Safety regulations for laboratory sessions in the Master of Science Programme in Pharmacy

Critical accident/illness:

Enter your name, location, type of injury, the person's condition and personal data (name, gender, age).

Fire:

Enter your name, location, if anyone is in danger, what is burning and the extent of the fire. For larger fires, use the fire alarm in the corridor.

Accidents:

This is the number for Uppsala University Hospital: **+46 (0)18 611 00 00**
Inform hospital personnel about the nature of the injury, especially in case of chemical injuries, so that proper treatment can be initiated as soon as possible.

Eye injuries:
Other:

This is the number for the Medical Advisory Service in Uppsala, which is open 24 hours a day: **1177**

1. General safety rules

In laboratory sessions at the Master of Science Programme in Pharmacy, the same laws and regulations apply as for any similar activity. The Occupational Safety and Health Act regulates the obligations and rights that apply to practical work in the laboratory. The Swedish Working Environment Authority is the highest decision-making body for safety matters.

This work, along with working environment inspections, makes sure that established laws and regulations are followed.

Special safety representatives are appointed to monitor safety matters locally.

There is always a risk of accidents when working in a laboratory. The risk of accidents and injuries can be almost completely eliminated if applicable safety rules are followed

1. Always wear a laboratory coat in the laboratory. Remove the laboratory coat when you spend time in communal areas outside the lab. You are allowed to wear the coat when going between the storage cabinet and the lab.

2. During chemistry laboratory sessions, you should always wear safety glasses! During lab sessions in certain subjects, safety glasses are not required but may be used if you wish. When no chemistry laboratory work occurs – when neither you nor anyone else at the lab is handling chemicals – you may take off your safety glasses. Contact lenses may never be used in the lab.

3. Wash your hands! It is important to wash your hands often during the lab session, especially before lunch, coffee breaks, WC visits and at the end of the laboratory session day.

4. It is absolutely forbidden to eat, drink, chew gum, take snuff or smoke in the lab!

5. No bags or outerwear can be present in the laboratory! This hampers evacuation and is a fire hazard.

6. When working with highly toxic chemicals, chemicals labelled as radioactive or biological material, protective gloves should always be worn. Because most chemicals can penetrate disposable gloves, they should be removed immediately after use. Nitrile gloves (mint green) are less permeable, so they should be used when handling highly corrosive chemicals (such as bromine, concentrated acid and concentrated bases). When handling any material that may be contaminated with remnants of blood, tissue or bacterial culture, protective gloves must always be worn. To avoid contaminating the entire lab, be sure to take off used gloves before touching door handles, etc.

7. Avoid all physical contact with all chemicals! Most chemicals have toxic effects on the human body, so all substances in the lab should be treated as if they were toxic.

8. Avoid inhaling powder as dust particles. Always handle powder carefully – when weighing it, for example.

9. Whether the laboratory session is conducted in a fume cupboard or on a laboratory bench depends on what you are working with. If you are handling volatile chemicals or solvents, ALWAYS work in a fume cupboard! The fume cupboard hood should always be pulled down, even while working in the fume cupboard. Pull down the hood as far as possible for you to comfortably insert your hands as you work. When no work is being done, the cover should be completely pulled down.

10. When weighing, a suitable container or weight boat should be used. Chemicals should never be placed directly on the scale. Always wipe up after yourself if you spill something.

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For safety reasons, biological material such as blood, tissue remnants and bacterial cultures and any objects that have been in contact with such material should be handled as if they are contaminated. Come prepared!

Carefully read all materials you receive in advance.

When planning work, conduct a risk analysis. The purpose is to avoid harm to people and the environment. This is especially important in laboratory work since it often involves dangerous chemicals and equipment that may pose a risk.

Before programme labs, laboratory students may be called upon to conduct a risk analysis. In short, this means that you:

1. Identify the chemicals, equipment and practical steps that may pose a risk.

2. Assess which are the most critical – that is, which are most likely to occur and which can produce the most serious consequences

3. Decide how you can reduce the risk of injury (by using the proper protective equipment, etc).

4. Follow the laboratory guide and observe the indicated precautionary measures. Use the proportions and quantities specified and talk with the laboratory supervisors if you are not sure what to do or why you should do something in a certain way.

For additional information about risk analysis:

1. Maintain order!

2. Be careful and keep your workplace and common areas clean.

3. Neutralise and immediately wipe up all spills (including water).

4. All containers with contents are to be carefully labelled with a marker.

5. Check!

6. Check cords, etc. on all electrical equipment before use.

7. Make sure there is water in the oil bath used in chemistry laboratories.

8. Otherwise violent boiling-over can occur with heating.

In case of accident:

If something unexpected and potentially dangerous occurs, summon the laboratory supervisor. If an unexpected reaction occurs in the fume cupboard (such as a very violent reaction, build-up of smoke, etc.) pull down the fume cupboard's hood.

In case of accident, prompt countermeasures certainly are important, but act calmly to avoid making the accident worse. Use common sense. All personal injuries (even seemingly insignificant ones) are to be reported to the laboratory supervisor. All serious or unclear injuries should receive medical treatment immediately (hospitalisation).

Always notify the laboratory supervisor when you leave the lab. If an accident happens, it is important to know where all the students are.

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2. Slops and waste management

Slops

It is absolutely forbidden to pour organic compounds/liquids into sinks. These are to be poured into special slops containers depending on the type of organic compound/liquid. Depending on the content, some aqueous solutions can be poured into the sink.

Inorganic acids (such as hydrochloric acid, sulphuric acid and nitric acid) and ***inorganic bases*** (such as sodium hydroxide [lye] and potassium hydroxide) must be diluted and neutralised before they may be poured into the sink.

"Non-halo": Organic liquids that do not contain halogens (such as isohexane, toluene, ethyl acetate) are poured into slops containers marked "non-halo". Only pure solvents from rotary evaporation, for example, or TLC eluent, etc.

"Halo": Organic solvents containing halogens (such as chloroform and dichloromethane [methylene chloride]) are poured into slops containers marked "halo". Only pure solvents from rotary evaporation, for example.

"Mixtures": Reaction mixtures, extraction remnants or other organic solvents containing one or more different compounds, reagents, by-products or reaction products are poured into the slops containers labelled "mixture". These have a list where you write down what substances you put in the container.

Ether:
is poured into special evaporation containers in a fume cupboard.

Organic liquids that are completely miscible with water (such as methanol, ethanol, acetone) are an exception to the above rules and may be poured into the sink.

Waste

Piercing & Cutting
Non-contaminated broken glass, pipette tips, used disposable gloves and the like are discarded into special hazardous waste boxes labelled "Piercing & Cutting".

Biological waste
All the waste that has been in contact with biological material such as blood, serums and microsomes (a type of tissue remnant), and bacterial cultures should be discarded into special containers for "**Infectious biological waste**". Biological waste should not be discarded in a "Piercing & Cutting" box even when it is also piercing by nature (such as a sharp needle). Proper handling of biological waste is very important as a disease control measure and also for environmental reasons. **Consult the laboratory supervisor if you are unsure** of how to discard any waste produced during laboratory sessions.

Chemical waste
Glass and other materials contaminated with chemicals are discarded in special containers labelled "**Chemical hazardous waste**"

Radioactive waste
Pipette tips, bench protection paper, gloves, incubation tubes and everything else that has been/could have been in contact with radioactive solutions should be discarded in hazardous waste boxes labelled "**Radioactive hazardous waste**".

3. Extinguishing fires

3.1 Burning chemicals
Extinguish all nearby flames; remove all combustibles. Fire in vessels with small quantities of chemicals is suffocated with a watch glass or something similar. Larger fires are extinguished with carbon dioxide extinguishers. Water should be used with caution. Burning sodium cannot be extinguished with water or carbon dioxide extinguishers but must be extinguished by suffocating it with a material such as dry sand.

3.2 Burning clothing
If your clothes catch fire, walk to the nearest emergency shower – *DO NOT RUN* — or lie on the floor and smother the flames by rolling or by using a fire blanket, laboratory coat, etc. Always work from the head to foot to prevent burns on the face.

3.3 Firefighting equipment in the lab
All laboratory premises have firefighting equipment in the form of carbon dioxide extinguishers (suitable for use in laboratory surroundings in case of fire in instruments, chemicals, etc.) and foam fire extinguishers (suitable for fires in furniture, etc.). There should also be a fire blanket for smothering fire and an emergency shower (suitable for extinguishing fire in clothing).

All laboratory students are obligated to find out where the above equipment is located at the laboratory. The laboratory supervisor shows students around the premises on the first day of laboratory sessions. Instructions for use of the fire extinguishers are written on them.

Appropriate measures for different types of injury

4.1 Wounds
There are plaster kits and first-aid kits by the laboratory. Serious wounds in the face, extensive wounds or deep wounds should be treated at hospital. Prevent shock through rest and warmth.

4.2 Burns
In case of mild burns: Cool with cool water as fast as possible until the pain subsides. Protect the injury with a bandage, if needed.
In case of serious burns: Apply cool water as fast as possible until the pain subsides. Try to keep blisters intact and protect the injury with a bandage if needed. Contact a doctor. Never attempt to remove burned clothes attached to the body.

4.3 Injury caused by acids or alkalis
On the skin: Rinse with large amounts of running water. In case of major injuries, seek medical treatment. PLEASE NOTE: Concentrated sulphuric acid should be wiped dry before flushing with water. Bromine spilled on the skin should be washed off immediately with a thiosulphate

solution (should always be accessible when handling bromine), after which the skin is rinsed with plenty of running water.

In the eyes: Rinse immediately with plenty of water; at least 20 minutes in case of an acid splash and at least an hour in case of a base splash. The rinsing is done using either an eyewash station or with a physiological common salt solution (0.9% NaCl in water that is ready). Seek medical attention at the slightest remaining irritation. Eye injuries caused by a base (NaOH and KOH) tend to be so extensive that a doctor is always to be consulted.

Corrosive and toxic gases: Inhalation of bromine vapour, chlorine or hydrogen chloride involves a risk of poisoning and lung damage (pulmonary edema). ***PLEASE NOTE:*** The symptoms are often diffuse and may not appear for several hours or up to 24 hours. Countermeasures are fresh air, rest and possibly artificial respiration (though not in the case of lung damage because this can make it worse). *Immediately transport to hospital.*

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Various chemicals and equipment

Keep in mind that many chemicals – such as acids, bases, bromines and phenols – are corrosive.

5.1 The Acid-in-Water Rule
To avoid splashing when diluting concentrated acid, it is poured into the water in a fine stream while stirring.

5.2 Alkali metals
Alkali metals (the first group in the periodic table, such as sodium) are stored most safely under hydrocarbons with a high boiling point. They react violently with water with a build-up of hydrogen gas. Remnants may not be discarded in sinks or slops pails but should be placed in a special container labelled “sodium remnants”. Sodium remnants can also be destroyed using alcohols with low water content (NOTE: build-up of hydrogen gas). Large pieces can be put back in the storage container.

5.3 Ether
Ether (at recrystallisation, for example) is to be heated/boiled in a water bath, never directly on a hot plate. Fire hazard!

5.4 Cyanides
If sodium cyanide (NaCN) or potassium cyanide (KCN) is exposed to acid, highly toxic hydrogen cyanide (HCN) gas forms.

5.5 Diazonium salts
In the preparation of diazonium salts, remember that if they are dry, there is a risk of explosion.

5.6 Powder
Powder in the form of dust needs to be handled with care to avoid inhalation. If there is risk of inhaling powder in dust form, respiratory protection is to be used.

5.7 Ultraviolet light (UV)
UV light is harmful to the eyes. Avoid looking directly into a UV lamp when illuminating thin layer chromatography (TLC) plates with UV and when analysing samples that fluoresce in UV light. When using a light box for analysis with UV, ***lower the UV filtering disc*** before you examine the samples. Do not look longer than necessary at the samples.

5.8 Sound and noise
If you use equipment that generates noise or other high-pitched sound, use hearing protection.

5.9 Gas masks
The chemistry laboratory has gas masks with filters. The filter is marked with brown/grey/green/white colour, and according to this marking, it provides protection against organic gases and vapours, inorganic gases and vapours, sulphur dioxide, ammonia and particles.

5.10 Compressed air
Handle compressed air with care, and do not direct a pressurised air stream directed at the body. Use hearing protection.

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6. Handling biological material

Sometimes laboratory sessions involve handling biological material, such as in connection with taking blood samples from experiment subjects and working with bacterial cultures, human tissue or certain types of plant material and the like. This may constitute a risk for individuals handling the material.

By working carefully and following sound procedures, participants will not be exposed to health hazards when taking samples or working with serum, tissues, bacteria or plant material. Working with these materials could, however, pose a potential risk of infection. To avoid this risk, you should consider all biological materials (needles, tubes with blood samples, bloody wads of paper, tissue remnants, plates with bacterial culture, etc.) as potential infection risks and therefore **never** handle these without gloves. Within reasonable limits, you should operate as if everything is infectious. Do not unnecessarily dirty glass utensils, benches, etc.; wash used materials thoroughly; to a suitable extent use disposable instruments for biological material; and absolutely never pipette by mouth. Utensils such as tips and other things that have been in contact with potentially infectious material should not touch anything else (such as benches, nearby laboratory associates and the like) *Think about what you are doing!*

7. Working with radioactivity

When you work with radioactivity, all work areas, including fume cupboards, should be covered with plastic-coated, highly absorbent protective paper. Benches and fume cupboards are to be labelled with tape with the symbol for radioactivity. Laboratory coats, gloves and safety glasses are to always be used. To avoid contaminating the entire lab, be sure to take off used gloves

before touching door handles, fume cupboards, etc. Change gloves frequently. Pipette tips, bench protection paper, gloves, incubation tubes and everything else that has been/could have been in contact with radioactive solutions should be discarded in hazardous waste boxes labelled “**Radioactive hazardous waste**”. If a solution happens to tip over or spill, contact the laboratory supervisor immediately. The bench surface should be cleaned with “Count Off” and new plastic-coated protective paper placed on the bench.

8. Accident insurance

Through the University you have some basic coverage for accidents (personal injury insurance) that applies if the accident takes place in conjunction with education or during transport to or from education in a course in which you are registered at the University.