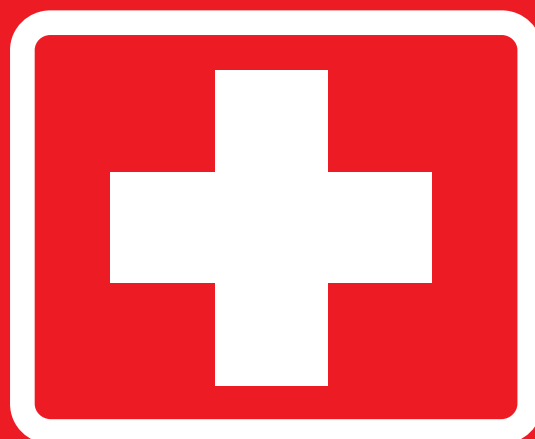


Guideline for Health and Safety Management and Preventing Accidents during Field Activities

Fourth Edition



Division for Environment, Health and Safety,
The University of Tokyo

Compiled by the Working Group for Measures against
Fieldwork Accidents

Introduction

On producing the “Guideline for Health and Safety Management and Preventing Accidents during Field Activities” (Fourth Edition)

Research and education at universities often require educational/research activities in the natural environment (hereinafter referred to as “field activities”). Many of these activities bring about valuable results that would not be gained from work done solely in research offices and laboratories or by means of computers. However, various types of risks exist from geographic factors, climatic conditions, contact with dangerous and harmful animals and plants, which can in some cases, result in serious accidents and damage to health.

The University of Tokyo experienced an accident in which a research fellow drowned while scuba diving in order to gather marine creatures for research on July 4, 2005. In response, never to repeat such tragedy again, faculty members involved in field activities conducted discussions and work for over a period of half-a-year to compile the university regulations called, “The University of Tokyo Regulations for the Management of Health and Safety during Educational and Research Activities Conducted in the Field” and a leaflet called, “Guideline for Health and Safety Management and Preventing Accidents during Field activities (First Edition).” Fortunately, it seems that the people concerned have become aware of and learned how to respond to potential risks during field activities. However, there are constantly new issues arising concerning the maintenance of health and safety, such as an accident involving a fall during a river survey and an encounter with a Japanese bear.

This “Guideline for Health and Safety Management and Preventing Accidents during Field Activities (Fourth Edition)” emphasizes activities in fields and mountains, rivers, coasts, and vessels, and also features dangerous and harmful animals and plants. Revisions have also been made to articles concerning first aid and medical knowledge, based on the latest findings.

We expect faculty members and students involved in field activities to read this guideline carefully and carry out field activity safely and healthily.

March 2014

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(*Not in any fixed order)

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* "Relevant accident cases during field activities" include those experienced by other universities

Introduction Basic Standpoint

- ▶ Field activities involve various types of danger that are different from those expected to occur indoors.
- ▶ Participants in field activities have the responsibility and duty to manage health and safety and to prevent accidents. They need to be able to respond appropriately, should an accident occur.

Field activities are conducted by a wide variety of departments at The University of Tokyo. These include all types of activities such as fieldwork, field observation, research and observation that include activities outdoors such as, surveys using observation boats, field practice for students, field excursions, etc. These field activities involve different types of danger that are distinct from those expected indoors, and there may even be the possibility of being seriously injured or in a worst case scenario, being involved in a life-threatening accident. Not only is there a possibility that you yourself may be injured, but there is also the possibility of hurting others as well. During field activities, every effort should be made to manage health and safety and to prevent accidents.

Faculty members have the responsibility to conduct field activities safely and prevent accidents. Additionally, with regard to field activities for bachelor's, Master's, and doctorate theses, even if the activities are conducted at the students' own expense or without the accompaniment of faculty members, the activities are still considered as part of the curriculum of the university. Therefore, supervisors are responsible for the management of health and safety and accident prevention during these activities; on the other hand, students must follow the regulations and guidelines, and manage health and safety and prevent accidents.

Should an accident occur, the person affected must act calmly and be cooperative. Faculty members must immediately notify their departments of the accident (students must notify their supervisors or faculties). Departments (or supervisors) notified of the accident must respond to it appropriately according to the seriousness of the accident.

With regards to the responsibilities and obligations, notification, and measures to be taken for accidents during field activities for all those involved in field activities, the "The University of Tokyo Regulations for the Management of Health and Safety during

Educational and Research Activities Conducted in the Field” (hereinafter referred to as the Regulations) has been established and must be observed (see Appendix 1).

Both the Regulations and this guidebook suggest only the minimum that the people of The University of Tokyo must observe, and when actually conducting activities, there may be additional regulations on health and safety which also need to be observed.

Chapter I: Before Starting Field Activities

- ▶ Be fully prepared and make appropriate plans.
- ▶ The leader (“responsible person”) of the educational/research group that conducts the field activities must be a faculty member of the University of Tokyo.
- ▶ The leader should develop a “Health and Safety Management Plan” and submit it to the relevant division/department before leaving to conduct any field activities.
- ▶ Equipment will differ depending on the conditions and environment of the field, so prepare thoroughly by consulting with experienced persons.

1. Planning and Responsibilities

1.1 Preliminary surveys and basic standpoint

- Conditions and dangers vary depending on the location, such as mountains, rivers, city centers, construction sites, the sea, vessels, disaster affected areas, etc., so conditions should be carefully surveyed. Expected dangers and the ways you respond to them should be thoroughly considered.
- Beginners should be accompanied by experienced persons and first learn how to conduct field activities from them. When the first field activity is expected to be dangerous, the team should consist of, and be led by several experienced persons.
- Field activities require more physical strength than that for experiments and research conducted indoors, so it is important to train daily to develop physical strength.
- For basic standpoint for safety, please refer to the introduction of this booklet.

1.2 Planning and preparation

- A “Health and Safety Management Plan” (Please refer to Chapter I, “2.1 Submission of a Health and Safety Management Plan Document”) should be prepared and it is mandatory for the leader of an educational/research group to submit it to his/her division/department before setting out for field activities (Article 5 of the Regulations).
- Plans should not be tightly scheduled but scheduled with plenty of time for each

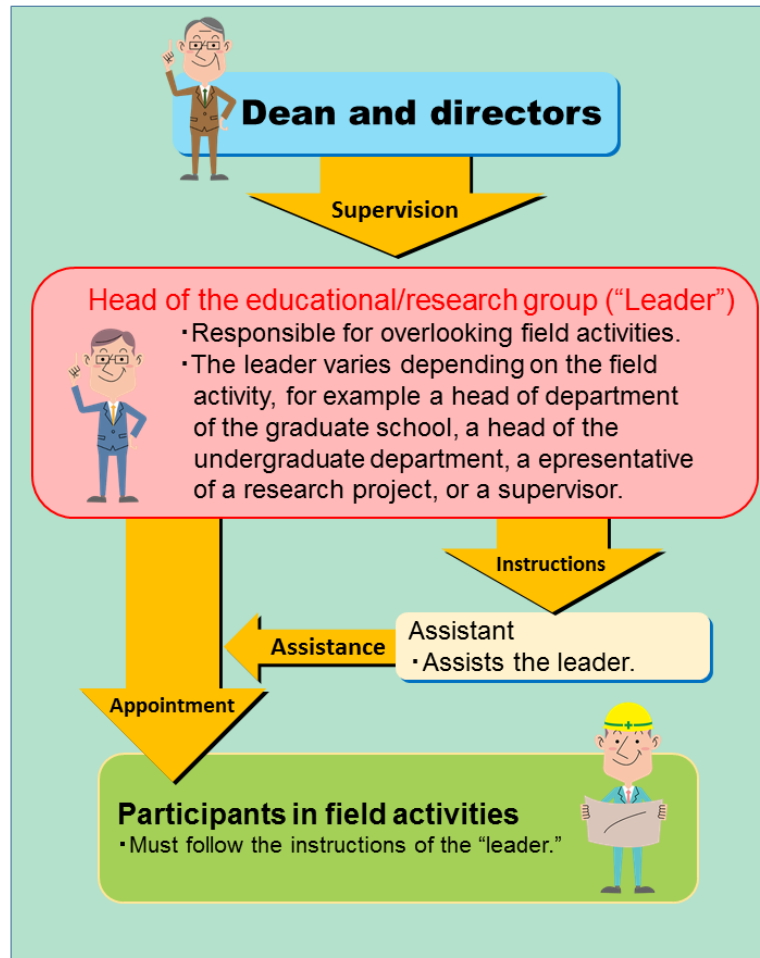
activity.

- Planned activities may become difficult to conduct due to changes of conditions in the field. Therefore, it is better to schedule the minimum amount of necessary activities, rather than creating a tight schedule and canceling activities as conditions change.
- Long-term plans should include an appropriate amount of days for rest.
- The leader of an educational/research group should make plans appropriate to the level of the participants' skills.
- Items, outfits, and procedures required for field activities should be listed after consulting with experienced persons and conducting attentive thought experiments, and should be prepared fully in advance. The details of necessary goods and outfits for several fields will be discussed later.

1.3 Responsibilities (Articles 6 & 7 of the Regulations)

1.3.1 Structure of responsibility

- Even if students conduct field activities on their own, as long as the activities are considered as part of the curriculum, they are to be conducted under the structure of responsibility consisting of the President, executive vice president in charge, deans and directors, heads of fields of studies, departments, research offices and educational/research projects, supervisors, and students. If an accident occurs due to defects in the content and/or the framework of the "Health and Safety Management Plan Document," those responsible will range from the supervisors to the entire university.
- Deans and directors should make sure that field activities carried out by all members of the university (faculty members, students, research students, and others) are conducted safely and that the latter have observed all regulations and relevant laws. The former should improve any defects and may order the latter to terminate field activities if necessary (Article 6 of the Regulations).
- Participants in field activities must observe the Regulations, precautions given in this guideline, and instructions from the leaders of educational/research groups, and conduct field activities safely.



1.3.2 Head of an educational/research group and his/her responsibilities (Article 7 of the Regulations)

- The head of an educational/research group, who prepares the “Health and Safety Management Plan” and is responsible for the management of health and safety, is constantly responsible for the management of health and safety during field activities (Hereinafter the person is referred to as the “leader”).
- The “leader” must be a faculty member of The University of Tokyo.
- The “leader” must be a head of department of the graduate school or a head of the undergraduate department, a representative of a research project, or a supervisor for field activities by students.
- Specifically, the person who prepares the “Health and Safety Management Plan” is the “leader” for each of the field activities.
- For field activities conducted by students under the guidance of a supervisor, the “leader” is the supervisor. The supervisor is the “leader” even if the field activities are conducted only by students. Therefore, the supervisor is also expected to prepare and submit the “Health and Safety Management Plan Document” to the relevant department.

1.3.3 Assistant (Article 7, Item 6 of the Regulations)

- An “assistant” to the “leader” should be appointed to assist in the management of health and safety and the prevention of accidents in field activities.
- The overall responsibility of health and safety management and accident prevention still lies with the “leader.”
- The “assistant” should keep in frequent contact with the “leader” during field activities for the management of health and safety.
- Field activities by one single person should be conducted with great care.
- If the “leader” is not participating in field activities, the “assistant” should be selected from one of the participants to ensure health and safety during field activities. The “assistant” should implement and make any necessary adjustments to the “Health and Safety Management Plan,” and report any accident while keeping in frequent contact with the “leader.”
- If field activities are conducted solely by students, the “responsible” person should be the supervisor, the head of the undergraduate department, or the head of department of the graduate school, and the “leader” should appoint an “assistant” from among the students.
- If it seems challenging for the “leader” to responsibly provide health and safety security and maintain frequent contact, field activities conducted solely by students must not be approved.

2. Notification and Insurance

2.1 Submission of a “Health and Safety Management Plan Document” (Article 5 of the Regulations)

- The preparation of a “Health and Safety Management Plan Document” is necessary for the development of a proper plan, notifying one’s department and the supervisor of the schedule, and for executing a swift response in case of an accident. (Please see “Appendix 3” for a sample.)
- Compiling a “Health and Safety Management Plan Document” is an opportunity for participants to gather information, survey the conditions of the field, and simulate any dangers, which in turn will lead to averting risk and preventing accidents.
- The “leader” must develop a “Health and Safety Management Plan.” In the “Health and Safety Management Plan Document,” the “leader” must indicate the site of field

activities, schedule, accommodations, names of participants and their emergency contact details (e.g. home telephone number), means of transportation, response to dangerous/harmful work, response to dangers expected at the activity sites and the surrounding environment, response to laws and regulations relating to health and safety, and ways to make contact in case of emergency. The “leader” should attach, if necessary, a detailed schedule with a map, contact details of medical institutions/police stations/fire stations, information on whether participants are insured or not, contact details of the “leader” if he/she stays in the university, expected timing for making a search request (when to start a search after a period of no contact), etc.

- The “leader” must notify all participants of the “Health and Safety Management Plan Document” and submit it to the head of department through the Environment, Health and Safety Office of the department (formerly the Health and Safety Management Office).
- The head of department should examine the submitted “Health and Safety Management Plan Document” to see whether or not health and safety have been ensured as well as whether or not laws and university regulations have been observed. If these are not confirmed, the head of department may ask the plan document to be revised and resubmitted. If the above aspects are still not confirmed after revision and resubmission, the head of department may order the termination of field activities.
- For activities conducted solely by students, the “leader” (in this case, the supervisor, the head of the undergraduate department, or the head of department of the graduate school) must prepare a “Health and Safety Management Plan Document” after thorough consultation with the appointed student assistant and responsibly submit the document to the dean or director. For example, the “leader” should take full responsibility even for a plan document prepared mainly by the students.

Precautions

- The submission of a “Health and Safety Management Plan Document” is mandatory for activities conducted in any area outside the premises of the university (Article 10 of the Regulations). The submission of a “Health and Safety Management Plan Document” is not mandatory for field activities taking

place within the premises of the university including the university's forests, practice facilities, observatories, etc. Those conducting field work in the university premises should observe general precautions in this guideline by following rules set by each facility. On the other hand, activities conducted outdoors and outside the premises of the university (e.g. surveys conducted in villages and cities, in mountains, rivers, seas, etc.), require the submission of a "Health and Safety Management Plan Document."

- In principle, a plan document needs to be submitted for each field activity session. However, where survey activities involve frequent visits to one particular site (for example, a daily boat visit to a certain sea area), exceptional measures, such as the submission of one plan document for a series of survey sessions, can be approved by the judgment of the dean or director.

2.2 Insurance

- In case of accidents involving injury to students during educational and research activities, The University of Tokyo began paying insurance premiums from April 2007, so that all students are mandatorily insured by "Personal Accident Insurance for Students Pursuing Education and Research" (called *Gakkensai*).
- Students covered by the *Gakkensai* include both undergraduate and graduate students, as well as others such as research students in research institutes. Research fellows of the Japan Society for the Promotion of Science are not covered automatically, but they may voluntarily be insured (at their own expense).
- Coverage by a more comprehensive insurance will be taken into consideration as needed.

<Reference>

Information on Personal Accident Insurance for Students Pursuing Education and Research

Website of Japan Educational Exchanges and Services

<http://www.jees.or.jp/gakkensai/index.htm>

(Japanese only)

2.3 Qualifications and Laws

- For activities that have laws and regulations requiring qualifications or special education, the relevant activities must not be carried out if the requirements stipulated in the laws and regulations are not met.
- Vehicles and motorcycles must be driven by those with a driving license and enough experience.
- In principle, operation of boats with a propulsion engine requires a small vessel operator license (This does not apply if the boat has a power output of less than 1.5 kW and is shorter than 3 m in length).
Operation of a yacht that draws over 5t, even without a propulsion engine, also requires a small vessel operator license. Operation of a watercraft requires a special small vessel operator license.
- For field activities involving scuba diving, operation of cranes or forklifts, chainsaws, etc., national qualifications and requirements stipulated in the Industrial Safety and Health Act need to be met.
- Should there be a possibility that surveys in national and quasi-national parks will violate the Natural Parks Act, permission must be obtained from the Ministry of the Environment and the governing park offices, and the prescribed procedures need to be followed. You also need to notify the governing forest management offices of any work to be conducted within national forests by following the prescribed procedures.
- Other laws relating to field activities must also be observed.

Qualifications and requirements relating to field activities required in the Industrial Safety and Health Act and other relevant laws

Diving (including scuba diving)	Diver's license
Operation of valves for diving	A person who has completed Special Education for Work under High Pressure
Work at sites with risks of oxygen deficiency (Refer to "Note")	A person who has completed Special Education for Work on Oxygen Deficient Dangers
Blasting work	Blasting operator's license Explosives handling and safety engineer's license
Forestry cableway operations	Operations chief of forestry cableway license
Operation of cargo lifting appliance	Cargo lifting appliance operator's license

(Limit load of 5t and over)	
Operation of cargo lifting appliance (Limit load of less than 5t)	A person who has completed a special training course for the operation of cargo lifting appliances
Operation of a crane (Lifting load of 5t and over)	Crane/derrick operator's license or crane operator's license
Operation of a mobile crane (Lifting load of 5t and over)	Mobile crane operator's license
Operation of a derrick crane (Lifting load of 5t and over)	Crane/derrick operator's license or derrick operator's license
Operation of a mobile crane (Lifting load of between 1t and over and less than 5t and over)	A person who has completed a skill training course for the operation of compact mobile cranes
Operation of a mobile crane (Lifting load of less than 1t)	A person who has completed a special training course for the operation of mobile cranes
Operation of a forklift (Limit load of 1t and over)	A person who has completed a skill training course for forklift operation
Operation of a forklift (Limit load of less than 1t)	A person who has completed a special training course for the operation of forklifts
Operation of a derrick crane (Lifting load of less than 5t)	A person who has completed a special training course for the operation of derricks
Operation of a shovel loader/fork loader (Limit load of 1t and over)	A person who has completed a skill training course for the operation of shovel loaders, etc.
Operation of a shovel loader/fork loader (Limit load of less than 1t)	A person who has completed a special training course for the operation of shovel loaders, etc.
Operation of a transporting vehicle on rough terrain (Limit load of 1t and over)	A person who has completed a skill training course for the operation of transporting vehicle on rough terrain A person who has passed the examinations for construction technique using construction machines
Operation of a transporting vehicle on rough terrain (Limit load of less than 1t)	A person who has completed a special training course for the operation of transporting vehicles
Operation of a chainsaw	A person who has completed a special training course for the operation of chainsaws
Operation of a machine for concrete placement	A person who has completed a special training course for the operation of the operational apparatus of a concrete pump vehicle
Adjustment and operation of a jack-	A person who has completed a special

type lifting machine	training course for the adjustment or operation of jack-type lifting machines
Operation of a boring machine	A person who has completed a special training course for the operation of boring machines
Operation of a power winding machine	A person who has completed a special training course for the operation of power winding machines
Slinging operation	A person who has completed a skill training course for slinging operation
Operation of a construction lift	A person who has completed a special training course for the operation of construction lifts
Operation of a gondola	A person who has completed a special training course for the operation of gondolas
Operation of a motive power unit of railway equipment	A person who has completed a special training course for the operation of motive power units of railway equipment
Excavation of tunnels, etc.	A person who has completed a special training course for the excavation, lining, etc. of tunnels, etc.

Operations involved in field activities that require an operations chief stipulated in the Industrial Safety and Health Act and its related laws and regulations

Work in places with an oxygen-deficient danger	A person who has completed a skill training course for operations chief of oxygen deficient danger A person who has completed a skill training course for operations chief of oxygen deficient/hydrogen sulfide danger
Operation of a machine for concrete placement	A person who has completed a skill training course for operations chief of concrete crushing machines
Excavation of tunnels, etc.	A person who has completed a skill training course for operations chief of excavating tunnel, etc.
Lining of tunnels, etc.	A person who has completed a skill training course for operations chief of lining of tunnel, etc.
Excavation of natural ground of 2m or higher, and shoring with earth retaining	A person who has completed a skill training course for operations chief of excavating

support	natural ground and shoring with earth retaining support
Excavation work for quarrying rocks on reclaimed surfaces of 2m or higher	A person who has completed a skill training course for operations chief of excavating for quarrying
Erection, dismantling or alteration of steel frame structures of 5m and higher	A person who has completed a skill training course for operations chief of erection, etc., of steel frame of buildings, etc.
Erection of wooden buildings of 5m and higher, or installation of roof beds and exterior wall beds	A person who has completed a skill training course for operations chief of erection, etc. of wooden buildings, etc.
Erection, dismantling or alteration of suspended scaffolds, outrigger scaffolds and scaffolds of 5m or higher	A person who has completed a skill training course for operations chief of erection, etc., of scaffolding

Note: Work at sites with risks of oxygen deficiency (Ordinance on Prevention of Anoxia: Appended Table 6, excerpt)

- Inside of wells, etc. (meaning wells, well curbs, shafts, tunnels, caissons, pits and other similar structures, the same shall apply in the next item) (excluding the places listed in the next item) in contact or leading to the following strata: Gravel layers topped with the impermeable layers, areas without water content or spring or with a small amount of water, strata containing ferrous salts or manganese salts, strata containing methane, ethane or butane, strata from which carbonic water is welling up or likely to well up, rotten layers
- Inside of wells, etc. that have not been used for a long period
- Inside of covered conduits, manholes or pits for accommodating cables, gas pipes and others to be installed underground
- Inside of pools, covered conduits, manholes or pits with rainwater, river water or spring water accumulated inside or those having once been filled with such kind of water
- Inside of the heat exchangers, pipes, covered conduits, manholes, ditches or pits (hereinafter referred to as "heat exchangers, etc.") where sea water remains or has once remained, or the insides of heat exchangers, etc., which have been filled with sea water for a considerable period of time or have once been filled with sea water
- Inside of steel boilers having been left closed tightly over a considerable period, tanks, reaction towers, holds and other facilities inside of which is

- apt to be oxidized (excluding those made of stainless steel or provided with an inside coating of appropriate antioxidants)
- Inside of storage facilities such as tanks, holds and hoppers, containing coal, lignite, sulfide ore steel, scrap iron, lumber, chips, volatile oil, fish oil and other oxygen absorbing substances or materials
 - Inside of silos, cellars, warehouses, holds or pits used for the storage of grains or livestock feeds, ripening of fruits and vegetables, germination of seeds or growing of mushrooms and the like
 - Inside of tanks, cellars or brewery chambers which contain or have once contained soy sauce, Japanese rice wine and the like, unrefined Japanese rice wine (soy), yeasts, and the other fermenting substances
 - Inside of tanks, holds, pools, pipes, covered conduits, manholes, ditches or pits containing or having once contained sewage, rotting earth, waste water, pulp liquid and other substances which are apt to decomposed easily

3. Various Equipment and Precautions Required for Different Field Environments

- ▶ Equipment required will vary depending on the objectives, content, destinations (mountains, rivers, urban areas, construction sites, vessels, the sea, disaster-stricken areas, etc.), and climatic conditions.
- ▶ A minimum level first-aid kit should be carried. The kit should include plasters, gauze, triangular bandages, disinfectant, bandages, antipyretics, antidiarrheal, etc. (Refer to Chapter V, “First Aid and Medical Knowledge Needed for Field Activities”).
- ▶ A health insurance ID card or its photocopy. A photocopy of an insurance contract document should also be brought if the participant has taken out insurance individually.
- ▶ The “Health and Safety Management Plan Document” and notes on emergency contact details. These should be carried even for surveys conducted in urban areas where no special outfits are considered necessary.
- ▶ This booklet should be carried and referred to as needed.

- ▶ Mobile phones are effective communicational tools but may not receive signals in areas such as mountains and isolated islands, so other means of communication should be considered in advance. Satellite phones should be carried as required (rental satellite phones are available.).
- ▶ Some types of equipment have a specified service life and regular maintenance periods. Equipment within their service life should be used, and maintenance should be conducted at the specified interval.

3.1 Activities in the mountains

- You should wear caps, long-sleeved shirt, long trousers, rain gear (when necessary) and climbing boots. Generally the temperature goes down by 6°C for every 1,000 m ascended, so appropriate clothing should be prepared for changes in temperature.
- Clothes and spare clothes should be prepared for sudden changes in the weather.
- Helmets should be prepared if the planned location includes cliffs or rocky areas.
- Climbing boots should always be well-maintained. Soles of the boots may suddenly come off while walking in mountains, making it impossible to continue walking. If you notice any gaps between the boots and soles or water starts coming inside the boots, the boots need maintenance or replacing. While walking in the mountains, wide taping plasters are also useful if the soles come off your boots as they can be used to temporarily fix the soles back on.
- Trekking shoes are preferred for mountains that are not so steep.
- Bags should be strong and not interfere with your activities. Bag covers should also be carried in case of rain.
- Insect repellents, masks, work gloves/rubber gloves, goggles/sun glasses, compasses, maps, hammers/shovels, field books, sampling bags, mobile phone, GPS, etc. should be carried as needed.
- A compass clinometer should be carried for geographic surveys.
- Enough water and food should be prepared in case of emergencies. Even if activities are to be conducted during the day, flashlights should be carried in case you lose



your way and need to move about after dark. In case you need to make camp in the mountains during an emergency, carrying lightweight and compact tents should be considered as needed.

- Information on climate should be obtained in advance from appropriate sources such as the AMeDAS website. You need to be aware that due to updrafts in mountains there is normally about one and a half times to twice as much rain expected compared to flat areas. Plans should be postponed if rain is expected.
- Weather in the mountains tends to change suddenly after 2 pm, so planned activities should start and end early.
- When walking in a line as a group, experienced persons should be positioned at the front and the back of the line so that they can make sure that the gap between the lead and the end of the line is not too far apart or disorderly.
- Activities involving camping, climbing up cliffs or climbing snowy mountains require heavily loaded outfits and concentration. Make sure to have persons with sufficient experience to accompany the group.
- You should keep an eye out for falling rocks when conducting activities on cliffs or rocky slopes.
- When it is raining or rain is expected, you should avoid going down towards a stream from the mountains. Note that you may not be able to cross the stream due to a swelling of the water or you may encounter a flash flood.
- When snowing, you should wear the appropriate attire (e.g. snowsuits, crampons), carry ice axes and should be accompanied by persons with sufficient experience.
- When conducting activities on snowy slopes, be aware of avalanches. From December to February there are more surface avalanches (fresh snow avalanches) that happen right after snowfalls, and from March to May, there are more total layer avalanches with piled-up snow sliding due to the rise in temperature. Surface avalanches (fresh snow avalanches) can occur at any time of the day, while total surface avalanches tend to occur during the day when temperature rises. Therefore, during the season when total surface avalanches are expected, you are encouraged to pass any areas with slopes of 30 degrees or more (where avalanches are likely to occur) early in the morning. When conducting field activities in snowy mountainous areas, you should increase your awareness on avalanches and snow walls before leaving for these activities.
- From April to May, when it is warm in flat areas, there may still be snowfalls in some

mountainous areas and you should be aware that avalanches are highly likely to occur during this period.

- Be aware that there may be snowfalls in some mountainous areas in and around October, even when it is still warm in flat areas.
- When conducting activities in groups, if some participants become unable to continue the activities because of exhaustion, illness or injuries, some of the other participants must accompany them, or the activities as a whole must be suspended.
- When camping or bivouacking in the mountains for an emergency, ridgelines of mountains should be avoided because you may be exposed to strong wind. Areas other than ridgelines with weaker winds should be chosen.
- If you get lost in the mountains, you should not wander aimlessly. Wandering aimlessly will exhaust you and increase the risk of your sliding down, so you should wait for rescue at a place with as much visibility as possible. Going down to streams must also be strictly avoided when you are lost.
- Many mountain trails have rough surfaces and soft shoulders, so driving on those trails requires sufficient experience and attentiveness. Speeding must also be strictly avoided when driving a vehicle.
- When conducting activities near volcanoes, you should be fully aware of volcanic gases that may be harmful to the human body. For example, hydrogen sulfide is a toxic gas with a smell of rotten-eggs and hinders the human body's use of oxygen, so if humans inhale more than a certain amount of hydrogen sulfide, they will become unable to move their bodies freely, will quickly become unconscious, and may often end up with cardiopulmonary arrest. Therefore, it is important not to get close to areas with a rotten-egg smell. Hydrogen sulfide is also heavier than air and tends to stagnate in depressions and valleys, so if you find someone fallen because of hydrogen sulfide poisoning, you should not immediately go to their rescue alone and should try to call out loudly to gather as many people as possible. This is because there is a danger of the rescuers also being exposed to hydrogen sulfide and liable to result in a secondary disaster. When conducting activities in areas that may cause hydrogen sulfide poisoning, it is necessary to carry gas masks and hydrogen sulfide detectors to protect against hydrogen sulfide.

Cases of accidents during field activities – activities in the mountains –

“Accident involving a vehicle falling during a survey conducted in the mountains”

Two students died in an accident involving a vehicle falling from a mountain trail. The accident happened the day after they left the university. They had been taking turns driving and napping in the car. The department found out about the accident 7 days after the accident had happened. It was a further 10 days after an extensive search that their bodies were found. There was a systematic failure in checking the preparation of the action plan and activity schedules.

“A fatal accident caused by a falling rock during a field survey in the Hida Mountains (Northern Alps)”

A supervisor and five students were carrying out a geological survey in a valley of Mt. Maehotakadake in the Northern Alps at an altitude of about 2,800 m. One of the students died after being struck in the head by a falling rock.

“A habu snake bite in the mountains”

A researcher carrying out a night-time ecological survey in Amami Oshima, felt a pain similar to that of an animal bite, when he touched a tree while trying to climb a slope. He was not able to find the animal to be able to identify the animal necessary for treatment later. He then hurriedly drove down the mountain to where his mobile phone could receive a signal to arrange for an ambulance. While waiting, he bound his wrist with tape and sucked the poison out from the wound. He then had the wound surgically operated on at the hospital and was discharged three days later.

From the diagnosis, the animal that bit him is considered to have been a habu snake. Prior confirmation of the means of achieving communication, knowledge of appropriate ways of coping, and calm behavior contributed to the prevention of a serious injury.

“A speeding accident on unpaved road in a suburb of a foreign country”

A car carrying 3 researchers heading from a work place in a city in Utah, U.S.A., to a temporary collection point in the suburbs, went off the road as it was about to approach a bend after a long straight section of unpaved road. The car overturned and was partly damaged. About 10 minutes later another car that was also heading to the collection point reported the accident using emergency radio service and the 3 researchers were transferred to a hospital. The two researchers in the front seats had contusions and scratches on their hands, and the other researcher in the back seat

had contusions on the left shoulder and the right leg. The accident happened because the driver of the car did not reduce his speed sufficiently when approaching the uphill, right-hand bend from the straight section of the unpaved road.

“A student got lost on the way back from field work in the university forest”

On the way back from a field work, a student walking in the middle of the line took a wrong turn and got separated from the group. The supervisor discovered this after they had descended the mountain trail and urgently started a search. A few hours later they found the student who had gotten lost. Although the participants were walking in a group, those who were walking behind the student in question did not notice that the student had gone the wrong way. The incident happened because the group did not observe the precaution of not keeping the line by maintaining a proper distance between the front and the end of the line.

“A fatal incident caused by hydrogen sulfide at a hot spring” (Not during educational and research activities)

A faculty member and his family visited a hot spring in Akita during the holidays. He went to look for his wife who had gone out to look for their children that had been playing in the snow, but did not return. They were all found dead later in a depression in a bank of snow. There was a strong rotten-egg smell in the depression, so it was assumed that the children fell into the depression and collapsed because of hydrogen sulfide poisoning, and the mother and the father themselves suffered secondary disaster while trying to rescue the children.

3.2 Activities in rivers, streams and lakes/marshes

- When carrying out activities in rivers, you should be as fully aware of changes in the weather as with activities in the mountains. Generally, when it is raining or rain is expected, activities in or near rivers should not be carried out.
- When conducting activities in rivers and there is a risk of drowning, you should prepare and carry ropes (climbing ropes, etc.) which are long enough to rescue a drowning person.
- When conducting activities in rivers, be cautious of water currents. If the water current is stronger than expected, you may be swept away by the flow of the water.
- When conducting activities in rivers, be aware that the water can suddenly become

deep as you get closer to the middle of the river, even if it looks shallow.

- When you see someone drowning, do not try to rescue the person alone; you should gather as many people as possible to rescue the person. Throw the rope you prepared beforehand at the drowning person, and loudly urge the person to hang on to the rope.
- When conducting activities in rivers, do not wear waders. If you fall into the river, water will come inside the boots, making it difficult to float to the surface. Ropes, life jackets, wet suits, etc. should be prepared as required.
- Even if it is not raining at the location while conducting activities in rivers, the volume of water may suddenly increase if it is raining upstream. The rain upstream may also cause flash flooding. Therefore, it is important to always be wary of the weather conditions upstream also. When conducting activities on a sandbar, the swelling of the river may make it impossible to get off the sandbar. If it is raining or is expected to rain upstream, activities must be discontinued. You should move off the sandbar to the riverbank and try to evacuate to the closest high ground.
- If the water of the river suddenly becomes muddy, you should suspect that it may be raining upstream.
- Beware that in places where the channel is straight and deep, it may be difficult to swim towards to the riverbank if washed away by the water, because of the force of the current.
- If concrete protection works have been conducted on both sides of the riverbanks, the water current will always flow towards the center of the river, making it difficult to swim back to the bank if you are washed away. It may also be difficult to hold on to the concrete wall, even if you reach the bank. Therefore, it is important to be extremely careful not to be washed away by the current in a river which has its banks protected by concrete.
- Downstream of man-made dams (banks and dams made to cross rivers and valleys for the purposes of storing water, controlling floods, and controlling sand erosion), the currents tend to be rapid. Once you fall into the current, there is a high risk of not being able to escape because your body is caught up in the current. Therefore, when you are conducting activities on man-made dams, it is best to avoid entering the water upstream.
- Water flows rapidly through wave-dissipating concrete blocks (such as tetrapods) from upstream to downstream. If you are washed away by the current upstream,

there is a risk of being drawn in between the blocks by the water flow. Therefore, close attention should be paid when you approach wave-dissipating blocks.

- There can be large rocks on the shores of rivers and lakes/marshes, so falling on the shore may result in serious injury, or falling into the water and drowning. You should be especially careful when stepping on rocks with moss and algae, because it can be extremely slippery.
- You should be careful when walking near mountain streams because dangerous and harmful animals, such as pit vipers, are often found there.
- You should not operate a boat or a canoe unless you are fully experienced. If you move your body carelessly on a boat or a canoe, you may lose balance and capsize, which may then lead to a drowning accident. Additionally, operating a boat with a propulsion engine output in excess of 1.5 kW and longer than 3 m in length, usually requires a small vessel operator license.
- When conducting activities near lakes/marshes with ice forming on the surface, make sure to not step on the ice carelessly.

Cases of accidents during field activities – activities in rivers, streams, and lakes/marshes –

“A fatal accident of drowning in a river”

During a session gathering samples in a rocky area of a riverbank, a student fell into the water. The student was not able to resurface and died from drowning. The participants of the field work had been wearing waders. If you fall into the water with waders, it can be fatal since water can pour inside the wader, making it difficult to keep the body afloat. This accident is an example of the importance of wearing proper outfits.

“A fatal accident caused by a flash flood while camping near a mountain stream”

Four members of the university’s hiking club had set up their tent for camping on the way back along the stream in the Mt. Hidaka range in Hokkaido, because it had started raining. At about 8:30 P.M., they were washed away along with the tent, due to a sudden flash flood. One of them was able to escape on their own, but the others were later found dead. The area where they set up the tent was a narrow space, sandwiched by rocky walls on both sides.

“An accident involving a fall while walking along a riverbank”

While walking along the riverbank during a field survey in a river (a tributary of the Oashigawa River, Kanuma City, Tochigi), one person lost their balance after being swept off their feet, and fell on their back. The equipment the person was using was a measuring staff. The person hit their back hard and though hurt, was able to walk without help. The survey was then discontinued and the person was taken to hospital to receive a medical examination and was found to have a fracture.

3.3 Activities along the coast or those using small vessels

- You should always wear a cap/hat.
- You should prepare footwear with proper grip, like deck shoes, marine boots, long boots, and so on. High heels, sandals and waders should be avoided.
- When the sunlight is strong, wear sunglasses and apply sunscreen.
- You should wear a long-sleeved shirt and long trousers in order to avoid sunburn and injuries caused by animals or bedrock.
- You should always carry a mobile phone for emergencies.
- You should protect yourself against the cold at sea and should wear a windbreaker.
- Water-resistant paper should be used for your itineraries and maps.
- Mobile phones, cameras, GPS, etc. should be stored in a waterproof bag/box.
- You should learn about the tides in advance using a tide table.
- During activities which use a small vessel, you should observe the captain's instructions and always wear a life jacket.
- You should maintain a low center of gravity while on a vessel and should not sit on or touch the gunwales.
- If you fall into the water, you should calmly wait for rescue (your life jacket will keep you afloat). If you find someone has fallen into the water, immediately report the accident to the captain and telling him the whereabouts of the person who has fallen in.
- If you find someone drowning and panicking, rescue the person from the shore or by throwing something to keep the person afloat. You should be aware that if you swim to the rescue, the drowning person may cling to you, causing you to drown as well.



3.4 Activities using large research vessels

When conducting activities using the university's large research vessel or a fisheries research vessel, etc., you should observe the regulations on safety measures for each boat.

In this section, only the general precautions are listed.

- You should confirm in advance where the life jackets are stored and how they should be used. You should also confirm escape routes and the location of the closest fire extinguishers.
- When engaged in observation work, you should wear the appropriate clothing, shoes, helmet, working gloves and a life jacket. (Rain gear and snowsuits should also be prepared depending on the weather condition.) Clothes that may get caught in machines, such as a winch, must be avoided.
- While conducting your work, you should be careful not to get caught in winches, wires, or ropes. You should especially avoid stepping under wires that are being used for the observation work, as it is very dangerous. You should not step onto or over any ropes that are in use. You should never step within the danger zone around a rotary roller.
- During rough weather, you should take safety into account by closing the portholes, lashing all observation devices, and use handrails when walking. You should also not go out on the deck unless it is necessary.
- You should avoid going out on deck as much as possible during the night. If you must go out, you must be accompanied by another person so that each of you can watch over the other.
- If you find someone who has fallen into the sea, notify the people around you by calling out for help, throw the closest available life buoy (or anything else that floats) into the sea at the drowning person, and report the accident to the bridge of the ship.
- If you notice a fire, notify the people around you, conduct initial firefighting using fire extinguishers and report the incident to the bridge.



Cases of accidents during field activities – activities involving large research vessels –

“An accident involving a fall from an academic research vessel”

The academic research vessel left on a research voyage during which marine observation work was carried out. After the work was completed and the vessel was on the way to another area for further observation work, researchers on board reported that one of the other researchers was missing. As the whereabouts of the researcher was unknown, it was highly likely that the researcher had fallen into the sea so the vessel turned back to start a search on the sea surface while the search inside the vessel continued. At about the same time the Japan Agency for Marine-Earth Science and Technology and the Japan Coast Guard were notified of the accident. Around 2 hours later, the researcher who had fallen in was discovered and taken back onto the vessel. The researcher was conscious and was wearing a life jacket. The researcher was transferred by helicopter and then accompanied to the hospital with another person to receive a medical examination. Immediately after the transfer, the researcher was suffering from hypothermia (35°C) due to exposure to water (falling into the sea), but after receiving IV treatment, the body temperature recovered to 37.2°C. The researcher had inhaled a small amount of seawater and signs of pneumonia were found in both of the lungs by a chest CT scan, but the researcher recovered after taking antibiotics for a few days. It is reported that the researcher felt sick during the night and went out on deck and fell into the sea. The greatest problem was that the researcher went out on deck alone in the middle of the night, when the researcher should have asked someone to go outside together for a breath of fresh air. It was a blessing that the researcher was wearing a life jacket.

3.5 Underwater Activities (Skin diving and scuba diving)

Activities involving diving should be recognized as dangerous work that may result in a fatal accident and must be conducted only by those who have completed necessary/proper training and after completely securing safe circumstances. In principle, the person conducting work should have a C-card (certification cards issued by private diving organizations) for skin diving, and must have the C-card



and diver's license stipulated in the Industrial Safety and Health Act for scuba diving. Activities must be conducted according to the relevant laws/regulations and the university rules and manuals.

- The C-card is issued by private organizations and the standards vary among the issuing organizations and even among diving shops. A diver's license is a national qualification, but is obtained by passing a paper examination and does not guarantee diving skills. Even if a person possesses a C-card or a diver's license, the person may have forgotten the necessary skills if he or she has not dived for a long period of time. You should be aware that activities in the sea require not only a C-card and a diver's license but also proper skills for conducting the work, and it is also important to train daily.
- A diver's license is required by law when scuba-diving is carried out as part of research work. The paper examinations for the license are in Japanese, and thus foreign researchers who are not able to take the exams due to language difficulties, must participate in training sessions provided by the departments or university give, and be sure the dives are conducted within the laws.
- You should prepare a diving plan and submit the plan document in advance. At the survey site you should also discuss and share information in detail about the buddy system, depth of the dive, conditions of the survey area, response to emergencies, among the team members.
- An operations chief of diving work should be appointed in order to ensure the safety of the work. Also for safety purpose it is advisable to appoint an observer.
- As a general rule, the buddy system should be applied and you should not act independently.
- Before starting any diving work, health conditions and diving equipment should be examined by 2 persons or more and the results should be confirmed by one another.
- You should prepare equipment such as wetsuits, masks, snorkels, marine boots, fins, BCDs (buoyancy control device), diver's knives, gloves, and waterproof recording paper. You should also become fully familiar with how to use them.
- For scuba diving, you should wear/carry a tank, a regulator, a weight belt, a compass, a surface marker buoy, etc. Relevant laws and regulations stipulate that, depth gauges underwater watches, gas cylinders and regulators need to be inspected and maintained regularly.
- You should raise a diving flag at the spot of your activities.

- You should not conduct skin diving activities with only swimming trunks or swimsuit in order to avoid sunburn and injuries caused by animals/plants or bedrock.
- You should wear a dry suit in sea areas with a low water temperature.
- You should take measures against losing survey devices underwater by attaching a strap or a karabiner.
- For fundamentally essential equipment, use good devices that are suitable for you. You must perform an operation check on any rented equipment. As devices deteriorate due to seawater, you should maintain and examine devices before and after field activities, examine them regularly, and be careful about their service life.
- You should be aware of the tides in advance by using a tide table. You should be careful about the conditions of waves and should cancel any diving survey if the waves are high and the weather is rough.
- Even while work is in progress, the operations chief of diving work must immediately discontinue the work when the sea conditions worsen, when divers feel unwell, or when any sort of trouble occurs.
- Each person and each laboratory must make a diving record.
- Activities involving scuba diving require a C-card and a diver's license as prescribed in the Industrial Safety and Health Act. It is necessary to thoroughly monitor diving skills and health conditions.
- If someone is drowning and panicking, you should throw something at them to keep them afloat, or approach the person from behind and put some air into their BCD. You should avoid being clung to, which may result in a fatal secondary accident.
- Precautions for scuba diving apply to hookah diving and standard diving with a helmet.

Cases of accidents during field activities – Underwater accidents –

“A drowning accident during a submersible survey”

One faculty member, one researcher and 2 students conducted a survey for collecting samples in Hachijojima Island. Right after starting the dive, the researcher sent a signal to the professor and tried to surface alone because water had entered his mask, but then the researcher went missing. The researcher was found two and a half hours later on the nearby sea bed after a search, and was confirmed dead on being pulled up. The buddy system must be applied when there is any trouble and a

diver needs to surface, however, in this case this was not observed. Furthermore, the diving skills of the researcher were not clearly understood and the researcher did not possess a diver's license. These are the main causes of this accident. The Labor Standards Inspection Office sent papers regarding the case to the public prosecutor's office against the faculty member and the university, for violation of the Industrial Safety and Health Act.

3.6 Activities in areas close to urban areas and local communities where people lead daily lives

Many laboratories conduct field activities in urban areas and local communities. There are dangers including traffic accidents in those areas, even though the activities are often similar to those we conduct in our daily lives. There may also be dangers of encountering criminal acts such as theft of equipment, assault, etc. In terms of equipment, it is difficult to generalize what sorts of equipment is necessary because they will vary depending on the purpose of the surveys or the conditions of areas to be surveyed.



In this section, general precautions are listed.

- If the activities involve walking around, wear shoes that are comfortable and easy to walk in.
- When conducting activities in areas that can easily dirty clothes, equipment, etc. such as a factory site or a river bed, wear clothes that you can move in easily and you don't mind getting dirty.
- If your activities involve interaction and questioning people, you should choose clothes that will not cause offense to others.
- When conducting activities on roads during the night, you should wear clothes with high visibility (such as yellow).
- During summer, you should wear a hat and long-sleeved shirt to protect yourself from the sun.
- When conducting activities in the suburbs or rural areas, you should wear a hat and white or light-colored clothes because there is a possibility of being attacked by bees. (Refer to Chapter IV, "1.3.1 Bees")

- When conducting activities in an environment where you will always come into contact with an unspecified large number of people, you need to be as careful as possible because your devices may be damaged, your belongings may be stolen, or you may damage others' assets. You must also make sure that pedestrians will not get involved in traffic accidents when trying to avoid any devices you have installed on the pavement.

When conducting field activities in urban areas, you tend to be less cautious because the danger level is somewhat similar to that of our daily lives. There was an actual case in which someone patted an apparently tame dog but was bitten and had to be vaccinated against rabies. Even for field activities in urban areas, it is necessary to be fully prepared for field activities by ensuring your safety and that of others, taking preventive measures against crime, securing a communications system for emergencies, and so on.

Cases of accidents during field activities – Accidents in urban areas and local communities –

“Incidents of dog bites on the premises of a house in China”

When a student was in China, walking within the premises of a house for the purpose of installing observation devices, he was bitten on the shin by a pet dog. The student's trousers had holes from the dog's teeth-marks and there were blood marks on his knee. As a result, the student had to receive vaccinations against rabies and tetanus. On the same day, after asking the owner to keep the dog away from the group, a faculty member conducting signal connection work was also bitten by another dog on the back, and also had to get a vaccination against rabies. It is necessary to take preventive vaccinations against rabies when activities are conducted in areas with a risk of rabies.

3.7 Archaeological excavations

Field excavation surveys are essential for archaeology. These days there is a wide range of field activity environments, including building construction sites and underwater archaeological activities such as the survey of a sunken ship. Therefore, it is impossible to give a general idea concerning equipment and preparations for ensuring safety, because they vary considerably depending on the type of activity.

General excavation surveys require equipment/outfits and safety measures that are usually expected for agricultural and horticultural work.

Recently, there are an increasing number of excavation surveys conducted in urban areas, and these may require items used for building construction works. Outfits and devices used for these types of activities



may be similar to those used for civil engineering works, and a more thorough safety measures are required. Specific measures are required for any work done near rocks or underwater, and the field conditions vary so appropriate measures should be considered for each field condition with priority put on the security of excavation survey workers.

- Excavation works in foreign countries are often conducted in areas with no readily available means of transportation or telephone communications. Before you leave Japan, you should keep close contact with those who are quite familiar with the situation in the excavation sites such as co-researchers in the relevant countries, and should make advance preparations after gathering information on public security, diseases, etc. At the excavation sites, you also need to conduct survey activities by consulting those who are knowledgeable about the particular areas.

3.8 Activities in disaster affected areas

3.8.1 Surveys conducted in volcanoes

- As a general rule, you should carry a portable GPS as specified in “3.1 Activities in the mountains,” Chapter I. You need to wear a helmet near craters, on cliffs and in rocky areas.
- In active volcanic areas, new fumaroles may have appeared, which may emit harmful gases. You need to carry a gas mask, a gas detector, goggles, and a wireless communications system when conducting surveys in those areas.
- Volcanic gases are heavier than the air and often stagnate



along valleys and in depressions, so you should avoid passing such areas especially when there is no wind. You should be especially cautious when you find dead birds or small animals, or withering plants in the area.

- When surveys in national and quasi-national parks may possibly violate the Natural Park Act, you should take prescribed procedures after gaining permission from the Ministry of the Environment and the park office in charge. When conducting work in a national forest, you also need to notify the park office in charge of the forest management. (Refer to Chapter I, “2.3 Qualifications and Laws”)
- Where surveys are to be conducted in restricted areas, before starting the activity you must submit an entrance application to the relevant local government, etc., and should only conduct activities after gathering enough information on weather and volcanic activities. You should assign personnel in safe areas and communicate on a regular basis when entering and leaving the area. Helmets are required when entering restricted areas.
- In volcanic areas where an explosive eruption can be expected, there may be shock waves caused by the eruption and the scattering of ash deposits. You should gather the latest information on volcanic activity and should not get close to dangerous areas carelessly.

3.8.2 Surveys in areas affected by earthquakes and tsunamis

- As a general rule, outfits are similar to those specified in “3.1 Activities in the mountains,” Chapter I. You also need to carry tools, a mobile GPS, and a wireless communications system.
- You should carry a satellite mobile phone in case of poor signal reception due to damages to power lines and phone lines.
- When conducting surveys in disaster stricken areas overseas, sanitary conditions may be extremely poor. Thorough measures, such as prior vaccinations, should be taken against endemic and infectious diseases.
- You should wear a helmet and work gloves (preferably leather gloves). It is preferable to wear rubber gloves when handling electricity. You may wear climbing boots, but when carrying heavy items, you should wear safety boots. In disaster stricken areas, there are sharp materials in collapsed buildings and waste, so it is advisable to wear safety boots with steel lining in the soles.
- After the occurrence of an enormous earthquake, you must be extremely cautious

because there are many unstable areas where the ground or buildings have collapsed.

- You should avoid carelessly approaching buildings damaged by the main shock because aftershocks may cause them to further collapse and the damaged walls and windows may fall down.
- When walking on roads, you should be careful about cracks/fissures and subsidences on paved surfaces because there may be a void underneath the road.
- Where roads are blocked due to landslides, etc., another landslide may occur, so do not climb over them without taking precautions.
- When there is water running along the surface of a road, an avalanche of soil and rocks may occur, so you need to be careful about the muddiness of the water and any changes in the amount of flow.
- There may be sharp materials such as broken glass or nails around collapsed buildings, so you must wear safety boots and be careful not to tread through them.

Chapter II: Safety Precautions during Field

- ▶ Plans should be reviewed depending on weather conditions, health conditions, and progress.
- ▶ Health and safety and accident prevention must be prioritized during a survey or when reviewing the plan.
- ▶ A system for communications with the university must be established and secured.

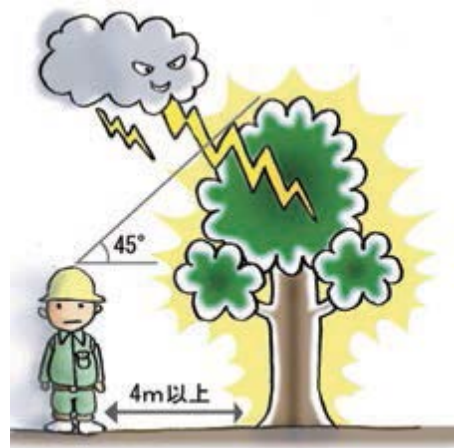
1. Judgment at the Field Activity Site and Changes to the Plan

1.1 Weather conditions

- You should always make your plans making full use of the weather information gained from TV, radio, and the Internet. You should pay attention to weather information such as the locations and passing speeds of low pressure, high pressure, cold fronts and warm fronts, and you also should be able to foretell weather changes based on the weather chart.
- You should review or cancel the plan when rough weather is expected.
- You should evacuate to a safe area as quickly as possible if the weather gets rough during the survey.
- During and after heavy rain, you should be extremely careful about the sudden swelling of rivers, freshets in routes near mountain streams, deterioration of the ground, collapsing of slopes, collapsing of where you are standing, sliding down, etc. You should also quickly evacuate to a safe location.
- When there is a gale or sudden gust of wind, you should avoid passing dangerous areas such as the ridges of mountains, cliffs, or sea dams, and should wait in a safe area until the wind stops. Unexpected accidents may occur due to tents or measuring instruments collapsing, so you need to take immediate measures such as reinforcement or evacuation.
- When you hear thunder or see lightning, there is a danger of being struck by lightning, so consider finding a safe place to take shelter. In flat areas, the human body can become a target for lightning strike, so take shelter by taking all metal gear off your

body and keeping low.

You will be safe in solid buildings, cars, trains, airplanes (and other metal-covered vehicles), and under power transmission lines (however keep at least 2m away from them). If you are right under a tree, there is a danger of lightning striking the tree, so you need to keep at least 4 m away and squat down where you can see the top of the tree at a 45 degree-angle.



1.2 Health conditions

- The “leader” and the “assistant” should monitor the health conditions of participants before and during the survey, and if necessary, recommend those in poor health condition to have a rest or to see a doctor near the survey site.
- They also need to make sure that participants avoid excessive drinking and get enough sleep during the survey period. If someone is not feeling well, the leader and assistant must be considerate enough to allow him or her to discontinue and rest.

1.3 Special precautions

- Working environments of survey activities can cause various effects on health. For example, you need to be careful not to have heatstroke when conducting work under the blazing sun, and hypothermia or frostbite in cold areas. When activities involve diving, you should be especially careful because there is a risk of decompression sickness (diver’s bends).
- You should also pay attention to indigenous parasitic diseases such as echinococcosis, scrub typhus, etc. It is advisable to be familiar with ways to respond to dangerous creatures such as hornets, Japanese copperheads, habu snakes, bears, deadly box jellyfish, and so on. (Refer to Chapter IV: Response to Dangerous and Harmful Animals and Plants)
- You should be extremely careful in caves and depressions in volcanic areas where there may be a low concentration of oxygen or accumulation of harmful gases. (Refer to Chapter I, “3.7 Archaeology excavation surveys” and “3.8 Activities in disaster affected areas”)
- When encountering contingent disasters and events such as an enormous

earthquake, terrorism and so on, you first need to secure your own safety and that of the participants, and then notify your department and the university headquarters of the incident.

1.4 Changes of plans

- As described before, it is necessary to review the plan according to the various situations at the sites of field activities.
- People tend to make unreasonable plans when set targets have not been fully attained. It would be meaningless to conduct a survey if accidents should happen. You need to prioritize health and safety, and the prevention of accidents. You should have the courage to review plans and perhaps even review the survey targets themselves if necessary.
- When a plan has been revised, the “leader “or the “assistant” must notify the relevant department of the changes.

2. Precautions before and during Field Surveys

2.1 Holding safety meetings

- You should notify those around you of the “Health and Safety Management Plan Document,” and should also hold a meeting for health, safety, and accident prevention. There is a possibility of encountering traffic accidents, or crimes such as theft with surveys in dangerous areas or even with surveys not involving dangerous operations. (Refer to Chapter I, “2.1. Submission of a “Health and Safety Management Plan Document””)
- It is strongly recommended to hold daily meetings attended by all the participants to pass and exchange information and to confirm the “Health and Safety Management Plan Document.”
- Private companies always hold risk prediction training at operations sites. This is done to make participants take turns to imagine what accidents could happen during the day’s activities and operations (such as falling from a height or having fingers caught in machines, etc.) and to think of specific ways to respond to the problems. This type of training is quite effective with regards to health and safety management, because simulating how to respond to risks will make it possible to avoid risks and become more conscious of safety and to respond quickly to emergencies.

2.2 Confirmation of emergency contact details at survey sites and means of communication

- Call 119 for an ambulance, 110 for the police, and 118 in the event of marine accidents (these numbers to be used only if the activities are in Japan).
- Confirm contact details, locations, and available facilities of hospitals.
- Make effective use of mobile phones. Participants must exchange mobile phone numbers with one another and save them.
- In areas, places, or countries where mobile phones cannot receive a signal, it is necessary to secure other means of communication that will work from the field. Satellite phones should be used as needed.
- If you encounter an accident or are affected by a disaster, you need to accurately report and notify the location.

2.3 Confirm the system of communication between supervisors, departments, and the university headquarters

- A system of communication with departments and the university headquarters (which section should be contacted) and an emergency contact network need to be established in advance in case of accidents. These should be in accordance with Chapter III: “2. Departments’ and the University Headquarters’ Response to Accidents.”
- You need to establish a system in which you appoint several persons to be contacted so that any one of the appointed can take unified responsive measures when contacted.
- For field activities conducted by students, the supervisor and the students need to know each other’s contact details. Students should make regular contact with the supervisor during the survey period even if the survey is proceeding as planned. The supervisor should make regular contact with students carrying out the field work and must also know contact information of the participants’ families in case of an emergency.

3. Precautions for Return Trips

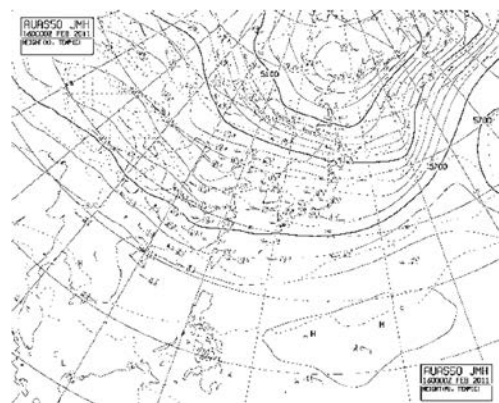
- For field activities conducted by students alone, an “assistant” should contact university staff (including the supervisor) and report progress after finishing the day’s work and getting back to their accommodation. The supervisor also needs to initiate appropriate contact for information on accidents and other updates.
- After returning to the university, you need to report the results of the survey immediately to the people concerned. If the university staff (including the supervisor) do not hear of the return of the survey group, it may become necessary to organize an emergency task force for fear of an accident. This will be conducted in accordance with Chapter III: “2. Departments’ and the University Headquarters’ Responses to Accidents.”

Basic Weather Knowledge

As a general rule, you should refrain from conducting field activities when a typhoon or a tropical cyclone is approaching, or when strong rain or snow is expected. It is also necessary to at least acquire the following basic knowledge on weather when conducting field activities (especially in the mountains, near rivers and at sea).

(i) Upper weather chart

A normal weather chart is called a surface weather chart and shows pressure patterns, while an upper weather chart shows the upper air temperature, the altitude, and the wind direction of areas under a certain pressure. Mainly upper weather charts of 850 hPa (for altitude of about 1,500 m), 700 hPa (for altitude of about 3,000 m), 500 hPa (for altitude of about 5,500 m) and 300 hPa (for altitude of about 10,000 m) are used. For field activities in the mountains, 850 hPa (for altitude of about 1,500 m) and 700 hPa (altitude of about 3,000 m) are used, and for forecasting



Upper air chart (500 hPa)

rainfall, snowfall and thunderstorms, a chart of 500 hPa (altitude of about 5,500 m) is useful. Upper weather charts are available from the website of the Japan Meteorological Agency (http://www.jma.go.jp/jmh/sml_00_auas50.html).

(ii) Cumulonimbus and nimbostratus clouds

A cumulonimbus appears when warm humid air (warm air) has risen after coming into contact with cold air or when it is cooled at high altitude after rising up along mountains. A cumulonimbus may rise up to an altitude of 10,000 m. It is also called a thundercloud, and is likely to be accompanied by strong rain and thunder. The appearance of a cumulonimbus causes afternoon showers during the summer and it also appears in areas along the Japan Sea during the winter and near cold fronts. If you notice a cumulonimbus suddenly becoming large, a thunderstorm is likely to be approaching and you should discontinue field activities early and find shelter.

A nimbostratus appears when warm air slides above and replaces cold air, and causes rainfall in large areas. A nimbostratus is generally referred to as a “rain cloud” and appears at relatively low altitudes of between 500 m and several thousand meters. When a nimbostratus is approaching, it is likely to rain, so it is advisable to finish field activities early.



Cumulonimbus



Nimbostratus

(iii) High cloud and middle cloud

High clouds appear at an altitude of about 10,000 m and include cirrus clouds and cirrostratus clouds, referred to as “streaks of clouds.” Middle clouds, on the other hand, appear at altitudes between 2,000 m and 5,000 m and include altocumulus clouds (also referred to as “sheep clouds”) and altostratus clouds. Middle clouds also include nimbostratus clouds. If high clouds have turned into middle clouds, low pressure is likely to be approaching and it is likely to rain

within half a day to 2 days.

High clouds



Cirrus clouds



Cirrostratus clouds

Middle clouds



Altocumulus clouds (Sheep clouds)



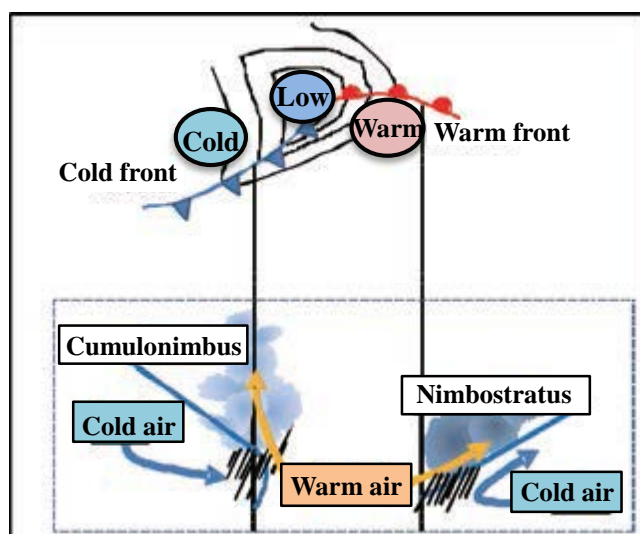
Altostratus clouds

(iv) Vapor trail

Vapor trails remaining for a long time in a clear sky means that clouds are likely to appear and that the weather is highly likely to worsen thereafter.

(v) Low pressure and warm front, cold front

Normally warm fronts are formed to the southeast of low pressure, and cold fronts are formed to the southwest of low pressure. Nimbostratus clouds are formed to the north of warm fronts, where clouds tend to overhang a large area and is likely to cause rain. You need to be aware that on the other hand, cold fronts have a narrower rain



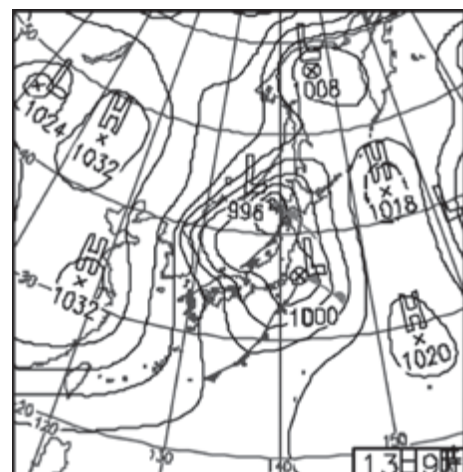
area than warm fronts but tend to cause heavy rain, and that cumulonimbus clouds will form and it will likely be accompanied by thunder.

(vi) Bomb cyclone

A bomb cyclone appears mainly from January to March and is a type of low pressure that develops rapidly. It can also be seen in April. Some appear near the southern coast of the main island of Japan and move to the coast off the Sanriku area, while others appear in the Japan Sea and pass through northern Japan. Pressure of a bomb cyclone decreases more than 1 hPa an hour and 24 hPa a day, and bomb cyclones move very fast and cause snowfalls and storms as serious as those caused by typhoons. If a strong cyclone appears in the above mentioned sea areas from January through April, you should consider the possibility of a bomb cyclone and be prepared for it as you would be for a typhoon.

(vii) Bicentric depression

A bicentric depression is a condition in which a depression on the Pacific side and another depression on the Japan Sea side move simultaneously as if to sandwich the islands of Japan. A bicentric depression tends to develop fiercely and may often develop into a bomb cyclone.



Bicentric depression

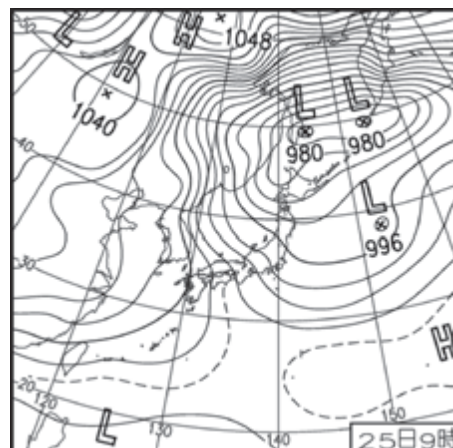
(A depression on the Pacific side and another depression on the Japan Sea side moving simultaneously.) (From the Japan Meteorological Agency website)

(viii) Winter climate and weather charts in winter

A typical weather chart in winter shows a pressure pattern in which high pressure lies to the west and low pressure lies to the east; high pressure lies from the East China Sea to Mainland China while low pressure develops off the Pacific coast to the east of the Tohoku region. In such a case, normally 5 to 6 isobars are distributed over the islands of Japan. An increase in the number of isobars over Japan means that the gradient of pressure becomes all the steeper. Generally speaking, more than 8 isobars over the islands of Japan indicates a severe winter climate. You also need to be careful that such weather conditions can cause windstorms in the mountains and at sea. If the depression lying to the east of the Tohoku region moves northward, the winter climate will last longer. On the other hand, if a cyclone lying to the east of the Tohoku region moves toward the eastern sea and an anticyclone closer to the Asian continent moves toward the east as it weakens, the winter climate will end soon.

Typical winter weather chart

(A pressure pattern in which high pressure lies to the west and low pressure lies to the east) (From the Japan Meteorological Agency website)



(ix) Heavy snow in winter

If cold air comes in from the Asian continent toward the sky over Japan at an altitude of about 5,000 m, there is a high likelihood of snow. This condition can be checked using an upper weather chart of 500 hPa. Generally speaking, if the cold air at an altitude of about 5,000 m is -33°C or lower, heavy snow will fall in the mountains, and if it is -36°C or lower, there will be heavy snow for flat areas. On the other hand, if the southward movement of cold air from the Asian continent becomes weaker and a depression approaches Japan from the Pacific Ocean, there will be rainfalls or snowfalls on the flat areas on the Pacific side, and it is highly likely to snow in the mountains.

(x) Spring's first south wind and climate conditions thereafter

When cyclones develop on the Japan Sea side from the end of February to the beginning of March, strong winds come in from the south and the temperature rises temporarily. The velocity of this southern wind often reaches 8 m/sec, and this strong wind is known as spring's first south wind. Thereafter, depressions on the Japan Sea side normally develop rapidly and there will be winter-like climate conditions with a pressure pattern in which high pressure lies to the west and low pressure lies to the east. Severe weather conditions should be expected, so take caution.

(xi) **May storm**

A May storm is a rough climate condition that occurs in May, caused when warm air coming in from the Pacific side clashes with cold air coming down southwards from the Japan Sea side near the islands of Japan. The rough weather does not last long, but there will be heavy snowfall in the mountains, which causes a large number of accidents.

(xii) **Cold-core depressions in the summer with thunder and lightning**

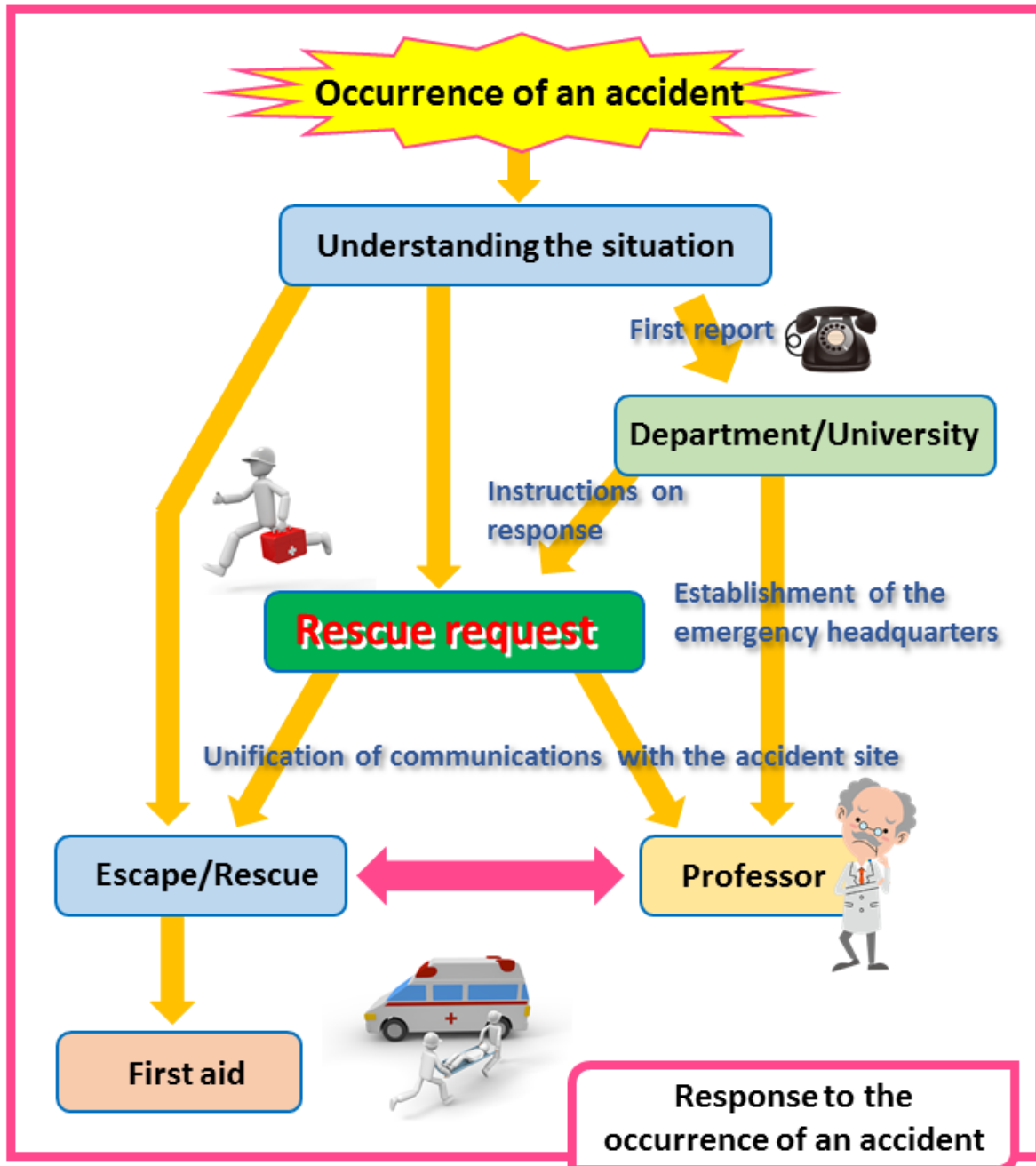
Cold-core depressions appear in Siberia and northeast China and cause snowfalls, etc. in the winter. If a cold-core depression comes down southwards toward Japan in the summer at a high altitude, the updraft caused by strong sunshine comes into contact with cold air in the upper tier, developing cumulonimbus clouds, which causes fierce thunder and lightning. It can be difficult to understand the conditions of cold-core depression in the summer from a regular weather chart. However, an upper air chart of 500 hPa will clearly show that cold-core depressions in the summer protrude in the sky over Japan.

(xiii) **Long rainy periods in autumn and the first snow on the mountains**

From mid-September to the beginning of October, anticyclones that have stayed in the sky over the islands of Japan during the summer retreat, and depressions that have lain north of Hokkaido move southward. This causes autumn rain fronts to stagnate and prolongs the autumn rain period. During this period, weather in Hokkaido is generally sunny, but also becomes extremely cold because Hokkaido is covered by cold air. After the long autumn rain period has passed, depressions and anticyclones alternately pass near Japan. This will

make the weather volatile and cause snow to fall in the mountains. Therefore, field activities in the mountains at altitudes of 2,000 m and higher will require cold weather outfits. The first snow on the mountains refers to the first date you can observe the summit of the mountain covered with snow from its base. Normally, the first snow to settle on the mountains can be observed in September in Hokkaido, in mid-October in northern Japan and the mountains in central Japan, at the end of October for Mt. Daisen in western Japan, and in mid-November for Mt. Aso. However, if the long autumn rain period lasts for a shorter period of time, the first snow in the mountains can be seen earlier than usual, so caution is necessary.

Chapter III: In Case of an Accident Activities



1. Participants' On-site Response to Accidents

1.1 Understanding of the situation and escape

- You should understand calmly, quickly, and accurately what has happened and what the situation is like.
- You need to escape from dangerous situations and if possible, secure your own safety by removing the cause(s) of the accident.
- You should ask for help from those around you and those concerned for assistance in the rescue procedures and responding to the accident.
- If you are with other people when involved in an accident, you should explain the situation and ask for help. If you are alone, you should judge whether you can escape from the dangerous situation by yourself or not. If you have determined that escaping by yourself is impossible, you should wait for help.
- If one or more participants are involved in an accident, you should judge whether or not your rescue attempt may result in a secondary accident and whether you can rescue the person by yourself. If you have determined that you may not be able to rescue the person on your own, you should wait for help.
- The leader of the participants (as a general rule, the “responsible person” of the educational/research unit or the “assistant”) should confirm the safety of all participants and assign the roles they should play in response to the accident.

1.2 Rescue, Transfer/Transportation

- First, stabilize the condition of the victim. If the person is bleeding, you should stop the bleeding. If the person has a fracture, you should splint the wounded area. You should keep the body warm if the body temperature is dropping. (Refer to Chapter V: First Aid and Medical Knowledge Needed for Field Activities)
- If the victim is unconscious and not breathing, you should try cardiopulmonary resuscitation immediately. Chance of resuscitation will decrease to 50% 4 minutes after a person has stopped breathing, therefore quick responses are essential. (Refer to Chapter V: First Aid and Medical Knowledge Needed for Field Activities)
- You need to move the victim to a safe place for first aid, and if necessary, you should dial 119 (if in Japan) for an ambulance to transfer/transport the person to a hospital. In such a case, someone should accompany the victim and bring some cash and a mobile phone.

1.3 Contact

- If rescue/transportation is necessary, the first thing you must do is request rescue.

- You should dial 119 for an ambulance, 110 for the police, and 118 for the Maritime Safety Agency (if in Japan).
- You should report the time, date, and location of the accident (or surrounding geographic features, features of landmarks, and routes if the exact location cannot be identified), the victim's name, contact information, and age, causes of the accident, and conditions of injury.
- You should accurately report where the accident happened. (It is desirable to use a landline rather than a mobile phone because it is easier to identify where you are calling from if you use a landline.)
- You should contact your university department and calmly and clearly report when and where the accident happened, who was affected, who was with the victim, what happened, and how the accident happened. You should also clearly indicate to the department that you are communicating regarding an emergency. You should notify them of contact details near where the accident happened and where you are staying, and secure a means of constant communication. If there are enough people, you should appoint someone in charge of communication. Thereafter, you should consult the department and the university headquarters, and quickly respond to the situation. You should request support from the department and the university headquarters if necessary.
- You should contact the family of the victim, the relevant local public agencies (including diplomatic establishment if overseas), and insurance companies.
- The leader should appoint a record keeper to record the accident and the series of subsequent actions including responses, communications, and measures taken, and also when those actions were conducted.

1.4 Response to be taken after an accident

- The leader should consult the department to decide on what actions are to be conducted thereafter. You should always be polite and grateful to local cooperators.

2. Departments' and the University Headquarter's Responses to Accidents

2.1 First report

- The receiver of the first report will not always be the "responsible person." You should establish a system in which all the people concerned such as members of a

laboratory/research group, clerical staff, guards, faculty members of other laboratories/research groups can receive the first report and deliver the information accurately to those who need the information.

- The receiver must not forget to repeat and confirm the information to be passed on.
- The receiver should immediately deliver the information to the head of department in accordance with the emergency contact network.
- The “responsible person” should secure a means that allows constant contact with those at the accident site, confirm information from the site, understand the situation of the accident, and give appropriate instructions to participants.

2.2 Establishing a response team

- The head of department should inform relevant parties, both inside and outside the university, of the first report. (Contact diplomatic establishment if overseas.)
- The head of department and the head of the university headquarters should immediately take measures based on the seriousness of an accident, for instance establishing a response team within the department/university, if they find the accident is very serious.
- The person in charge of the response team within the department/university headquarters should be appointed and the roles of its members should be determined. A record keeper should also be appointed to make detailed records of all the activities.
- The response team should communicate with those at the accident site from the second report onwards and determine whether or not they need to send someone or a relief team to the site. After consulting with those at the accident site, the response team should also request support from nearby areas of the accident site, if necessary.
- The response team should provide victim’s family, guardians, etc. with detailed information soon after following the initial report.
- The response team should provide quick and accurate information in a unified manner to the media (in general, through the university headquarters).
- The response team should unify all forms of communication with the accident site, into a single line of communication. If either side tries to communicate with the other disregarding this line of communication, then what can be done will be limited and may end up preventing smooth operation at the accident site. Irritation and anxiety can be caused by the lack of smooth communication, and could also make you use

thoughtless words. Therefore, it is important to remember to be considerate towards others and respond calmly. You should encourage others without losing hope and try to take the best possible measures.

2.3 Rescue

- The response team should secure funds for rescue operations, prepare materials, and dispatch a relief operation team as needed.
- The response team should request support from relevant parties at the accident site.

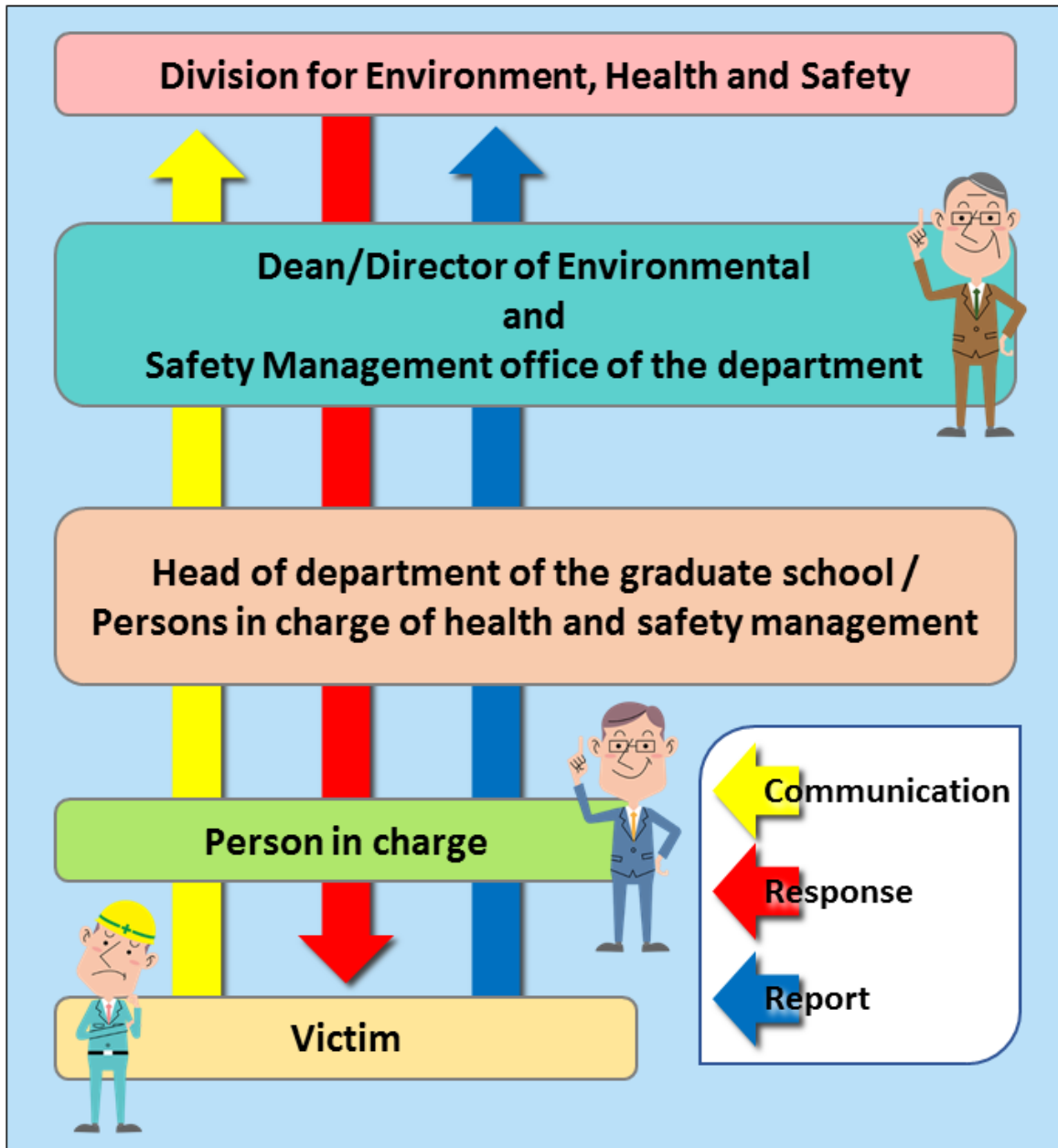
2.4 Report

- Regardless of the severity of an accident, you must report the accident to the supervisor, the head of department, and the Division for Environment, Health and Safety.

2.5 Levels of communications, responses and reports

- Emergency communication and responses at the accident site should be conducted in accordance with the severity of the accident. You should report daily changes in plans to the “responsible person,” and for serious injuries that require transportation of the victim to a hospital, report to the head of department and the department’s Environment, Health and Safety Management Office. The department should immediately report serious or fatal accidents to the Division for Environment, Health and Safety.
- After you return from field activities, you must report even minor accidents to the university through the department.
- When an accident occurs, it is natural to feel that you do not want to make the situation too serious and that you need to understand the whole situation before you start taking any measures. The combination of these reactions may cause you to underestimate the severity of the accident and delay in reporting it, which then increases the damage caused by the accident due to late communication and responses. It is much better to communicate and respond excessively to a minor accident than to have an unexpectedly serious situation develop because of underestimation or delay in communication and response.
- Whether an accident is serious or not, you must contact people in charge of health and safety management and the Division for Environment, Health and Safety

because they are prepared and have know-how on ways to respond to an accident.



Chapter IV: Response to Dangerous and Harmful Animals and Plants

- ▶ You should pay special attention to particularly dangerous and poisonous animals and plants in Japan.
- ▶ When activities are to be conducted overseas, you need to do individual research on the situation of the area chosen for survey activities beforehand.

1. Response to Dangerous and Harmful Animals

1.1 Mammals and birds

1.1.1 Brown bears

Brown bears live in the mountains of Hokkaido. In the autumn, they may be seen in arable land in pursuit of food. From the end of October till the end of March, they generally pass the winter in a den, however, they may still be seen during this period. Around October, just before they start hibernation in their den, they are especially aggressive and dangerous. If attacked by a brown bear, you may be fatally injured from the claws of their forefeet and its bite. In July 1970, 3 members of a private university's hiking club were attacked and killed by a brown bear while they were traversing the Hidaka Mountains. When conducting educational and research activities in the mountains of Hokkaido, you should contact local governments and local forestry offices in advance to check for any recent sightings. For preventive measures, you should make noise by using bells, whistles, and a radio to let the bears know that humans are approaching, and it is essential that you should stop and head back if you find what seem to be new footprints, faeces, or claw marks. If a field survey is absolutely necessary in an area where brown bears have been seen, you need to be accompanied by a hunter and carry tools, such as bear sprays and hatchets, for repelling them. If you find yourself having a close encounter with a brown bear, you must quickly decide on your own, how to respond to the situation. Refer to the recommended steps below for appropriate measures.

- 1) You must not try to escape in panic and show your back. There have been many cases where people were chased by a brown bear and then injured. You should also not unnecessarily excite a bear by shouting or throwing something at it.
- 2) If you have any bear spray and it is ready for use, you should prepare to spray it. The range is about 5 m, and you should spray as needed at the bear's face (nose) by calmly checking the direction of wind and the bear's movement.
- 3) If you do not have any bear spray or it is not ready for use and the bear continues to approach you, lay objects that may catch the bear's attention on the ground (like your rucksack) without looking away, and try to distance yourself slowly by stepping back. If you have secured enough distance, you can escape by running.
- 4) In the worst case scenario of a bear attacking you, there are no safe response measures. If you can use a hatchet or something similar as a weapon, you may escape by making a desperate stand against it. If you have no weapons and there is nowhere to hide, you may have no choice but to stay still (pretend to be dead) by lying on your stomach and guarding your neck with your hands. However, there is still a very low likelihood of your survival and it is highly likely that you will suffer fatal wounds. You need to conduct activities by taking preventive measures against such a situation before starting your field survey.



Bear spray

1.1.2 Japanese black bears

Japanese black bears inhabit the mountains of Honshu and Shikoku. It is thought that in Kyushuu, they are either extinct or there are only a few. They pass the winter in a den and before they start hibernation, they can be seen near private residences in pursuit of food. They are not as aggressive as brown bears, so it is quite rare to be attacked by a Japanese black bear. The exception is when you encounter one suddenly or encounter a parent bear with their cubs. It is important to make noise by using bells, whistles and the radio to let them know that humans are approaching. Most injuries are caused by claws of the forefeet and bites. If you encounter a Japanese black bear, you should shout out and threaten it by making huge gestures, such as

waving your arms or swinging around a stick. You should use bear spray if you have some, and then calmly escape. You must never try to escape in panic.

1.1.3 Japanese wild boars

Japanese wild boars inhabit mountainous areas below an altitude of 1,000 m throughout Japan except Hokkaido. There are less in areas with heavy snowfalls. Ryukyu wild boars inhabit Okinawa. Adult boars reach a length of about 1 m. They may appear near arable land and private residences. In 2003, a male high school student had both of his legs bitten and was seriously injured in a residential area of Kobe City, close to Mt. Rokko. Thereafter, several people were also bitten by wild boars in Kobe City. Japanese wild boars are not very aggressive, but they may charge at you if they are with their young or if you have suddenly surprised them. If you encounter one, it is best to escape to a higher place such as a tree branch. If you cannot escape to a higher place, you should leave your belongings on the ground and step back, and then quickly escape while the boar is distracted by your belongings. If you panic and try to run away, it will be more dangerous because you may fall and get injured. You must not threaten them or throw stones at them because these actions may also trigger their aggressiveness.

1.1.4 Japanese macaques

Japanese macaques inhabit an area from the Shimokita Peninsula of Aomori prefecture to Yakushima Island of Kagoshima. They form a group consisting of several male macaques, many female macaques and young macaques. Grown male macaques sometimes leave the group and live independently. They basically do not attack human beings without reason, but they may attack you if they want to steal your belongings and food or if you approach a young macaque. There is a report that in the past someone was surrounded by a group of more than 10 macaques and was under threat. If you carelessly try to give food to wild macaques, you may end up being surrounded by a group of them. If you are driving on a forest road and find a macaque, you must not stop the car and carelessly open a window. You must also not stare them in the eyes because this will anger the macaque. If you are surrounded by a group of macaques, you must never try to escape by showing your back to them because you may be bitten from behind. It is effective to prevent an attack if you calmly stand up straight and spread your arms to appear as large as possible. Bear spray is also

effective if you have some.

1.1.5 Stray dogs

In recent years, there have been reports of injury caused by stray dogs. The reason for this seems that a large number of heartless people leave their pets unattended or abandon them as puppies. In some areas, these stray dogs form groups of more than 10 and there have been reports of attacks by these groups on farm animals and pet dogs. In 2003, in the suburbs of Tottori City, a woman was attacked by a stray dog and was bitten on the hand. When conducting educational/research field activities outside urban areas, you need to contact local governments to check in advance whether there have been reports of injuries from stray dogs or of groups of stray dogs. If you are about to be attacked by a stray dog, running away with your back towards them will likely get you bitten, so you should stand straight and hold your belongings or a stick in the air to appear large. It is also effective to flash a strobe light or make loud noises by blowing a whistle. You can also use bear spray if you have some.

1.1.6 Ravens

The breeding season for ravens is between March and June, during which they are particularly aggressive and may attack humans. When a raven is cawing sharply and in short intervals, drops twigs or tries to peck at a tree or power lines, this means that it is angry. In such cases, you need to evacuate while protecting your head with a broad brimmed hat or an umbrella. In May and June, chicks often fall out of their nest and can be seen on the ground. The parent raven is very likely to attack you to protect the chicks, so you must not get close to fallen chicks. Furthermore, ravens form flocks except during the breeding seasons. You should avoid approaching areas where ravens live in flocks.

1.2 Reptiles/Amphibians

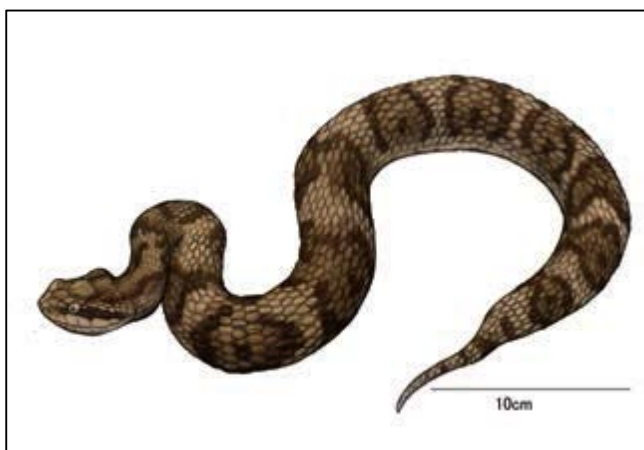
1.2.1 Snakes

Of the snakes that inhabit Japan, Japanese copperheads, tiger keelbacks, and habus are the major venomous snakes. Other venomous snakes include Amami coral snakes found in Amami Oshima and around Yoronjima, and Hai coral snakes in Tokunoshima, the main island of Okinawa, and Kumejima, but these exist in small numbers and there have not been any reports of injuries from bites by these snakes.

Generally speaking, when you are bitten by a non-venomous snake, the area around the wound does not swell. Therefore, any swelling of the area around a snakebite wound means that you are likely to have been bitten by a venomous snake. If you are bitten by a venomous snake, you should immediately use a poison remover (Refer to Chapter V, “2. First Aid Supplies for Field Activities Sites”), or if you do not have one, suck out the venom from the wound. If you are bitten on the arm, on the hand, or on the leg, it will also be effective to tie around the area closer to the torso (chest and abdomen) than the bitten wound, with a cloth or something similar as shown in Chapter V, “3.3.3 Application of tourniquet” so that the venom will not circulate through the whole body.

1.2.1.1 Japanese copperheads

Japanese copperheads inhabit areas throughout Japan except Okinawa. A Japanese copperhead has a long-triangular head with large coin-shaped spotted patterns. Their body color varies from black, ocher, to red and they reach 45 cm to 80 cm when grown. They widely inhabit the plains as well as mountainous areas, and are often seen in valley streams,



Japanese copperhead

in brooks and on ridges between rice fields. They are usually nocturnal, but on cloudy and rainy days, they may be active during the daytime. Normally they do not attack humans unless stepped on or held by hand. However, Japanese copperheads have protective coloring and are hard to find, so there is a danger of carelessly making contact with them. Therefore, if you go into areas where these snakes may be living, you must not expose your skin by being bare-handed or wearing sandals. If you encounter what you think is a Japanese copperhead, you should not get close to it and wait calmly until it leaves, without moving your body. A Japanese copperhead has venom fangs in the front of its mouth, and if you are bitten, you will experience subcutaneous bleeding over a large area of your body because the venom inhibits blood coagulation. You may also have subjective symptoms such as dizziness, wobbliness, double vision, and drooping eyelids (ptosis). However, in reality, there are

only a few cases of fatalities caused by bites from Japanese copperheads. For treatment, an antiserum for Japanese copperhead venom is used. It is advisable to take antiserum for Japanese copperhead venom within 2 days of being bitten. In Japan, Astellas Pharma Inc. and Kaketsuken (The Cemo-Sero-Therapeutic Institute) sell antisera for Japanese copperhead venom to medical institutions. The Japanese copperhead also has the habit of biting several more times after the first bite, so even after you are bitten, you still need to escape from the snake.

1.2.1.2 Tiger keelbacks

Tiger keelbacks inhabit an area throughout Japan except Hokkaido and Okinawa. Because they eat frogs, they are often seen near rice fields, lakes, marshes, wetlands, and riversides. They are large and reach 1 to 1.5 m with coloring ranging from brown to olive, and have



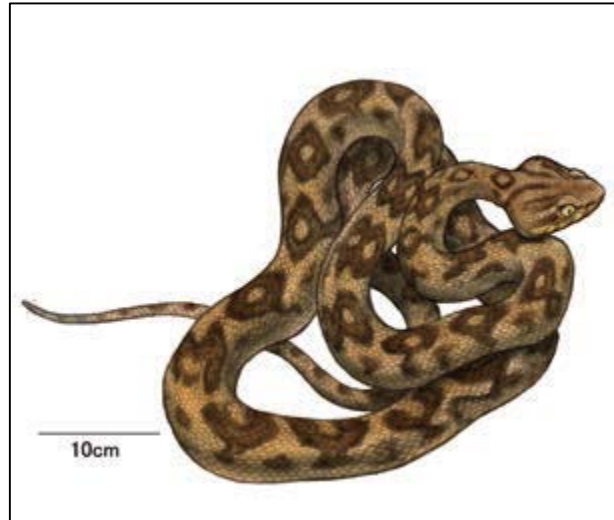
Tiger keelbacks

characteristically reddish spotted patterns on the front part of the body. However, there are many species variations and sometimes they may be misidentified as non-venomous Japanese ratsnakes. The head of a tiger keelback does not protrude as much as that of a Japanese copperhead. Normally they do not attack human beings unless stepped on or held by hand, but if you carelessly come into contact with one, you may be bitten, which may result in symptoms that can be fatal. Therefore, as in the case of Japanese copperheads, if you go into areas where these snakes may be living, you must not expose your skin by being bare-handed or wearing sandals. The venom of a tiger keelback also inhibits blood coagulation, and is stronger than that of a Japanese copperhead, so a bite from a tiger keelback may have a higher risk of causing a fatality than a bite from a Japanese copperhead. A tiger keelback has venom fangs in the rear of its mouth, so normally the venom is less likely to enter your body unless you are bitten deeply. Right after you are bitten, you may sense some slight pain and have swelling, but in a few hours to 2 days, you will start bleeding from your gums and nose followed by bloody faeces and bloody urine. Also, it may cause brain hemorrhaging. If you recognize any tendency of bleeding after a bite from a tiger keelback, you need to inject an antiserum for tiger keelback venom. In order to obtain

the antiserum, you need to contact the Japan Snake Institute (0277-78-5193) to have it sent to the medical institution where you are being treated.

1.2.1.3 Habu (Yellow spotted pit viper)

Habus inhabit Okinawa and the Amami Islands and mainly eat rodents, so they are seen not only near watersides and in wetlands but also in areas with trees and grass such as forests, bushes, and fields. They are usually nocturnal and you often encounter them between dusk and dawn. They vary in size from around 50 cm to 2 m. Many of them have coloring of brown ochre with lines of black spots, however, species variations



Habu

have also been identified. They have a protruding diamond-shaped head. Subspecies of habus include hime habu (Okinawa pit vipers) and Tokara habu (Tokara pit vipers) which are said to be less venomous. A habu has venom fangs in the front of its mouth and its venom causes bleeding and dissolves protein in the body. If you are bitten by a habu, you may experience intense pain and start bleeding from where you are bitten. The skin and muscles around the wound may necrotize leaving deep ulcers. In severe cases, the matter generated by the dissolving of the muscles may accumulate in the kidney and cause kidney failure. There used to be many cases of fatalities caused by habu bites every year, but in recent years, effective antiserums have become more widely available and there have been fewer cases of fatalities. You should be aware that some islands in Okinawa and some of the Amami Islands are the habitat of habus while others are not, so you need to check beforehand.

1.2.2 Japanese fire belly newt

Japanese fire belly newts inhabit waterside areas of Honshu, Shikoku, Kyushu, and Osumi Islands. A Japanese fire belly newt has a dark brown back and a reddish-orange stomach with scattered black spots. It discharges a toxin called tetrodotoxin, the same as the blowfish (fugu) toxin, from its parotid glands and dermal glands. You will not

have any particular symptoms if you touch it directly, but if you touch your eyes, mouth or any open wound with your hands after you have touched a Japanese fire belly newt, there will be intense pain. It's important to wash your hands thoroughly after you touch the animal. If the toxin comes into contact with your eyes or mouth, rinse thoroughly with water.



Japanese fire belly newt

1.2.3 Japanese common toads/Eastern-Japanese common toads

Japanese toads inhabit an area west of the Kinki region of Honshu, Shikoku, Kyushu, and Osumi Islands. Eastern-Japanese common toads are subspecies of the Japanese common toad and inhabit the south of Hokkaido to the Kinki region and the Izu Islands. Both species reach around 6 cm to 15 cm and are often referred to as “gamagaeru.” They discharge a combined toxin called bufotoxin, which causes an inflammatory reaction, from the parotid glands and dermal glands. If this toxin enters the eyes, you feel intense pain and the eyes will become bloodshot. If this toxin adheres to the surface of the body, only the wounded area will become inflamed, but if a large amount of bufotoxin enters your body, there may be malfunctions of the heart and the nervous system. There was a case in which a dog died after eating a toad. You should not carelessly touch a toad, but if you do touch it, then you should wash your hands carefully and if the toxin adheres to the eyes or the mouth, rinse thoroughly with water.

1.2.4 Tree frogs

Tree frogs inhabit all areas of Japan north of Yakushima Island. They reach around 2 cm to 4 cm, and discharge a toxin called tetrodotoxin, which is the same as the fugu toxin, from mucous membranes of the body surface. You will not have any particular symptoms if you touch it directly. However, if the toxin touches the eyes, the mouth, or wounds, you will feel pain. You should not carelessly touch a tree frog, and if you do touch it, you should wash your hands completely. If the toxin adheres to the eyes or the mouth, rinse thoroughly with water. It is said that green frogs, which look very much like tree frogs, do not have a toxin.

1.3 Arthropods (Insects, spiders, myriapods, etc.)

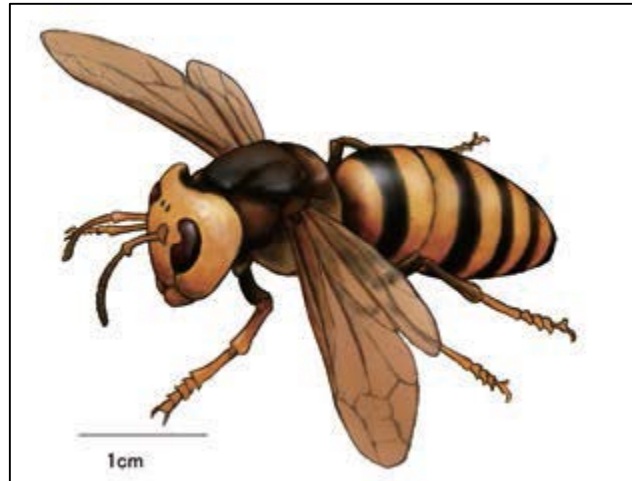
1.3.1 Bees

Bees that inhabit Japan include hornets, paper wasps, honey bees, bumblebees, carpenter bees, mason wasps, leaf-cutting bees, spider wasps, potter wasps, digger wasps, and velvet ants among them. All inject bee toxins consisting of histamine, serotonin, and various neurotoxins, which cause inflammation after stinging humans. The inflammation around the area stung is generally accompanied by pain. If you are stung by a bee, you should use a poison remover (refer to Chapter V, “2. First Aid Supplies for Field Activities Sites.”). If you don’t have one, you should suck out the toxin, rinse the wounded area and apply a steroid ointment that contains antihistamine. It is scientifically groundless to apply ammonia water to the wounded area, so it should not be used. Also, if you are stung by a honeybee, its sting will remain where it was inserted and it should be removed first. At times, a sting inflicted by a bee may be life-threatening because it may not only cause symptoms around the wounded area but also anaphylaxis. Symptoms of which include systemic skin erythema, agonizing breathing caused by swelling in the larynx, arrhythmia, etc. (refer to Chapter V, “12. Anaphylactic Shock”). About 30 people a year die of anaphylactic shock in Japan. If you are stung by a bee, you need to rest for at least 30 minutes to see if you have anaphylactic symptoms such as discomfort, agonizing breathing, etc. Those who have been stung by a bee in the past also tend to develop anaphylactic symptoms, so they should carry an epinephrine self-injection kit during field activities. Bees have a habit of approaching black or yellow objects so you should wear white or light-colored clothes instead during field activities, especially from the end of spring till autumn, when you are most likely to be stung by a bee. Of the various species of hornets, Japanese giant hornets, Japanese yellow hornets, European hornets, and dark-waist paper wasps are very aggressive and may attack you even if you are not approaching their nests. On the other hand other bees, normally do not attack you unless you suddenly touch them or stimulate their nests. Yellow-vented hornets, black hornets, and greater banded hornets rarely attack humans if they just approach their nests.

1.3.1.1 Hornets

Hornet species that inhabit Japan include Japanese giant hornets, Japanese yellow hornets, European hornets, yellow-vented hornets, black hornets, and greater banded

hornets, and so on. Japanese giant hornets and European hornets inhabit Hokkaido, the Honshu, Shikoku, and Kyushu. Japanese yellow hornets, black hornets, and greater banded hornets inhabit Honshu, Shikoku, Kyushu, while yellow-vented hornets inhabit Honshu, Shikoku, Kyushu, and the Okinawa Islands. Japanese hornets, a subspecies of Japanese yellow hornets, inhabit Hokkaido. Black

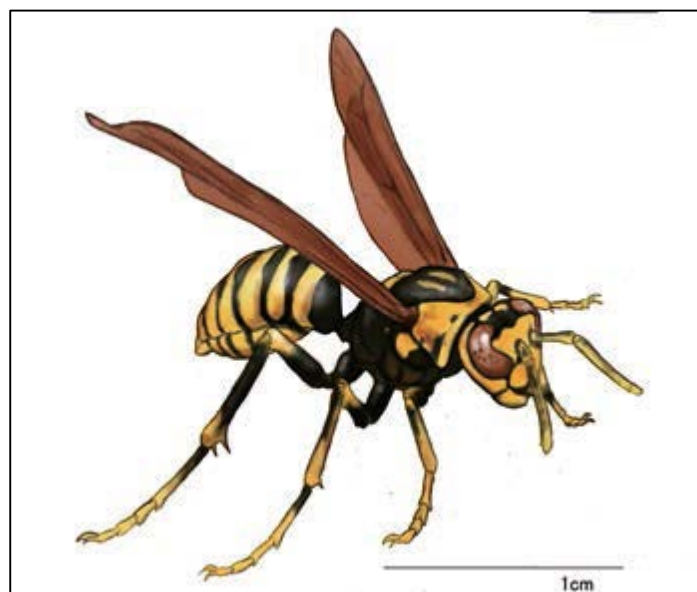


Hornet

hornets are called “Jibachi” because they have a body coloration of black and form spherical nests underground. Of the various species of hornets in Japan, Japanese giant hornets, Japanese yellow hornets, and European hornets are very aggressive. If you approach the nests, normally several will noisily fly around you and threaten you. If you get closer, they may attack you in groups. Also things that move fast catch their attention, so trying to shake them off by hand or trying to escape by running will excite and make them more prone to attack. If hornets approach you, you should try to leave the spot calmly and quietly. Other types of hornets will rarely attack you unless you suddenly touch them or stimulate their nests. Sting injuries often occur from July till October, but you should always be cautious because they normally become active around April.

1.3.1.2 Paper wasps

There are several types of paper wasps inhabiting Japan including the Chinese paper wasps, dark-waist paper wasps and *Polistes rothneyi*. Many of them inhabit Honshu, Shikoku, and Kyushu. Dark-waist paper wasps and *Polistes rothneyi* inhabit the Amami Islands and the Okinawa Islands. *Polistes snelleni*, *Polistes mandarinus*, *Polistes*



Paper wasp

japonicus japonicus inhabit Hokkaido as well. Of the various types of paper wasps in Japan, dark-waist paper wasps are very aggressive and may attack you if you just approach their nests. Other types of paper wasps will rarely attack you unless you suddenly touch them or stimulate the nests. However, you should be careful of *Parapolybia indica* because they may attack you in groups if excited. Sting injuries inflicted by paper wasps occur from April till November.

1.3.1.3 Honey bees

Native Japanese honey bees and Western honey bees, which were imported in the Meiji Era for the purposes of beekeeping and then later returned to the wild, inhabit Japan. Japanese honeybees inhabit Honshu, Shikoku and Kyushu while Western honey bees are widely found from Hokkaido to Okinawa. Neither type is aggressive, but you should be careful as they may attack you in groups if you stimulate their nests. The bee toxin of honey bees is less inflammatory and you may feel a small amount of pain and have slight swelling if you are stung by a honey bee. However, its sting will remain where it was inserted and it needs to be removed using a thorn remover or tweezers. A sting injury inflicted by a honey bee may cause anaphylactic symptoms, so you should be cautious about this.

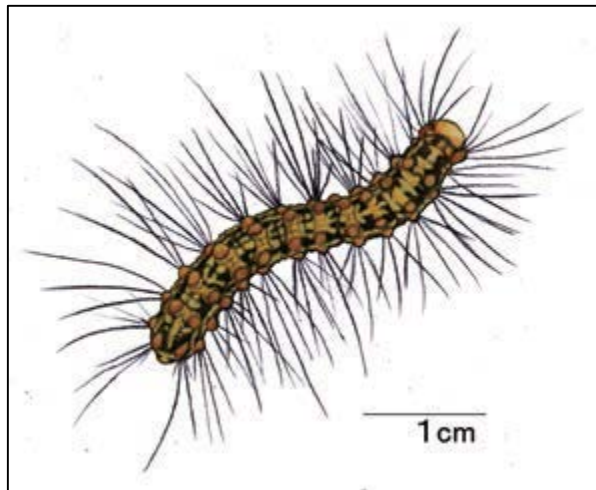
1.3.2 Moths

There are about 50 types of moths inhabiting Japan that are harmful to humans. Many of the sting injuries are inflicted by the urticating hairs of a larva, but you also need to be careful of the eggs and adults of some poisonous moths that have urticating hairs. When you are stung by a moth, many urticating hairs can remain on your skin, so you need to remove them by using adhesive tape such as cellotape or packing tapes. Then you need to rinse the wounded area thoroughly and apply a steroid ointment containing antihistamine. You must not scrub the wounded area because if you do so carelessly, the inflamed area will spread and the urticating hairs will become difficult to remove. If the moth toxin enters your eyes, you should rinse your eyes thoroughly and see an ophthalmologist as soon as possible.

1.3.2.1 Tussock moths

Tussock moths, tea tussock moths, yellow tussock moths, and brown tail moths inhabit Japan. Tea tussock moths inhabit Honshu, Shikoku, and Kyushu, and other

types of tussock moths inhabit Hokkaido, Honshu, Shikoku, and Kyushu. Moths of the subfamily Lymantriidae inhabit the low mountains, thickets in flat land, roadside trees, and hedges. Of these, tea tussock moths tend to live in groups in theaceous plants such as tea, camellia, and sasanqua. Unlike other types of moths, moths of the subfamily Lymantriinae have urticating hairs during their egg and adult stages as well as their larva stage, so you



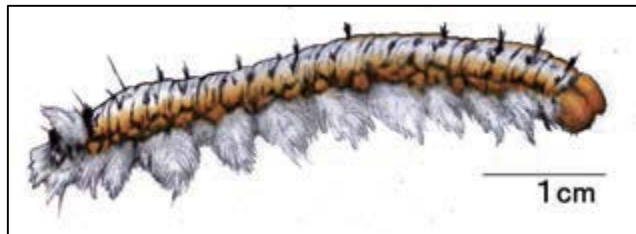
Tussock moth

need to be careful. Tussock moths have the larval stage in May and June, and the adult stage in June and July, while tea tussock moths have the larval stage from April to June and the adult stage in June and July. Then tea tussock moths lay eggs, so their larvae will appear again in August and September, and the next generation adults appear in September and October. Also, adult tussock moths are normally active during the night and tend to be drawn to light. In order to prevent injuries inflicted by tussock moths, you need to be aware of the above described characteristics of tussock moths and should be careful as to whether tussock moths are living in trees, and should minimize the exposure of your skin. If you are stung by a tussock moth, you will feel a tingling pain and red rashes with intense itchiness will appear, with the rashes sometimes spreading over a wide area of the body. Itchiness may last for 2 to 3 weeks. Urticating hairs of tussock moths are fine and short and therefore hard to identify with the naked eye. You need to remove the urticating hairs by applying adhesive tape, and then rinse the wounded area with water thoroughly and apply a steroid ointment containing antihistamine. You must not scrub the wounded area because if you do so carelessly, the wounded area will expand and urticating hairs will become difficult to remove.

1.3.2.2 *Dendrolimus spectabilis*

Dendrolimus spectabilis, also referred to as “pine caterpillars”, inhabit trees of the pine family in Hokkaido, Honshu, Shikoku, and Kyushu. The Lasiocampidae family includes *Dendrolimus spectabilis*, *Kunugia undans*, *Euthrix albomaculata*, *Kunugia yamadai*, and *Dendrolimus superans*. The *Dendrolimus spectabilis* larvae incubates

from summer through autumn, falls from trees to hibernate in winter, and again inhabits trees of the pine family from spring through summer. You need to be careful when approaching pine trees and should minimize the

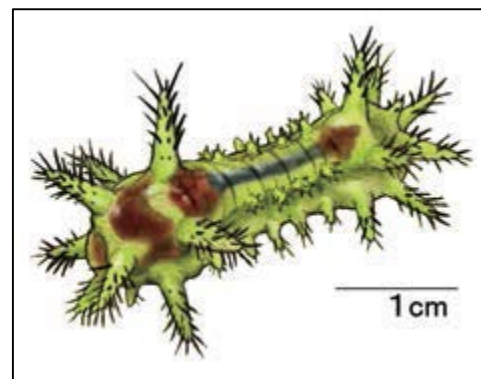


Dendrolimus spectabilis

exposure of your skin. The larvae form cocoons and turn into adults from June through autumn. You need to be careful with the cocoon also because it also has urticating hairs. The adults do not have any urticating hairs. If you are stung by the urticating hairs of a *Dendrolimus spectabilis* larva, you will feel intense pain and red rashes will appear followed by the appearance of urticarial pimples that accompany intense itchiness. Sometimes you may develop fever. It may take 2 to 3 weeks before you fully recover. Urticating hairs of a *Dendrolimus spectabilis* larva are identifiable by the naked eye, so if you are stung, you should remove the urticating hairs using adhesive tape and tweezers, rinse the wounded area thoroughly, and apply a steroid ointment. You must not carelessly scrub the wounded area.

1.3.2.3 Slug moths

A slug moth larva has a body color of yellow green and inhabits the leaves of persimmon trees, pear trees, cherry trees, plum trees, apple trees, chestnut trees, walnut trees, maple trees, willow trees, and so on. Several types of moths in the slug moth family can be seen in Japan including slug moths, *Parasa consocia*, *Austrapota dentata*, *Philixolepia sericea*, and *Scopelodes constricta*. If you are stung by a slug



Slug moth

moth, you will feel intense pain, and may develop red rashes and pimples. You should apply a steroid ointment containing steroid if stung. The pain usually disappears after a few hours, and rashes and papules disappear in a few days.

1.3.3 Ants

Among the injuries inflicted by ants, there have been cases where humans have been stung by ants with a venomous spine at the tip of the stomach such as

Pachycondyla chinensis, tropical fire ants, *Monomorium intrudens*, etc. There have also been cases where humans were bitten by *Pheidole fervida*, and cases where inflammation of the skin has been caused by formic acid discharged from the tip of the stomach of *Formica yessensis*, *Formica japonica*, and *Camponotus japonicus*. In most cases, you will feel pain just temporarily and symptoms will rarely become serious. However, there was a case in the past where a person was stung with a venomous spine of a tropical fire ant (which mainly inhabit Iwo Jima) and developed anaphylactic symptoms. Also if you come into contact with ants that discharge formic acid, you must thoroughly cleanse the wounded area immediately because the causticity of formic acid to the skin may cause ulcers to develop if left untreated. Entry of formic acid into the eyes may cause corneal ulcers, so thorough cleansing is necessary.

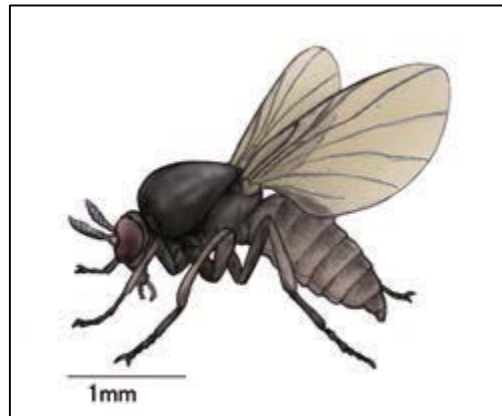
1.3.4 Mosquitoes

In the past, infectious diseases transmitted by mosquitoes have been seen in Japan such as Japanese encephalitis, dengue fever, malaria, Bancroft filariasis (a type of filariasis), etc. However, today the annual number of domestic cases of Japanese encephalitis is fewer than 10, and there have been no cases of malaria. In recent years the epidemic areas of dengue fever and malaria have tended to spread to sub-tropical and temperate regions from tropical region due to global warming. In Korea, malaria, which was thought to have been eradicated, has reappeared, and in Taiwan, the spread of dengue fever has already become a major social problem. On the other hand, apart from these specific infectious diseases, if you have many mosquito bites, you may develop allergic reactions over your entire body and become feverish. When conducting field activities in areas where you are highly likely to have mosquito bites, you should take measures such as minimizing the exposure of your skin, using insect repellent sprays, carrying mosquito coils, etc. Common house mosquitoes, which transmit Japanese encephalitis, tiger mosquitoes and yellow fever mosquitoes, which transmit dengue fever, also breed in urban areas, so you need to be careful when conducting field activities even in urban areas.

(Also refer to Chapter V, “13.1 Diseases transmitted by mosquitoes.”)

1.3.5 Blackflies

Blackflies are called “Buyo” in Eastern Japan and “Buto” in Western Japan, and more than 60 species have been identified. Adult blackflies can even be as small as 4 mm fully grown, and some species suck blood from humans. If you are bitten by a blackfly, you will start bleeding at the bite and develop a red rash with swelling, as well as experience intense itchiness around the wounded area. Characteristically, small amount of bleeding will occur on the bitten spot and the itchiness may last for 2 weeks or so. At times there may be a large outbreak of blackflies, and if you receive many bites, blisters may develop on your skin, intense swelling may develop over a wide area, and allergy symptoms may appear across your entire body and a fever may develop. Many injuries inflicted by blackflies occur from spring through autumn, but they do occur all year round south of Kyushu. In order to prevent injuries from blackflies, you should take such measures as minimizing the exposure of your skin, using insect repellent sprays, carrying mosquito coils, and besides, you should avoid approaching areas where blackflies are known to congregate. If bitten by a blackfly, you should apply a steroid ointment containing antihistamine.



Blackfly

1.3.6 Gadflies

About 100 types of gadflies can be seen in Japan and they inhabit Hokkaido, Honshu, Shikoku, and Kyushu. Many of them appear in brooks, rice fields, marshes, wetlands, meadows, and the mountains from June through September. They suck blood and are said to be active at dawn and in the evenings. There are often large outbreaks in Hokkaido, Tohoku, and Hokuriku. If you are bitten by a gadfly, you will feel intense pain and start bleeding, and the wounded area will get swollen and intense itchiness will follow from the next day or so. The itchiness may even last for approximately 2 weeks. In order to prevent injuries from gadflies, you should minimize the exposure of your skin and carry an insect repellent spray. You should avoid approaching areas where blackflies are known to congregate. If bitten by a gadfly, you should apply a steroid ointment containing antihistamine. Of all the gadflies, both the larvae and adults of *Tabanus trigenus* and horseflies have a habit of biting humans, and you need to be

careful because there have been reports of injuries in rice fields and wetlands where these larvae live.

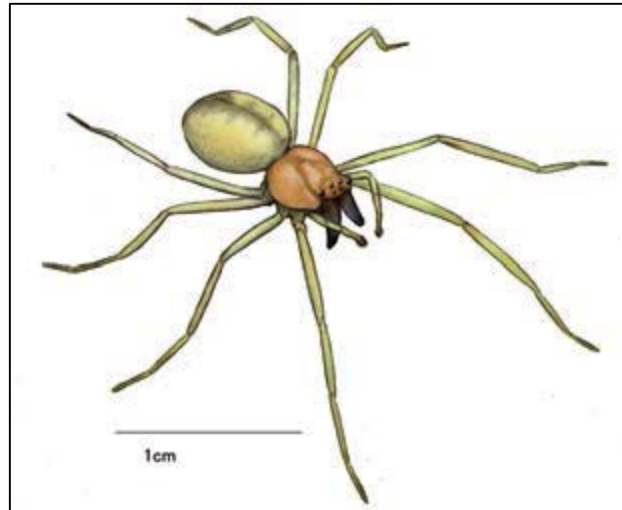
1.3.7 Spiders

There are about 1,200 types of spiders inhabiting Japan. Those which can harm humans with toxin through bites, are limited to the family of Chiracanthiums, widow spider families, Ummeliata families, orb-weaving spiders, huntsman spiders, and brown recluse spiders. Of all the injuries reported, those inflicted by Chiracanthium japonicum of the Chiracanthium family are the largest in number. Generally speaking, humans are bitten by spiders when they touch spiders carelessly; spiders do not proactively attack humans. Also, in addition to spider bites, if the threads of a spider web and body fluids of a spider enter into the eyes, they will cause ocular disorders so you need to be careful. Spider toxins generally consist of inflammation-inducing substances, pain-inducing substances, and neurotoxins. Spider toxins cause symptoms such as pain, swelling, and numbness in the bitten area, and in more severe cases, symptoms such as high fever, headache, nausea, and shock as well. If you are bitten by Ummeliata insecticeps of the Ummeliata family, dot hemorrhage, a papule of about 2 cm in size, and burning sensations will occur, as well as pain and itchiness which will last for several days. Toxins of brown recluse spiders will necrotize the skin and muscles of the wounded area and develop ulcers. When bitten by a spider, you should apply a steroid ointment containing antibiotics. If you have severe swelling, you should cool the wounded area with water, etc. If constitutional symptoms appear, you need to see a doctor. Also, if you can kill the spider that bit you and bring the body to a medical institution, they will identify the type of spider and you may be able to receive more appropriate treatment.

1.3.7.1 Chiracanthium

Spiders of the Chiracanthium family inhabiting Japan include Chiracanthium japonicum, Chiracanthium lascivum, and Chiracanthium eutittha. Chiracanthium japonicum live in a wide area from Hokkaido through Kyushu and have a brown-ocher carapace. Of all the spider bites in Japan, those inflicted by Chiracanthium japonicum are the largest in number. Chiracanthium lascivum live in a wide area from Hokkaido through Okinawa and have a brown-black carapace. They often live on the leaves of Japanese pampas grass and you are likely to be bitten if you walk through a bush of

Japanese pampas grass carelessly. Many bites occur from May through summer. If you are bitten by a spider of the Chiracanthium family, you will find 2 bleeding points from the bitten area as well as intense burning sensations, with a red rash and swelling to follow. Blisters and ulcers may develop around the wounded area. The bitten area will normally heal in a few days, but pain and numbness caused by neurotoxins

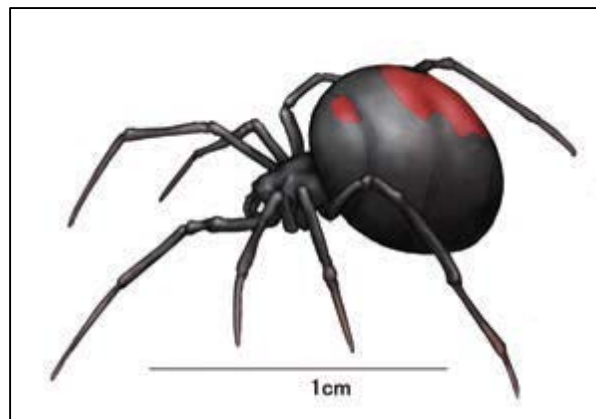


Chiracanthium

may last for about 2 weeks. In more severe cases, symptoms such as high fever, headache, nausea, and shock may develop.

1.3.7.2 Widow spiders

In 1995, the discovery of a redback widow spider caused a huge disturbance and then later, brown widow spiders were also discovered in Tokyo, Nagoya, Osaka, Kitakyushu, and Naha. It has also been known that *Latrodectus elegans* species inhabit the Yaeyama Islands in Okinawa. Widow spiders inhabit residential/urban areas and are often found in gutters, pipes of residential



Widow Spider

areas, inside blocks, and in between the gaps of tombstones. The only injury inflicted upon humans by the widow spider species in Japan was the case inflicted by a *Latrodectus elegans* spider in 1955, but there are a lot of injury reports overseas which include fatalities. Most cases occurred when victims held the spiders with their bare hands or accidentally touched their nest. If bitten by widow spiders, you may feel pain, heat sensation, itchiness in the bitten area, as well as erythema, and swelling of lymph nodes in the bitten area. Many of the symptoms will reduce in a few days. However, a neurotoxin called alpha-latoxin contained in the toxin of widow spiders may cause constitutional symptoms such as elevation of blood pressure, dyspnea, headache,

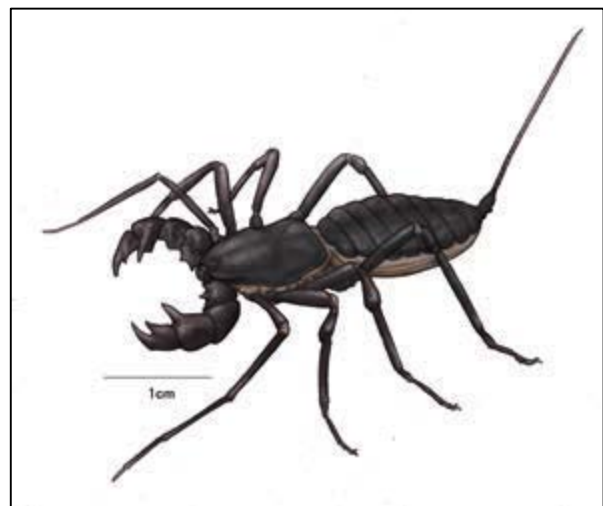
weakness, myalgia, and insomnia. These symptoms may last for several weeks and may be fatal. You should see a doctor immediately after you are bitten. Also, if you can kill the spider that bit you and bring the body to a medical institution, they will identify the type of spider and you may be able to receive more appropriate treatment.

1.3.8 Scorpions

Of the scorpions inhabiting Japan, lesser brown scorpions inhabit the Yaeyama Islands of Okinawa and the Ogasawara Islands, and dwarf wood scorpions inhabit the Yaeyama Islands of Okinawa. While some scorpions found overseas are so venomous that a sting may cause respiratory muscle paralysis and be fatal, both the lesser brown scorpions and dwarf wood scorpions are far less venomous and usually a sting will result only in some pain in the wounded area.

1.3.9 Whip scorpions

Whip scorpions have large scissor-like pedipalps and chelicerae, but unlike scorpions, do not have a venomous spine or gland. Two types of whip scorpions inhabit Japan. Amami whip scorpions inhabit the Amakusa region in Kyushu, the Tokara Islands, the Amami Islands, and the Izena Island of Okinawa, and Taiwan whip scorpions inhabit the Iheyajima Island, Taramajima Island, and the



Whip scorpion

Yaeyama Islands of Okinawa. In recent years, Amami whip scorpions have also been found in Shikoku, Kinki, Shizuoka, Chiba, and Hachijojima Island, and their habitat seems to be expanding. Whip scorpions are nocturnal and live under stones or fallen trees. If you are pinched by the large pedipalps and chelicerae of a whip scorpion, you will feel intense pain. If you excite a whip scorpion, it will spray liquefied gas from its anal gland which has acetic acid as its main component, so if the gas adheres to the skin, which may result in a sore or ulcer developing, just like a chemical injury. If it enters the eyes, it is dangerous because it may damage the cornea and the conjunctiva. If the liquefied gas sprayed by a whip scorpion adheres to any part of your body, you should rinse it thoroughly with water.

1.3.10 Acarina

There are 1,700 types of acarina inhabiting Japan. Of all these types, ticks, for example, can be observed with the naked eye, but chiggers, itch mites, and house dust mites are smaller than 4 mm and are hard to see with the naked eye. Damage caused by acarina include pain and inflammation in the wounded area after it bites and sucks blood, rashes and itchiness over a wide area of the body exemplified by scabies caused by itch mites, allergic diseases such as asthma and atopic dermatitis caused by dead bodies and feces of house dust mites, scrub typhus caused by the infection of pathogenic rickettsiae after bites by chiggers, Lyme disease caused by spirochetes transmitted by Taiga ticks that belong to the family of Ixodidae, and systemic diseases such as rabbit fever and Japanese spotted fever caused by *Ixodes ovatus*.

1.3.10.1 Chiggers

Chiggers are hard to observe with the naked eye because of their small size, being smaller than 4 mm. Adult chiggers live under the ground and do not stick to human beings and other mammals. It is the chigger larvae that harm humans causing infection due to pathogenic rickettsiae when they stick to humans and other mammals. Often you do not feel pain if a chigger sticks to you. There used to be outbreaks of *Leptotrombidium akamushi*, a type of chigger, along the basins of the Omono River in Akita, the Mogami River in Yamagata, and the Shinano River in Niigata, and scrub typhus had a high mortality rate and was known as an endemic disease in these areas (classic scrub typhus). There were many cases caused by *Leptotrombidium akamushi* especially from July to September, but since the 1970s, the number of outbreaks of *Leptotrombidium Akamushi* has remarkably decreased (Some say *Leptotrombidium Akamushi* is now extinct.). On the other hand, since the 1950s, there has been a spread of cases caused by *Leptotrombidium scutellare* and *Lepototrombidium pallida* throughout Japan except Okinawa (novel scrub typhus). Many adults of *Leptotrombidium scutellare* and *Lepototrombidium pallida* are seen from October to December mainly in Kanto through Kyushu, because their eggs hatch from autumn to early winter. There has been an increase in the number of cases caused by *Leptotrombidium scutellare* at the foot of Mt Fuji, in the Izu Islands, Chiba, Kanagawa, Gunma, Miyazaki, and Kagoshima. *Lepototrombidium pallida* is resistant against cold climates and hibernates for the winter but resumes activities in spring, so they emerge

from April to June in Hokkaido, Tohoku, and the Hokuriku. *Leptotrombidium akamushi*, which causes classic scrub typhus, are often found to inhabit along the basins of rivers, while *Leptotrombidium scutellare* and *Leptotrombidium pallida* can be found not only along the river basins but also in mountains, forests, bushes, and meadows. When conducting field activities in mountains and forests, bushes and meadows, you should be careful about your choice of clothes and should minimize exposure of the skin so that chiggers will not get inside your clothes. It is also important to use a mite repellent and take a bath to cleanse your body after conducting field activities in mountains, forests, bushes, and meadows. Also, nowadays there are annually about 500 reported cases of scrub typhus in Japan, so when you are in the mountains, forests, bushes, and meadows, you also need to check if the relevant areas have cases of scrub typhus. (Refer also to Chapter V: 13.2.1 Scrub typhus.)

1.3.10.2 Ticks

Ticks inhabit areas throughout Japan and they bite humans and other mammals to suck blood. Ticks that have sucked blood enlarge in size, between 5 to 10 mm and are can be seen by the naked eye. In most cases you do not sense any pain if bitten, so it may take some time to realize that you have been bitten. When bitten by a tick, you need to have the tick removed surgically at a medical institution because if you try to force it out, its head may remain under the skin causing an ulcer, or if you are bitten by an infectious tick, there is a higher risk of pathogens entering the body from forcing it out. Preventive measures against bites by chiggers also apply to ticks. If a tick bites you to suck blood, it may be possible that you will become infected with systemic diseases, such as Japanese spotted fever or rabbit fever.

(Refer also to Chapter V, “13.2.2 Japanese spotted fever,” “13.2.3 Tularemia (Rabbit fever),” and “13.2.4 Lyme disease.”)

1.3.11 Other arthropods

Other types of arthropods that sting or bite humans and cause harm also exist in Japan, such as the assassin bugs, and centipedes, etc. Especially, if you are stung by a centipede, you will feel a stinging kind of pain, have reddening and swelling, and may experience swelling of the lymph nodes, fever, headache, and polypnea. On the other hand, other arthropods in Japan, such as the Japanese ground beetles, coconut beetles, rove beetles, tiger beetles, millipedes, etc., discharge body fluids causing

dermatitis when touched so you should not touch them carelessly. Chironomids, which inhabit Hokkaido, Honshu, Shikoku, and Kyushu, look like mosquitoes but do not suck blood. However, there are often outbreaks in lakes, marches, rivers, and sewage, and they are seen to grow en masse in urban areas. You should not approach areas where there is an outbreak of chironomids because their body fluids or their dead bodies can be causative agents of allergies that can trigger allergic diseases like asthma.

1.4 Dangerous animals other than vertebrates and arthropods

1.4.1 Leeches

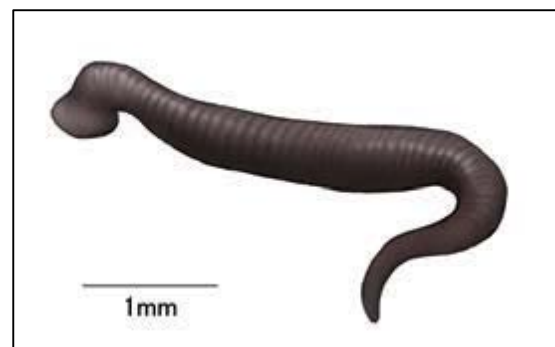
Leeches are a kind of annelid and many of them inhabit fresh water, but some species are found on land and in the seawater. Some leeches suck the blood of other animals for nutrition and at the same time inject a substance called hirudin, which prevents blood from clotting, so the bleeding tends to be continuous and in a large amount. When leeches suck blood, they inject a pain-relieving substance along with the anticoagulant, hirudin, so you may not feel any pain when they suck blood from you. If you try to forcibly remove a leech from the skin when you are bitten, part of its mouth that has bitten you may remain under the skin, you should therefore remove it by putting a flame from a lighter close to it, or by using a waterproof spray. You should thoroughly rinse and disinfect the wounded area and then apply a steroid ointment containing antibiotics.

1.4.1.1 *Hirudo nipponia*

Hirudo nipponia inhabit ponds, marches, rice fields and slow-moving streams throughout Japan. They are not particularly venomous, but may sometimes cause itchiness that lasts for several days, or cause allergic reactions.

1.4.1.2 *Dinobdella ferox*

Dinobdella ferox are found under stones, etc. in mountain streams west of the Kinki region, and parasitize the pharynx, the nasal cavity, and the eyeballs of animals coming to drink water. Depending on which part of the body is parasitized, the airways may become

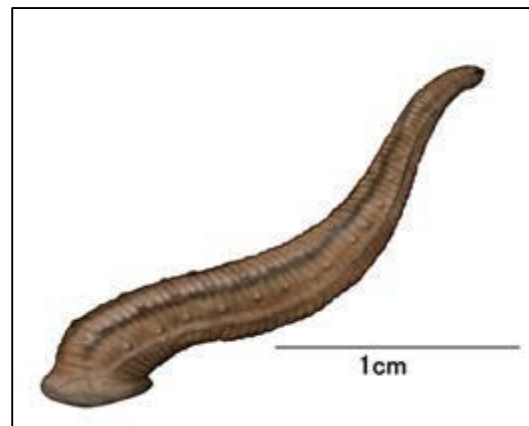


Dinobdella ferox

blocked, which could be fatal. If a *Dinobdella ferox* has parasitized the body internally, it needs to be removed surgically. If you want to wash your face with water from a stream or drink it, you need to check whether there are *Denobdella ferox* present by pouring some water into a glass and checking.

1.4.1.3 Land leeches

Land leeches are found throughout Japan except in Hokkaido. They inject hirudin when they suck blood and will cause a large amount of bleeding from the wound. When a land leech sucks blood from you, you need to firmly press and protect the wound to suppress the bleeding. If you need to enter mountains and forests inhabited by land leeches, you need to avoid exposing the skin and minimize the openings of your clothes so that they will not get in through the collar, armholes, or cuffs of your trousers.



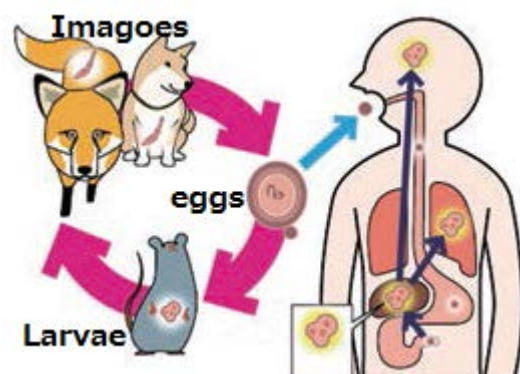
Land leech

1.4.2 Parasites

Many of the parasitic infectious diseases have decreased remarkably in number, but there are still some that appear in particular areas, and some are also reported to have appeared sporadically in other areas, so you need to pay a certain amount of attention when conducting field activities. This section explains echinococcus, which parasitize humans through the eggs of parasites, and *Angiostrongylus cantonesis* and Threadworms, which intrude directly from the skin and parasitize humans.

1.4.2.1 Echinococcus

Echinococcus belongs to the Cestoda family of flat worms and usually inhabit Hokkaido. Wild rats that have eaten parasitic eggs become intermediate hosts, and animals, such as Ezo red foxes and dogs, eat those rats and become the final hosts. Consequently echinococcus eggs are mixed



into the feces of Ezo red foxes and dogs, and through orally intaking vegetables or water containing the eggs, echinococcus parasitize humans. In Japan, it was believed that echinococcus existed locally in Hokkaido, but in recent years, more than 10 cases of echinococcosis have been reported in people with no experience of travelling to Hokkaido, so the nationwide spread of echinococcus is a matter of concern. If echinococcus eggs enter the human body, the larvae parasitize mainly the liver, and after a long period of time (sometimes 10 years or more), liver dysfunction will develop. If it becomes more serious, you may develop jaundice, causing you to die of hepatic failure. To prevent echinococcosis, you must never eat unwashed wild strawberries, especially in Hokkaido. You also need to sterilize your dishes with boiling water, not just with fresh water (refer also to Chapter V: 13.3 Echinococcosis.).

1.4.2.2 Angiostrongylus cantonensis

Angiostrongylus cantonensis belongs to the Nematode family of Nematodes and there have been many cases of angiostrongyliasis caused by parasitism of Angiostrongylus cantonensis in southern China, Thailand, and Taiwan. In Japan, there are many reports of infectious cases in Okinawa, but there have been more than 10 cases of infectious cases in other areas of Japan also. Angiostrongylus cantonensis mainly parasitize shellfish such as snails, toads, tree frogs, freshwater prawns, and terrestrial crabs. Humans will get infected if they eat these infected hosts, but the Angiostrongylus cantonensis larvae can also directly intrude from the skin and parasitize humans. The latency period is about 2 weeks and any Angiostrongylus cantonensis larvae that have entered the human body quickly gather in the brain and grow there, causing various abnormalities in the cerebral nervous system as well as fierce headaches, nausea, and vomiting. A high fever of about 38°C will also develop at the same time. If you develop symptoms of angiostrongyliasis, normally you will recover in about 4 weeks, but sometimes you may fall into a coma and could be left with after effects such as mental disorders and convulsions. For preventive measures, you should avoid eating raw meat or meat that is not fully cooked from animals, which are common places for Angiostrongylus cantonensis to inhabit. At the same time, you need to prevent percutaneous infections by avoiding exposure of the skin. (Refer also to Chapter V: 13.4 Angiostrongyliasis.)

1.4.2.3 Threadworms

Threadworms belong to the Nematode family of Nematodes and there are many cases of infection in tropical/sub-tropical regions. Domestically, there are still many reports of cases of infection in the Amami Islands and Okinawa. Threadworms parasitize dogs, cats, monkeys, and humans, with the larvae entering the body through the skin to infect the hosts. If you are infected with threadworms, you may not show any symptoms, however, threadworms that parasitize the body grow in the stomach and lungs and lay eggs inside the body. Hatched larvae are discharged through the feces and may reenter the body from the anal region. You may feel itchiness in the area where they enter through the skin, as well as itchiness in the anus as the threadworms reenter the body from the anal region. You may also experience stomachaches and diarrhea due to parasitism in the stomach, and develop pneumonic and asthmatic symptoms due to parasitism in the lungs. Anthelmintics, like thiabendazole, are effective for treatment but once you are infected, symptoms tend to recur. For the prevention of strongyloidiasis, it is important to avoid skin contact with any soil contaminated with the feces of dogs, cats and humans particularly in the Amami Islands and Okinawa (refer also to Chapter V, "13.5 Strongyloidiasis.").

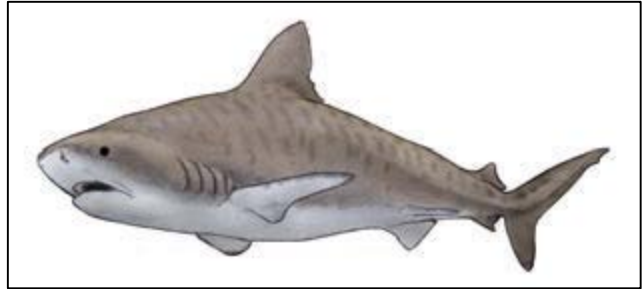
1.5 Harmful/dangerous animals in the sea

There are a large number of dangerous animals inhabiting the sea. Of the harmful/dangerous animals in the sea, you need to be especially cautious about rabbit fish, whip rays, striped eel catfish, sea snakes, and geography cones. If you are stung by any of these, you may lose the ability to swim and drown because their toxins may cause motor paralysis and intense pain. Also, toxic night anemones inhabit relatively shallow water, so you need to be careful as you may be injured when walking barefoot or wearing sandals in the shallows.

1.5.1 Sharks

There are many cases worldwide of sudden attacks by sharks in the oceans and murky bays. Particularly dangerous species include the great white sharks and tiger sharks. Sharks have an incredibly acute sense of smell and can detect the smell of

blood and urine from a few kilometers away. You should not enter areas where sharks are said to appear and should always conduct activities in groups consisting of at least of 2 persons. Sharks are particularly active at dawn, in the evening, and during the

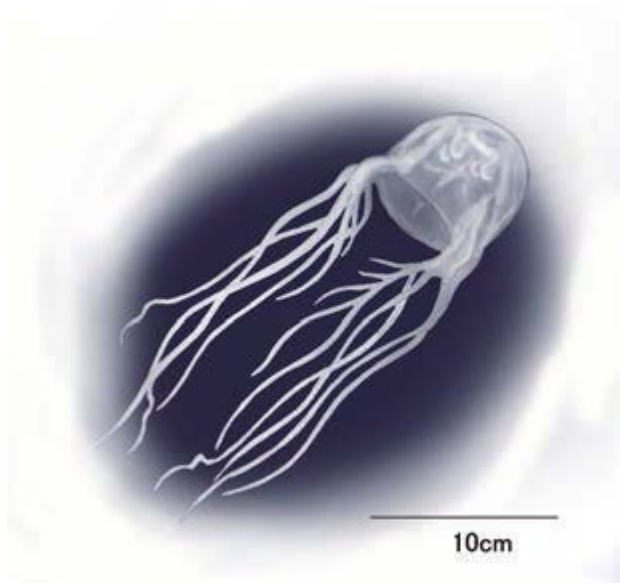


Shark

night. Also you must not enter the water until all previous injuries have healed completely or urinate in the water in order to not attract sharks. If you encounter a shark, you should try to escape by moving away without showing your back and with a stick pointed toward the tip of the nose.

1.5.2 Deadly box jellyfish

Deadly box jellyfish appear in large numbers along coastal areas of the Ryukyu Islands, especially in bathing resort areas with sandy beaches and bays with calm waters. There have been many incidents where people have been stung even on sandy beaches in a depth of water of about 10 centimeters. If you are stung, you will feel acute pain and welts may develop in the wounded area. You may have difficulty in breathing, which may often result in



Deadly box jellyfish

death. You should quickly wash away any tentacles of the jellyfish by pouring plenty of vinegar over them. If they do not come off, you should remove them softly with your fingers. Use of water, beer, or alcohol may stimulate the cnidocyte cells and trigger the discharge of stinging filaments, so you must avoid this. You need to cover the wounded area with gauze and cool with an ice bag.

2. Response to Dangerous and Harmful Plants

Most typical cases of people being harmed by plants in the field are when they

carelessly eat harmful plants, most typically poisonous mushrooms. As a general rule, when conducting educational field research activities, you should avoid eating wild plants. This section discusses plants that may be harmful when conducting field activities, specifically those that are harmful if touched or stung. In order to protect yourself from these plants, you should avoid exposing your skin, touching the plants carelessly, or touching their sap by breaking their stalks and branches. You should also avoid rubbing your eyes with your hands and touching other parts of your body after touching the sap.

2.1 Sumacs

Sumacs can be found all over Japan. Their height reaches 7 m to 10 m and their trunk and branches are grayish white. A number of small, yellow green flowers bloom in May to July. If inflammatory matter called urushiol is contained in sumacs' sap, which can cause itchiness, reddening, swelling and also develop blisters. Inflammatory reactions vary depending on individuals, so some may have reactions just by getting close to a sumac without directly touching it. You need to be careful when you touch other parts of your body after touching a sumac because inflammation will develop in any of the areas touched. Also if you make a bonfire using sumac trees, the smoke may also cause dermatitis. If sumac sap adheres to the skin, you should thoroughly rinse the wounded area with water and apply a steroid ointment containing antihistamine. If there is swelling you should cool the wounded area with water. You must not scratch the wounded area even if it feels itchy, because the inflammation area will expand. Sumacs include Japanese sumacs, which are found in the mountains, and Asian poison ivies, which grow as trailing plants. Wax trees, which are found west of Kanto on Honshu through Okinawa, also belong to the family of sumacs and the sap can cause inflammation. Euphorbia adenochlora (Nourushi) sounds as if it belongs to the family of sumacs, but it actually belongs to Euphorbiaceae and is a totally different species.

2.2 Ranunculaceae

Of the ranunculaceae, soft windflowers, virgin's bowers, buttercups, *Aquilegia flabellata*, and pasqueflowers have inflammatory matter called protoanemonin in their sap. This is highly inflammatory to the skin and may cause blisters to develop. If sap

adheres to the skin, you should thoroughly rinse the wounded area with water and apply a steroid ointment containing antihistamine, and if blisters have already developed, you should disinfect the wounded area. If sap enters the eyes, it will cause severe conjunctivitis. Soft windflowers grow on forest floors in the mountains from Hokkaido through Okinawa, and grow to the height of 15 cm to 30 cm, with white flowers blooming from March to May. Their leaves have white spots. Virgin's bowers are trailing plants that grow in fields, mountains, and on roadsides from south of Hokkaido through Okinawa. White flowers bloom from August to September and the flowers have numerous white hairs. Buttercups grow in fields and on roadsides throughout Japan, and yellow flowers bloom from April to July. Their flowers especially contain a large amount of protoanemonin. *Aquilegia flabellate* grow in the high mountains in Hokkaido and eastern parts of Japan, and bluish purple flowers bloom facing downward from June to August. Pasqueflowers grow in sunny fields and mountains of Honshu, Shikoku, and Kyushu. White hairs grow thickly on its radical leaves and scapes. Dark purplish-red flowers bloom facing downward from April to May.

2.3 Euphorbiaceae

Of the Euphorbiaceae, sun sparges, *Euphorbia pekinesis*, and *Euphorbia adenochlora* discharge a white milky liquid containing an irritant called Euphorbon when their stalks are broken. If Euphorbon comes into contact with the skin, it is very irritating and sometimes causes blisters to develop. If their sap adheres to the skin, you should rinse the wounded area thoroughly with water and apply a steroid ointment containing antihistamine. If blisters have developed, you need to disinfect the wounded area. Sun sparges grow on roadsides and in open spaces on Honshu, Shikoku, and Kyushu, and have spatula-shaped leaves with 5 additional small yellow-green leaves on the tips of their stems. *Euphorbia pekinesis* grow in fields and mountains on Honshu, Shikoku, and Kyushu, and their stem stands upright and grows to a height of 20 cm to 80 cm. They have 5 verticillate leaves on the tip of the stem. The *Euphorbia adenochlora* are perennial plants that reaches a height of 40 cm to 50 cm, with yellow flowers blooming from April to May.

2.4 Araceae

Of the Araceae, eastern skunk cabbages, *Alocasia odora*, and *Arisaema serratum*

contain needle crystals of calcium oxalate in their sap. The sap causes itchiness, reddening, and the development of blisters if it comes into contact with the skin. If you get the sap in your eyes, it will cause fierce keratitis and conjunctivitis and may even cause loss of eyesight. Eastern skunk cabbages grow in the wetlands from Hokkaido through northern part of Central Japan and reach a height of 20 cm to 40 cm. They look like white skunk cabbages, but the coloring of their petals ranges from dark brownish-purple to dark green and they also have a bad odor. The flowers normally bloom from March to May. *Alocasia* grow in evergreen forests in southern part of Shikoku, southern Kyushu, and Okinawa, reaching a height of 60 cm to 2 m and have huge leaves. *Arisaema serratum* grow across a wide area, from Hokkaido through Kyushu, in flat lands, forests in the mountains, and in fields. They reach a height of 50 cm to 60 cm and have pedate leaves. Narrow green or dark purple flowers bloom from April to June. The toxin of *Arisaema serratum* mainly exists in the bulb, and will most likely not cause dermatitis unless you touch it.

2.5 Urticaceae

Urticaceae plants are perennial herbs that grow up to a height of 40 cm to 100cm in the mountains. Their stalks and leaves have stings that contain irritants such as formic acid, butyric acid, and inflammation-inducing substances such as histamine and serotonin. If you touch the stings, itchiness, pain, reddening, and swelling will occur. Itchiness and pain may last for a few days. Urticaceae plants include nettles, which grow on Honshu, Shikoku, and Kyushu, while the *Laportea cuspidate* and *Laportea bulbifera* grow from Hokkaido through Kyushu. If you are stung by nettles, you should remove the stings by applying adhesive tape several times to the wounded area and then apply a steroid ointment containing antihistamine. You must not scratch the wounded area because the inflammation area will expand if you do so.

2.6 Japanese walnuts

Japanese walnuts are deciduous trees that grow in Hokkaido through Kyushu, and produce nuts from September to October. The ripe nuts are edible, but unripe nuts and leaves contain inflammatory substances. You should not touch them barehanded carelessly, because they will cause dermatitis symptoms such as itchiness and reddening if you do so.

Chapter V: First Aid and Medical Knowledge Needed for Field Activities

►You should always be prepared to respond appropriately to unfortunate accidental injuries during field activities. You should especially be able to judge whether or not you need to see a doctor immediately.

1. Basic Information on First Aid

1.1 Keep calm

The victim and the people around the victim should act calmly. Fluster may increase the damage, which could result in a secondary accident. If the people around the victim are making an unnecessary fuss, the victim may panic, causing dyspnea.

1.2 Understand the situation

It is important to closely observe the conditions of the victim, and be able to determine whether the victim should be transferred to a medical institution by ambulance or if the victim should first rest and go there after calming down.

Symptoms which indicate that a victim should be transferred to a medical institution immediately

- 1) Unconscious or absent-minded (slow in responding even when addressed loudly)
- 2) Breathing weakly or breathing heavily and fast
- 3) Having a coughing fit
- 4) Looks very pale and is having a cold sweat
- 5) Yawning slightly
- 6) A lot of bleeding (pressing the wounded area cannot stop the bleeding)
- 7) Paralysis in arms and legs (motor impairment)
- 8) Suspected to have fractures/dislocations
- 9) Suffers burns over a wide area
(Entire upper limbs, more than half of lower limbs, more than a quarter of the torso)

- 10) Burns on the face caused by flames
- 11) Eye injuries

1.3 Transferring of the victim

If the victim cannot move by himself/herself, you should not forcibly move them unless the site is dangerous. Transferring the victim may worsen the conditions. Especially if the victim is suffering from a fracture or a spinal cord injury, carelessly transferring them may worsen any neurological disorder and may leave them permanently paralyzed. In principle, someone with expert knowledge should transfer a severely injured victim, so you should wait as long as possible, for an ambulance.

1.4 Gathering as many people as possible from closeby

You must never try to respond by yourself but instead, try to gather as many people as possible from nearby. You should assign roles to people when responding to an accident by appointing someone to give first-aid to the victim, someone in charge of preventing the spread of damage at an accident site, someone to contact medical institutions and relevant organizations, and so on. If several persons are involved in responding to an accident, it is also absolutely necessary to appoint a responsible person to supervise the whole operation and provide instructions.

2. First Aid Supplies for Field Activities

- 1) Iodoform disinfectant (Iodine)
- 2) Hydrogen peroxide disinfectant (Oxyfull, Pyrozone)
- 3) Clean gauzes (Unopened packages)
- 4) Adhesive plasters (in several sizes)
- 5) Bandages
- 6) Elastic bandages (for fixing joints after sprains)
- 7) Rubber gloves, plastic gloves (e.g. for dealing with bleeding of victims)
- 8) Thermometer
- 9) Fomentation, antiphlogistic ointments
- 10) Antihistamine ointments (e.g. for insect bites)
- 11) Steroid ointments (e.g. for rashes)
- 12) Antibiotic ointments

The following should be prepared if possible.

13) Sterile distilled water (for cleaning wounds)

14) Triangular bandages (for dislocations and fractures of the shoulders and arms)

Furthermore, you may need the following when conducting field activities in areas where you may come into contact with dangerous/harmful animals, such as bees and snakes (refer to Chapter IV: Response to Dangerous and Harmful Animals and Plants).

15) Tools for poison suction (poison removers to be used when stung by a bee or bitten by a snake)

16) Self-injectable epinephrine (e.g. to be used for the treatment of anaphylactic shock caused by bee stings)

An example of a poison remover



3. Treating Incision Wound

3.1 Observation of incision wound and determining whether to see the doctor or not

Keep the following 3 points in mind when someone has a cut

- 1) Has the wound reached any layers underneath the skin (subcutaneous fatty tissues)?
- 2) Is the victim bleeding a lot?
- 3) Are foreign substances, such as soil or bits of glass, still inside the wound?

If the incision wound stops at the skin surface and there are no foreign substances, such as soil or bits of glass, and bleeding can be stopped just by applying a plaster or gauze, you should rinse the wound thoroughly with clean water, disinfect the wound completely, and leave it at that for the time being but follow-up closely. If the pain from the wound continues, worsens, or becomes reddish and swollen, the victim must see the doctor because they may have a bacterial infection.

However, if the wound has reached the subcutaneous layers, or the victim is bleeding a lot, or foreign substances such as soil or bits of wood are still inside the

wound, the victim needs to see a doctor as soon as possible. If foreign substances remain in the wound for a long period of time, this may be likely to cause infectious diseases such as tetanus.

In addition, if you have a deep cut in the hand or in the arm caused by a knife or broken glass, nerves as well as arteries may be damaged. In such cases, you need to see a medical specialist, otherwise you may be left with motor paralysis in your fingers.

- Tetanus -

Tetanus is a disease caused by infection by *Chlostridium tetani*, an anaerobic bacteria. *Chlostridium tetani* is likely to breed in conditions where it has little contact with oxygen, so tetanus is likely to develop in a deep stab wound or when the wound is closed with *Chlostridium tetani* having adhered to any foreign substances remaining inside the wound. The latency period between infection and the outbreak ranges from 3 days to 3 weeks. The toxin of *Chlostridium tetani* disturbs the nerves and initial symptoms include stiff shoulders, impaired tongue movement, and distortion of the face, and then difficulty in opening the mouth. Gradually dysphagia, speech impairment, and dysbasia appear, and later a convulsive seizure will occur, and in most cases, the victims remain conscious. Increase in the heart rate, perspiration, and high fever are other symptoms of tetanus as well. For treatment, antibiotics and immunoglobulin against the *Chlostridium tetani* toxin will be given. The average mortality rate worldwide is about 50%.

3.2 Disinfecting

If you are wounded, you should rinse the wound thoroughly with clean water if possible, for example if the wound is dirty with soil or other materials, it needs to be cleaned. Make sure to rinse out foreign substances like soil out of the wound completely. However, if you are bleeding a lot, cleansing may worsen the condition, so in such a case, you should not carelessly cleanse the wound. An iodoform disinfectant is effective enough for disinfecting normal types of wounds. You should apply the disinfectant over a clean gauze and then apply the disinfectant over the wound by softly rubbing the wound with the gauze. You can also pour the disinfectant directly over the wound. If the wound is dirty with mud and soil, you need to disinfect the wound with a hydrogen peroxide disinfectant first, cleanse the wound completely with clean water, and then apply an iodoform disinfectant. Hydrogen peroxide disinfectants have

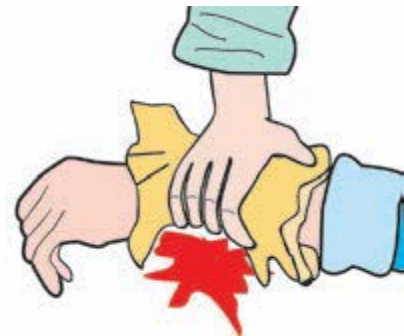
a high disinfecting power and are effective for the prevention of anaerobic infections such as tetanus.

3.3 Hemostatic approaches

If someone is bleeding, you should try to stop it by applying pressure directly first, then indirectly, and finally applying a tourniquet.

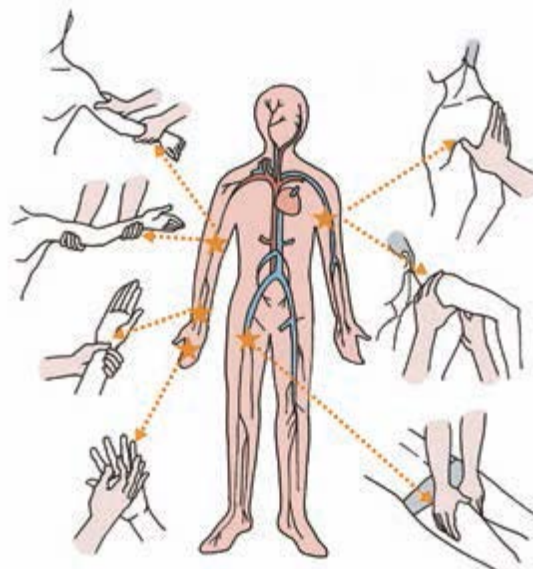
3.3.1 Application of direct pressure

You should directly apply pressure on the bleeding area with a gauze or handkerchief. In most cases, the bleeding will stop in this way. If somebody is bleeding from arteries, it may be necessary to keep pressing the bleeding area for more than 30 minutes. You may need to apply pressure to the bleeding area using both of your hands and by using your weight.



3.3.2 Application of indirect pressure

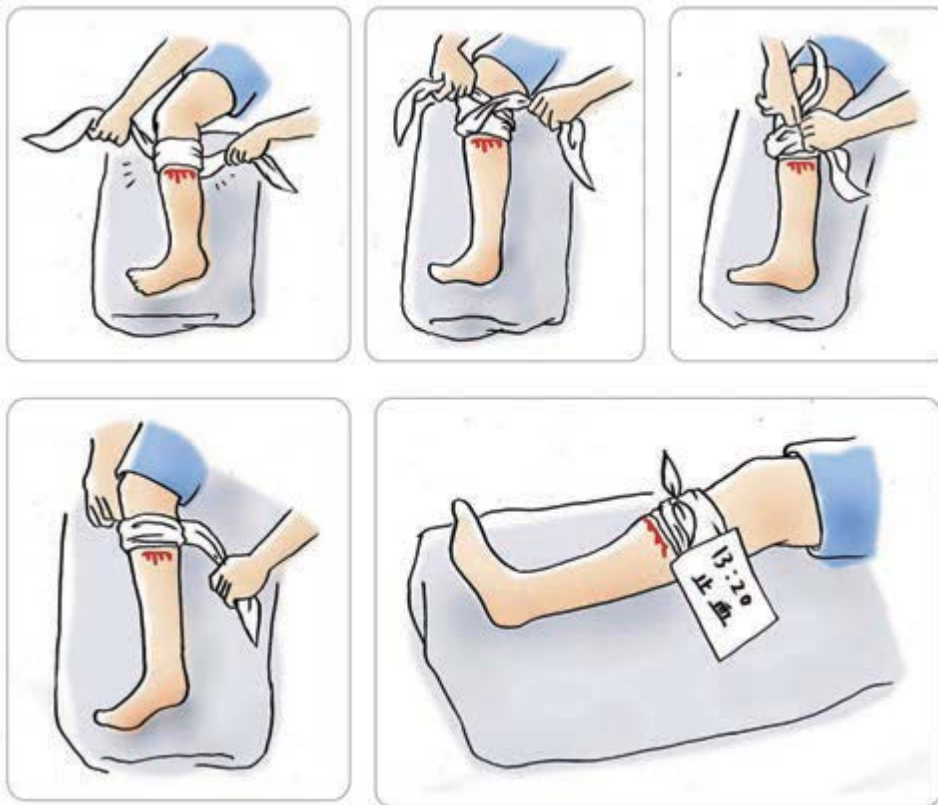
You need to pressurize the arteries located closer to the heart from the wound. You should take this approach if the bleeding does not stop with the application of direct pressure, or if pressing the wound directly is impossible, or if bleeding does not completely stop while applying direct pressure.



3.3.3 Application of tourniquet

You should stop bleeding by tying the area about 3 cm to 5 cm closer to the heart from the wound, only when someone is massively bleeding from their arms and/or legs and application of direct/indirect pressure do not work. This approach may cause necrosis of tissues, so the timing of any hemostatic attempts should be recorded and the tourniquet should be loosened once every 30 minutes.

Hemostatic approach, applying a tourniquet



Also, at any time of mass bleeding, if the victim's face turns pale, the victim is absentminded and is slightly yawning, this means that not enough blood is being supplied to the brain and the victim may be suffering from a hemorrhagic shock. In such a case, you should lay the victim with their head down and their legs up so that enough blood will be supplied to the brain.

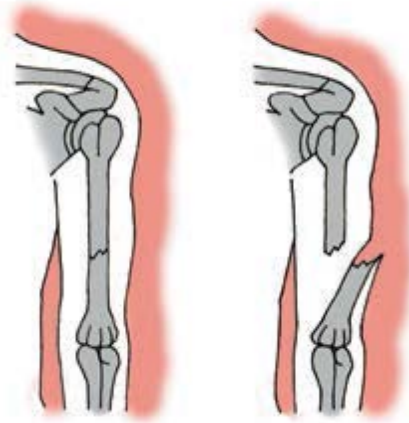


Posture to be taken during a hemorrhagic shock
(Smoother provision of blood to the brain)

4. Treating Fractures, Dislocations, and Sprains

4.1 Fractures

Fractures can be categorized into 2 types. The first type is called an open fracture in which the fractured part of the bone is in contact with or is exposed to the exterior of the body through the wound, and the other type is called a closed fracture in which the fractured part of the bone is not in contact with the exterior of the body. With an open fracture, you need to have the wound cleaned as soon as possible (within 8 hours) at a medical institution because otherwise infection at the fractured



Closed fracture Open fracture

part of the bone (osteomyelitis) may develop and treatment will become extremely difficult. Also with an open fracture, mass bleeding and nerve injuries tend to follow. If you notice bleeding from the wound, you should follow the above described hemostatic approaches (3.3) and deal with the bleeding. With a closed fracture, a fractured pelvis or a fractured thigh bone may also be accompanied by mass bleeding and in many cases the victim may suffer from a hemorrhagic shock.

Where a fracture is obvious or likely, you must not move the wounded part carelessly. If you do so, it may not only cause severe pain but may also damage blood vessels and nerves, and even leave the victim with after-effects. If you cannot expect an ambulance to arrive or you find it dangerous to stay at the accident site, you should transport the victim while minimizing the movement of the fracture. If splints or boards are available for fixing the fracture, you should externally fix the fractured part.



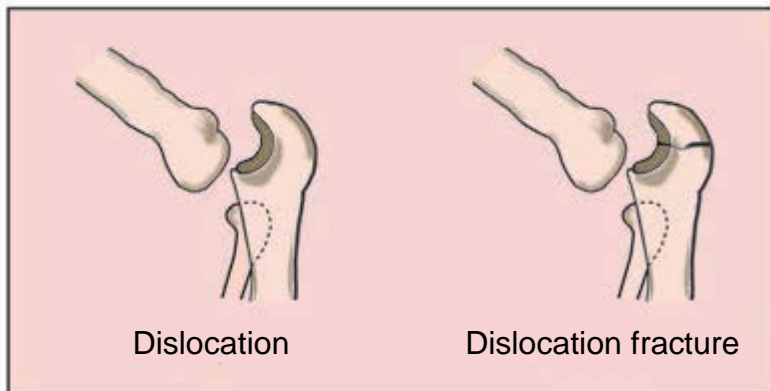
Fracture of humerus



Fracture of femur

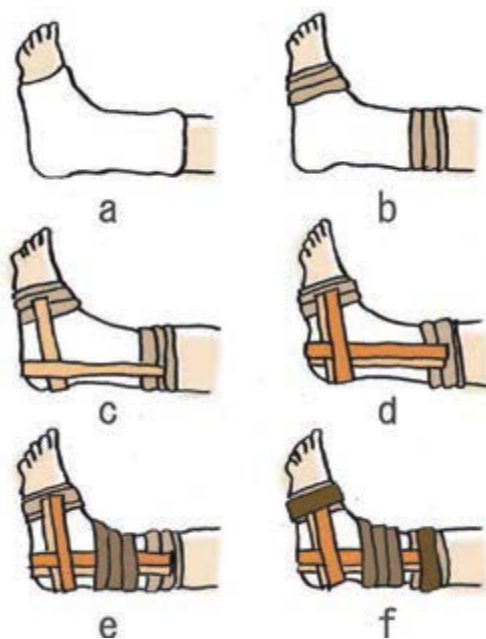
4.2 Dislocations/Sprains

A dislocation and a sprain will occur when unreasonably strong external extension/inflection forces are put against joints. Dislocation is the condition where a bone has come out of its joint because of an external force, while a sprain is the condition where a bone has returned to its normal position after it was about to become dislocated. A dislocation may often be accompanied by a fracture near the joint of the bone (dislocation fracture).



If you have a dislocation, usually you will not be able to move the affected part by yourself, while with a sprain, you can move the joint with some pain because the bone remains within the joint. If you have a dislocation you should not try to fix it forcibly and should minimize the movement of the dislocated joint and see a doctor as quickly as possible. A dislocation may involve damage to blood vessels and nerves after it has been pulled and may leave the victim with after-effects that may last for a long time.

You can expect to cure a sprain by cooling it with ice and applying a fomentation sheet. However, a sprain may involve damage to ligaments around the joint, so you should avoid forcibly moving the joint. If the ligaments are damaged, swelling in the wounded area and internal bleeding will often follow. If ligaments are feared to have been damaged, you need to see a doctor as quickly as possible.



Taping for ankle sprain

5. Treating Hyperthermia

Sunstroke is a type of hyperthermia generally caused by exposure to sunlight for a long time.

Hyperthermia is a disorder caused by high temperature, and there are 4 preventive measures described below.

- 1) You should discontinue work if it is hot and the area is poorly ventilated, and you should take appropriate breaks.
- 2) You should replenish with water and salt.
- 3) You should wear loose-fitting clothes and hat for ventilation.
- 4) You should refrain from work if you feel unwell such as a lack of sleep, a hangover, or exhausting.

Hyperthermia can be categorized into heat cramp, heat collapse, and heatstroke depending on the symptoms.

5.1 Heat cramp

A heat cramp occurs when you use muscles under a very high temperature and you have a lack of internal salt because of extensive sweating. It especially tends to occur when you take in pure water which contains no salt after you have been sweating. Muscles in the arms and the legs go into convulsions accompanied by pain. If you let the patient stay calm in a well-ventilated area and give them some salt and water (or sports drinks, etc.), the patient will recover. However, the patient may die when systemic convulsions occur, so they should be transferred to a medical institution immediately.

5.2 Heat collapse

Heat collapse occurs when the amount of blood flow decreases after becoming dehydrated due to extensive sweating. Symptoms include headache, dizziness, nausea, and weakness. It also usually involves low blood pressure, pallor, tachycardia, but not an extreme elevation of body temperature. In more serious cases, the level of consciousness will become lower. Most patients will recover after taking a rest in a cool, well-ventilated area and taking some slightly salted water (or a sports drink).

5.3 Heatstroke

Heatstroke is the most dangerous condition of hyperthermia. Hot and humid

conditions and a state of dehydration, prevent the cooling of body temperature through sweating and the functions of the thermoregulatory center of the brain are hindered, causing an unusual rise in body temperature (often 40°C and above). It also involves headache, nausea, dizziness, flushing of the face (reddish purple in more severe cases), and an increased rate of respiration. Further symptoms of impaired consciousness, convulsions or stiffness of arms and legs are signs of more severity. The patient should take a rest in a cool and well-ventilated area. You should use a fan and pour water over the patient to lower the body temperature down to at least 38°C. In this case, it is inadequate just to cool the head, so you must try to cool the whole body. The patient also needs to be transferred to a medical institution as soon as possible. If it is too late, all body muscles will dissolve (rhabdomyolysis), and systemic disorders such as kidney failure will develop; it is not unusual for patients to die as a result.

6. Treating Burns

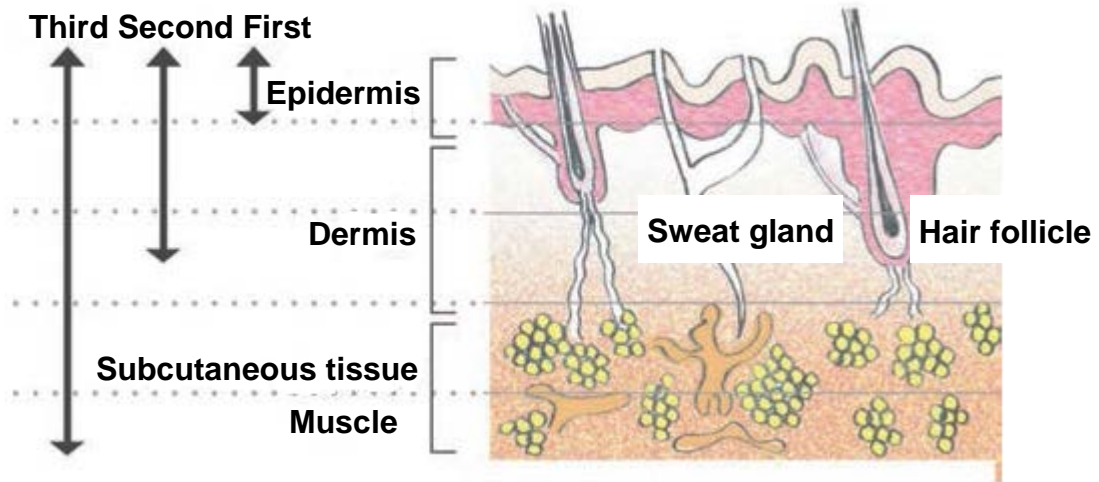
If someone suffers a burn, you must first rinse the wounded area completely with water and cool under running water for more than 15 minutes (more than 30 minutes if possible). The water temperature should be that of normal tap-water and ideally be between 10 to 15°C. You should avoid excessively cooling the wounded area with ice. If the burn area has spread to a wide area (more than a quarter of the body surface area), pouring running water for a long time may lower the body temperature and cause a state of shock. For a burn that has spread over a wide area, you should first pour water to get rid of the high temperature on the surface, then wrap the wounded area with a clean towel or sheet, and transfer the patient to a medical institution as soon as possible.

The severity of burns is determined by the depth, the size of the wounded area, and the part of the body which suffered the burn. Depths of burns are divided into three categories of first degree, second degree, and third degree burns.

First degree burns are just reddening of the skin. You should cool a first degree burn fully with running water and apply over-the-counter, anti-inflammatory ointment, then monitor the progress.

Second degree burns may cause abrasion of the skin surface (epidermis) or blisters. If boiling water is splashed over the body, a second degree burn is highly likely to

develop and the burn must be disinfected and treated at a medical institution. Normally, new skin will appear and the burn will be cured in about 2 weeks. However, if the surface of the burn becomes infected with bacteria, etc., the burn will become deeper and more difficult to cure, so you need to be careful.



Categorization of burns based on invasion depths

Third degree burns are burns with all layers of the skin and the subcutaneous tissue destroyed by heat, and the destroyed and necrosed regions need to be surgically removed at a medical institution. Third degree burns also often require a skin transplant over the surface of the burn. If you have suffered from third degree burns over the joints of your arms or legs, or on your hands, you may be left with motor paralysis. For second degree and third degree burns, you should also fully cool down the wounded area and generally, must see a doctor. You must not apply zinc oxide oil without consultation.

7. Treating Frostbite

If you have suffered frostbite, you should soak the wounded area in warm water of about 40°C (tepid water) and warm the area for about 30 minutes. Excessively hot water may cause intense pain and even worsen the condition of the frostbite. If no warm water is available, you may instead use warmer areas of the body such as under the armpits to warm the frostbitten area. Minor frostbite is just reddening of the skin and will cure naturally by warming the wounded area properly. However, if the surface of the frostbitten area turns reddish-purple, blackish, or whitish, you need to receive

surgical treatment at a medical institution.

8. Treating Altitude Sickness

In mountains with an altitude of 2,000 m or above, you may develop altitude sickness if you have not fully adjusted to an environment with low oxygen partial pressure. Altitude sickness tends to occur after you have climbed up to a height in a short time. Changes in temperature, dehydration, and fatigue may also cause altitude sickness to appear. Subjective symptoms of altitude sickness include headache, dizziness, nausea, and breathlessness. Symptoms at an advanced stage include coughing, swelling of the face and the feet, and pulmonary edema (lungs with stagnant water in them). If you develop pulmonary edema, you breathe rapidly because of the difficulty in breathing and expel a lot of thin watery (sometimes pinkish) phlegm, and the face, torso, arms, and legs turn dark-purplish (cyanosis). In order to deal with altitude sickness, you should first keep calm and warm, take in enough water, and if possible, move to a lower altitude. If a portable oxygen respirator is available, you should inhale oxygen from it. If you are suspected to have developed pulmonary edema, you need emergency transportation to a medical institution by a helicopter or other means.

9. Treating Snow Blindness

While working on the surface of snow, inflammation of the eyes may develop due to the reflection of ultraviolet rays. Symptoms usually do not develop immediately after ultraviolet rays hit the eyes, but symptoms such as pain in the eyes, sensation of a foreign body, tearing, and conjunctival injection appear 3 to 8 hours later. The symptoms usually disappear naturally in 1 to 2 days and the use of anti-inflammatory eye drops and antibiotic eye drops may cure the symptoms faster. If symptoms persist, you should see an ophthalmologist. When working on the surface of snow, you should wear ultraviolet insulating sunglasses even on cloudy days.

10. Treating Caisson Disease (the Bends)

If you scuba dive more than 10 m deep under the sea, water pressure will rise and more nitrogen will be absorbed into the body than usual as you breathe. Then if you

surface suddenly, the excess nitrogen you have absorbed turns into bubbles and blocks the blood vessels causing blood circulation disorder (decompression sickness or 'the bends'). Symptoms include severe pain in the joints of shoulders, elbows, wrists, and knees, symptoms of numbness and dizziness in the brain, and sometimes loss of consciousness. Bones of arms or thighs may be necrotized and fractured due to circulation disorders in bones. If caisson disease develops, you need to receive hyperbaric oxygen therapy at a medical institution immediately. For preventive measures, it is necessary to limit the duration of diving based on the depth of water and surface slowly. You also need to be aware that flying in an airplane or transferring to high altitudes after diving may also cause caisson disease. In addition, if you try to suddenly surface while holding your breath, air in the lungs will inflate abruptly and may cause the lungs to rupture.

11. Dealing with Drowning

When people drown, water enters the lungs and the trachea, causing suffocation. Even if you have not sucked in a large amount of water, the water you have sucked in and the panicking may also cause spasms in the larynx, which may then cause suffocation. If you are drowning in the sea, the accumulated seawater in the lungs raises the osmotic pressure and water content in blood transfers to the lungs, which tends to cause pulmonary edema (fluid accumulating in the lungs). On the other hand, if you are drowning in fresh water, the water you have breathed in with low osmotic pressure is absorbed in the body to increase the amount of blood, and the electrolytic concentration of sodium and chlorine inside the body will decrease. Therefore, if you have breathed in a large amount of water while nearly drowning, you need to see a doctor even if you only have minor symptoms. If someone seems to have drowned and stopped breathing, you need to perform cardiopulmonary resuscitation. In such a case, you do not have to try to force out any water that has been breathed in. In many cases, if someone has remained in the water for a long time after drowning, the body temperature will also be very low. It is difficult to resuscitate someone with a low body temperature from the state of cardiac arrest, so it is important to keep the body warm while performing cardiopulmonary resuscitation (refer to Chapter V, "14. Cardiopulmonary Resuscitation").

12. Anaphylactic Shock

Anaphylactic shock, is an extreme allergic reaction against toxins from animals, typically bees, and products of plants that causes a reduction in blood pressure and difficulty in breathing, and is a very dangerous condition which often results in death. Aside from bees, anaphylactic shock may be caused by the stings and bites of ants, gadflies, and other animals. Symptoms often involve flushing in the face, wheals, tachycardia (excessively rapid heartbeat), and palpitations. The main cause of death from anaphylactic shock is suffocation caused by swelling of the larynx. The swelling may develop suddenly, but sometimes may also initially develop with a feeling of difficulty in breathing and a hoarse voice, and gradually become more serious. If you have been stung by a bee or other animal, you need to keep calm for at least 30 minutes to see whether there are any changes in your physical status. If anaphylactic shock develops, you need to go to a medical institution immediately. The first thing to do for treatment is to inject epinephrine as soon as possible. If you feel any difficulty in breathing, drinking cold water will also reduce the symptoms because it helps the blood vessels in the throat to shrink and the swelling to be reduced. Caffeine can constrict the blood vessels, so cold coffee or tea can reduce the swelling of the larynx more effectively. Today, you are allowed to carry an epinephrine self-injection kit and they can be prescribed by a certified medical practitioner. Those who have the experience of being stung by venomous animals such as bees in the past or those who are allergic to wild plants are advised to carry an epinephrine self-injection kit. However, the expiry date of the medicine should be strictly observed. If you are stung or bitten by venomous animals like bees, you can check if you are allergic to toxins (or if you are susceptible to anaphylactic shock) by taking skin tests at a medical institution.



13. Diseases Transmitted by Animals

13.1 Diseases transmitted by mosquitoes

13.1.1 Japanese encephalitis

Japanese encephalitis is a viral disease transmitted mainly by *Culex tritaeniorhynchus*. In Japan, more than 1,000 people have had Japanese encephalitis in the past, but the decline in the number of *Culex tritaeniorhynchus* and the spread of the Japanese encephalitis vaccine contributed to the sudden reduction in the number of patients from around 1970. However, there are still 5 to 10 patients every year, mostly in western Japan. The incubation period of Japanese encephalitis is between 7 and 21 days after a sting. After the onset of the disease, symptoms include a sudden fever, heavy headache, nausea, and vomiting. The fever will last for about 7 to 10 days. Then symptoms of encephalitis appear, such as impaired consciousness, convulsions, and abnormal behavior. There is no special treatment for the disease, and even today, the mortality rate after the onset of the disease is still high at 30%. Also, even after recovery, about half of the patients are left with the after-effects of this disease such as changes in personality, intelligence disorders, and convulsions.

13.1.2 Malaria

Malaria is transmitted by anophelids when malaria plasmodia enters the body while mosquitoes are sucking blood. Malaria is categorized into vivax malaria, quartan malaria, ovale malaria, and tropical malaria. In the past, there have been onsets of vivax malaria in Japan, and tropical malaria in the Yaeyama Islands, but these have now been eradicated. However in Korea, where malaria was also considered to have been eradicated, there have been onsets of malaria since the 1990s, and since 1993 more than 20,000 infectious cases have been reported. Malaria is a disease that causes symptoms such as fever, chills/shivers, swelling in the liver and the spleen, anemia, and so on. Tropical malaria has an incubation period of between 6 days to 1 month, quartan malaria between 18 to 40 days, while normally vivax malaria and ovale malaria have an incubation period of between 12 to 17 days. However, the incubation period may sometimes extend to more than half a year. High fevers, with body temperatures reaching over 40°C and can last from 30 minutes to a few hours, with temperature lowering together with massive perspiration. Fevers recur at intervals of

48 hours for vivax malaria and ovale malaria, and 72 hours for quartan malaria. On the other hand, specific periodic fever patterns are rarely recognized for tropical malaria, so the patient may be continuously feverish, may become feverish every day, or may become feverish at intervals of a few days. Normally, an antimalarial agent such as mefloquine is administered for treatment. Not many people die of vivax malaria, quartan malaria, or ovale malaria, but tropical malaria is at times resistant to therapy and has a high mortality rate especially when occurring together with malaria encephalosis.

13.1.3 Dengue fever

Dengue fever is a viral disease transmitted by yellow fever mosquitoes. It used to occur only in southern China and tropical regions south of the Philippines in East Asia. However, in recent years, there have been mass outbreaks in Taiwan, and the expansion of its geographic distribution has become problematic. The incubation period is between 5 to 8 days and the patient becomes suddenly feverish along with chills and headaches. Ophthalmalgia, myalgia, and arthralgia in the entire body will then follow, and 3 to 4 days after a fever, erythematous rashes (redness of the skin) will appear. The patient often becomes feverish again after initial alleviation. Dengue fever will cure naturally in most cases and the mortality rate is said to be less than 0.1%. There is no specific therapy for dengue fever. After the second infection, dengue fever mainly occurs in conjunction with hemorrhagic dengue fever, which involves bleeding from the skin and the gastrointestinal tract. If you are infected with hemorrhagic dengue fever, you may also have a cardiac insufficiency and encephalitis as well, and the mortality rate reaches between 2% to 15%.

13.2 Diseases transmitted by mites

13.2.1 Scrub typhus

Scrub typhus is a disease that occurs when pathogenic rickettsiae enter the body after being bitten by a chigger, a type of mite. When you are bitten by a chigger infected with rickettsiae of scrub typhus, you will have a high fever of 38°C and over, small reddish rashes mainly over the torso, and swelling in the lymph nodes, after an incubation period of between 5 and 14 days. Initial reddening of about 5 to 10 mm will appear, and a blackish circular scab will cover the area after the formation of blisters and ulcers in the area where the chigger has bitten you. Antibiotics such as

chloramphenicol and tetracycline are effective for the treatment of scrub typhus, so you should quickly go to a medical institution for examination if you think you are infected with scrub typhus (for details, refer to Chapter IV, “1.3.10.1 Chiggers”).

13.2.2 Japanese spotted fever

Japanese spotted fever was first reported domestically in 1984. It is a disease caused by rickettsiae transmitted by ticks and often occurs from April to October. Initially the number of domestic cases remained at about 10 per year, but since 1999, the number has been increasing to about 40 cases per year. The incubation period is between 2 to 8 days after a bite by ticks. Fever, headache, and small reddish rashes mainly on the arms and legs will appear. A blackish circular scab will appear where the tick has bitten. Sometimes it is difficult to distinguish Japanese spotted fever from scrub typhus. Antibiotics such as tetracycline are effective for treatment, so you should go to a medical institution promptly for examination, if you think you are infected with Japanese spotted fever (for details, refer to Chapter IV, “1.3.10.2 Ticks”).

13.2.3 Tularemia (Rabbit fever)

Rabbit fever is a zoonotic infectious disease that tends to infect rodents like rabbits, and its pathogen is *Francisella tularensis*, a type of bacterium. Humans are infected with rabbit fever when bitten by ticks. Rabbit fever used to appear mainly in the Tohoku from winter to spring, but the number of occurrences of rabbit fever has remarkably declined in recent years. However, a few cases are still reported annually. The incubation period is between 3 to 7 days, and it involves a sudden fever of 38°C and over, headaches, chills, nausea, vomiting, and ulcers around the bitten area. Lymph nodes near the bitten area become suppurative, which accumulates pus with pain. At an advanced stage, the pus may be discharged outside the skin. You may die if left untreated, but antibiotics such as streptomycin are effective. At times suppurated lymph nodes may need to be surgically removed, therefore you need to quickly go to a medical institution for examination (refer also to Chapter IV: 1.3.10.2 Ticks).

13.2.4 Lyme disease

Lyme disease is transmitted by taiga ticks and is caused by the infection of a spirochete called *Borrelia*. Taiga ticks inhabit areas from the mountains in central Japan through to the flat lands of Hokkaido. From summer to early autumn, several

hundred cases of infection have been reported so far mainly in Hokkaido and Nagano. After an incubation period of between several days and several weeks (10 days on average), few to several linear red spots about ten centimeters in size appear running over the skin radially with the bitten spot at the center, with flu-like symptoms developing such as myalgia, arthralgia, headache, fever, chills, and a sense of fatigue, etc. (early stage of infection). The red spots are accompanied by itchiness, pain, and a sensation of heat. If the pathogen has further spread throughout the body, in addition to symptoms on the skin, various other symptoms appear including neurologic symptoms such as meningitis, myocarditis accompanied by arrhythmia, eye symptoms, arthritis, and myositis (dissemination stage). During this dissemination stage, symptoms alternately improve and recur, and after a few years, the disease reaches the final stage. During the final stage, there appear inflammatory symptoms accompanied by the atrophy of the arms and legs called acrodermatitis chronica atrophicans. Also arthritis may appear quite often throughout the body. During the early stage of infection, the disease can be cured completely by the administration of antibiotics such as tetracycline and minocycline, so if you suspect that you have been infected, you should go to a medical institution for examination as soon as possible. In addition, while there have been a limited number of cases of Lyme disease in Japan, there are tens of thousands of patients in Europe and North America, and the number has been increasing (also refer to Chapter IV, “1.3.10.2 Ticks”).

13.3 Echinococcosis

There is no effective medical therapy for echinococcosis, so there is no other way but to surgically remove the liver in order to remove echinococcus. However, if the stage of parasitism has advanced, it is difficult to completely remove echinococcus surgically. Once the echinococcus is in its advanced stages, the success rate of an operation is said to be less than 60% (refer to “Chapter IV: 1.4.2.1 Echinococcus” for details).

13.4 Angiostrongyliasis

In order to treat Angiostrongyliasis, mainly symptomatic treatment will be conducted for cerebral nerve symptoms. In most cases, if a person develops Angiostrongyliasis, they will recover in about 4 weeks. However, the patient sometimes can fall into a coma and may be left with a mental disorder or convulsion. The mortality rate is said to be

less than 3% (refer to Chapter IV, “1.4.2.2 Angiostrongylus cantonensis,” for details).

13.5 Strongyloidiasis

Anthelmintics such as thiabendazole are effective for the treatment of strongyloidiasis. However once you are infected, the symptoms recur repeatedly and you may have difficulty achieving a complete cure. (Refer to “Chapter IV: 1.4.2.3 Threadworms” for details.)

13.6 Cercarial dermatitis

Cercariae is a general term that refers to one of the growth stages of parasite larvae that belong to the Trematoda family of flatworms. Cercarial dermatitis develops as flukes that are parasitic to waterfowls, and they enter the human skin with fresh water shellfish as their intermediary hosts. Because cercariae that have entered the human skin cannot grow thereafter, the disease results in just temporary dermatitis. There are many reports of cases west of Kanto in Honshu and in Okinoshima Island. In many cases, cercariae stick onto and enter humans through their exposed skins while in the water of lakes and rice fields, during the period in which migratory birds are present (mostly from May to October in Japan). Spotted papules and herpes accompanied by fierce itchiness can appear within 12 hours of entering the water. As a preventive measure, you should not enter rice fields or marshes/lakes with the skin exposed. Cercarial dermatitis will cure completely in 1 to 2 weeks on application of antihistamine ointments or steroid ointments.

13.7 Diseases transmitted by other animals

Of the diseases that animals transmit in Japan, the table below shows diseases that are transmitted by parasites (apart from Ecchinococcosis and Angiostrongyliasis), when people eat raw or not-fully-cooked meat, fish, squids, and other animals, which are hosts to the parasites. In order to prevent infection from these parasites, it is important to cook the meat thoroughly before eating and not to eat raw meat of the hosts.

Parasitic diseases infected when humans eat raw or not-fully-cooked meat of the host(s) of parasites (Domestic)

Name of Disease	Host(s)
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Diphyllobothriasis	Trout
Spirometra erinaceieuropaei disease	Frog, snake, swine, wild boar, fowl
Diplogonoporus grandis	Sardine, mackerel, tuna, squid
Clonorchiasis	Freshwater fish
Metagonimosis	Mainly parasitic to sweetfish (ayu)
Paragonimus westermanii disease	Japanese freshwater crab, crayfish
Paragonimus miyazakii disease	Japanese freshwater crab, crayfish
Anisakiasis	Mackerel, horse mackerel, cod, salmon, Japanese common squid
Gnathostomiasis cutis	Freshwater fish like loach, snakehead, landlocked salmon, frog, snake
Gnathostoma nipponicum disease	Freshwater fish like loach, snakehead, landlocked salmon, frog, snake
Gnathostoma doloresi disease	Freshwater fish like loach, snakehead, landlocked salmon, frog, snake, wild boar
Spiruria disease	Firefly squid, Japanese common squid, cod, Atka mackerel, Japanese sandfish
Trichinosis	Bear, swine

On the other hand, just like echinococcosis, some types of infections occur when people consume vegetables or water that are contaminated with eggs and larvae from faeces of host animals, or when people eat without washing their hands, to which eggs and larvae have adhered through contaminated soil. A representative example of these is oxyuriasis. More than 70% of the Japanese are said to have been hosts to these pinworms. Today, parasitism of pinworms is at about 1%, but it is necessary to always keep clean during field activities in order to prevent the entry of parasites. In Japan, eggs and larvae contained in faeces of old world hookworms will also parasitize humans.

Of these parasites, the number of cases caused by parasitism by pinworms, *Clonorchis sinensis*, *Paragonimus westermani*, and *Gnathostoma spinigerum* have declined remarkably in recent years. However, you need to be aware that there has been an increase in the number of reported cases of diphyllobothriasis, *Diplogonoporus grandis*, *Gnathostoma nipponicum* disease, *Gnathostoma doloresi*

disease, and Spiruria disease.

14. Cardiopulmonary Resuscitation

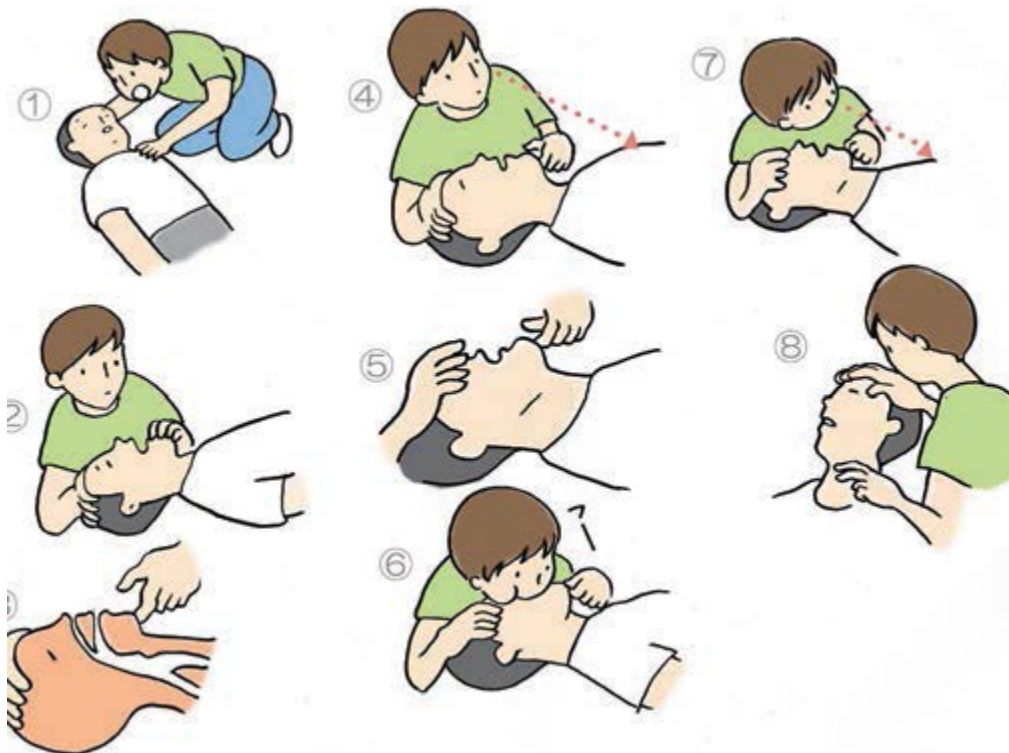
Cardiopulmonary resuscitation is a measure for saving life by performing artificial manipulation on a person whose breathing and heartbeat have stopped or nearly stopped. About 50% of people will die 3 minutes after their heart has stopped beating, 10 minutes after they have stopped breathing, and 30 minutes after they have lost a great amount of blood. Those around someone with cardiopulmonary arrest or mass bleeding must give first aid without delay. The cardiopulmonary resuscitation method described below is just an introductory example, so in order to respond to actual accidents, you need to take training courses offered by the Japan Red Cross Society or fire stations. If you make an inquiry about training courses with the fire station closest to you, they will be able to recommend one. Also if there are a certain number of people interested in participating, you can have an instructor dispatched to provide training for the group and can take a course using a life-size doll or similar.

The ABCs of the cardiopulmonary resuscitation are as follows:

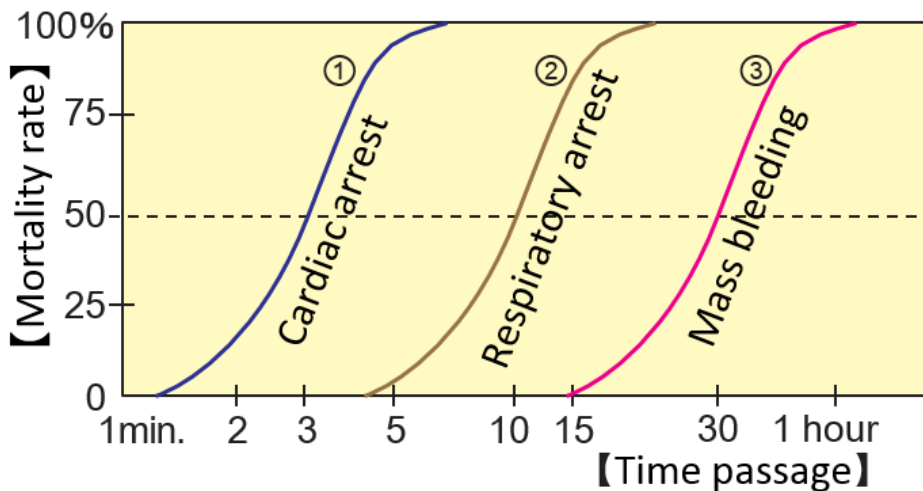
A: Airway (Securing airway)

B: Breath (Breathing)

C: Circulation (Heartbeat/Pulse)



That is, you need to secure an airway, perform artificial respiration on someone who is not breathing, and perform cardiac massage. You always need to bear in mind these ABCs when performing cardiopulmonary resuscitation.



Relation between the mortality rate and the passage of time after cardiac arrest, respiratory arrest, and mass bleeding

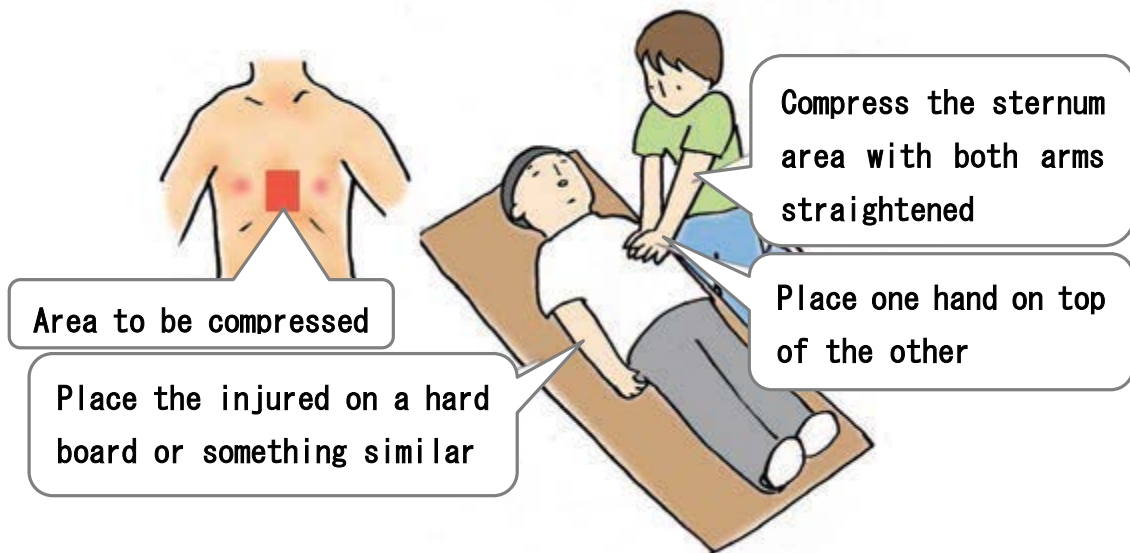
14.1 Cardiac massage and artificial respiration

When performing a cardiac massage, regardless of whether or not it is being performed by 1 person or more, it is recommended to perform cardiac massage 30 times while you perform artificial respiration twice (30:2, the universal ratio of compression to ventilation).

- 1) If a person is injured, first you need to check if he or she is conscious or not, while securing safety. If the person is unconscious, you need to ask for help and dial 119 to request an ambulance dispatch.
- 2) You need to secure airway. If the injured is unconscious, the tongue sinks and tends to block airway. In order to secure airway, you need to place your right hand on the forehead of the injured to lower the head and pull up the lower jaw with your left hand. If you find a foreign object in the mouth, it must be removed.
- 3) You need to check to see whether the injured is breathing spontaneously or not, and if the person is not breathing, you need to perform artificial respiration. You should determine whether or not he or she is breathing by observing for 10 seconds. There are two ways of performing artificial respiration. One is the mouth-to-nose

method and the other is the mouth-to-mouth method. Both should be performed after you have secured the airway. In the mouth-to nose method, you need to push the lower jaw up with your left hand to close the mouth. You should inhale enough air and fully open your mouth to hold the entire nose of the injured in to the mouth, and then breathe slowly for a second or so into the injured through the nostrils. With the mouth-to-mouth method, you should close the nose pores with your right hand and then breathe slowly for a second or so into the injured through the mouth. If you are hesitant to conduct it directly to the mouth, you can place a handkerchief over the nose and the mouth to breathe into that person. In either case, you need to breathe into the injured twice with an interval of two seconds.

- 4) After breathing into the person twice, you should check if there is any reaction. You need to observe whether or not he or she starts breathing, coughing, or moving the body.
- 5) If there is no reaction, you need to repeat the cardiac massage and artificial respiration 4 more times with the ratio of 30:2. For cardiac massage, you need to straighten your arms and overlap your hands to compress by using your palms in the area 1/3 below from the bottom of the sternum and between the nipples in the



center of the invalid's chest (where the sternum is). The strength of compression should be such that the sternum is pressed 4 to 5 cm down. At times a fracture may occur on the rib with a snapping sound when compressed. However, it is imperative to restart the heart, so cardiac massage must not be discontinued or done with less pressure. You should compress the relevant area 100 times per minute, and perform artificial respiration twice after compressing the sternum area 30 times.

While performing artificial respiration, cardiac massage should also be continued. Where there are several people, you can take turns performing cardiac massage every few minutes, but you need to minimize the duration of the interruption of cardiac massage by taking turns quickly.

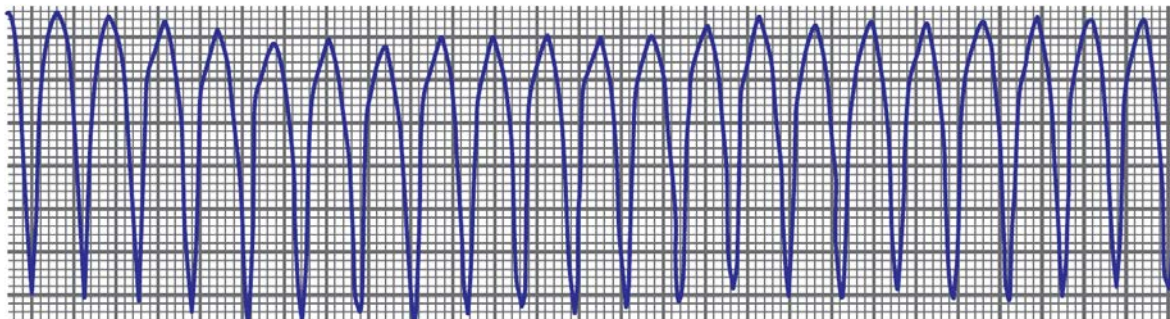
- 6) After repeating cardiac massage and artificial respiration 4 times with a ratio of 30:2, you should check the reactions of the injured once more. If there is still no reaction, you should repeat the process until paramedics or medical professionals arrive.

14.2 Automated External Defibrillator: AED

In recent years, thanks to the spread of the automated external defibrillator (AED), which stops serious arrhythmia, the number of those who have been saved by its appropriate use has been increasing. However, if someone suddenly loses consciousness with no pulse during field activities conducted far apart from an urban area, there may be limited opportunities to actually use an AED. However, if you know the proper way of applying and using an AED, it may be quite useful when an AED is available, so it is advisable for you to be fully familiar with its use.

If the heart has completely stopped, it is no use performing defibrillation involving electric shocks, so you must perform cardiac massage first (refer to “14.1 Cardiac massage and artificial respiration”). An AED can be used for the fatal type of arrhythmia, called ventricular tachycardia or ventricular fibrillation. AEDs prevalent today can automatically detect the heartbeat and are programmed not to operate if the AED is not suitable for a particular case.

Serious arrhythmia to be treated with an AED (Ventricular fibrillation)



An AED should be used by following the procedures below.

- 1) If someone suddenly loses consciousness and falls, you should follow the

procedures described in the previous section “14.1 Cardiac massage and artificial respiration” to check the condition of the injured. During that time someone else should call the ambulance.

- 2) If it is found that the invalid needs cardiopulmonary resuscitation, you should perform a compression of the sternum (cardiac massage) at a rate of 100 times a minute and artificial respiration with the ratio of 30:2 as described in the previous section, during which someone else should run to collect an AED.
- 3) You should continue the above-described treatment until an AED arrives.
- 4) When an AED arrives, switch it on and stick the electrode pads directly onto the skin.
- 5) When the battery of the AED becomes fully charged, check the safety and start defibrillating the injured. (If the injured has either ventricular tachycardia or ventricular fibrillation, the AED will automatically discharge electricity.)
- 6) Following the voice guidance, you should immediately resume cardiopulmonary resuscitation procedures if necessary.
- 7) The electrode pads must not be removed until paramedics arrive. Also the power of the AED should be kept on and if cardiopulmonary resuscitation on the injured becomes necessary again, you should repeat the treatment using the AED after performing cardiac massage and artificial respiration.

★ An example of an installed AED

AED located in the gatehouse of the University of Tokyo





Appendix

Material 1

The University of Tokyo Regulations for the Management of Health and Safety during Educational and Research Activities Conducted in the Field

Article 1: Purpose

The purpose of the Regulations is to provide for necessary matters concerning safety and health considerations during activities in the field (hereinafter referred to as fieldwork activities), in addition to what is provided for by The University of Tokyo Regulations on Environment, Safety and Health Management for Academic and Administrative Staff (Rule No. 10 of 2004).

Article 2: Definitions

Definitions of terms in this Regulation shall be governed by the provisions in each of the following items:

- (1) The term, “fieldwork activities,” means educational and research activities conducted outdoors (excluding those specified by the Division for Environment, Health and Safety).
- (2) The term, “participants of fieldwork activities,” here refers to the participants of educational and research activities conducted outdoors by The University of Tokyo (hereinafter referred to as the University), or faculty, students, or researchers of the University participating in fieldwork activities conducted by institutions other than the University.
- (3) The term, “educational/research group,” refers to a basic group formed to carry

out fieldwork activities conducted by the University, or a basic group comprised of faculty, students, research students, and other members partaking in fieldwork activities conducted by institutions other than the University.

- (4) The term, “department,” here refers to the affiliated organizations, school and hospitals set forth in Chapter 3 and Chapter 4 of The University of Tokyo Rules on Basic Organizations.
- (5) The term, “head of department,” here refers to in the head of the department, in which the definition is set forth in the previous item.

Article 3: Obligations to Comply with Rules and Regulations

The participants of fieldwork activities shall fully comply with the rules of the University as well as laws and regulations related to safety and health.

2. For fieldwork activities that require qualifications or special credentials, the requirements of the law must be satisfied.

Article 4: Obligations to Ensure Safety and Health

Participants of field education and research activities shall endeavor to ensure their safety and health in accordance with measures taken to ensure safety and health by the University.

Article 5: Safety and Health Management Planning and Notification

The head of the educational/research group shall develop management plans for the following health and safety matters in advance:

- (1) The location of the activity, date, and accommodation
- (2) Names and contact information of the participants
- (3) Means of transportation
- (4) Responses to hazardous or dangerous work
- (5) Responses to risks involved at the location of fieldwork activity and in its surrounding environment
- (6) Responses to the requirements of the law
- (7) Contact procedures to and between the head of the educational/research group and the head of department during emergency
- (8) Contact information of the Japanese diplomatic mission or its equivalent in the country of stay, if fieldwork activities are being conducted overseas

2. The head of the educational/research group shall notify the head of his/her department of the health and safety management plans set forth in the preceding paragraph.

Article 6: Obligations and Authority of the Head of Department

The head of department, in accordance with the provisions of the second paragraph of the preceding article, shall confirm that the reported fieldwork activity follows laws and regulations of the University and that safety and health is ensured.

2. If the confirmation set forth in the preceding paragraph is not possible, the head of educational/research group shall be required to re-evaluate and re-submit the safety and health management plan to the head of department.
3. If the document required in the preceding paragraph is not submitted or if the confirmation set forth in the first paragraph of this article is not possible even after the re-submission or if it is judged that the participants may be exposed to grave physical or mortal danger, the head of department has the authority to order the cancellation of the fieldwork activity.
4. The head of department shall be required to retain the safety and health management plans, set forth in paragraph 1 and 2 above, for one year from the date of receipt.

Article 7: Responsibility and Duty of the Head of the Educational/Research Group

The head of the educational/research group must be a faculty member of the University.

2. The head of the educational/research group shall be responsible for ensuring the safety and health of the participants of fieldwork activities and is obliged to enforce the laws and the University regulations concerning health and safety.
3. The head of the educational/research group must notify the participants of the fieldwork activity of the health and safety management plan submitted to the head of department.
4. For fieldwork activities conducted by the University along with other institutions, the head of the educational/research group shall in advance, consult with the heads of other institutions and determine an integrated measure pertaining to the fieldwork activity to ensure health and safety and to comply with laws and regulations.

5. The head of the educational/research group shall be required to retain a copy of the Safety and Health Management Plan that has been accepted by the head of the department for one year after submission.
6. The head of the educational/research group shall appoint an assistant out of the fieldwork research participants in order to ensure safety and health of the participants. The head of the educational/research group must be in close contact with the appointed assistant.

Article 8: Educational/Research Activities at Institutions other than the University

If the participants from the University take part in a field activity at an institution other than the University, the participants must obey the measures taken by that institution to ensure safety and health.

Article 9: Measures to be taken if an event occurs as a result of which safety or health cannot be maintained or is expected to worsen

If an event occurs and the safety and health of the participants cannot be maintained or is expected to worsen as a result of the event, the head of the educational/research group must immediately take the most appropriate action.

2. In the case of the preceding paragraph, the head of the educational/research group must inform the heads of the participants' relevant departments, or if the participant is from an institution other than the University, inform the head of the relevant institution.
3. On receiving the report as described in the preceding paragraph, the head of the relevant departments must immediately inform the Division for Environment, Health and Safety.

Article 10: Exceptions

For activities taking place within the grounds of the University as well as activities decided separately by the Division for Environment, Health, and Safety, the provisions set forth in Article 5; Article 6, Paragraph 1, Paragraph 2 and Paragraph 4; and Article 7, Paragraph 3, Paragraph 5, and Paragraph 6 do not apply.

Article 11: Miscellaneous Rules and Provisions

In addition to what is prescribed in these regulations, necessary matters regarding safety and health in fieldwork activities shall be governed by the provisions set forth by the Division for Environment, Health and Safety.

Supplementary Provision

These regulations shall be effective beginning on April 1, 2006.

Supplementary Provision

These regulations shall be effective beginning on April 1, 2010.

Material 2

Q & A

I. Questions concerning the regulations

Q1: What is a “field” stipulated in the relevant Regulations?

A1: A “field” refers to anywhere outside the premise of the University. Activities conducted in the university forests, practice facilities, and observatories are considered to be within the premise of the University and are conducted within the framework of the normal health and safety management of the University. Therefore, even if they are conducted outdoors, submission of a “Health and Safety Management Plan Document” (Article 5 of the Regulations) is not obligatory, and these activities are not “field” activities stipulated in the Regulations. On the other hand, for activities conducted outside the premise of the University in mountains, rivers, the sea, etc., as well as those conducted in communities and urban areas, a “Health and Safety Management Plan Document” needs to be submitted. Therefore, these activities are considered “field” activities stipulated in the Regulations. In addition, the Regulations do not apply to the following activities.

- Club activities, etc. by students, conducted outside
- Activities conducted on premises managed as a specifically controlled areas by organizations other than The University of Tokyo (other universities or research institutions), such as the National Astronomical Observatory of Japan

Q2: Do the regulations apply to general citizens?

A2: The University of Tokyo has the responsibility for safety management of all

educational and research field activities organized by the University. Therefore, the Regulations apply also to participants from other organizations (other universities, other research institutions). By the same token, the Regulations also apply to general citizens participating in educational and research field activities organized by The University of Tokyo.

Q3: Article 6, paragraph 3, of the Regulations stipulates that “If the document required in the preceding paragraph is not submitted or if the confirmation set forth in the first paragraph of this article is not possible even after the re-submission or if it is judged that the participants may be exposed to grave physical or mortal danger, the head of department has the authority to order the cancellation of the fieldwork activity.” Is there any other provision that stipulates the authority of the head of the department?

A3: This is stipulated in Article 5 of “The University of Tokyo Regulations on Environment, Safety and Health Management for Academic and Administrative Staff.” Also, “Responsibility and Authority of the Environment, Health and Safety Management Organization of The University of Tokyo” stipulates that “if an educational and research activity has violated laws or the University regulations relating to safety and health, the head of the department has the authority to order the prohibition of operations involved in the relevant activity, other operations, and the use of facilities.”

Q4: What are the specific roles played by an “assistant” stipulated in Article 7, paragraph 6, of the Regulations?

A4: An assistant, who acts as a sub-leader, must be appointed in addition to the leader of the group in case the leader of an educational and research group has an accident. If the leader of an educational and research group cannot participate, the “assistant” must act as the leader of the group to try to secure safety and health by making close contact with the leader of the relevant group. In settings outside of the University, for example, if people have an accident while climbing a mountain, the responsibility of the leader of the party may be questioned in civil court. Therefore, if an accident happens during field activities led by an “assistant,” she or he may face charges for the accident.

Q5: The Regulations stipulate that “participants of fieldwork activities” refer to

the participants of educational and research activities conducted outdoors by The University of Tokyo. Then, how about students who are not officially enrolled at the University but are commissioned to conduct graduation research?

A5: Regardless of whether or not students are enrolled at The University of Tokyo, the Regulations apply to all participants of educational/research field activities conducted under the responsibility of the University's academic and administrative staff. Therefore, all the names of students of other universities, members of companies, and general citizens need to be listed on the participants list of the "Health and Safety Management Plan Document," and they need to conduct activities while ensuring safety and health according to the "Health and Safety Management Plan Document" and other regulations, etc.

Q6: Of the "participants of fieldwork activities," specifically who would be included in "faculty members, students or researchers of the University participating in educational/research activities conducted by institutions other than the University"?

A6: In addition to educational/research activities that The University of Tokyo organizes, if any students, researchers and other staff of the University participate in educational/research field activities organized by institutions other than the University, they should generally observe the safety and health management policy of the organizing institution. However they can participate only after submitting their own "Health and Safety Management Plan Document" to the head of the department.

The purpose for this measure is to ensure that members of The University of Tokyo are conducting activities while paying enough attention to ensure safety and health in field activities organized by institutions other than the University.

II. Concerning the "Health and Safety Management Plan Document"

Q1: When conducting educational/research field activities overseas, is it necessary to indicate ways to respond to laws and regulations of the relevant countries/regions in the "Health and Safety Management Plan Document"?

A1: When conducting educational/research field activities overseas, you need to check as much as possible through the embassy and collaborators of the relevant country/region, whether the details of activities may violate the laws and regulations of

the country/region. You must avoid doing things which will get you arrested for violation of the laws and regulations, etc.

Q2: If participants are from multiple departments of The University of Tokyo, is the “Health and Safety Management Plan Document” to be submitted only to the head of the department the “leader” belongs to?

For example, a university-wide seminar holds practice sessions centered on field activities. In this case, does the faculty member appointed as the “responsible person” have to submit the “Health and Safety Management Plan Document” just to the department they belong to? Or do they have to also submit it to other departments participating students belong to? Furthermore, when faculty members leading a group belong to several different departments, does the “Health and Safety Management Plan Document” have to be submitted only to the department the “responsible person” belongs to?

A2: As a general rule, a “Health and Safety Management Plan Document” should be submitted only to the department the leader of an educational/research group belongs to. However, the document needs to clarify which department each participant belongs to so that you can immediately contact the heads of the department participants belong to should an accident occur.

Q3: The laboratory belonging to our department often sails outside the premise of the University to conduct various types of work. In this case, do they need to submit a “Health and Safety Management Plan Document” each time they do so?

A3: If you conduct activities outside the University premise daily, you should consult the Division for Environment, Health and Safety via the department’s Environment, Health and Safety Office. For activities conducted on a routine basis, alternatively you should prepare an annual “Health and Safety Management Plan,” which should be made public and observed thoroughly.

Q4: Do the Regulations apply to research seminars students participate in individually?

A4: No.

Q5: Do the Regulations apply to a research trip which involves educational/research field activities?

A5: It depends on the purpose of the trip. The Regulations do not apply if the purpose of the trip is a “social gathering,” but they do if it is an educational/research activity, like gathering specimens.

Q6: When I go overseas on a research trip, I often visit libraries and museums there. If these activities are considered as educational/research field activities, can you give me some exemplary cases of “Health and Safety Management Plan Document” meant for activities overseas?

A6: Libraries and museums that have clearly specified areas of administration do not apply. We will increase the number of reference cases for overseas activities.

Q7: Is the “Health and Safety Management Plan Document” just a notification or a necessary document to obtain permission?

A7: It is meant to be a notification.

Q8: What if the “leader of an educational/research unit” cannot take responsibility?

A8: Please be advised that a person who cannot take responsibility cannot conduct educational/research field activities.

Q9: When conducting research activities that will be affected by weather conditions and those that are to be conducted continuously, is it acceptable to leave the column for the schedule of the “Health and Safety Management Plan Document” blank if we cannot decide on the dates until the last minute?

A9: We leave that to the judgment of the head of the department.

Q10: Do educational/research field activities include research camps, observation visits to facilities, etc., conducted at hotels and Japanese inns?

A10: Activities conducted at hotels, Japanese inns, and other facilities with specific facility administrators are not considered field activities. Activities conducted at facilities whose facility administrators are not clearly known, such as harbor facilities or rivers, are in the gray zone and should be determined case-by-case. You should

consult the Division for Environment, Health and Safety in advance via the department's Environment, Health and Safety Office.

Q11: Can we not wear “waders” when conducting field activities?

A11: As described in Chapter 1, “3.2 Activities in rivers, streams and lakes/marshes”, wearing waders should be avoided because it will fill up with water and hinder body movements if you fall into the water, especially where water is deep. If you need to wear them, please do so carefully after checking the situation.

Q12: What should we do if we want to conduct field activities at a construction site?

A12: If you visit a construction site, you need to observe the management regulations for the site as well as the Regulations.

Q13: What should we do if we need to submit a “Health and Safety Management Plan Document” urgently?

A13: You should contact the department's Environment, Health and Safety Office first and then you can submit the document by email or other means.

Q14: If the schedule has changed after the submission of a “Health and Safety Management Plan Document,” is there anything we should do?

A14: You do not need to do anything unless there is a drastic change in the schedule, but you should notify us of the change if the details have changed drastically.

Q15: I will give educational instructions to students, but there are many potentially “dangerous” sites when conducting field activities, so it is difficult to cover all the possible situations.

A15: If activities involve such a great variety of situations that it is difficult to prepare a “Health and Safety Management Plan Document” for each situation, it may be easier if you prepare, in advance, a “Health and Safety Management Plan Document” that is expected to be necessary after fully examining the nature of the research. It is also advisable to ensure safety by giving educational instructions regularly in reference to those prepared plan documents.

Q16: The “Health and Safety Management Plan Document” seems to take into consideration an employment relationship, but do students need to be included?

A16: Students have the same status as academic and administrative staff as members of the University.

Q17: Excavation surveys of ruins concern various laws and regulations. Should all the participants acquire relevant licenses?

A17: In principle, a person doing excavation work needs to have a relevant license. If this is not possible, you must observe laws and regulations by having other people, such as a licensed contractor, work for you. For activities conducted overseas, you must confirm the laws and regulations of a relevant country/region.

Q18: After submitting a “Health and Safety Management Plan Document,” will it really be checked?

A18: The department’s Environment, Health and Safety Office is required to check all the submitted “Health and Safety Management Plan Documents.”

Q19: Sometimes students set out for educational/research field activities without consulting their supervisor. How should one deal with such situations?

A19: You should instruct students to consult their supervisor and submit a “Health and Safety Management Plan Document” without fail.

Q20: Is it possible to change the format and/or items of the “Health and Safety Management Plan Document”?

A20: You can customize the format to suit your needs.

Q21: Are entry columns for a fire station or a police office not necessary in the “Health and Safety Management Plan Document”?

Q21: Entry columns for that sort of information are unnecessary because it is already known that you should dial 110 for the police, 119 for fire stations, and 118 for marine accidents in Japan.

Q22: Should a student have an accident, will this be recognized as worker’s accident?

A22: No. Accidents that academic/administrative staff have are recognized as workers' accidents, but those of students are not.

Q23: Will the Workers' Accident Compensation Act apply to Teaching Assistants and Research Assistants?

A23: No. The Workers' Accident Compensation Act does not apply to Teaching Assistants and Research Assistants because they are not employees of The University of Tokyo.

Q24: Which department should a "Health and Safety Management Plan Document" be submitted to from teaching staff who hold different positions at different departments?

A24: The document should be submitted to the head of the department for which the teaching staff is actually conducting the research field activities.

Q25: When members of The University of Tokyo participate in field activities organized by people belonging to institutions other than The University of Tokyo, who is to be appointed as "the leader of an educational/research group"?

A25: Situations are different between academic staff and students.

1) When academic staff of UTokyo are participating

The person who has the budget and is responsible for the project should be appointed as "the leader of an educational/research group." When a professor is the "responsible person," even someone with associate professorship should be appointed as an "assistant."

2) When students are participating

The supervisor would be "the leader of an educational/research group." One of the students is appointed as an "assistant" if they participate under the guidance of the supervisor.

Q26: For internships, students notify the University and earn credit, or students participate just as a part time job. Is notification necessary only for the case in which the University is involved?

A26: Internships are usually conducted under the management and regulations of private companies, so notification is not necessary for either case.

Q27: Concerning study abroad and leave of absence, what am I supposed to do if I study at a research institution overseas or visit a research institution overseas for conducting survey and research during my leave of absence?

A27: If you study overseas, you do not need to notify us but you should follow the regulations of the research institution you are visiting or studying at.

Q28: Isn't it problematic for unskilled students to conduct a survey for educational/research field activities?

A28: Academic staff with the sufficient skills and knowledge should guide students and ensure safety during field activities. Students should learn skills for conducting safe field activities through educational instruction, etc.

Material 3

Head of the department Seal
20YY, MM, DD

Mr. , Dean of the School of XXXX

Department: Graduate School of XXXX

Position: Professor

Name: Seal

Health and Safety Management Plan Document for Educational/Research Field Activities

We hereby notify that we will be conducting educational/research field activities.

1. Survey site	Kushiro Marshland District, Shibetsu-cho, Kawakami-gun & Tsurui-mura, Akan-gun, Hokkaido
2. Schedule	From mm/dd/20yy to mm/dd/20yy (Days)
3. Accommodation	Minshuku XXXX XXXX, XXXX-cho, XXXX-gun, , Hokkaido Post code: 088-22XX TEL/FAX: 015-487-XXXX
4. Outline of activities	Aquatic survey in Kushiro Marshland
5. Names & contact details of participants	Refer to Appendix 1.

<p>6. Means of transportation</p>	<p>Haneda → (JAL)→ Kushiro Airport → (Car rental) → Shibeche-cho (Accommodation)</p> <ul style="list-style-type: none"> •Means of transportation at the survey site include car rental, powered support, and walking. •The return trip will be the reverse route of the above.
<p>7. Health & safety measures for dangerous/harmful work</p>	<ul style="list-style-type: none"> •Activities will always be conducted by two or more persons. •Boats will be operated by someone with a small vessel operator license and enough experience. •When standing inside water, participants will be required to wear a lifesaving rope and to be careful of deep waters. •Everyone will be required to wear a life jacket while on board. •We will instruct people to keep thier posture lower on a vessel and to not sit on or touch gunwales. •We will carry an iridium satellite mobile phone.
<p>8. Responses to expected dangers in activities sites and the surrounding environment</p>	<ul style="list-style-type: none"> •We will discontinue activities when it is raining or visibility is low. •We will prepare waterproof outfits. •We will not consume things that have had contact with raw water (for the prevention of echinococcosis, etc.).
<p>9. Responses to requirements stipulated by laws and regulations</p>	<ul style="list-style-type: none"> •Possession of a grade 2 small vessel operator license •Survey has been authorized by the Kushiro Nature Conservation Office of the Ministry of Environment
<p>10. Ways of communication in emergency (Enter ways of contacting the head of an educational/research group and the person in charge of health and safety management.)</p>	<ul style="list-style-type: none"> •Contact details of the head of an educational/research group Iridium satellite mobile phone: 0010010-8816-8679-XXXX Accommodation: Tel/Fax: 015-487-XXXX •Contact details of the department Faculty of XXXX Environment Management Office: 03-5841-XXXX

11. When conducting field activities overseas, enter a host country, contact details of the diplomatic establishment of the Japanese government or the equivalent.	
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* Please attach a detailed itinerary when submitting this plan document.

Health and Safety Management Plan Document for Educational/Research Field Activities, Appendix 1

List of participants in research activities

⊙ indicates the leader of an educational/research group and ○ indicates the “assistant”

Name	Department/Position/Student	Contact info	Notes (Insurance, Licenses, etc.)
XXXX XXXX ⊙	Professor in XXXX, Department of XXXX, School of XXXX	048-883-XXXX (Home)	Grade 2 small vessel operator license
XXXX XXXX ○	Research fellow in XXXX, Department of XXXX, School of XXXX	075-453-XXXX (Parental home)	Grade 2 small vessel operator license
XXXX XXXX	Year 2 Ph.D. student in XXXX, Department of XXXX, School of XXXX	03-4253-XXXX (Parental home)	Policy holder of Personal Accident Insurance for Students Pursuing Education and Research
XXXX XXXX	Year 1 postgraduate student in XXXX, Department of XXXX, University of XXXX	0294-822-XXXX (Parental home)	Policyholder of Personal Accident Insurance for Students Pursuing Education and Research
XXXX XXXX	Year 4 undergraduate student in XXXX, Department of XXXX, Faculty of XXXX	045-654-XXXX (Parental home)	Policyholder of Personal Accident Insurance for Students Pursuing Education and Research
			* All participants have licenses for ordinary vehicles

Material 4

Health and safety preliminary checklist for field activities (Domestic)

Yes	No	Sorted	Health & Safety Management Plan	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Submission of Health & Safety Management Plan Document	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Approval of Health & Safety Management Plan Document	<input type="checkbox"/> Approved <input type="checkbox"/> To be approved later <input type="checkbox"/> Modification request
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Contact with relevant organizations	Local forestry office, management office, municipal offices, etc.
Yes	No	Sorted	Collection of information before starting activities	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prevalence of infectious diseases, etc.	<input type="checkbox"/> No prevalence <input type="checkbox"/> Confirmation required (Consultation with experts)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Information on medical institutions in the activity area	<input type="checkbox"/> Obtained <input type="checkbox"/> Confirmation required
Yes	No	Sorted	Preparation for activities	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Securing means of communication	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	List of contact details (to be kept at the laboratory)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	List of contact details (to be carried)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Driver's license	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Certificates of various qualifications	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Medical insurance card	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	First-aid kits and medicines	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other first-aid supplies	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Supplies for health & safety (Protective tools, etc.)	

Yes	No	Sorted	Confirmation of health conditions	Notes	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Confirmation of health conditions of participants	<input type="checkbox"/> No problems <input type="checkbox"/> Confirmation required (Consultation with experts) <input type="checkbox"/> Required (Daily medication to be secured)	
Yes	No	Sorted	Immunization	Notes	
			Tetanus	<input type="checkbox"/> Unnecessary <input type="checkbox"/> Recommended <input type="checkbox"/> Strongly recommended	
Yes	No	Sorted	Others	Notes	
<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"/>	<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"/>	<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"/>			

Health and safety preliminary checklist for field activities (Domestic/Urban areas)

Yes	No	Sorted	Health & Safety Management Plan	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Submission of Health & Safety Management Plan Document	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Approval of Health & Safety Management Plan Document	<input type="checkbox"/> Approved <input type="checkbox"/> To be approved later <input type="checkbox"/> Modification request
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Contact with relevant organizations	Local forestry office, maintenance office, municipal offices, etc.
Yes	No	Sorted	Collection of information before starting activities	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prevalence of infectious diseases, etc.	<input type="checkbox"/> No prevalence <input type="checkbox"/> Confirmation required (Consultation with experts)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Information on medical institutions in the activity area	<input type="checkbox"/> Obtained <input type="checkbox"/> Confirmation required
Yes	No	Sorted	Preparation for activities	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Securing means of communication	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	List of contact details (to be kept at the laboratory)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	List of contact details (to be carried)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Driver's license	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Certificates of various qualifications	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Insurance card	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	First-aid kits and medicines	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other first-aid supplies	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Supplies for health & safety (Protective tools, etc.)	
Yes	No	Sorted	Confirmation of health conditions	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Confirmation of health conditions of participants	<input type="checkbox"/> No problems <input type="checkbox"/> Confirmation required

				(Consultation with experts)	
				<input type="checkbox"/> Required (Daily medication to be secured)	
Yes	No	Sorted	Others	Notes	
<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"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
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<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"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

Health and safety preliminary checklist for field activities (Overseas)

Yes	No	Sorted	Health & Safety Management Plan	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Submission of Health & Safety Management Plan Document	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Approval of Health & Safety Management Plan Document	<input type="checkbox"/> Approved <input type="checkbox"/> To be approved later <input type="checkbox"/> Modification request
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Contact with relevant organizations	Local forestry office, maintenance office, municipal offices, etc.
Yes	No	Sorted	Collection of information before starting activities	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Risk information /security situation of the field activity site	<input type="checkbox"/> No risk information <input type="checkbox"/> Pros and cons to be examined <input type="checkbox"/> Postponement recommended <input type="checkbox"/> Must be postponed
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prevalence of infectious diseases, etc.	<input type="checkbox"/> No prevalence <input type="checkbox"/> Confirmation required (Consultation with experts)
			Information on medical institutions in the activity area	<input type="checkbox"/> Obtained <input type="checkbox"/> Confirmation required
Yes	No	Sorted	Preparation for activities	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Securing means of communication	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	List of contact details (to be kept at the laboratory)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	List of contact details (to be carried)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Driver's license	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Certificates of various	

			qualifications	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Insurance card	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	First-aid kits and medicines	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other first-aid supplies	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Supplies for health & safety (Protective tools, etc.)	
Yes	No	Sorted	Confirmation of health conditions	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Examinations before travelling	(Mandatory for a stay for over 6 months)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Confirmation of health conditions of participants	<input type="checkbox"/> No problems <input type="checkbox"/> Confirmation required (Consultation with experts) <input type="checkbox"/> Required (Daily medication to be secured)
Yes	No	Sorted	Immunization	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yellow fever	<input type="checkbox"/> Unnecessary <input type="checkbox"/> Recommended <input type="checkbox"/> Required <input type="checkbox"/> Mandatory
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Polio	<input type="checkbox"/> Unnecessary <input type="checkbox"/> Recommended <input type="checkbox"/> Strongly recommended
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Japanese encephalitis	<input type="checkbox"/> Unnecessary <input type="checkbox"/> Recommended <input type="checkbox"/> Strongly recommended
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hepatitis A	<input type="checkbox"/> Unnecessary <input type="checkbox"/> Recommended <input type="checkbox"/> Strongly recommended

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hepatitis B	<input type="checkbox"/> Unnecessary <input type="checkbox"/> Recommended <input type="checkbox"/> Strongly recommended
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tetanus	<input type="checkbox"/> Unnecessary <input type="checkbox"/> Recommended <input type="checkbox"/> Strongly recommended
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hydrophobia	<input type="checkbox"/> Unnecessary <input type="checkbox"/> Recommended <input type="checkbox"/> Strongly recommended
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Diphtheria	<input type="checkbox"/> Unnecessary <input type="checkbox"/> Recommended <input type="checkbox"/> Strongly recommended
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Measles	<input type="checkbox"/> Unnecessary <input type="checkbox"/> Recommended <input type="checkbox"/> Strongly recommended

Health and safety preliminary checklist for field activities (Overseas)

Area & Duration of stay	Short term/ Long term	Yellow fever	Polio	Measles	Japanese encephalitis	HA	HB	Hydro-phobia	Tetanus	Diphtheria
East Asia	Short term					●				
	Long term			●	●	●	●	●	●	
Southeast Asia	Short term					●				
	Long term			●		●	●	●	●	
South Asia	Short term					●				
	Long term		●	●		●	●	●	●	
Middle & Near East	Short term					●				
	Long term		●	●		●	●	●	●	
Pacific Region	Short term					●				
	Long term			●		●	●	●	●	
Oceania	Short term					●				
	Long term			●		●			●	
North Africa	Short term					●				
	Long term		●	●		●		●	●	
Central Africa	Short term	●				●				
	Long term	●	●	●		●		●	●	
South Africa	Short term					●				
	Long term		●	●		●		●	●	
Northern/ Western Europe	Short term					●				
	Long term			●		●		●	●	
Eastern Europe	Short term					●				
	Long term			●		●		●	●	●
Southern Europe	Short term					●				
	Long term			●		●	●	●	●	
Russia	Short term									
	Long term			●		●	●	●	●	●
North America	Short term									
	Long term			●				●	●	
Central America	Short term					●				
	Long term			●		●	●	●	●	
South America	Short term	●				●				
	Long term	●	●	●		●	●	●	●	

- : Areas where an immunization record of yellow fever is required internationally.
- : Immunization is strongly recommended.
- : If there are risks, such as a limited outbreak, immunization is recommended.
- : Immunization is recommended if there are special circumstances to the trip and there are risks.

Long term: Long term generally refers to a stay of over one month.

Source: Infectious disease information for overseas tourists, Quarantine Information Office, Ministry of Health, Labour and Welfare

http://www.forth.go.jp/tourist/useful/02_tokou_vobou.html

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Notes for emergency contact

Name
Address 〒
Telephone number
Emergency contact information (parental home, etc.)
Contact information at the university
No. of the insurance card
Blood type
Situation of accident
(When)
(Where)
(Description of accident)
(Status of injury)
(Consciousness)
Yes / No
(Rescue request)
Yes / No
(Name of the notifier)
(Contact information of the notifier)

Division for Environment, Health and Safety, The University of Tokyo

Compiled by the Working Group for Measures against Fieldwork Accidents