NUS National University of Singapore

Office of Safety, Health & Environment

NUS Safety & Health Guidelines for Field Trips

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Approved by	:	Mr. Saravanan s/o Gunaratnam

DOCUMENT AMENDMENT AND REVIEW HISTORY

	DATE	REV. NO.	AMENDMENT / REVIEW	RECORDED BY
01	14 Feb 2019	2.1	Amendments: • Removal of Indemnity Form. Inclusion of link to Risk Acknowledgement and Consent Form.	Dr. Sheela Reuben
02	26 Mar 2019	2.2	Amendments: a. Change of regulator from AVA to NParks, as all non-food related animal, plant and wildlife management services will be provided by new divisions under NParks: i. Animal & Veterinary Service (AVS) for animal health and animal-related issues. ii. Plant Health & Wildlife for CITES and BSAA	Dr. Sheela Reuben

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Acronyms

AVS	-	**Animal & Veterinary Service (AVS) under the National Parks Board (NParks)**
CeLS	-	**Centre for Life Sciences**
CMC	-	**Comparative Medicine Centre**
CWC	-	**Chemical Weapons Convention**
IACUC	-	**Institutional Animal Care and Use Committee**
IATA	-	**International Air Transport Association**
IBC	-	**Institutional Biosafety Committee**
NACLAR	-	**National Advisory Committee for Laboratory Animals Research**
NParks	-	**National Parks Board**
NUS	-	**National University Of Singapore**
OH	-	**Occupational Health**
OHR	-	**Office of Human Resources**
OSHE	-	**Office of Safety, Health and Environment**
PI	-	**Principal Investigator**
PPE	-	**Personal Protective Equipment**
RCULA	-	**Responsible Care and Use of Laboratory Animals**

1 INTRODUCTION

1.1 OVERVIEW

This document provides a framework for establishing policies and procedures that enable staff, students and other participants in NUS to undertake fieldwork safely. This document details the risk assessment methodology / safety considerations for field trip and its related activities, thereby facilitating fieldwork in even the most remote and challenging of environments and circumstances. It is aimed at Heads of Institutions/Departments and other senior researchers or managers responsible for setting policy, fieldwork leaders and others who may be accountable for the health and safety of staff, students and other participants engaged in fieldwork. It covers all university-endorsed field trips for research purposes.

A field trip is defined as any activity that occurs outside campus, typically involving local or overseas travel and taking place in an outdoor environment. This definition will therefore include activities as diverse as attending recruitment fairs, or undertaking social service, as well as activities more traditionally associated with the term fieldwork such as survey/collection work carried out by geologists or biologists.

In view of this range of activities the guidance is targeted not only towards fieldwork involving hazardous activities and locations, but also routine low risk activities away from the institution. It is recognized that, for many institutions, much of the fieldwork defined above is carried out by individuals travelling and working alone or in pairs. It is envisaged that institutions or research supervisors will wish to reflect this distinction in their own policies and communicate clearly their expectations of fieldworkers in all circumstances that fall under the definition.

Field trips pose unique hazards not necessarily encountered when conducting laboratory based research. All affected NUS staff and students are advised to understand and apply, where applicable, the guidelines stated in this document before they start their field trip. They should also attend the relevant safety trainings as detailed in this manual.

In addition to the Appendixes, documents referenced in this manual (underlined in the text), can be directly accessed through the NUS staff portal and student portal under the section of “safety, security & sustainability”.

Go to NUS website > Staff or student portal > safety, security & sustainability >Field Trip Safety

This manual should be used in conjunction with other NUS safety & health manuals, i.e.:

- **NUS Laboratory Chemical Safety Manual** - provides safety and health requirements for working with chemical substances, such as flammable materials, toxic chemicals, acids and base, peroxides, poisons, etc.
- **NUS Laboratory Biorisk Management Manual** - provides safety and health requirements for working with materials of biological origin, including genetically modified organisms (GMOs) in laboratories.
- **NUS Research Diving Manual** – provides safety and health requirements pertaining to diving research activities.

1.2 CONTACT INFORMATION

Researchers might need to contact the following departments for addition information pertaining to their field trip activities. For example:

1.2.1 Office of Safety, Health and Environment (OSHE)

(For release of grants for new projects and if vertebrate animals will be handled by staff or students in the duration of the project)

Office of Safety, Health and Environment
University Health Centre, Basement
20 Lower Kent Ridge Road
Singapore 119080
Telephone: 6516 1084

Fax: 6774 6979

Email: safety@nus.edu.sg

1.2.2 Comparative Medicine

(If vertebrate animals caught in the field are brought on campus and are housed in any of the CM facilities)

Centre for Life Sciences (CeLS),

28 Medical Drive, #05-02,

Singapore 117456

Telephone:

Fax: 6873 3905

Email: LACSEC@nus.edu.sg

1.2.3 Institutional Animal Care & Use Committee

(If vertebrate animals are handled in the field or in the laboratory)

Office of Institutional Animal Care & Use Committee (IACUC)

Centre for Life Sciences (CeLS)

National University of Singapore

28 Medical Drive

Singapore 117456

Telephone: 6516 2861

Fax No.:6778 6216

Email: IACUC_FORUM@nus.edu.sg

1.2.4 Occupational Health Clinic

(If staff or students will be handling vertebrate animals and/or when travelling overseas to areas where certain diseases are endemic or any circumstances where health consultation is necessary)

Office of Safety, Health & Environment (OSHE)

University Health Centre, Basement

20 Lower Kent Ridge Road, Singapore 119080

Telephone: 6601 1781

Fax: 6774 6979

Email: oshv17@nus.edu.sg

oshgsw@nus.edu.sg

1.2.5 Emergency Phone Numbers

SCDF - Ambulance/Fire	995
Police	999
Campus Security (24hrs)	x 1616 (6874 1616)
Occupational Health Physician	6516 5969

2 FIELD TRIP SAFETY GUIDELINES

The National University of Singapore (NUS) is committed to ensuring the safety and health of the University staff, students and visitors involved in field trips. This commitment is demonstrated by the establishment of field trip safety guidelines. The Office of Safety, Health and Environment (OSHE) is the administrator of this document.

The field trip safety manual is a systematic process for the identification, assessment and management of the risks associated with field trips. The Field Trip Safety Manual includes the following components:

(1) Process for the hazard identification & risk assessment encountered during field trips.
(2) Risk controls requirements such as training and occupational health required to be implemented during field trips.
(3) Emergency preparedness and response measures.

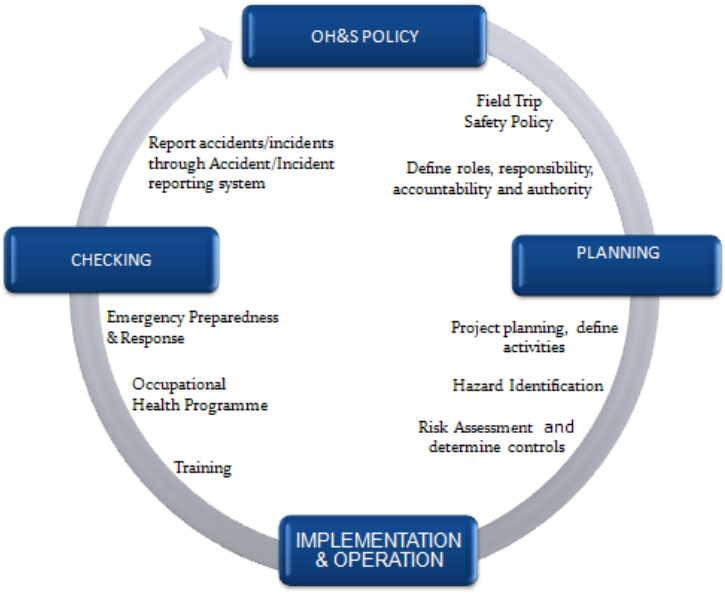

Fig 1: Structure of Field Trip Safety Program

2.1 ROLES AND RESPONSIBILITES

The roles and responsibilities of implementing the field trip program & guidelines are given below.

2.1.1 NUS PRESIDENT

The President of NUS represents the University as the Employer. The ultimate responsibility for safety and health in the University rests with the President. The President may delegate the authority and responsibility to the Deans, Administrators and Head of Departments (HODs) for the effective supervision of the occupational safety and health of staff and students under his / her management.

2.1.2 Institutional Animal Care and Use Committee (IACUC)

All research and teaching activities that involve vertebrate animals and are conducted at or sponsored by the University shall adhere to the National Advisory Committee for Laboratory Animals Research (NACLAR) Guidelines (Guidelines on the Care and Use of Animals for Scientific Purposes). They shall not be conducted without the approval of the Institutional Animal Care and Use Committee (IACUC). This includes the collection of animal specimens during field trips.

The IACUC protocol review process shall include a review of animal care and use activities that potentially present hazards to personnel, and compliance of personnel with institutional safety and health requirements and policies. Any questions or concerns related to safety and health may be directly to OSHE.

2.1.3 Deans and Head of Departments

All Deans, HODs and Directors of the respective departments or research institutes/centers have management responsibility for the implementation of Field Trip Safety Program and applicable recommendations stated in this manual.

2.1.4 Principal Investigator and Supervisor

The Principal Investigators (PIs) and Supervisors are primarily responsible to conduct risk assessment for all field trip activities. They are responsible to ensure that all reasonably practicable control measures are implemented in eliminating or minimizing the risks associated with the field trips.

The PIs and Supervisors are to ensure staff, students and others (contractors, collaborators) involved in the field trip have received adequate instructions and information pertaining to the risks involved in field trip. They are responsible for communicating the following:

(1) hazards involved in the field trip activities,

(2) the control measures required for this field trip

(3) emergency response plan(s)

(4) Applicable regulations and standards

2.1.5 Staff, Students and Non-University Personnel

All staff and students should adhere to the recommendations proposed in this document, as well as other university, faculty and departmental level manuals, directives, standard operating procedures (SOPs), standards and guidance documents that are applicable to their area of work. Non-university personnel such as hired drivers, property owners, host- institutions, service providers, (such as hotel, tour companies or guides) as well as volunteers should adopt reasonably practicable measures stated in this document and other known best practices.

2.1.6 Office of Safety, Health and Environment

The Office of Safety, Health and Environment (OSHE) will be the programme manager for the NUS Safety & Health Guidelines for Field Trips. OSHE is only the central University department to coordinate any incident or accident investigations

2.1.7 Occupational Health Clinic

The OH Clinic will provide clinical occupational health services comprising of medical preparedness of the personnel going for research field trips in Singapore or overseas. The services include:

a. Identifying the medical requirements for the area of deployment and activity including the travel medicine requirements (eg: high altitude, diving, rural environments, endemic areas for infectious diseases such as malaria, yellow fever, TB)

b. Assessing the fitness for participation and any medical restrictions

c. Assessing the medical status upon return of the deployment

d. Vaccinations and chemoprophylaxis

e. Discussion on the first aid requirements and the medical response plan

3 RISK MANAGEMENT

The principle of risk management is to identify the safety and health hazards associated with field trip activities, assessing these risk levels, prioritizing and implementing measures to control the hazards and reduce these risks to acceptable level.

3.1 DETAILING THE FIELD TRIP ACTIVITIES

The first step in performing the risk assessment is detailing the field trip activities. Planning and preparation before embarking on the field trip is important. The organizer of the trip should plan the activities and communicate this plan to all participants. This plan should also be communicated to colleagues in the department for use in case of emergencies. The plan where applicable should include the following:

General Information

- General description of the activities to be conducted in the field trip
- Expected transportation routes and modes
- Feedback/records/risk assessment of previous field trips / similar activities, etc
- The Planned itinerary – Locations, dates of arrival and departure, lodging details, type of transportation.
- Environmental conditions of the location – altitude, temperature, humidity, etc
- Applicable/relevant regulations and standards
- List of participating personnel – organizer may need to capture information such as participants addresses, phone numbers, passport details, blood type, medical condition and next-of-kin emergency contacts. Participants should provide relevant information about their medical background to the organizer, eg: drug allergies. In cases of accidents, this information may be useful to emergency or rescue personnel. Designate a primary point of contact in the field who will be the person in charge (principal investigator or other on-site personnel if PI does not travel) of the field trip personnel. Participants & Next-Of-Kin's Details form can be used as template for preparing this list.

- Add a list of vaccinations taken by the team members with dates especially for overseas trips. The PI should recommend vaccinations to the team members depending on the nature and location of work.

3.2 HAZARD IDENTIFICATION

General risks inherent to field trip include risk of the physical nature, posed by climatic and geographic conditions, and biological risks (for example, those arising from the presence of poisonous animals or pathogenic microorganisms). Other risk factors, such as chemical exposure, vehicular traffic, slips, trips and falls, etc should not be neglected.

Following the listing of activities involved in the field trip, the personnel involved and the means of travels, the next step is to:

- Compile a list of potentially hazardous plants, animals, terrain, weather conditions, and other hazards which may be encountered in the locations to be visited. A useful checklist for identification of possible hazards and risks in any field trip can be found from the following document - Factors of Safety Consideration in Planning of Student's/Staff's Event/Activity

3.3 RISK ASSESSMENT

Once the hazards have been defined, the next step is to qualify and quantify the risks. This is done through a procedure of risk assessment. In risk assessment, we determine the severity and frequency of the hazard resulting in an injury to staff and students. The following factors need to be considered when assessing the risk level:

- Location of the field trip -local or overseas (political, economic, cultural conditions of the country)
- Nature of the activities conducted during the field trip (climbing, diving, handling of animals, carrying of tools/equipment)
- Number of personnel involved in the field trip (competency of those staff, students, working with tour guides, collaborators)
- Transportation arrangements (mode of transportation, hired drivers/boatmen, licenses and permits)

In NUS risk assessment for field trip is done either via activity based risks assessment or project based risk assessment, the risk assessment procedures are detailed below

3.3.1 Activity Based Risk Assessment

Under the NUS Lab Occupational Safety and Health Certification Scheme, an activity based risk assessment is conducted for each laboratory-based experiment or field procedure that is regularly conducted. Through this risk assessment, the PI would be able to identify the anticipated and potential hazards and risks. In addition, the necessary risk controls to protect the safety and health of the staff and students involved are defined and documented. A sample of the activity based risk assessment has been provided in *Appendix C* for your reference.

More information on the lab certification scheme can be found at OSHE staff portal: Laboratory Safety & Health Management System Certification Scheme

3.3.2 Field Research Project Risk Assessment

A PI (or teaching staff) who conducts field research will submit an application through the integrated online research compliance (iORC) system to OSHE for review and approval. This form is intended to stimulate investigators to identify the risks and hazards to be encountered in the field and subsequent controls to be implemented. Any laboratory based work associated with the field studies may also be described directly on this form.

For more information on risk assessment refer to OSHE Project Risk Assesment Submission.

The following chapters detail the common hazards and risks noted during field trips and the appropriate corresponding risk control measures.

3.4 RISK CONTROLS

Once the risks are identified, the next step is to determine the appropriate type of risk controls. When determining the type of control measures, one should always consider the Hierarchy of Control:

a. Elimination,

b. Substitution/Reduction,

c. Engineering control,

d. Administrative control (including standard operating procedures) and

e. Personal Protective Equipment (PPE)

In most instances, combinations of controls are required to manage the risk effectively. In field trips, risk controls should also be considered for emergency situations or scenarios.

Elimination of potential hazards will be given the first priority while PPE will be the last resort in all control measures implemented in laboratories.

3.4.1 Elimination

Elimination of potential hazards is the first form of control. For example, by doing activities in the day instead of the night, the hazards arising from poor lighting/working in the dark can be eliminated. Another way of eliminating the risk associated with field work is by reviewing the need for field trip by considering using data obtained from collaborators, other institutes, etc.

3.4.2 Substitution

Substitution risk controls would include choosing a field trip location that has less severe weather fluctuations, doing activities in the day versus night, using motor boats instead of manual driven boats.

3.4.3 Engineering Control

Engineering risk controls would include mechanical traps to collect animals instead of manual means.

3.4.4 Administrative Control

Administrative controls are work procedures such as safety policies, safety rules and regulations, supervision, standard operating procedures (SOP), training of staff and students on field trip procedures and first aid requirements.

After conducting risk assessment for the field trip, standard operating procedures (SOP) should be developed to mitigate the risks and define the roles and responsibilities of managing these risks. This manual consists of three templates that could be used in the development of your SOPs:

1. Generic Safety Operating Procedure – recommended for field trips (Please refer to *Appendix A* for SOP template). Researchers may use one SOP for repeated trips to the same site and/or for similar work.
2. Safety Management Plan – recommended for field trips; involves conducting risk assessments, implementing controls. (Please refer to OSHE website; under Crisis and Emergency)
3. Crisis Management Plan – recommended for field trips; involves course of action and plans for mitigation of crises or accidents if and when they happen. (Please refer to OSHE website; under Crisis and Emergency)

Preparation is the Key! - In situations where there is substantial number of risks, controls are to be placed prior to the field trip. It would be beneficial to have a checklist to ensure that all procedures, equipment required, etc are in place before embarking on the field trip. Refer to the checklist template provided.

Other administrative controls would include vaccinations and immunizations as recommended by occupational health clinic.

3.4.5 Personal Protective Equipment (PPE)

PPE would include scratch resistant gloves while handling animals, life jackets while on boats, adequate footwear – boots, when collecting samples on beach and forest areas. Torch light for working at night.

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4. ENVIRONMENTAL HEALTH RELATED HAZARDS AND RISK CONTROLS

There are a variety of environmental health related hazards associated with field trips. The key risk would involve exposure to infectious materials that contain viruses, bacteria, fungi, parasites, and prions which cause diseases. Some may be transmitted by exposure to contaminated food or water, while others are passed to humans through animals (Zoonotic diseases) or arthropod vectors.

The following table lists some diseases which may be encountered in South East Asia and worldwide. This list is not a comprehensive list and is included here for reference. Please add to this list or omit those that are not applicable for your specific locations to be visited. It will be beneficial to determine which diseases are endemic in the locations which you will travel so that the appropriate vaccinations and/or chemical prophylaxis can be provided. The OH clinic maybe consulted in such cases.

Table 1: Environment/Public Health Related Diseases

Disease Type	Location	Exposure Route	Symptoms	First Aid	Prevention
Food-borne Diseases: e.g. Campylobacter, Cholera, *E. coli*, Hepatitis A, Salmonella, Typhoid Fever	Worldwide; often rural areas	Contaminated food (varies by organism, but can include poultry, beef, pork, seafood, shellfish, uncooked contaminated vegetables, etc.) and water	Diarrhea Vomiting Abdominal pain Fever	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Always cook food thoroughly. Vaccination available for some diseases including Typhoid Fever and Hepatitis A. Consult your doctor at least 1 month prior to departure for vaccination or guidance on prevention. Wash vegetables

					before consuming. Never drink water from an impure source without proper treatment. Treat water before use with purifiers, or by boiling for more than 3 minutes
Leptospirosis	Worldwide especially in swampy or flooded areas	Ingestion, swimming or other activities in water that is contaminated with Leptospira bacteria	Flu- like symptoms Occasionally more serious symptoms like yellowing of eyes/skin (jaundice), abnormal urine	Seek medical attention for diagnostic tests	Use care when working in the water, especially after a flooding event. Avoid entering the water with open wounds.
Rabies (vaccine available)	Worldwide endemic rural areas	Infection from bite of animal infected with Lyssavirus	Spasms Paralysis fatal, without immediate treatment	See a doctor IMMEDIATELY if bitten by a rabies- carrying species (e.g., bats, dogs, carnivores). May need to be given rabies immunoglobulin .	To vaccinate if staying in endemic rural areas for more than 2 weeks.
Tetanus (vaccine available)	Worldwide	Infection occurs after a wound. Tetanus bacillus	Painful muscle contractions	See a doctor if you suspect tetanus.	Obtain a tetanus shot every 10 years.

Typhus fever	Worldwide in jungles or forested areas	Infection from bite of lice, fleas, ticks, or mites Rickettsiae 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.
Dengue Fever	Africa, Southeast Asia and China, India, Middle East, South and Central America, Australia and the Pacific Islands	Infection from the bite of an infected Aedes mosquito	Persistent fever 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 repellants. Use a mosquito net.
Malaria (Preventable with Drugs)	Central and South America, Hispaniola, Africa, India, Southeast Asia, Middle east and Oceania	Infection from the bite of an infected Anopheles mosquito	Persistent and relapsing fever May take up to 2 weeks for symptoms. 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 and to continue for 2 weeks after return. Wear long pants and long sleeved shirts. Use repellents. Use 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 Neotoma and Peromyscus	Fever Headache Muscle aches Cough Breathlessness Severe respiratory distress	Seek medical attention	Avoid contact with rodents

		species			
Schistomiasis	Brazil, Egypt, Sub- Saharan Africa, Southern China, Philippines and Southeast Asia	Transmitted by swimming in contaminated 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 lung, liver intestines or bladder	Seek medical attention	Avoid freshwater wading or swimming in endemic regions. Heat bath water over 50^{o}C for at least 5 minutes before use.
Yellow Fever (vaccine available)	South America and Africa	Infection from the bite of an infected mosquito	Persistent fever 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. Yellow Fever certificate is an absolute requirement for entry into certain countries. Wear long pants and long sleeved shirts.Use repellents.Use a

					mosquito net.

5 WEATHER RELATED HAZARDS AND RISK CONTROLS

Personnel participating in field trisp are subjected to a variety of weather/climate related hazards while conducting his work depending on the nature and location of the work.

Field trip encompasses a wide range of activities: from simple surveys of animals or road traffic and sampling of air/water/soil to more complex activities such as deploying machines for testing in water bodies, trapping/handling large animals and diving. In this section, we will address the hazards that arise due to the physical environment/weather/climate.

The most common hazard pertaining to field trip is dehydration. Field trip personnel must monitor their water intake even while working in cold weather. Heat exhaustion and heat stroke are hazards faced in hot weather, while hypothermia may be experienced in cooler climate or while working in water. Other than these, there is altitude sickness, exposure to poisonous elements and even socio-political factors like theft, violent crime and political unrest.

Common hazards are listed below and should be contemplated thoroughly before you depart. Keep in mind that this list is not exhaustive. Hazards particular to your location of field trip and methods to control them should be addressed in the site-specific Field Work Plan. The Plan should be communicated it to all the team members. Methods to mitigate the effects of these hazards like training, emergency plans, adequately stocked first aid kits, trained first-aiders, etc must be included.

The following table lists climate hazards which may be encountered worldwide. This list is for your consideration and is not a comprehensive list. Please add to this list or omit those that are not applicable for your specific locations to be visited.

Table 2: Weather/Climate related Hazards and Controls

Hazard	Location	Cause	Symptoms	First Aid	Prevention
Dehydrating environment	Worldwide	Inadequate water intake	Dark urine Lethargy Constipation Light- headedness	Drink Plenty of fluids. Take frequent rest breaks. Minimize intake of beverages containing caffeine.	Drink plenty of water (at least 2 liters of water per day). Drink more if working strenuously or in a warm climate.
Sunburn	Worldwide	Excessive exposure to the sun	Irritated skin, pink to red in color, blistering in extreme cases	Apply cool water, aloe, or other cooling lotion to affected area.	Wear long sleeved clothing and a hat. Apply sun block with sun protection factor (SPF) of 30 or greater. Avoid activities during peak heat times of day.
Heat Exhaustion	Worldwide: Hot climate	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 plenty rest breaks. Avoid activities during peak heat times of the day.

Heat Stroke	Worldwide: Hot climate	Prolonged physical exertion in a hot environment	Exhaustion Light- headedness Change in behavior Loss of consciousness	Cool the victim at once by shower/bath/ice, replenish fluids, and seek medical attention immediately	Acclimate to heat gradually. Drink plenty of liquids. Take frequent rest breaks. Avoid activities during peak heat times of the day.
Hypothermia	Worldwide: Cold climate or working in water	Prolonged exposure to cold temperature	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 medical attention as soon as possible.	Dress in layers. Wear appropriate clothing Avoid getting damp from perspiration.
Extreme weather and natural disasters	Worldwide	Monsoon rains, hurricanes, typhoons, floods, earthquakes, etc. Lightning	Severe weather can result in physical injury and/or death. Can cause injury or death	Seek shelter immediately, or if known in advance, consider evacuation from affected area.	Be aware of special regional weather or natural disaster concerns. Bring appropriate equipment to deal with severe weather. Do not stay on high ground. Seek shelter in a building or vehicle. If it's not possible, seek shelter in

					a low-lying area e.g. thick growth of small tree and crouch into a ball on the ground Spread out if you are in a group. Avoid holding metal objects and avoid standing under tall trees, metal fences, pipes & rails Avoid using the telephone, electrical appliances and electronic equipment. Head for shore if you are in open water.
High altitude sickness	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.

In addition to climate related hazards, there are other hazards associated with the social, political and economic situation of the country

Hazard	Location	Cause	Symptoms	First Aid	Prevention
Violence caused by political unrest, military conflict, or terrorism	Worldwide	N/A	N/A	Defensive Action: Leave the affected area as soon as it is safe to do so.	Be aware of current travel advisories or restrictions.

6 ANIMAL RELATED HAZARDS AND RISKS CONTROLS

All field trip activities which involve trapping or handling vertebrate wild animals must be reviewed and approved by the NUS Institutional Animal Care and Use Committee (IACUC) prior to commencing the project. This review is intended to address the ethical considerations and wellbeing of the animals involved, and serves as a mechanism to ensure that all individuals listed on the project approval are properly trained and have successfully enrolled in the OH Programme. Further information regarding the IACUC review process can be found at *IACUC* website.

6.1 ANIMAL RELATED HAZARDS

6.1.1 Diseases Transmitted from Animals to Humans

Humans do not usually "catch" infectious diseases that affect animals. However, there are some important exceptions. Infections of animals may sometimes cause very serious disease in people. These infections, which begin in animals, but are then transmitted to humans, are called **zoonotic diseases, or zoonoses**. In many cases, the animals do not look or act sick. Although the animals have developed resistance to their own bacteria and viruses, humans with no previous exposure to these infectious agents may lack protective immunity. Some zoonotic infections can cause significant illness in humans.

Refer to *Appendix D* for more detailed information on some of the diseases transmitted from animals to humans.

6.1.2 Animals and Pests

Dangerous animals and other pests are present worldwide. A number of animals may be encountered in field trip, even if animal research is not included. Staff and students should be aware of the appearance and habitat of hazardous animals and pests, and first aid kits taken to the field should include prophylaxis for bites and stings. Avoid contact with sick or dead animals whenever possible. Field trip emergency plans should address some of these hazards when they are anticipated to be encountered.

Refer to *Appendix E* for a list of some animals and pests which may be encountered in South East Asia. This list is for your consideration and is not a comprehensive list. Please add to this list or omit those that are not applicable for your specific locations to be visited. CITES related information or general advisories on animal encounters, can be found at https://www.nparks.gov.sg

6.2 ANIMAL HANDLING TECHNIQUES

Here are some helpful common sense steps that you should take to reduce your risk of acquiring an injury or illness from wild animals:

- Discuss the zoonotic diseases associated with the species you are studying, along with transmission and prevention strategies with the attending veterinarian and the occupational physician. Familiarize yourself with emerging diseases in the region(s) you are traveling as these may develop or change rapidly – ProMed is a powerful resource.
- Take fully charged cell phone(s) or satellite phone(s) and a method to recharge batteries with you; if traveling in groups, walkie-talkies may be a useful adjunct. If you will be separated or divided into groups check in on a set schedule. If a group member(s) develop an illness or are bitten, develop a plan to keep everyone apprised of the situation as their condition may progress rapidly and further compromise the individual's health or the health of others. Treat bites promptly.
- Handle all animals as if they are potentially infectious; be careful and use precautions at all times.
- Always wear all the personal protective equipment (gloves, gowns, mask, etc.) that you are required to wear.
- Wash your hands before and after animal contact.
- Do not eat, drink, or put anything in your mouth while in the animal areas. Keep your hands away from your face.
- If you are working with venomous animals, don't be with them alone and ensure anti-venom, antidote, etc. is drawn up and ready for administration.
- Do not put on makeup, lotions, or put in contact lenses while in areas housing

animals.

- To help prevent bites, scratches, and injuries:
    - Recognize that the animal may be frightened.
    - Never let your guard down.
    - Get help when moving or lifting large animals.
    - Use chemical restraint (sedation) whenever possible.
    - Do not touch or go near sick animals or animals with unusual behavior.
    - Take care to avoid cuts when using sharp objects.
    - Consider animal restraints if performing injections into animals that may present a sharps hazard to you. Ensure the restraint materials are in good working order and have any reasonable supplies before you set out.
    - Do not recap needles
    - Accidents happen to even the most experienced and careful workers, as animals can be very unpredictable. Please use caution at all times when working with wild animals. Know what first aid to use if you have an accident or exposure, and always report exposures immediately to your field supervisor.

7 TRANSPORTATION RELATED HAZARDS AND RISK CONTORLS

Certain field trip activity may require transportation of the personnel to the destined location, transportation of the animals back from the field to the laboratory, transport of chemicals and biological samples, etc. Identify the appropriate transportation needs while planning for the field trip.

7.1 GROUND TRANSPORTATION

Few useful tips have been listed below to reduce risk and ensure safety while using ground transportation.

A. General:

- Carry a first aid kit in the vehicle at all times.
- Know your routes and carry maps if required.
- Make sure there is adequate number of approved drivers for longer trips to allow sufficient rest for drivers.
- Ensure there is no overloading of passengers, or equipment onto a vehicle or boat. Ensure there is no standing on moving vehicle, especially during off-road travel, unless it is catered for in designated public transportation.
- Drivers should avoid driving between midnight and 6 a.m. In some areas, drivers should be extra cautious and drive only during daylight hours
- If your vehicle is pulling a trailer/load, check brake lights and turn indicators on the trailer to be sure the electrical connection between the vehicle and the trailer is working properly.
- Multi-vehicle groups should be able to communicate between vehicles or have pre-designated meeting areas to gather if vehicles become separated.
- All weights, compressed gas cylinders, and other heavy or large items shall be secured in the vehicle. Gasoline and other hazardous materials should be transported in leak-proof containers and secured to prevent movement. Refer to NUS Laboratory Chemical Safety Manual for detailed information on transportation of chemicals.

B. Off-Road Driving:

- Be aware of the following off-road hazards

        - barbed wire and bailing wire, which can be picked up and wrapped around the vehicle
        - animals (cattle, deer, etc., especially at night)
        - objects such as logs, rocks, etc. which can damage the vehicle or cause hang-ups
    - Know what is around the vehicle before moving it in locations such as woods and marshes.
    - Consider carrying the following if off-road operation is anticipated:
        - Shovel
        - Axe or chain saw (for removing downed trees).
        - Hand winch or come-along (for removing stuck vehicles).
        - Fire extinguisher, which should be securely mounted and easily accessible.
- If you get stuck in sand or soft sediment, you can let some air out of your tires for better traction.
- Beware of approaching storms when traveling on dirt roads.
- If you plan to be in a very remote area, carry some survival gear in the vehicle, e.g., sleeping bags and extra food.
- Wear helmets and goggles when operating All-Terrain Vehicles or snowmobiles.

7.2 TRANSPORTATION BY BOAT

Field trip activities may involve transportation across water bodies such as river channels, sea, etc. PI/Laboratory Supervisor should assess the appropriate transportation requirements and ensure that the students/ staff have received appropriate training to carry out the activity, informed about the risks involved and the safety requirements.

Make sure the vessels are equipped with items as determined by the risk assessment. For example:

- Personal flotation devices (one per person, should be worn at all times)
- First aid kit and manual
- Tool kit
- Distress flares or other visual distress signals
- Fire extinguisher

- Citizens Band radio, marine radio, or cellular phone
- Nautical map

Only a licensed operator should operate a powered boat. Trained operators may operate non-powered boats. The supervisor should inform all the participants on the emergency procedures.

Develop float plan which should include the approximate launch point, destination, routes traveled, and the latest expected return time. File the float plan with a contact person stationed in campus or at the launch point.

Refer to NUS Research Diving Manual for more details.

7.3 TRANSPORT/TRANSFER OF MICROBIOLOGICAL SAMPLES

Transfer refers to the movement of microbiological samples between laboratories, within buildings or between research institutes/departments. NUS policy and guidelines clearly outline the packaging and labeling requirements for infectious substances and materials, as well as environmental specimens that have a low infectious dose. The Director/HOD/PI of the lab performing the transfer/transport has overall responsibility for ensuring a system is established for the safe transfer or transport of microbiological materials.

1. The basic component of all shipping requirements, with various minor modifications, is triple packaging, as follows:
    a) A primary container that contains the specimen and its sample container. This must be leak proof and tightly closed. A positive seal, such as parafilm or tape around the cap is needed;
    b) A secondary container that contains the primary container and packaging capable of absorbing the specimen. This must be watertight, leak proof, puncture proof.
    c) An outer rigid shipping container that contains the secondary container and other packing material. Strong cardboard embossed or printed with the UN 6.2 certification seal may be used.

2. The shipping container must be able to withstand leakage of contents, shocks, pressure changes and other conditions encountered during normal transportation handling. The contents should not leak to the outside of the shipping container even if the primary container should leak, unless there is severe damage to the outer shipping container.

4. When shipping with dry ice, the dry ice must be outside the outer container. The outer container and the dry ice can be enclosed in a Styrofoam box with a sturdy cardboard outer cover. Shipping companies may not accept Styrofoam boxes as outer layers.

5. Absorbent materials such as paper towels, vermiculite, disposable diapers, miracle polymers, etc. Ensure there is enough absorbent to contain the entire sample should a leak occur.

6. Itemized contents list listing whatever is in the secondary container by full name and volume. E.g. Human Cornovirus, 5 tubes @ 1.5 ml - 7.5 ml total volume. This list shall be placed between the secondary container and the outer packaging and provide advice for anyone who may need to open the box of its contents (e.g. Inspectors). Should the box be opened, they will use this list to aid in hazard cleanup.

7. The outer package must be clearly marked with the following: "This End Up" indications to illustrate correct vertical orientation.

8. The proper shipping name, the UN identification number and the technical name of the specimen must be on the outside of the box. In case of infectious agents there are two choices for proper shipping name: a. infectious substance, affecting humans, or b. infectious substance, affecting animals.

9. The label must indicate the name and telephone number of the person shipping the material as well as the person receiving the package and a 24-hour telephone number to be called in case of damage or leakage.

10. Training is recommended for those involved in the preparation for transport, packaging or transport of microbiological specimens.

11. Permits, transfer records, inventory, training records, incident reports, etc pertaining to the transport of microbiological specimens should be maintained for at least three years.

For more information regarding the transport of biological materials, refer to OSHE Biorisk Manual.

7.4 TRANPSORTATION OF CHEMICALS

Singapore adopts the *United Nations Recommendations on the Transport of Dangerous Goods* and the *United Nations Globally Harmonised System of Classification and Labeling of Chemicals* (GHS). Improper transportation and transferring of chemicals in the field can result in spills and, chemical exposures and even fire hazards. The following guidelines can be useful while transporting chemicals in the field:

1. The Risk Assessment must be conducted for activities involving transport or transfer of chemicals.
2. Preventive measures shall be put in place when the chemicals are expected to be transported from one location to another via common areas such as lifts and corridors. Where feasible, use freight/goods lift instead of common passenger lift to transport the chemicals. Avoid crowded lift in order to minimize personnel exposure in the event of any chemical spillage/leakage.
3. Loose chemical bottles or containers shall be placed in a secured and enclosed secondary containment container before it is transported from one location to another location.
4. The chemicals should be packaged in durable, leak-proof container made of compatible material. It should be protected from external forces and secured in an appropriate cart or trolley, when necessary.
5. Carry along an emergency spill kit and the appropriate PPE, if necessary.
6. Be cautious when transporting/ transferring shock- or impact-sensitive chemicals. Consult the SDS for special precautions to be taken.
7. Special measures must be undertaken when transporting and transferring cryogenic liquids. For e.g.: transport in a well-ventilated area, transport in an unmanned lift, avoid splashing, etc.
8. Chemical compatibility must be taken into consideration when transporting chemicals of diverse reactivity, together at the same time.

9. Movement of chemicals across laboratory, departments, institutes or countries may require additional documentation such as permits, consignment notes, etc. The PI shall ensure that such permits are obtained prior to transportation of these materials.
10. The PI shall communicate with the transporting and receiving parties to ensure they have appropriate facilities and license to transport and store these materials.
11. For CWC Chemicals**,** the PI shall inform OSHE of the transfer of ownership of the scheduled chemicals and the loss of any scheduled chemicals within 24 hours.
12. The Regulations specify that only licensed waste collectors are allowed to collect or transport general wastes and toxic industrial wastes (TIW). List of TIW collectors/ PVC Waste Collectors can be found in NEA website.

For more information regarding the transport of chemicals, refer to the OSHE Chemical Safety Manual.

7.5 TRANSPORTATION OF VERTEBRATE ANIMALS

7.5.1 Packing and Transporting

For animals caught in the field, transportation may occur between the capture site and field holding facilities or even the institutional animal holding facilities. Careful planning for all types of transportation should occur to ensure animal safety and well-being. The process of transportation should provide an appropriate level of animal biosecurity, while minimizing zoonotic risks, protecting against environmental extremes, avoiding overcrowding, providing for the animals' physical, physiologic, or behavioral needs and comfort, and protecting the animals and personnel from physical trauma.

Movement of animals within or between sites or institutions should be planned and coordinated by responsible and well-trained persons at the sending and receiving sites to minimize animal transit time or delays in receipt. Shipping should be coordinated to ensure that animals arrive during normal business hours or, if delivery occurs outside of this time, that someone is available to receive them. All animals in

transit within and between institutions or jurisdictions should be accompanied by appropriate documentation to minimize delays in shipping and receipt. Documentation may include health certificates, sending and receiving institutions' addresses and contacts, emergency procedures and veterinary contact information, and agency permits as needed.

For animals, reinforced shipping containers with filter-protected ventilation openings and internal food and water sources help ensure that illnesses or accidents do not occur during transit. Commercial vendors are experienced in animal transport and typically use dedicated transport systems and protocols to minimize these risks. Transportation of animals in vehicles not equipped for transporting animals or by drivers without adequate training is discouraged because of potential animal biosecurity, safety, health, and liability risks for the animals, personnel, and institution. The feasibility of this activity must be examined after a thorough risk assessment. For aquatic species and amphibians, special considerations are required for transportation in an aqueous or sufficiently moist environment, and special attention should be given to avoiding temperature extremes for poikilotherms. In all cases, appropriate loading and unloading facilities should be provided for the safe and secure transfer of animals at an institution. Facilities and procedures should be in place to help ensure that the environment at the destination lab does not pose risks to animal well-being or personnel safety. During times of extreme temperatures animal transport may be detrimental to animal well-being and therefore may not be possible unless an appropriately heated or cooled means of transportation is available.

Preserved or Dead biological samples (like plants, insects or small animals preserved in ethanol) must at least have secondary containment during transport. Within the institution, appropriate transportation methods and routes should be developed to avoid inappropriate exposure of humans to animals in transit. If possible, animals should not be moved past offices, lunch rooms, or public areas where people are likely to be present.

7.5.2 Transboundary

In addition to the above mentioned provisions, special attention must be given when transporting animals into Singapore. This is governed by a number of regulatory agencies and international bodies. Animal & Veterinary Service (AVS) under the National Parks Board (NParks)"sets standards for export, import and transshipment animals and related products; the International Air Transport Association (IATA) updates the Live Animals Regulations annually and IATA member airlines and many countries agree to comply with these regulations to ensure the safe and humane transport of animals by air (IATA 2009; Refer Live Animals Regulation (LAR)).

Certified courier service must be engaged for trans-boundary shipment of animals and animal samples. It is possible for the researchers to bring in the samples with them when they return from field work if they have an appropriate permit for it. PI's may contact Comparative Medicine (CM) for more information regarding this.

The AVS enforces regulations to prevent the introduction, transmission, or spread of communicable diseases and regulate the importation of any animal or animal product capable of carrying a zoonotic disease. For more information, please visit the AVS website: Import, Export and Transshipment of Laboratory Animals

Institutions should contact appropriate authorities to ensure compliance with any relevant statutes and other animal transportation requirements that must be met for animals to cross international boundaries. The NRC publication *Guide for the care and Use of Laboratory Animals (8th Edition)* provides a comprehensive review of this topic. For local guidelines, refer to *Guidelines on the Care and Use of Animals for Scientific Purposes (2004)* by IACUC.

For animals caught in the wild, that are to be transported live, it is important for the veterinarian or the veterinarian's designee to review the health status and other housing and husbandry requirements before authorizing shipment of animals. This action will ensure that effective quarantine practices are implemented for incoming animals and address any special requirements needed to ensure animal well-being.

Of special concern are animals that are suspected or potential carriers of infection. More extensive arrangements need to be made with respect to transport and even stabilization and quarantine of such animals. The WHO has laid out specific guidelines for the transport of such animals. This information is available at Transport of Infectious Substances. Geneva, World Health Organization, 2004.

8 DISPOSAL OF HAZARDOUS WASTE

Hazardous waste refers to the chemical and biohazardous waste materials which by their nature and quality may be potentially detrimental to human health and/or the environment. Improper disposal of hazardous wastes can cause pollution and endanger the safety and health of the field trip participants and the general public who are exposed to it.

Several guidelines on the safe disposal of hazardous chemical wastes and biohazardous waste have been discussed in NUS Laboratory Chemical Safety Manual and NUS Biorisk Manual.

Please note that the regulations and practices of waste disposal will be different in different countries, and researchers need to make themselves aware of these regulations and practices.

9 NON - UNIVERSITY PERSONNEL

Non - University persons may be invited to participate in the field trip. Such persons should be briefed on the nature of the work, the risks involved and of the health, safety regulations and procedures of the University.

Typical Non-University personnel involved in field trip scenarios may include:

- Participants/Volunteers who are not from NUS faculty, staff or students;
- Hired drivers;
- Property owners;
- Host institutions;
- Service providers, such as hotel, tour companies or guides.

All non-university personnel participating should also be considered in risk assessment.

10 TRAINING

PI should identify the appropriate training required for each team member participating in field trip. Training should be conducted prior to participation in the field activities. Indicate training providers and dates of training if possible.

Principal investigators/Supervisor is responsible for ensuring that all staff and students receive adequate project specific training on field trip activities and safety. All procedures should be understood and practiced, where applicable, prior to going out into the field so that each individual is comfortable with the activities in which they will participate.

For field trip involving vertebrate animals, training must be obtained on the proper handling and management techniques for the species to be encountered. Principal investigators may provide this training to staff and students. If necessary, the NUS Comparative Medicine (CM) may be consulted for more information or guidance on techniques for the safe handling of wild animals. Every individual handling wild animals (vertebrates only) in the field must also attend the lecture seminar of the RCULA training offered by the CM which covers animal ethics, regulations pertaining to animals, and safety. The hands-on section of the RCULA is not required; however, PIs remain responsible for providing project specific hands-on training to all staff and students involved in the field trip.

PI shall assess the need for swimming skills training of the field trip participants.

The number of qualified first aiders required on a field trip shall be determined by the PI commensurate with the type of work and numbers of personnel involved. In addition, it is strongly recommended that all supervisors receive basic first aid training. First aiders must be trained in Occupational First Aid, Cardiopulmonary Resuscitation (CPR), and addressing field emergencies.

To register for first aid training refer to Office of Human Resources (OHR) training directory.

For CPR training registration, refer to OSHE website: CPR Familiarization Programme.

11 OCCUPATIONAL HEALTH PROGRAMME

NUS Occupational Health (OH programme) is administered by licensed healthcare providers within OSHE and is aimed to protect the individuals participating in the various unique field trip activities conducted by:

- Assessing medical fitness for anticipated field trip activities
- Providing immunizations and/or chemoprophylaxis for specific regions of travel
- Addressing any specific regional zoonotic risks, especially if animal handling is involved
- Reviewing location specific first aid preparedness and medical emergency plans
- Consulting on any medical emergencies (or providing treatment if in Singapore)

PI should review the occupational health needs for staff and students participating in the field trip. After the completion of risk assessment, identify the required and recommended travel vaccinations for the locations to be visited, especially in overseas trips. You should consult the OH physician for any vaccinations unique to the country they are conducting the work in.

Women who are pregnant should consult the occupational health physician or their personal doctor before embarking on field trip, especially if it involves handling or has potential exposure to wild animals.

If you are being treated for a chronic illness, be sure to notify the Occupational Health Physician before you have animal contact. Diseases that lower your immunity, such as HIV infection and cancer, as well as drugs that lower immunity, like prednisone, may put you at increased risk of contracting a zoonotic infection. Exposures to certain animal species may be unsafe for you.

OH Programme enrolment and general information may be found on the OSHE website.

12 EMERGENCY PREPAREDNESS AND RESPONSE

12.1 EMERGENCY PLAN

Develop emergency plans for all overseas locations to be visited during the field trip, including considerations for evacuation, communication, nearest medical clinics and hospital locations and contacts (especially when working in remote locations and/or in developing countries). In addition, consider the following points to be included in your emergency plan:

- Local contact information – Location specific contacts that will be able to contact you in the event of an emergency. They should be familiar with your scheduled itinerary and should be informed with contact information if the field trip participants do not return or report in within a predetermined period of time. List the location and contact information for the nearest medical clinics and hospitals in case of emergency. Note that written arrangements in advance may be necessary for emergency medical services in some locations.
- Prepare a list and compile the necessary components for a field first aid kit. Items required may vary depending on location due to the local risks present.
- List and compile any additional safety provisions for the journey, as required – first aid kit and first aid manual, medications you take regularly, allergy treatments if you have allergies, sunscreen, water purification tablets or filter devices, flashlights, flares, extra batteries, two-way radio, personal protective equipment necessary for field trip (i.e. gloves, safety glasses or goggles, hard hat, proper footwear, etc.), and others.
- Designate an individual among the field trip participants to be the responsible first aider. Have at least one backup first aider, or designate several first aiders if multiple field study locations will be visited simultaneously which are geographically separated. First aiders must be trained in first aid, CPR and addressing field emergencies – contact the Occupational Health Programme for more information on this training.
- Take note if any field researchers have any medical predispositions that should be

considered for field emergency preparedness (e.g. asthma, allergies, etc).

- Ensure that all staff and student participants have obtained the necessary travel insurance coverage, inclusive of emergency evacuation services when travelling overseas for field trip.
- Personnel travelling overseas for field trip must follow the NUS guidelines for overseas travel: Student/Staff Official Overseas Trip Safety Guidelines
- Compile a list of local emergency contact numbers in the country, like Police, Fire and Emergency Services, Park Ranger Station, Singapore Embassy/Consulate/High Commission, etc. Ensure all members carry the compiled emergency contact list at all times.
- Whenever possible, field trip activities should be performed using the buddy system, in teams of at least two people in case of emergency.
- Ensure all individuals carry photo identification at all times in case of accident or injury.
- Designate one or two members of the team to be the accompanying member to accompany the injured member evacuated to the clinic or hospital. This accompanying member is to be the link person to provide update and coordination to the project/team leader and the home base in NUS. The accompanying member shall have all the relevant contact numbers and information.
- Personnel travelling overseas for field trip must be well informed on the government agencies and their contact details for contacting during emergencies. A comprehensive list of Singapore Embassies/High Commission/ Consulates can be found in OSHE website. eRegister all the field trip members (inclusive of Singaporean, Singapore PR and non-Singaporeans) with Ministry of Foreign Affairs via the ministry website.

12.2 MEDICAL CARE AND FIRST AID

Injuries sustained in the field should be addressed immediately by the designated project first aider. They must make the determination of when an individual requires emergency medical evacuation and/or transportation to the nearest hospital if the injury cannot be addressed in the field. If possible, written arrangements must be made in advance with local facilities for emergency medical treatment, to ensure this is completed before

travel.

First aid kits are required for all off-campus activities. Each department or field trip team is responsible for purchasing and maintaining first aid kits, ensuring that the appropriate location specific components are included in the kits. Contact the Occupational Health Clinic Programme for advice on the contents of a first aid kit and to arrange a first aid training course.

Animal or insect bites, scratches, mucous membrane exposures, or injuries that break the skin and are likely to be contaminated are to be treated as exposures. Perform first aid procedures immediately and notify your field supervisor. If you are ill with fever or other symptoms of an infection and you also have animal contact, let the first aider or local physician know that you have been exposed to animals in the field. Report any unusual or lengthy illnesses to the first aider, local physician, or Occupational Health Physician if you have returned to NUS.

This important reporting mechanism is utilized to ensure proper medical treatment and follow up is performed, if necessary, and provides the documentation needed for reimbursement claims submitted through insurance. If an injury or illness results in overnight hospitalization or any fatality, notify your campus contact immediately. The campus contact should notify the OH Clinic or the emergency hotline (6874 1616), who will in turn submit the necessary notifications.

12.3 INSURANCE COVERAGE CONSIDERATIONS

12.3.1 For Staff

NUS staff members are provided with basic travel insurance coverage when traveling on official university business. Emergency evacuation services will also be covered under staff insurance. Based on personal risk tolerance, some individuals may want to explore purchasing additional travel insurance to supplement this basic plan. Any additional travel insurance must be arranged in advance of the departure

date for the field trip. Detailed information about staff travel insurance coverage, please visit: NUS Staff Insurance

12.3.2 For Students

Unfortunately, NUS students **are not** provided with travel insurance under their basic student health insurance plans. Principal investigators should make arrangements with students to purchase travel insurance coverage for the locations and time period of travel. This must be done in advance of the travel dates. If multiple students are involved, purchase of group insurance plans should be explored.

13 RISK ACKNOWLEDGEMENT AND CONSENT FORM

The Risk Acknowledgement and Consent Form is available at Office of Legal Affair's Website at the following link.

https://share.nus.edu.sg/corporate/policies/legal/Risk%20and%20Consent%20Form.pdf

The form is a basic release form. It may not sufficiently cover all risks and organizers need to conduct their own prior risk assessment. Please consult OLA at olasec@nus.edu.sg if you have specific legal queries with respect to the use of the form.

14 ACCIDENT/ INCIDENT REPORTING AND INVESTIGATION

Bites, scratches, mucous membrane exposures, or other injuries or illnesses sustained in the field that require medical attention are to be reported to the activity supervisor. Upon returning to NUS all the injuries or illness should be reported to OSHE through the Accident and Incident Management System (AIMS). All injuries requiring first aid treatment shall be recorded in the First Aid Log Book. It can be submitted by the informant, injured staff/ student, PI, Laboratory Supervisor or other representative if the staff/ student are unfit or unable to do the initial report.

All accidents and incidents must be investigated in order to identify the root cause(s) and contributing factor(s). The investigation team may comprise of representatives from

OSHE, the Departmental Safety and Health Committee, the Faculty Safety & Health Officer, PI, Laboratory Supervisor or other members if required.

15 ACKNOWLEDGEMENT

This manual has been graciously adapted with permission from the model document "Safety Guidelines for Field Researchers" created by the Office of Environmental, Health, & Safety at the University of California, Berkeley (USA). We would also like to acknowledge the Emergency Management Division of Office of Safety, Health and Environment, National University of Singapore for their inputs while drafting this manual.

16 REFERENCES

1. Animal & Veterinary Service (AVS) under the National Parks Board (NParks). Animals and Birds Rules (Care and Use of Animals for Scientific Purposes).

2. National Advisory Committee on Laboratory Animal Research (NACLAR). Guidelines on the Care and Use of Animals for Scientific Purposes, 2004.

3. Committee on Occupational Safety and Health in Research Animal Facilities. Occupational Health and Safety in the Care and Use of Research Animals. National Academy Press, 1997.

4. Committee on Occupational Health and Safety in the Care and Use of Nonhuman Primates. Occupational Health and Safety in the Care and Use of Nonhuman Primates. National Academies Press, 2003.

5. Institute of Laboratory Animal Resources Commission on Life Sciences. Guide for the Care and Use of Laboratory Animals. National Academy Press,1996.

6. Centers for Disease Control and Prevention / National Institutes of Health Biosafety in Microbiological and Biomedical Laboratories, 5th ed. Government Printing Office, Washington, D.C., 2007.

17 LIST OF APPENDICES

APPENDIX A : SOP Template

APPENDIX B : Field Trip Checklist

APPENDIX C : Sample of Activity based Risk Assessment Form

APPENDIX D : Diseases transmitted from animal to human

APPENDIX E : Animals and Pests List

APPENDIX A: SOP Template

NUS National University of Singapore	**Department of ..... National University of Singapore**	**Ref. No**	*..../SOP/008*
Standard Operation Procedure		**Rev. No**	*1*
Title: ***Conducting field trips***		**Page:**	*10*
Lab: ***(Name of Lab)***			
Written by	**Approved by**	**Issue date**	**Review date**
Name of person	*Name of PI*		(usually 3 yrs after date of issue)

1. Purpose: The objective of this SOP is to provide guidelines to all the laboratory personnel on conducting field trips in Singapore.
2. Scope: The procedure is applicable to all research staff, research students and technical staff working in the laboratory.

3. Responsibility: It is the responsibility of the PI in conjunction with the laboratory I/C to ensure that all research and technical staff and graduate students are adequately advised, prepared and trained.

3.1. Principal Investigator
The Principal investigator is responsible for the implementation of these guidelines and takes ownership of all research and technical staff, graduate and undergraduate students under his charge in ensuring that they will carry out their activities in a reasonably practicable manner. The PI has to ensure that all the above mentioned personnel are adequately advised, prepared and trained.

3.2. Staff/ Research Personnel
All research and technical staff and graduate students participating in field activities are under the obligation to work and behave safely in the field, and are responsible for taking care of their own health and safety and not placing themselves or others at risk of injury during a field activity.

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<tr><td rowspan="2">  </td><td rowspan="2">Department of ……
National University of Singapore</td><td>Ref. No</td><td>..../SOP/008</td></tr>
<tr><td>Rev. No</td><td>1</td></tr>
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<tr><td>Name of person</td><td>Name of PI</td><td></td><td>(usually 3 yrs after date of issue)</td></tr>
</table>

4. Procedures*:*

All NUS staff, students and visitors involved I field work should take the necessary medical vaccinations, undergo a medical examination if necessary, to ensure that he/she is physically fit ……

Make periodic checks (once a week) of the first aid box….

Training should be provided for the necessary skills required by the activity or trip…….

At least two personnel should go out on each field trip.

All equipment for the field trip, eg:……. well maintained…..

Accidents/ Incidents reporting…….should be reported to …….. using the OSHE online Accident/ Incident Reporting System ……..

Participants to fill in the necessary documents eg: details of the Next Of Kin (NOK), Student/ Staff Official Overseas Trip Safety Guidelines, etc……

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<tr><td>Name of person</td><td>Name of PI</td><td></td><td colspan="2">(usually 3 yrs after date of issue)</td></tr>
</table>

5. Execution:

Research Assistant (…….) will liaise between the field work team and NParks/PUB/NEA etc

Carry sufficient drinking water …….

Bring a handphone (with sufficient battery life) ……

Insect repellent, first-aid kit…..

Transport to be used……..public transport/dept. vehicle.

Singapore traffic regulations to be followed……..

In the case of an accident/incident:

For a non life-threatening emergency, ……..

For a life-threatening emergency …….

Please see attached file (Nearest medical facility.xls) ……

Field work is to cease in case of serious accidents or during extreme weather conditions…….

All participants are to take safety measures when inclement weather is impending. Eg: locate lightning-safe shelters, etc

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</table>

5. Safety Precautions:

a. Exercise prudence during all field activities to avoid unnecessary risk to oneself and others.

b. Do not wander from the group alone. Always ensure that there are at least two team members together or that others are informed of location of all team members at all times.

c. Ensure that one is well hydrated for the duration of the field work.

d. Take adequate rest breaks to avoid heat exhaustion or heat stroke in hot weather.

e. Take extra precautions when working in forested areas in case of snake bite, and bee or wasp sting.

f. …….

g. ……..

Appendix 1

NUS Field Trip Safety Management Plan

This form aims to help the Principal Investigator and the Field Trip Safety Officer in developing a Safety Plan and also to provide guidelines as to what they are lacking in their preparation before setting off for field research. This plan is suitable for multiple trips to the same location. However, the Safety Plan should be revised whenever there is a significant change to the location or scope of fieldwork to be carried out. For those who are going on short term field trips, other than having this Field Trip Safety Management Plan submitted to the Principal Investigator or the Department (if the PI is also going for the trip), there should also be a movement chart for the individuals in the laboratory who are required to go on field trips for sample or specimen collection. The person to monitor the movement chart to ensure that the individual who goes on the field trip will either be back to the lab or straight home from the trip, should either be the Principal Investigator, or his designate. However, the responsibility will ultimately fall back on the Principal Investigator.

Principal Investigator/Tutor:	**Faculty/ Department:**
Contact No:	**Email Address:**
Date/(s) of Travel: **Total number of personnel** Staff: Students:	

NUS National University of Singapore	**Department of …… National University of Singapore**	**Ref. No**	*..../SOP/008*
Standard Operation Procedure		**Rev. No**	*1*
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Lab: ***(Name of Lab)***			

Written by	Approved by	Issue date	Review date
Name of person	*Name of PI*		(usually 3 yrs after date of issue)

LOCATION OF FIELD TRIP

Country:

Mode of Travel:

Climate:

Food/Water/Environmental Situation:

Nearest City:

Nearest Hospital:

Please see attached file (Nearest medical facility.xls) for the list of the nearest medical facilities for site.

Field Research: *(A brief description of field work involved.)*

University Faculty/Department Incident Commander	**Emergency Contact (Locally/ Overseas)**

University Campus Security Contact No: 6874 1616

Emergency Procedures: *(The detailed plans for the field location, the necessary evacuation and emergency communication plan should also be included.)*

Personnel certified in First Aid (Heart savers/CPR/BCLS):

NUS National University of Singapore	**Department of .....** **National University of Singapore**	**Ref. No**	..../SOP/008
	Standard Operation Procedure	**Rev. No**	*1*
	Title: ***Conducting local field trips***	**Page:**	*10*
Lab: ***(Name of Lab)***			

Written by	Approved by	Issue date	Review date
Name of person	*Name of PI*		(usually 3 yrs after date of issue)

No.	Full Name	NRIC / Passport No.	Nationality	Sex	Contact No.	Email	DOB (dd/mm/yyyy)	Staff/student No.
1								
2								
3								

No.	Full Name	Address	Home Tel	Blood Type	Special Medical Condition/ Drug Allergy	NOK's Name	Relationship	NOK Tel	NOK HP No	NOK Address (if different from earlier address)
1										
2										
3										

APPENDIX B: Field Trip Checklist Template

National University of Singapore

Checklist for Field Research

This checklist serves as reminder for PI's or Team Leaders to complete certain tasks before embarking on a field trip. There is no compulsion to submit this form to the PI or the Department and is only for the researchers' own reference.

Principal Investigator	Name: Contact no:	
Time Period:	dd/mm/yy	to dd/mm/yy
Location(s) of research activities:		
Brief Description of research activities:		
Expedition Leader or Field Safety Officer:		Onsite contact No.:

A. EMERGENCY /MEDICAL INFORMATION:		
1. First Aid/Medical Emergency *[trained personnel required for groups >5]* ☐ Emergency/contact list completed	☐ First Aid Kit available ☐ Local emergency response phone #: _____	___ No. of personnel trained in first aid ___ Level of training: Basic/Standard + CPR Wilderness/Survival
2. Medical evacuation plan:		
3. Communication methods: ☐ Cell phone(_____) ☐ Satellite phone(_____)	☐ Local land line (_____) ☐ Radio ☐ Locator beacon	
4. Frequency of mandatory communication with field research team: **Dept contact**_____	☐ Daily ☐ Weekly ☐ Monthly ☐ Other (_____)	☐ Field research team to contact Principal Investigator / Departmental contact OR ☐ Principal Investigator/ Dept to contact Field research team
5. Contact numbers of all participants and their next of kin	☐ Yes ☐ No	*(attach a namelist)*

B. ACCOMODATION & LODGING:			
	Indoor	**Camping/Outdoor** *Recommended Equipment:*	
Facility name:		☐ Tent	☐ Adequate sleeping bags
Facility contact no:		☐ Potable water required	☐ Provisions – food, fuel, etc
		☐ Stove/cookware/utensils	☐ Lighting – lantern, flashlight, etc

C. HAZARD IDENTIFICATION:			
Possible Hazards	**Applicable**	**Suggested Precautions**	**Remarks**
1. Communicable Disease prevalent in the region	☐ Yes ☐ No	☐ Review regional travel advisories ☐ Ensure appropriate vaccinations ☐ Ensure appropriate prophylactic medication ☐ Insect controls (netting, repellent)	
2. Health Conditions E.g., allergies, diabetes, health conditions	☐ Yes ☐ No	☐ Encourage participants bring adequate supply of required medication	
3. Predatory Animals	☐ Yes ☐ No	☐ Research habitat/behavior ☐ Pepper spray ☐ Firearms	
4. Firearms/Weapons (type: _____)	☐ Yes ☐ No	☐ Firearm license (PAL) issued to person carrying firearm ☐ Training on safe use	Name and License number: _____
5. Venomous Animals/Plants	☐ Yes ☐ No	☐ Research habitat/behavior ☐ Antidotes (if available)	
6. Work at Height *Fall protection is required at heights >2m*	☐ Yes ☐ No	☐ Training (e.g. ladder safety ☐ Climbing equipment (& training)	Equipment certification date: _____
7. Electroshocking ☐ Back-pack	☐ Yes ☐ No	☐ Non-conducting boat hull (if applicable)	

☐ Generator		☐ CPR trained personnel ☐ Rubber boots & gloves	
8. Marine/Aquatic ☐ Research local current/surf ☐ Diving Project approved Project no: _____	☐ Yes ☐ No	☐ SCUBA ☐ Chest waders ☐ Safety/throw line ☐ Life jacket/flotation device	SCUBA divers certificate Nos: _____ _____ _____
9. Hazardous Materials ☐ Chemical/ other hazardous materials ☐ Compressed Gas ☐ Radioisotopes ☐ Biological ☐ Explosives	☐ Yes ☐ No	☐ Chemical Safety Training by all personnel ☐ Personal Protective Equipment ☐ Radiation permit issued (if applicable) ☐ License/Permit for chemicals (if applicable) ☐ MOH/ AVA/GMAC (if applicable) ☐ Transport permit (if applicable)	Permit no:_____ Permit no: _____
10. Political/Civil Unrest	☐ Yes ☐ No	☐ Local guides/security ☐ Research local travel warnings via Emergency Management Division on OSHE website ☐ Contact numbers for Embassy/Consulate/Trade Office:_____	
11. Extreme Environmental Conditions - arctic - desert - remote locations - heavy rainfall, thunderstorm	☐ Yes ☐ No	☐ Survival skills training ☐ Wilderness first aid ☐ Locator beacon ☐ GPS	
12. Animal Care	☐ Yes ☐ No	☐ IACUC approval no:_____ ☐ RCULA training modules completed by all personnel	
13. Vehicles ☐ Cars/Trucks ☐ Water craft ☐ All-Terrain Vehicles ☐ Snowmobiles ☐ Tractors/Heavy equipment	☐ Yes ☐ No	☐ Valid license ☐ Driver Information Profile complete ☐ Adequate insurance Equipment training & authorization	License no:_____ _____
14. *(add more information unique to individual field trips)*			

15.			

D. TRANSPORTATION:	
Name(s) of drivers / license holder(s):	
Itinerary of Travel:	
☐ University-owned/leased ☐ Rented vehicle ☐ Public transportation - flight, train, etc	☐ All operators have valid licenses and training ☐ Health Insurance (International travel) ☐ Private vehicle (not recommended)

E. BOATING: ☐ Yes ☐ No				
Name(s) of operator card holder(s):				
Equipment:		☐ Life jackets †	☐ Flashlight/flares †	☐ Air horn/whistle †
☐ Bailing bucket †	☐ Fire extinguisher †	☐ Oars or Anchor/line †	☐ 15m buoyant rope †	☐ First Aid Kit
☐ Radio	☐ Drinking water	☐ Compass & charts	☐ Knife	☐ Spare gas tanks
† - *Required equipment for powered pleasure craft*				

APPENDIX C: Sample of Activity based Risk Assessment Form

Experiment-Based Risk Assessment Form

Name of Department	Biological Sciences	Location of Lab	14 Science Drive 3, Blk S14, #01-05
Name of Laboratory	Marine Biology Laboratory	Name of PI	A/P Donald Messer
Name of Researcher/LO	Ng Chan Sun	Name of Activity/Experiment	Field Work for Coral Project

No	Description/Details of Steps in Activity	Hazards	Possible Accident / Ill Health & Persons-at-Risk	Existing Risk Control (Mitigation)	Severity	Likelihood (Probability)	Risk Level	Additional Risk Control	Person Responsible	By (Date)
1	Collection of corals colonies; fragmenting of large colonies	Sharp and heavy tools such as hammers, chisels, cutters	Cuts and bruises from improper tool handling	Bundle tools together when not in use. Ensure tools are not strewn around. Follow SOP for safe handling of tools (DBS/SOP/02/007). Ensure all personnel are trained before being allowed to use the tools.	1	2	2			
2	Surveying for target organisms	Sharp corals, venomous organisms	Accidental stings or cuts	Be fully suited while carrying out tasks, including the wearing of gloves/booties. Avoid provoking marine organisms. Be aware of surroundings while diving or at intertidal areas. First Aid box will be carried on the field along with trained first aiders.	1	2	2			
		Working in intertidal zones or deep sea	Drowning	Strictlty follow guidelies in the NUS Diving Manual. All personnel will be well trained before commencing work.	3	1	3			
3	Carrying corals in baskets or heavy equipment with the aid of lift bags.	Heavy loads may cause a strain on personnel.	Lift bag might be overinflated accidentally and cause ascent to be too rapid	Undergo prior training before usage of lift bags. Inflate lift bags carefully. Use suitable lift bags and not exceed the stated limits.	1	1	1			
4	Deploying of experiments	Slippery seawalls	Falls, abrasions	Proper attire; watching out for team members; move around wet areas carefully, training.	1	2	2			

Conducted By Ng Chan Sun

Approved By

Name A/P Donald Messer

Signature

Approval date

Next Revision date (Maximum 3 years)

APPENDIX D: Diseases transmitted from animal to human

1. Working with Non-Human Primates (Rhesus and Cynomolgus Monkeys)

Nonhuman primates present special zoonosis risks because so many nonhuman primate diseases are transmissable to humans. Zoonoses from nonhuman primates can sometimes cause very serious illnesses. For example, **tuberculosis** can be transmitted back and forth between nonhuman primates and people.

Common human viruses such as **measles** and **herpes simplex** can be a risk to nonhuman primates, if they come in contact with these human infections. **Hepatitis A, B, C, and D/E** has been seen in nonhuman primates and can be cross-transmitted between nonhuman primates and people.

A: Cercopithecine Herpesvirus 1 (B-virus infection) is carried by many Old World monkeys, such as macaques. B virus is found in otherwise healthy monkeys and often does not cause symptoms in the infected animal. B virus infection can cause a rare, but fatal, brain infection in man. Any bite, scratch, mucous membrane exposure, or exposure to any other break in the skin can allow B virus into your body. The virus is found in monkey saliva, urine, and body fluids; it can also resist drying and can be found on environmental surfaces such as cages and floors. Report all monkey exposures immediately to your supervisor, the veterinarian on call and the Occupational Health Physician.

Every area that houses nonhuman primates should have a “Macaque Exposure Kit” which provides supplies and instructions for first aid and cleaning of injuries. First aid procedures are posted in these kits. Know the location of these kits. The use of protective clothing, including gloves and face shields, as well as the use of physical restraint when handling nonhuman primates, should help prevent exposures. As a reminder, since this is critically important, all injuries should be immediately reported to your supervisor, the veterinarian on call and the Occupational Health Physician. As with all occupational injuries and illnesses, be sure to also report through the AIRS system.

B: Simian Immunodeficiency Virus (SIV), a relative of the AIDS virus, is found in the African green monkey and other African nonhuman primates. It is used in some research protocols as a model for HIV-like illness. This virus can infect other nonhuman primates in experimental settings; several laboratory workers have also become infected, although none of these people became ill.

APPENDIX E: Animals and Pests List

Table 3: Animals and Pests

Type	Location	Most Dangerous Species	Defensive Action	First Aid	Prevention
Snakes	Worldwide	Gold- ringed Cat Snake, Blue Malayan Coral, Banded Malayan Coral Snake Equatorial Spitting Cobra (Yellow- Thailand; Black- Singapore & Peninsula Malaysia), King Cobra, Amphibious Sea Snakes	Do not pick up, disturb, or corner a snake. Move away from the snake.	Let the wound bleed freely for 30 seconds. Apply a cold pack sparingly. Do NOT tourniquet. Keep area immobilized at heart level. Carry anti-venom (if available) after consulting with OH clinic/hospital. 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.
Sharks	Worldwide: Shorelines of ocean	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.	Do not swim in waters known to be shark infested. Never swim alone. Don't wear sparkling

					jewelery. Don't enter the water when bleeding.
Crocodiles and Alligators	Worldwide	Estuarine Crocodile, Nile Crocodile, American Alligator	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.
Mosquitoes	Worldwide, especially wet areas conducive to breeding.	Multiple diseases transmitting species depending on location.	Avoid contact with mosquitoes whenever possible.	Use topical ointment to relieve itching.	Use insect repellent and mosquito nets.
Spiders	Worldwide	Funnel web, Redback Spiders, Brazillian Wandering Spider, Brown Recluse and Tarantula	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 ahead if possible).	Use care around rock piles, logs bark, outdoor toilets, and old buildings. Shake out clothing and bedding before use.
Scorpions	Worldwide but especially North Africa, Middle East, North and 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	Always shake out clothing and bedding before use. Avoid rock and wood piles and old tree stumps.

				antihistamine if desired. Take victim to hospital (alert ahead if possible).	
Bees, Wasps	Worldwide	Bees, wasps, hornets and yellow jackets	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; garbage contained.
Fleas and Ticks	Worldwide	Multiple species depending on location	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 and seek medical attention if necessary.	Wear clothing of tightly woven material. Tuck pants into boots. Avoid brush and long grass. Check for fleas and ticks on body frequently.

Dangerous Marine Animals	Worldwide	Blue Ringed Octopus, Box Jellyfish, Irukandji, Stonefish, Sea Snakes, etc.	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) and seek medical attention. Blue- ringed octopus sting: Provide CPR and/ or supportive care to the patient and seek medical attention IMMEDIATELY.	Avoid going in waters known to be inhabited by jellyfish and octopus. Wear sandals in the water to avoid stepping on a stonefish.
Bears	Worldwide	Asiatic black bears (SE Asia)	Never run. Move slowly and avoid direct eye contact. If attacked, lie in the fetal position and protect head. Play dead.	Seek medical attention for serious injuries or wounds.	Never approach or feed a bear, especially a cub. Stay away from bear's food. Keep camp areas free of garbage and food waste.
Elephants, lions, tigers and other large land	Asia, Africa	Asian Elephants, Bengal and Siberian tigers, Rhinos, Hippos,	Do not provoke these large animals. Keep	Seek medical attention for serious injuries	Stay inside of vehicle if traveling near

dwellers		etc.	distance.	and wounds.	large animals. Keep a lookout in open spaces.
Rodents	Worldwide	Various species carry zoonotic disease	Do not touch rodents if you can avoid them, dead or alive.	Clean wounds thoroughly if bitten or scratched.	Keep areas clean to avoid attracting rodents. Keep food stored in sealed containers. Seek training before attempting to handle wild rodents for study.
Bats	Worldwide	Various species carry zoonotic disease	Do not touch bats if you can avoid them, dead or alive.	Clean wounds thoroughly if bitten or scratched. Seek medical treatment, rabies prophylaxis.	Seek training before attempting to handle bats for study.
Poisonous plants	Worldwide	Exposure to poisonous plants (such as poison ivy)	Itchy rash Red, swollen skin, blistering in extreme cases	Wash clothes and skin immediately following exposure. Apply wet compress with baking soda or vinegar or use a topical ointment. Avoid scratching affected areas.	Avoid contact with unfamiliar plants.