within a vehicle unless they are securely isolated in intact plastic bags (e.g., large garden bags) or otherwise placed in an area in which air circulation is separate from that of the driver and any passengers.
4. Mammalogists should avoid direct contact with urine, feces, saliva, blood, and internal organs of rodent species associated with HPS. Eye protection and rubber, latex, vinyl, or nitrile gloves are recommended when handling or doing invasive procedures with rodents that potentially transmit Hantavirus.
5. Appropriate training should prioritize safe and secure handling of small mammals to avoid being bitten or scratched. Rodents can be anesthetized or euthanized by placing the trap containing the rodent inside a disposable plastic bag containing the anesthetic agent. For mark-and release studies smaller rodents (100 g) can be removed from traps using disposable plastic or washable cloth bags and handled safely and securely by grasping them firmly at the nape of the neck.

6. In the unlikely event that a field researcher is bitten, scratched, or comes into direct contact with the fluids of rodents that potentially transmit Hantavirus, the affected area should be washed thoroughly with soap and water, then disinfected with an alcohol-based hand sanitizer or similar disinfectant, such as Lysol or Clorox (Clorox, Oakland, California) hand wipes.
7. All mammalogists should be fully aware of the symptoms of HPS, which include severe muscle aches, fever, and headaches. If these flu-like symptoms appear within 6 weeks after fieldwork, the person should see a physician immediately and report that he or she might have been exposed to Hantavirus.

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APPENDIX A

WHO International Travel and Health Recommendations ⁴¹

<http://www.who.int/ith/precautions/en/>

All individuals planning travel should seek advice on the potential hazards in their chosen destinations and understand how best to protect their health and minimize the risk of accidents or acquiring disease. Forward planning, appropriate preventive measures and careful precautions can protect their health and minimize their risks. It remains the traveler's responsibility to seek information, to understand the risks involved and to take the necessary precautions to protect their health while travelling.

1 [Travel-related risks](http://www.who.int/ith/precautions/travel_related/en/index.html) (http://www.who.int/ith/precautions/travel_related/en/index.html)

Key factors in determining the risks to which a traveler may be exposed are:

- mode of transport
- destination(s)
- duration and season of travel
- purpose of travel
- standards of accommodation, food hygiene and sanitation
- behavior of the traveler
- underlying health of the traveler.

2 [Medical consultation before travel](http://www.who.int/ith/precautions/medical_consultation/en/index.html) (http://www.who.int/ith/precautions/medical_consultation/en/index.html)

Travelers intending to visit a destination in a developing country should consult a travel medicine clinic or medical practitioner before the journey. This consultation should take place at least 4–8 weeks before the journey and preferably earlier if long-term travel or overseas work is envisaged. However, last-minute travelers can also benefit from a medical consultation, even as late as the day of travel. The consultation should include information about the most important health risks (including traffic accidents), determining the need for any vaccinations and/or antimalarial medication and identifying any other medical items that the traveler may require.

Dental, gynecological and age-appropriate examinations are advisable before prolonged travel to developing countries or to remote areas. This is particularly important for people

with chronic or recurrent health problems. Travelers with underlying medical problems are strongly advised to consult a travel medicine clinic or a medical practitioner to ensure that their potentially complex travel health needs are met. All travelers should be strongly advised to seek comprehensive travel insurance.

3 [Assessment of health risks associated with travel](http://www.who.int/ith/precautions/assessment_healthrisks/en/index.html) (http://www.who.int/ith/precautions/assessment_healthrisks/en/index.html)

Medical advisers base their recommendations, including those for vaccinations and other medication, on an assessment of risk for the individual traveler, which takes into account the likelihood of acquiring a disease and how serious this might be for the person concerned. Key elements of this risk assessment are the pre-travel health status of the traveler, destination(s), duration and purpose of travel, the mode of transport, standards of accommodation and food hygiene, and risk behavior while travelling.

For each disease being considered, an assessment is also made of:

- availability of appropriate medical services in the destination, prophylaxis, emergency treatment packs, self-treatment kits (e.g., a travelers' diarrhea kit);
- any associated public health risks (e.g. the risk of infecting others).

Collecting the information required to make a risk assessment involves detailed questioning of the traveler. A checklist or protocol is useful to ensure that all relevant information is obtained and recorded. The traveler should be provided with a personal record of the vaccinations given (patient- retained record) including, for example, intramuscular administration of rabies vaccine, as vaccinations are often administered at different centers (<http://www.who.int/ith/vaccines/en/>). A model checklist, is provided below:

Pre-departure travel health record

Surname: _____ First name(s): _____

Date of birth: _____ Country of current residence: _____

Purpose of travel: Tourist Business NGO and other traveller categorie
 Visiting friends and/or relatives

Special activities: Accommodation: e.g. camping, bivouac
 Sports: e.g. diving, hunting, high-altitude trekking
 Adventure: e.g. bungee, jumping, white-water rafting

Date of departure and length of stay: _____

Places to be visited

Country	Town	Rural area		Dates	
		Yes	No	From	to
		Yes	No	From	to
		Yes	No	From	to
		Yes	No	From	to
		Yes	No	From	to
		Yes	No	From	to

Medical history

Vaccination record including details of vaccination received to date: _____

Current state of health: _____

Chronic illnesses: _____

Recent or current medical treatment, including current medications: _____

Allergies (e.g. eggs, antibiotics, sulfonamides): _____

For women: Current pregnancy
 Pregnancy likely within 3 months
 Currently breastfeeding

History of anxiety or depression:
 If yes, treatment prescribed (specify): _____

Neurological disorders (e.g. epilepsy, multiple sclerosis): _____

Cardiovascular disorders (e.g. thrombosis, use of pacemaker): _____

4 [Medical kit and toilet items](http://www.who.int/ith/precautions/medical_kit/en/index.html) (http://www.who.int/ith/precautions/medical_kit/en/index.html)

Sufficient medical supplies should be carried to meet foreseeable needs for the duration of the trip. A medical kit should be carried for all destinations where there may be significant health risks, particularly those in developing countries and/or where the local availability of specific medications is uncertain. This kit will include basic medicines to treat common ailments, first-aid articles, and any other special medical items, such as syringes and needles (to minimize exposure to bloodborne viruses), that may be needed and can in some cases be used by the individual traveler.

5 Travelers' (http://www.who.int/ith/precautions/medical_conditions/en/index.html)

Health risks associated with travel are greater for certain groups of travelers, including infants and young children, pregnant women, the elderly, the disabled, the immunocompromised and those who have pre-existing health problems.

Pre-existing illness

People suffering from underlying chronic illnesses should seek medical advice before planning a journey. Conditions that increase health risks during travel include:

- cardiovascular disorders
- chronic hepatitis
- chronic inflammatory bowel disease
- chronic renal disease requiring dialysis
- chronic respiratory diseases
- diabetes mellitus
- epilepsy
- immunosuppression due to medication or to HIV infection
- previous thromboembolic disease
- severe anemia
- severe mental disorders
- any chronic condition requiring frequent medical intervention
- transplantation
- oncological conditions
- chronic hematological conditions.

Travelers should carry the name and contact details of their physician on their person with other travel documents, together with information about the medical condition and treatment, and details of medication (generic drug names included) and prescribed doses. This information should also be stored electronically for remote retrieval, e.g. on a secure database. A physician's attestation should also be carried, certifying the necessity for any

drugs or other medical items (e.g. syringes) carried by the traveler that may be questioned by customs officials and/ or security personnel.

6 [Insurance for travellers](http://www.who.int/ith/precautions/insurance_travellers/en/index.html) (http://www.who.int/ith/precautions/insurance_travellers/en/index.html)

Travelers are strongly advised to travel with comprehensive travel insurance as a matter of routine and to declare any underlying health conditions to their travel insurer. Travelers should be aware that medical care abroad is often available only at private medical facilities and may be costly. In places where good-quality medical care is not readily available, travelers may need to be evacuated in case of accident or illness. If death occurs abroad, repatriation of the body can be extremely expensive and may be difficult to arrange. Travelers are advised to seek information about possible reciprocal health-care agreements between the country of residence and the destination country (see http://www.who.int/ith/links/national_links/en/index.html), and to obtain comprehensive travelers' health insurance for destinations where health risks are significant and medical care is expensive or not readily available. This health insurance should include coverage for changes to the itinerary, emergency evacuation for health reasons, hospitalization, medical care in case of illness or accident and repatriation of the body in case of death. Travelers should discuss with the parties concerned any issues or claims as they happen and not upon return from the trip.

7 [Responsibility of the traveller](http://www.who.int/ith/precautions/traveller_responsibility/en/index.html) (http://www.who.int/ith/precautions/traveller_responsibility/en/index.html)

Travelers can obtain a great deal of information and advice from medical and travel industry professionals to help prevent health problems while abroad. However, travelers are responsible for their health and well-being while travelling and on their return, as well as for preventing the transmission of communicable diseases to others. The following are the main responsibilities of the traveler:

- the decision to travel;
- recognizing and accepting any risks involved;
- seeking health advice in good time, preferably 4–8 weeks before travel;
- complying with recommended vaccinations and other prescribed medication and health measures;
- careful planning before departure;
- carrying a medical kit and understanding its use;
- obtaining adequate insurance cover;
- taking health precautions before, during and after the journey;
- obtaining a physician's attestation pertaining to any prescription medicines, syringes, etc. being carried;

- the health and well-being of accompanying children;
- taking precautions to avoid transmitting any infectious disease to others during and after travel;
- full reporting to a medical professional of any illness on return, including information about all recent travel;
- being respectful of the host country and its population;
- practicing responsible sexual behavior and avoiding unprotected sexual contact.

8 [Medical examination after travel](http://www.who.int/ith/precautions/medical_examination/en/index.html) (http://www.who.int/ith/precautions/medical_examination/en/index.html)

Travelers should be advised to have a medical examination on their return if they:

- return with a fever from a country where malaria is or may be present, so that malaria can be excluded as a cause of their illness
- suffer from a chronic disease, such as cardiovascular disease, diabetes mellitus, or chronic respiratory disease or have been taking anticoagulants;
- experience illness in the weeks following their return home, particularly if fever, persistent diarrhea, vomiting, jaundice, urinary disorders, skin disease or genital infection occurs;
- they received treatment for malaria while travelling;
- may have been exposed to a serious infectious disease while travelling;
- have spent more than 3 months in a developing country.

Travelers should provide medical personnel with information on recent travel, including destination, and purpose and duration of visit. Frequent travelers should give details of all journeys that have taken place in the preceding weeks and months including pre-travel vaccinations received and malaria chemoprophylaxis taken.

9 WHO Checklist for the Travelers

Checklist for the traveller

Obtain information on local conditions

Depending on destination

- risks related to the area (urban or rural)
- type of accommodation (hotel, camping)
- length of stay
- altitude
- security problems (e.g. conflict)
- availability of medical facilities.

Prevention

Vaccination. Contact the nearest travel medicine centre or a physician as early as possible, preferably 4–8 weeks before departure.

Malaria. Request information on malaria risk, prevention of mosquito bites, possible need for appropriate preventive medication and emergency reserves; pack a bednet and insect repellent.

Food hygiene. Eat only thoroughly cooked food and drink only bottled or packaged cold drinks, ensuring that the seal has not been broken. Boil drinking-water if safety is doubtful. If boiling is not possible, a certified well-maintained filter and/or disinfectant agent can be used.

Specific local diseases. Consult the appropriate sections of this book as well as <http://www.who.int> and authoritative web sites (http://www.who.int/ith/links/national_links/en/index.html).

Be aware of accidents related to

- traffic (obtain and carry a card showing blood group before departure)
- animals (beware of venomous marine or land creatures and other animals that may be rabid)
- allergies (wear a medical alert bracelet)
- sun (pack sunglasses and sunscreen)
- sport

Get the following check-ups

- medical—obtain prescriptions for medication according to length of stay, and obtain advice from your physician on assembling a suitable medical kit
- dental
- other according to specific conditions (e.g. pregnancy, diabetes)

Insurance

Purchase medical insurance with appropriate cover abroad, i.e. accident, sickness, medical repatriation.

Appendix B: Tables ³

These tables were copied with permission from the University of California, Berkeley's Safety Guidelines for Field Researchers (<http://www.ehs.berkeley.edu/pubs/fieldresearchsfty.pdf>). They were not intended to cover every health risk in every location. They do provide some information about many common hazards.

PHYSICAL AND ENVIRONMENTAL HAZARDS

Table 1 Physical and Environmental Hazards Found Worldwide

Hazard	Location	Cause	Symptoms	First Aid	Prevention
Dehydration	Worldwide	Not enough water intake	Dark urine Lethargy Constipation Light-headedness	Drink plenty of fluids, take frequent rest breaks, and minimize intake of beverages containing caffeine.	Drink plenty of water (at least 2 quarts of water per day). Drink more if working strenuously or in a warm climate.
Impure Water	Worldwide	Harmful organisms and pathogens living in "natural" water sources	Gastrointestinal illness Flu-like symptoms	Drink clear liquids. Slowly introduce mild foods, such as rice, toast, crackers, bananas, or applesauce. See a doctor if there is no improvement.	Carry your own water. Treat water before use with tablets, purifiers, or by boiling for more than 3 minutes.
Sunburn	Worldwide	Excessive exposure to the sun	Irritated skin, pink or red in color	Apply cool water, aloe, or other cooling lotion to affected area.	Wear long sleeved clothing and a hat. Apply sunblock with sun protection factor (SPF) of 30.
Heat Exhaustion	Worldwide: hot climates	Prolonged physical exertion in a hot environment	Fatigue Excessive thirst Heavy sweating Cool and clammy skin	Cool the victim, treat for shock, and slowly give water or electrolyte replacer.	Acclimate to heat gradually. Drink plenty of liquids. Take frequent rest breaks.
Heat Stroke	Worldwide: hot climates	Prolonged physical exertion in a hot environment	Exhaustion Light-headedness Bright red skin which is warm to the touch	Cool the victim at once, replenish fluids, and seek medical attention immediately.	Acclimate to heat gradually. Drink plenty of liquids. Take frequent rest breaks.
Frostbite	Worldwide: cold climates	Exposure to cold temperatures	Waxy, whitish numb skin Swelling, itching, burning, and deep pain as the skin	Slowly warm the affected areas (do NOT rub area) and seek medical attention as soon as possible.	Dress in layers. Cover your extremities with warm hats, face mask, gloves, socks, and shoes.
Hypothermia	Worldwide: cold climates	Prolonged exposure to cold temperatures	Shivering Numbness Slurred speech Excessive fatigue	Remove cold, wet clothes. Put on dry clothes or use a blanket or skin-to-skin contact to warm up. Drink warm liquids and seek	Dress in layers. Wear appropriate clothing. Avoid getting damp from perspiration.

Carbon Monoxide	Worldwide	Running a vehicle or burning a fuel stove in an enclosed space	Severe headaches Disorientation Agitation Lethargy Stupor Coma	Remove the victim to fresh air immediately and perform CPR if needed.	Keep areas adequately ventilated when burning fuel. Ensure that vehicle tailpipe is not covered by snow.
Extreme Weather	Worldwide	Snow squalls, blizzards, lightning, tornadoes, hurricanes, monsoon rains, floods	Severe weather can result in physical injury and/or death.	Seek shelter immediately.	Be aware of special weather concerns. Bring appropriate equipment to deal with severe weather.
High Altitude Illness	Worldwide: high altitudes	Decreased oxygen and increased breathing rate	Headache Nausea Weakness	Use supplemental oxygen and decrease altitude.	Allow your body to acclimatize by gaining elevation slowly.

Table 2 Physical and Environmental Hazards Found in North America

Hazard	Location	Cause	Symptoms	First Aid	Prevention
Hunting Season	United States	Local hunting seasons and regulations vary.	A hunting accident may result in serious injury or death.	Seek medical attention for serious injuries or wounds.	Wear appropriately colored safety clothing. Avoid animal-like behavior (e.g. , hiding in thickets).
Poison Plants	North America	Exposure to poison ivy, poison oak, or poison sumac plants	Itchy rash Red, swollen skin	Apply a wet compress with baking soda or vinegar or use a topical ointment. Avoid scratching the rash.	Avoid contact with poison plants. Wash clothes and skin with soap and water after exposure.

Table 3 Physical and Environmental Hazards Found Internationally

Hazard	Location	Defensive Action	Prevention
Violence caused by political unrest or military conflict	International	Leave the area as soon as it is safe to do so.	Be aware of current travel advisories (see Section V).
Theft	International	Report theft immediately to local authorities.	Keep wallet in front pocket. Carry shoulder bag diagonally and keep bag in front under your arm.

Table 4 Animals and Pests Found Worldwide

Type	Location	Most Dangerous Species	Defensive Action	First Aid	Prevention
Sharks	Worldwide: Shores of oceans, including the U.S., Africa, Central and South America, Australia, and the Pacific Islands	Great White, Bull, Tiger, Oceanic Whitetip	Call for help; swim towards safety. Punch or kick the shark if necessary.	Seek medical attention for serious injuries or wounds.	Never swim alone. Don't wear sparkling jewelry. Don't enter the water when bleeding.
Crocodiles and Alligators	Worldwide: Tropics and subtropics of North America, Australia, eastern China, and Africa	American Alligator (North America), Estuarine Crocodile (Australia), Nile Crocodile (Africa)	Do not provoke an alligator or crocodile.	Seek medical attention for serious injuries or wounds.	Avoid waters known to be home to crocodiles or alligators. Keep at least 30 feet away from any crocodile or alligator.
Rodents	Worldwide	Refer to Section IV: Diseases	Don't touch a rodent, dead or alive.	Clean wounds thoroughly if bitten or scratched.	Keep areas clean to avoid attracting rodents. Keep food stored in sealed containers.
Conenose Bugs	North and South America	May cause allergies in some people. Refer to Section IV: Diseases		Use topical ointments to soothe itching. Take victim to the hospital in case of anaphylactic shock.	Use caution when working near nests and wood rat dens. Use extra caution when working near rock shelters.

Mosquitoes	Worldwide, especially wet areas conducive to breeding	Refer to Section IV: Diseases		Use topical ointment to relieve itching.	Use insect repellent to deter mosquitoes. Don't leave standing pools of water.
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Table 5 Animals and Pests Found in North America

Type	Location	Most Dangerous Species	Defensive Action	First Aid	Prevention
Bears	North America	Black Bear (North America), Grizzly Bear (Alaska, western Canada, Pacific Northwest), Polar Bear (Arctic)	Never run. Move slowly and speak in a low soft voice. If attacked, lie in the fetal position and protect head. Play dead.	Seek medical attention for serious injuries or wounds.	Keep food out of sleeping areas. Never approach a bear or bear cub. Wear a bell or other noisemaker. Stay away from the bear's food supply.
Mountain Lions	North America: western Canada, south into Wyoming, California, parts of Texas, Florida Everglades (few)	All	Do NOT run. Fight back. Protect your neck and head. Don't play dead.	Seek medical attention for serious injuries or wounds.	Do not corner it. Make yourself look larger (arms overhead). Use loud voice. Throw sticks or rocks. Carry pepper spray.
Snakes	North America	Rattlesnakes, Cottonmouths, Coral Snakes, Moccasins, and Copperheads	Do not pick up, disturb, or corner a snake. Move away from the snake.	Have the person lie down and be still with wound below the heart. Remove jewelry. Cover the wound with loose, sterile bandage. Take victim to hospital (alert ahead if possible)	Walk in open areas. Wear heavy boots. Use a stick to disturb the brush in front of you.

Spiders	North America	Black Widow and Brown Recluse	Do not pick up or disturb a spider.	Clean wound with soap and water. Put an ice or a cool pack on the area. Keep area immobilized above heart level. Take victim to hospital (alert ahead if possible)	Use care around rock piles, logs, bark, outdoor privies, and old buildings. Shake out clothing and bedding before use.
Scorpions	North America, especially Mexico, Arizona, southeastern California, and Utah	All	Avoid contact with scorpions whenever possible.	Clean wound and put a cool pack on the area. Keep area immobilized at heart level. Use painkiller or antihistamine if desired. Take victim to hospital if he or she shows no signs of improvement.	Always shake out clothing and bedding before use. Avoid lumber piles and old tree stumps.
Bees, Wasps	North America	Bees, wasps, hornets, and yellow jackets, Africanized Killer Bees (southeastern U.S.)	Avoid contact with these insects whenever possible.	Remove the stinger quickly. Place an ice pack and elevate to heart level. Use an antihistamine if needed.	Bring medication if you have an allergy (the sting may be fatal). Keep scented foods and meats covered.
Fleas and Ticks	North America	Refer to Section IV: Diseases	Avoid contact with animals or areas where fleas and ticks might be found.	Remove the flea or tick with tissue or tweezers and clean wound with antiseptic. Pay attention for signs of illness (see Section IV: Diseases) and seek medical attention if needed.	Wear clothing of tightly woven material. Tuck pants into boots. Stay on widest part of path. Drag cloth across campsite to check for fleas or ticks.

Table 6 Animals and Pests Found Internationally

Type	Location	Most Dangerous Species	Defensive Action	First Aid	Prevention
Bears	Worldwide: Arctic, South America, Asia	Polar Bears (Greenland and northern Russia), Spectacled Bears (northern and western South America), Asiatic Black Bears (southern and eastern Asia)	Never run. Move slowly and speak in a low soft voice. If attacked, lie in the fetal position and protect head. Play dead.	Seek medical attention for serious injuries or wounds.	Keep your camp area free of garbage and food waste. Never feed or approach a bear, especially a cub. Stay away from the bear's food.
Lions	Africa and Asia	All	Do not provoke a lion.	Seek medical attention for serious injuries or wounds.	Stay inside the vehicle if travelling near lions. Do not camp near areas frequented by lions.
Other Large Land Dwellers	Africa, Asia	Hippos, African Elephant, Rhinos, and Buffalo (Africa); Asian Elephants and Bengal Tigers (Southeast Asia); Siberian Tigers (northern and eastern Asia)	Do not provoke these large animals.	Seek medical attention for serious injuries or wounds.	Stay inside the vehicle if travelling near large animals. Do not camp near areas frequented by large animals. Keep a lookout in open spaces.
Water Dwellers	Worldwide, especially Australia	Blue Ringed Octopus, Box Jellyfish, and Irukandji Jellyfish (Australia); Stonefish (worldwide)	Never touch an unidentified octopus or jellyfish. Avoid stepping on them.	Jellyfish sting: Use seawater to remove nematocysts. Pour vinegar on the wound. Seek medical attention immediately. Stonefish sting: Rinse in hot water (45°C or 113°F) and seek medical attention.	Avoid going in waters known to be inhabited by jellyfish and octopus. Wear sandals in the water to avoid stepping on a stonefish.

Snakes	Worldwide	Russel’s Viper and Indian Cobra (India); Tiger, Black, Brown and Sea Snakes (Australia); Egyptian Cobra, Puff Adder, and Saw Scaled Viper (Africa); Ferdelance (Central and South America)	Do not pick up, disturb, or corner a snake. Move away from the snake.	Have the person lie down and be still with wound below the heart. Remove jewelry. Cover the wound with loose, sterile bandage. Take victim to hospital (alert ahead if possible)	Walk in open areas. Wear heavy boots. Use a stick to disturb the brush in front of you.
Spiders	Worldwide	Funnel Web and Redback Spiders (Australia); Brazilian Wandering Spider, Brown Recluse, and Tarantula (South America)	Do not pick up or disturb a spider.	Clean wound and put a cool pack on the area. Keep area immobilized at heart level. Take victim to hospital (alert them first). Kill spider for positive ID (if possible).	Use care around rock piles, logs, bark, outdoor privies, and old buildings. Shake out clothing and bedding before use.
Scorpions	Worldwide, especially North Africa, the Middle East, South America, and India	All	Avoid contact with scorpions whenever possible.	Clean wound and put a cool pack on the area. Keep area immobilized at heart level. Use painkiller or antihistamine if desired. Take victim to hospital if he or she shows no signs of improvement.	Always shake out clothing and bedding before use. Avoid lumber piles and old tree stumps.

Table 7 Diseases Found Worldwide

Type	Location	Exposure Route	Symptoms	First Aid	Prevention
Food-borne Diseases: Campylobacter	Worldwide	Poultry Products	Diarrhea Gastrointestinal symptoms	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Always cook food thoroughly.
Food-borne Diseases: Cholera	Africa, Asia, Latin America	Contaminated food and water	Diarrhea Gastrointestinal symptoms	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Always cook food thoroughly. Never drink water from an impure source.
Food-borne Diseases: E. Coli	Worldwide	Beef, unpasteurized milk, unwashed raw vegetables, contaminated water	Diarrhea Gastrointestinal symptoms	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Always cook food thoroughly. Wash vegetables before consuming. Never drink water from an impure source.
Food-borne Diseases: Hepatitis A (vaccine available)	Worldwide (underdeveloped countries)	Contaminated water, shellfish, unwashed raw vegetables	Diarrhea Gastrointestinal symptoms	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Obtain a vaccine. Consult with your doctor at least 1 month prior to departure. Always cook food thoroughly. Wash vegetables before consuming. Never drink water from an impure source.
Food-borne Diseases: Salmonella	Worldwide	Beef, poultry, milk, eggs, unwashed raw vegetables	Diarrhea Gastrointestinal symptoms	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Always cook food thoroughly. Wash vegetables before consuming.
Food-borne Diseases: Typhoid Fever (vaccine available)	Worldwide	Contaminated food and water	Diarrhea Gastrointestinal symptoms	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Obtain a vaccine. Consult with your doctor at least 1 month prior to departure.

available)				longer than 3 days.	Always cook food thoroughly. Never drink water from an impure source.
Histoplasmosis	Worldwide (especially Mississippi and Ohio River Valleys)	Inhalation of fungus from soil contaminated with bat or bird droppings <u><i>Histoplasma capsulatum</i></u>	Mild flu-like symptoms Occasionally can turn into acute pulmonary histoplasmosis	See a doctor if you suspect histoplasmosis. Typically clears up in 3 weeks.	Use caution when disturbing dry soils or working near bat or bird droppings. Keep surfaces wet to reduce dust.
Leptospirosis	Worldwide	Ingestion, swimming, or other activities in water that is contaminated with the <i>Leptospira</i> bacteria	Flu-like symptoms Occasionally more serious symptoms	See a doctor if you suspect leptospirosis.	Use care when working in the water, especially after a flooding event. Avoid entering the water with open wounds.
Plague	Worldwide	Infection from flea bite (Fleas are infected by rodents.) <i>Yersinia pestis</i>	Flu-like symptoms; nonspecific symptoms; swollen and painful lymph nodes (bubonic)	See a doctor if you suspect plague.	Use care when working in areas where plague is found. Use caution when working with wild rodents. Wear gloves and wash hands frequently.
Rabies (vaccine available)	Worldwide	Infection from bite of animal infected with Lyssa virus	Spasms Paralysis Fatal, without immediate treatment	See a doctor IMMEDIATELY if bitten by a rabies-carrying species (e.g. , bats, carnivores).	Obtain the vaccine series if you will be working with bats or other carnivores. Use extreme caution handling these animals.
Tetanus (vaccine available)	Worldwide	Infection occurs after a wound. <i>Tetanus bacillus</i>	Painful muscle contractions	See a doctor if you suspect tetanus.	Obtain a tetanus shot every 10 years.
Typhus Fever	Worldwide	Infection from bite of lice, fleas, ticks, or mites <i>Rickettsiae</i> species	Headache Fever Rash	See a doctor if you suspect typhus fever. Treatable with antibiotics	Wear repellents. Wear long sleeved shirts. Tuck pants into boots.

Table 8 Diseases Found in North America

Type	Location	Exposure Route	Symptoms	First Aid	Prevention
Coccidioidomycosis “Valley Fever”	North and South America: arid regions, Central Valley of California	Fungus is inhaled when soil is disturbed. <i>Coccidioides</i>	Flu-like symptoms Occasionally becomes severe lung disease	See a doctor if you suspect Valley Fever.	Use caution when in close contact with soil or dust and keep surfaces wet to reduce dust. African Americans, Filipinos, and immunocompromised are at greater risk than others.
Encephalitis	North and South America (St. Louis Encephalitis) and the U.S. (West Nile Virus)	Infection from bite of an infected mosquito	Mild: Fever and headache Severe: Headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, very occasionally, death	Seek medical attention immediately if you suspect encephalitis.	Use repellents. Wear long pants and long sleeved shirts. Avoid being bit by mosquitoes. Avoid areas of standing water where mosquitoes breed.
Lyme Disease	United States, Europe, and Asia	Infection through the bite of an infected tick <i>Borrelia burgdorferi</i>	Spreading rash Early: Flu-like symptoms Later: Arthritis and neurologic problems	See a doctor if you suspect Lyme Disease.	Avoid tick-infested areas. Wear long pants and long sleeved shirts. Use a repellent. Check clothing and hair for ticks and remove any ticks.
Rocky Mountain Spotted Fever	United States, southern Canada, Mexico, and Central America	Infection through the bite of an infected tick <i>Rickettsia rickettsii</i>	Sudden onset of fever, headache, muscle pain, spotty rash	See a doctor if you suspect Rocky Mountain Spotted Fever.	Avoid tick-infested areas. Wear long pants and long sleeved shirts. Use a repellent. Check clothing and hair for ticks and remove any ticks.

<p>Hantavirus Pulmonary Syndrome (HPS) Sin Nombre Virus</p>	<p>North America</p>	<p>Inhalation of dusts or aerosols from the infected rodent's feces, urine, or saliva Vector: Deer mouse (<u>Peromyscus maniculatus</u>)</p>	<p>Early (1 to 5 weeks): Fatigue, fever, muscle aches, and sometimes headaches, dizziness, chills, and abdominal problems Late (4 to 10 days after early symptoms): Coughing, shortness of breath</p>	<p>Seek medical attention IMMEDIATELY if you suspect HPS. The likelihood of survival is greatly increased with early diagnosis and treatment.</p>	<p>Avoid contact with rodents, especially their feces. See below for details on how to clean and dispose of a rodent infected area.</p>
<p>Arenavirus (White Water Arroyo— WWA)</p>	<p>North America</p>	<p>Inhalation of dusts or aerosols from infected rodent's feces, urine, or saliva; Carried by Wood rats (<u>Neotoma fuscipes</u>) and other Neotoma species</p>	<p>Fever Headache Muscle aches Severe respiratory distress (occasionally)</p>	<p>Seek medical attention IMMEDIATELY if you suspect WWA. The likelihood of survival is greatly increased with early diagnosis and treatment.</p>	<p>Avoid contact with rodents, especially their feces. See next page for details on how to clean and dispose of a rodent- infected area.</p>

Table 9 International Diseases

Type	Location	Exposure Route	Symptoms	First Aid	Prevention
Dengue Fever	Africa, Southeast Asia and China, India, the Middle East, South and Central America, Australia and the Pacific Islands	Infection from the bite of an infected mosquito	Flu-like symptoms Rash Takes up to 1 month to recover.	See a doctor if you suspect Dengue Fever.	Wear long sleeved shirts and long pants. Use repellents. Use a mosquito net.
Malaria (Preventable with Drugs)	Central and South America, Hispaniola, Africa, India, Southeast Asia, the Middle East, and Oceania	Infection from the bite of an infected mosquito	May take 10 to 30 days for symptoms to appear. Flu-like symptoms Anemia Jaundice Can be fatal.	See a doctor if you suspect Malaria	Visit doctor 4 to 6 weeks before travel for anti-malarial drugs. Wear long pants and long sleeved shirts. Use repellents. Use a mosquito net.
Yellow Fever (Vaccine Available)	South America and Africa	Infection from the bite of an infected mosquito	Flu-like symptoms Jaundice Can be fatal.	See a doctor if you suspect Yellow Fever.	Visit doctor at least 10 days before travel for vaccine. Wear long pants and long sleeved shirts. Use repellents Use a mosquito net.
Hantavirus and Arenavirus	Central and South America and Asia	Inhalation of dusts or aerosols from the infected rodent's feces, urine, or saliva Vector: Rodents; especially <u>Neotoma</u> and <u>Sarcoptes scabiei</u> Peromyscus species	Fever Headache Muscle aches Severe respiratory distress (occasionally)	Seek medical attention IMMEDIATELY if you suspect hanta or arenavirus. The likelihood of survival is greatly increased with early diagnosis and treatment.	Avoid contact with rodents, especially with their feces. See above for details on how to clean and dispose of a rodent infected area.

Schistosomiasis	Brazil, Egypt, sub-Saharan Africa, southern China, the Philippines, and Southeast Asia	Transmitted by swimming in contaminated fresh water	Can be asymptomatic. Acute: (2 to 3 weeks) Fever, lack of appetite, weight loss, abdominal pain, weakness, headaches, joint and muscle pain, diarrhea, nausea, and cough Chronic: Disease in the lungs, liver, intestines, or bladder	See a doctor if you suspect schistosomiasis.	Avoid freshwater wading or swimming in endemic regions. Heat bath water over 50°C for at least 5 minutes before use.
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APPENDIX C RESOURCES (1)

On Campus

LSU Office of Environmental Health & Safety:

225-578-5640 or on-line , <https://sites01.leu.edu/wp/ehs/>

LSU Office of Risk Management: The Office of Risk Management is available to answer questions and assist with travel insurance questions. They can be reached at 225-578-3297, or on-line at

<http://sites01.lsu.edu/wp/riskmgmt/>

First Aid/CPR Training:

LSU Office of Environmental Health & Safety:

225-578-5640 or on-line , <https://sites01.leu.edu/wp/ehs/>

LSU Division of Laboratory Animal Medicine (DLAM), School of Veterinary Medicine.

Skip Bertman Drive • Baton Rouge, LA 70803

Telephone: 225-578-9643 • Fax: 225-578-9649 • E-mail: dbest@vetmed.lsu.edu

<http://www1.vetmed.lsu.edu//DLAM/index.html>

LSU International Programs

101 Hatcher Hall

Telephone: 225-578-3191

Fax: 225-578-6806

Other Universities

Brad Williams, University of Idaho.

Animal Welfare Information Center Bulletin, Summer 1999, Vol. 10 No. 1-2.

Wildlife Research and the IACUC.

<http://www.webpages.uidaho.edu/wlf314/labs/Wildlife%20Research%20and%20the%20IACUC.pdf>

Georgia Institute of Technology. 2012. Field Research Safety Plan.

<http://www.safety.gatech.edu/field/Field%20Research%20Safety%20Plan.pdf>

University of Toronto, Environmental Health and Safety. March 2011.

<http://www.ehs.utoronto.ca/resources/manindex/policies/fieldres.htm>

Queen's University. Health & Safety in Field Research

<http://www.queensu.ca/ors/researchgrantsanddevelopment/workshops/archived/DanHealthSafetyinFieldResearch2013.pdf>

Texas A&M University. 2009. Fieldwork Safety Manual.

<http://ehsd.tamu.edu/documents/OccupationalSafety/TAMUFieldworkSafetyGuidelines.pdf>

Scott Jeffrey, Patlovichand. University of Texas School of Public Health and Patrick Sharp, Clerestory Life Sciences Consulting. AFLAS 2012, The 5th Asian Federation of Laboratory Animal Science Association Congress. October 11, 2012. Bangkok, Thailand. Development of an Institutional Field Research Manual

General

The Centers for Disease Control and Prevention (CDC) offers a web site that describes many topics related to travel, both domestic and international: <http://www.cdc.gov/travel/>.

Advisories: Travel advisories are announced through the U.S. Department of State. Current travel warnings, public announcements, and consular information sheets can be obtained online at: <http://travel.state.gov/>

Research Vessel Safety: Addresses field operations aboard research vessels or larger watercraft. http://www.unols.org/publications/manuals/saf_stand/contents/htm

General Outdoor Safety:

For more information on outdoor and recreational safety. <http://www.fs.fed.us/safety/outdoor/>

Travel Health & Outbreaks: Updated information about disease outbreaks and international travel health can be found from the World Health Organization (WHO). <http://www.who.int/ith/en/>

Medical: Information

Information about a variety of illnesses, including dehydration, carbon monoxide poisoning, sunburn, excessive heat, hypothermia, and high altitude sicknesses, can be found on-line at <http://my.webmd.com>.

Diseases

The CDC offers more detailed information about many diseases on their web site: <http://www.cdc.gov/travel/diseases.htm>.

Government of Canada. 2013. Canadian Biosafety Standards and Guidelines for Facilities Handling Human and Terrestrial Animal Pathogens, Prions, and Biological Toxins. 1st edition. Publication Number: 130037. <http://canadianbiosafetystandards.collaboration.gc.ca/>

Travel Health & Outbreaks: Updated information about disease outbreaks and international travel health can be found from the World Health Organization (WHO): <http://www.who.int/en/>

Hantavirus: The CDC has detailed information about hantavirus available at <http://www.cdc.gov/ncidod/diseases/hanta/hps/noframes/generalinfoindex.htm>

Lyme Disease: The American Lyme Disease Foundation provides information about the disease at <http://www.aldf.com/>.

Waterborne Diseases and Prevention: More information about water-borne diseases is available online from the CDC at <http://www.cdc.gov/healthywater/disease/>

Weather

More information on extreme weather and how to protect yourself can be found from the National Weather Service at <http://weather.gov/safety.html>.

OSHA. A Guide for Employers to Carry Out Heat Safety Training for Workers. https://www.osha.gov/SLTC/heatillness/osha_heattraining_guide_0411.pdf

Impure Water

For more information about water-borne diseases, the CDC provides information on-line at http://www.cdc.gov/ncidod/diseases/list_waterborne.htm.

Hunting Season

To get more information concerning hunting seasons and regulations, contact the U.S. Forest Service by phone at (202) 205-8333 or on-line at <http://www.fs.fed.us/>.

DNR Hunting Season Links By State/Canada
http://www.dccl.org/dnrcorner/hunting_seasons.htm

Poison Plants

More information about poison plants, including photos, can be found at: <http://poisonivy.aesir.com/>.

Survival in an Emergency

Alaska Department of Fish and Game. 1983. The Bears and You. ADFG. Box 3-2000, Juneau, AK 99802-2000. 8pp.

Alford, Monty. 1987. Wilderness Survival Guide, Alaska Northwest 130 Second Ave, South Edmonds. WA 98119. 103 pp. \$9.95.

Brown, Robert E. 1984. Emergency/Survival Handbook, 3rd ed. American Outdoor Safety League, distributed by The Mountaineers, 306 Second Ave. West, Seattle, WA 98119. 45 pp. \$3.50.

Brown, Robert E., ed. 1984. Boater's Safety Handbook, American Outdoor Safety League, distributed by The Mountaineers, 306 Second Ave. West, Seattle, WA 98119. 45 pp. \$3.50.

Davenport, Gregory. 2003. Surviving Cold Weather. Stackpole Books, 5067 Ritter Road Mechanicsburg, PA 17055. 232 pp. \$14.95.

Herrero, Stephen. 2003. Bear Attacks: Their Causes and Avoidance. McClelland & Stewart, Toronto, ON Canada M5G 2E9. 304 pp. 24.99

Wiseman, John, 1999. The Sas Survival Handbook: How to Survive in the Wild, in Any Climate, on Land or at Sea. HarperCollins Pub Ltd, NY. \$24.00

Wilkerson, James A., ed. 1986. Hypothermia, Frostbite, and other Cold Injuries. The Mountaineers, 306 Second Ave. West, Seattle, WA 98119. 105 pp. \$12.95.

Sharkey, Brian J. 1979. Heat Stress. U.S. Department of Agriculture, US Forest Service, Missoula, MT 59801. 14 pp. free