School of Pharmacy

Health and Safety Booklet

EMERGENCY TELEPHONE NUMBERS

Fire, Police, Ambulance, Cardiac Unit or Poisons Centre: **2222**
University Health Service, 7 University Terrace, Elmwood Ave, BELFAST, BT7 1NP extension 4634
University Safety Service, Level 1 of the Administration Building, Room 01.036. Ext: **4681**

Issued by the School Health and Safety Committee

Contents

Introduction and Statement of Intent

The School of Pharmacy is a School with substantial practical activities at research and undergraduate levels. As such, we are committed to providing a safe working environment to everyone who works or studies in the School. The School Health and Safety Booklet is an important document, which is part of our commitment to fully supporting and complying with all Health and Safety policies of the University. It sets out the arrangements for the management of Health and Safety issues and includes information on responsibilities. Please take the time to study this document carefully, and ask for clarification if you need it on any issue.

Professor Carmel Hughes
Head of School

Health and Safety in the University

Without due care accidents can potentially happen on University premises. Many have serious consequences and most are avoidable. It should be self-evident that everyone working in the University has a moral duty of care towards others and his or herself**. Under the Health and Safety at Work (N.I.) Order of 1978 and COSHH regulations, for those working in laboratories handling chemical or biological materials which are hazardous, this moral duty is backed by the law**. Non-laboratory activities must also be carried out safely. Information in this booklet will help you minimise any risk (*e.g.* fire or electrical risks) associated with these activities.

Safety is a large and continuously evolving subject. This booklet gives a statement of our safety policy and informs you of procedures, which you must follow to work safely. If you do research, you will often need to seek additional safety information, references for which are given at appropriate points. More detailed information may be obtained from references given in COSHH Appendix A.

The administrative structure of safety in the School is summarised in Appendix 1 of this handout. You are encouraged to consult the School Health and Safety Coordinator or a member of the Safety Committee if you have any concerns about safety in the School.

In the approach to safety a logical order of priorities is as follows. Firstly, prevent the accident if you can. Secondly, cope with it properly if it happens. Thirdly, report it properly so that lessons can be learnt from it.

University Health and Safety Policy

All staff and students should read the University Health and Safety Policy which can be found at:

http://www.qub.ac.uk/directorates/EstatesDirectorate/UniversitySafetyService/HealthandSafetyPolicy/

The Health and Safety Policy details the University's commitment to health and safety, how the organisation is structured and the day to day arrangements in place for its implementation.

Undergraduate Health and Safety

All undergraduates in the School are expected to adhere to the University and School policies. Although sections of this booklet will not be relevant to you, it will be useful for you to familiarise yourself with its contents.

During Welcome Week, an induction session on Health and Safety is held to make you aware of the key points of our policies and expectations. You will also find details on Health and Safety in your MPharm handbook. In any module with a practical laboratory component, the module coordinator will brief you on any Health and Safety considerations specific to that module. This may include, for example, bringing risk assessments carried out under COSHH to your attention when working with chemicals. While we do not expect undergraduates to carry out risk assessments for their own experiments until later in the course, you are expected to have read and to abide by any information provided to you by module coordinators. Details on risk assessments for students during placements will also be provided in advance.

We encourage you to bring to our attention any issues relating to, or comments on, Health and Safety. You can do this either by contacting the School Health and Safety Coordinator, or by contacting your Year Representative. All Year Representatives attend meetings of the School Health and Safety Committee and can raise issues on your behalf.

Safe Working Practice to Avoid Accidents

1. Safety and working in offices

One aspect of risk assessment that cannot be overlooked involves working in offices. Many academic and research staff spend considerable time working in an office environment, frequently involving work on a personal computer. Therefore, it is essential that staff must conduct a risk assessment of their office environment and on their use of a computer. Therefore, all staff who work in offices should address the following points:

- *Examination for fire hazards*
  In the office environment several fire hazards may exist, including the storage of paper and cardboard boxes on the floor, hazards resulting from overheating of electrical appliances and the use of electrical equipment that has not been officially tested (termed portable appliance testing). Therefore, it is important that all paper/boxes are removed from the floor of offices and the contents stored in, e.g. bookshelves, cupboards or filling cabinets. It may be common practice for some staff to leave electrical appliances switched on overnight, a practice that will increase the risk of fire if there is a malfunction in the appliance. Therefore, all electrical appliances should be switched off overnight. Finally, it is important that if a member of staff brings electrical appliances into their offices (e.g. heaters, kettles, radios, coffee makers), the safety of such equipment must be assessed (portable appliance tested) by trained personnel before their use can be commissioned. The equipment must then be officially labelled to indicate the date of the testing and the initials of the trained tester. Please contact the School Health & Safety Coordinator if advice is required concerning the above issues.

All staff are required to take an online fire awareness course through Queen's Online on an annual basis. The School Health and Safety Coordinator will issue email reminders of this to all staff periodically, and you should ensure that your training is up to date at all times.

- *Risk assessment at workstations*
  One source of concern for members of staff that spend a considerable time using a computer or other display screen equipment (DSE) is injury. In such conditions injury is not acute but chronic resulting in possible injuries to the wrist, back and neck. Therefore it is important that the working posture of the user is optimised to minimise risk of neck and back strain by altering the height of the chair and/or screen. Specialised chairs and footrests are available and may also assist in the prevention/resolution of potential problems. Furthermore, staff may use wrist aids to minimise RSI (repetitive strain injury) to the wrist. Prolonged usage of computer display units may cause eyestrain and therefore it is important that users should take regular breaks from this activity. In addition, screen filters are available that may be useful in persons susceptible to, e.g. headache when using computer display units. **All staff are required to carry out a DSE self-assessment of their risks when using such equipment.** If, when you carry out this assessment, any remedial action is required, please contact a DSE Assessor for assistance.

- *Minimisation of accidents in the workspace*
  The office environment presents several accident concerns. These include tripping on furniture and accidents resulting from the improper use of filling cabinets. It is important that furniture is orientated within the workspace to minimise tripping. In addition, all leads/cables (e.g. electrical extension leads, computer cables) or carpet snags that represent a tripping risk should be taped down. Serious ripping of carpets represents a serious risk and must be repaired/replaced.

  In addition, clear access to fire doors in workspaces is mandatory. Therefore, items of furniture etc. must be arranged so that in the event of a fire, rapid clearance of personnel from the workplace is ensured.

  Particular care should be exercised when using filling cabinets. These should be preferably secured to the wall, should be closed immediately after use and filling cabinets, in which two of more drawers may be opened simultaneously should not be used unless these are bolted to the wall.

  All staff must conduct a risk assessment of their workspace to minimise accidents. Please contact the School Health & Safety Coordinator if advice is required to complete the risk assessment.

- *Late working in offices*
  Late working is regarded as working between 7.00 pm and 11.00 pm. Late working is often routine in low risk environments such as offices. Late working in higher risk areas should be avoided but is permissible under appropriate conditions. All out-of-hours working must be authorised by supervisors and senior management through completion of a signed out of hours working permit form, available through the School Office or SharePoint. Late working (between the hours of 7.00 pm and 11.00 pm) in offices is generally permitted. Where staff in a building do not normally work late, they must notify Security (Tel: 5099) that they are working late, as well as comply with any our local rules, which require you to sign in and out on the register held at the McClay foyer. Where late working is not a usual practice, staff should notify/obtain permission from their line manager that they may be working late. Security should be notified at 7.00 pm that late working is taking place and again before leaving the building. Where late working is a regular occurrence, Security must be consulted on the arrangements in place. If you have a pre-existing medical condition which may heighten the risk of working alone, you should contact the University's Occupational Health Service for advice, where necessary.

There are no exceptions to these rules. Any questions concerning this issue may be discussed with the School Health and Safety Coordinator.

2. Monitoring of safety in laboratories and workspaces

An important aspect of monitoring safety functions within the School of Pharmacy is the monthly audit of safety. In this the School Health and Safety Coordinator and/or members of the Safety Committee audit the laboratories and workspaces. Several aspects are audited, examples of which are shown below

(i) General Tidiness in Laboratories and Workspaces
(ii) Access within the Laboratory/Workspace
(iii) Use of protective measures, e.g. safety glasses, gloves, laboratory coats
(iv) Storage of chemicals
(v) Waste disposal measures
(vi) Labelling of samples

A sample audit of COSHH for each laboratory/workspace will be performed during routine monthly inspections. During the safety inspection the above aspects will be examined and records kept for each laboratory/workspace. Comments regarding the above topics are recorded as satisfactory or unsatisfactory. In the event of an unsatisfactory outcome, more specific details are recorded and these details are forwarded to the staff members that are working in the aforementioned area, in addition to recommendations for improvement. In certain (more serious) circumstances, these details will be forwarded to the Director of Research of the Cluster to which the laboratory/workspace is assigned. Following an agreed period, a second inspection will be performed to monitor the laboratory/workspace to ensure that the recommendations have been acted on.

It should be noted that failure by an individual to comply with the safety policy in the School of Pharmacy will result in the removal of the individual's right to conduct research.

3. Laboratory tidiness and hygiene

Untidiness causes accidents both directly and, by its effect on morale and standards of work, indirectly. It often puts cleaning staff in the dilemma of either taking risks that they do not understand, or leaving a laboratory dirty. ***Keep floors and access to safety devices and ensure that exit pathways are clear***. ***Food or drink must not be consumed in the laboratory.***

Do not let dirty glassware accumulate. The best and safest way of removing even stubborn grease and dirt is prolonged soaking (days) in a 3-5% solution of 'Decon' or 'Teepol' detergent in a plastic bucket. Chromic/sulfuric 'cleaning mixture' is an expedient which can cause serious injury by skin ulceration and damage to property if spilt. ***Chromic acid must not be used and other corrosive cleaning agents involving such materials as caustic alkalis or concentrated nitric acid are not to be used*** except under the direction of a member of staff and in specific instances. Degreasing taps and ground joints is best performed with inhibisol (1,1,1-trichloroethane; fume cupboard).

Ensure that the laboratory remains uncluttered. It is important that chemicals, paperwork, boxes etc. are properly stored to optimise safety in the laboratory. This will assist in the minimisation of accidents.

Furthermore, there are several communal facilities in the School of Pharmacy, e.g. analytical equipment, balances, and ovens. It is mandatory that the users of such facilities leave the equipment and the surrounding area in a clean state, in accordance with the Local Safety Rules and COSHH.

4. Working alone in laboratories and working outside regular hours

Undergraduates ***must not*** work alone in laboratories at any time. Research students must not work alone on experiments, which, in the opinion of students or supervisors, present special hazards.

The following rules apply to working **alone or in isolation**:

Staff and students may be permitted to work alone or in isolation provided appropriate precautions have been taken and the risks are not unacceptable. Hazardous work activities associated with significant risks should not be undertaken in isolation except where there are appropriate measures in place to mitigate the risk.

Categories of hazardous work activity with significant risks may include work with:

- dangerous machinery or equipment;
- high-voltage electrical systems;
- dangerous chemicals;
- pressure systems;
- large or potentially dangerous animals;
- dangerous pathogens;
- sources of ionising and non-ionising radiations;
- cryogenic materials;
- hot substances or equipment;
- cutting tools or implements or other sharp objects.

Certain categories of hazardous work shall <u>not</u> be undertaken by staff or students in isolation under any circumstances. These include:

(i) any work involving entry into a confined space or other area where there is a reasonably foreseeable risk of exposure to asphyxiating or toxic gases or vapours or conditions resulting in oxygen deficiency;

(ii) any work on fragile roofs or at high levels where measures to guard against falls are not provided;

(iii) any work entailing entry into or access onto any building or structure in the course of demolition or erection or any workings above or below ground level where there is a reasonably foreseeable risk of collapse or other failure.

Before any work in isolation is undertaken the risks to health and safety must be assessed and, where significant risks exist, they must be documented. Before work in isolation which has significant risk commences, permission must be given by senior management through completion of a signed permit form, available through the School Office or SharePoint.

Any person working in isolation that becomes aware of or encounters an unforeseen hazard should stop work (as long as it is safe to do so), and leave the area if necessary. Advice or

assistance should be sought from their Supervisor or Security, if their Supervisor is not available.

The medical fitness of staff and students should be taken into account before permission to work in isolation is granted. Medical conditions which are likely to require urgent medical attention, such as some forms of diabetes or epilepsy, may preclude working in isolation. Contact the University's Occupational Health Service for advice, where necessary. In all cases emergency arrangements should be put in place.

During normal working hours it may be considered necessary for lone workers undertaking work involving significant risk to contact the University Security Control Room (Tel: 5099) to have their presence recorded as a point of first contact in the event of any security or safety issue. This requirement will be identified in the risk assessment. Out of hours, Security must be informed. Where appropriate, further calls can be agreed with the Control Room staff to periodically check on welfare. When a Security Patrol is in the area they may check in with the member of staff to ensure they are safe.

The following rules apply to **working out of hours**:

Working out of hours may lead to a situation where there is an increased risk to the safety and security of staff or students, particularly when working alone or in isolation. Normal working hours for the majority of staff and students fall within the period 7.00 am to 7.00 pm, Monday to Friday. Staff working outside of these normal working hours should be confident they are up-to-date on:

- evacuation and emergency procedures;
- use of fire alarms covering the building;
- information on their access within the building;
- Instructions on how to secure the building on leaving.

Support Services

Support services such as fire wardens and first aiders will not normally be available outside normal working hours. Out of hours, a self-evacuation policy is in place in the event of a fire alarm. Emergency assistance can be obtained by contacting the Security Control Room, Level 1, Administration Building, which is staffed 24 hours a day all year round.

Emergency Number Extension:	2222	(External 028 9097 2222)
Internal Extension Numbers	5099 and 5098	(External 028 9097 5099)

Staff and students are advised to have these numbers displayed and readily available. If there are any concerns in relation to personal safety or suspicious activity on site, it should be reported to the Control Room immediately.

Notification of Security

When notifying Security of out of hours working, the following information should be provided:

- staff name;
- contact details (office extension, mobile phone number etc);
- date and time of being on site and duration of stay;
- location of room/building/area;
- brief description of the nature of work/reason for working after working hours;

- directions for Security in the event of an emergency;
- supervisor to contact in the event of emergency.

These details will be held securely and confidentially in a log book in the Control Room.

Staff and students working out of hours must comply with this process for their safety and security. Additionally, permission **must** be given by senior management and supervisors through completion of a signed out of hours working permit form, available through the School Office or SharePoint.

Late Working

Late working is regarded as working between 7.00 pm and 11.00 pm. Late working is often routine in low risk environments such as offices. Late working in higher risk areas should be avoided but is permissible under appropriate conditions. All out-of-hours working must be authorised by supervisors and senior management through completion of a signed out of hours working permit form, available through the School Office or SharePoint.

Late Working in Offices

Late working (between the hours of 7.00 pm and 11.00 pm) in offices is generally permitted. Where staff in a building do not normally work late, they must notify Security (Tel: 5099) that they are working late, as well as comply with any other local arrangements. Other arrangements may include a sign in and out system or in offices where late working is not a usual practice, staff should notify/obtain permission from their line manager that they may be working late. Where late working is not normal practice, Security should be notified at 7.00 pm that late working is taking place and again before leaving the building. Where late working is a regular occurrence, Security must be consulted on the arrangements in place.

Late Working in Laboratories, Workshops and Studios

For late work in laboratories, workshops and studios etc, express written permission is required from supervisors and senior management. In all cases local procedures must be followed, including completion of an out-of-hours permit and signing in and out upon entry and exit on the forms in the foyer. Permission should only be granted for low risk activities following a formal risk assessment and mitigation of any significant risks. Work may be conditional on having two persons present. Where late working in laboratories, workshops and studios is not normal practice, staff must notify security that late working is taking place and again on leaving the building. Where late working is a regular occurrence, Security must be consulted on the arrangements in place.

Overnight Working

Overnight working is not normally permitted. If there are exceptional reasons why such work is required, it must be agreed with line managers. This applies to all forms of overnight working, including office-based work. Normally permission will only be granted for low risk activities following a formal risk assessment. In all cases, Security must be informed of the working arrangements in place.

Weekend Working

The same controls for weekday work apply to weekend work. As there will be fewer staff working in buildings at the weekends, special consideration should be given to the risks of lone working. Security should be informed of any arrangements in place.

There are no exceptions to the above rules. Any questions concerning late or lone working may be discussed with the School Health and Safety Coordinator.

5. Personal protection in Laboratories

In conducting research in laboratories, students **must** firstly complete a COSHH form to fully understand the possible hazards associated both with the chemicals/biological being used and the methods used to manipulate these systems. Following completion of this step, knowledge of the protective measures will have been identified. Some general rules concerning personal protection is provided below.

i. *Eye protection must be worn for all laboratory work*. Undergraduates who do not normally wear spectacles must use safety spectacles except where special exemption is given. All laboratory workers who normally wear glasses ***must*** either cover them with 'wrap around' safety spectacles or wear proper prescription safety spectacles. The latter may be obtained free of charge by staff members and research students by application to the chief technician. It is emphasised that ***academic staff, demonstrators and technicians must wear safety spectacles at all times in teaching laboratories.*** Know where eyewash facilities are kept. If eyes come in contact with a hazardous substance hold the affected eye open and wash under lids for at least 10 minutes.

ii. Students and research workers must wear laboratory coats when working in teaching or research laboratories. Such coats are an excellent first defence against splashes.

iii. Rubber gloves must be worn for the manipulation of substances that cause skin irritation or burns. Beware of dehydrating agents such as H_2SO_4 and CaO. In addition, gloves are required for repeated manipulations of volatile and toxic solvents such as benzene, carbon tetrachloride and carbon disulfide, which are rapidly absorbed through the skin as liquid or vapour. Check the gloves' permeability to the material handled. Students are strongly advised not to wear hand jewellery while doing practical work. Leather clothing can absorb chemical vapours. Wear strong shoes.

iv. Any person working with ultraviolet light must comply with the eye protection rules. Although ordinary safety spectacles, especially the plastic type, provide some protection, extended exposure requires the use of purpose-designed protective spectacles. Any person working with a Class 3B or Class 4 laser must comply with specific safety rules, outlined in detail with such equipment. **In particular, all operators must be trained in the safe use of these lasers and must wear safety glasses designed for use with the specific laser wavelength being used.**

v. Under certain circumstances, research staff may require the use of respirators. If this is the case, the University Safety Service should be consulted to ensure that advice is given and training is performed regarding wearing the mask (particularly ensure that the mask is fitted properly) and on the best type of respirator for the required application.

vi. Special care should be taken whenever cylinders of gas are opened or if highly volatile systems require to be transported within the School.

When you are opening a cylinder of a gas for the first time, ensure that due consideration has been given to the nature of respiratory protection. Have a second person in attendance and make sure that an escape route from the room is clear. You can be badly hurt by a rush of gas from the sudden opening of a stiff valve, even when the cylinder is in a fume

cupboard, as it should be. Once the valve can be worked easily you may discard the respirator. Cylinders of all types must be firmly clamped vertically; a full cylinder with its head knocked off becomes a rocket and can penetrate a masonry wall.

The transport of liquid nitrogen in a container around the School of Pharmacy (particularly from one floor to another) requires special precautions. To transport the container from one floor to the next, the following rules must be applied:

- A sign must be attached to the front face of the container in which the liquid nitrogen is being transported informing staff that no-one should enter the lift. **This must be clearly visible. Travelling in a lift with a container of liquid nitrogen is forbidden. An oxygen depletion monitor should be attached to the liquid nitrogen container during transport through the School buildings.**
- The container is placed in the lift and the operator should ensure that the lift door remains open until verbal contact has been made with a second operator who is at the point of proposed exit for the container. The second operator must then call the lift
- If the lift will pass through other floors, additional operators must attend the lift entrance at each floor to ensure no-one enters the lift
- The liquid container must be removed immediately after arriving at the required floor

(vii) A suitable dust mask must be worn for any work with dangerous powders and other people must not be unknowingly exposed to dusts created by your experiments. ***Note that silica gel used for chromatography is harmful*.** Mop up solution spillages before they become harmful dusts.

6. Fire Prevention

All staff are required to take an online fire awareness course through Queen's Online on an annual basis. The School Health and Safety Coordinator will issue email reminders of this to all staff periodically, and you should ensure that your training is up to date at all times.

It is essential that all staff within the School of Pharmacy are aware both of the hazards of fire and additionally if fire prevention. Once again the process of COSHH assessment will identify systems and situations that may be associated with a high fire risk. If this is the case appropriate measures must be used to minimise the risk of fire.

Some relevant points are provided below:

- Remember that solvent vapours can be ignited by flames, the electric elements of heating mantles, hotplates, sparks in thermostat controls and switches. Ether and CS_2 can ignite on the hot glass surface of electric light bulbs or, for CS_2, surfaces at 100°C.

- Winchesters of flammable solvents must be stored in the metal bins provided. They must not be kept permanently on bench tops or shelves, and especially ***they must not be left on the floor or used to prop open doors.*** Winchesters of solvents and all other reagents must be carried through the building in Winchester carriers, not in the hands.

- Sodium, potassium or calcium metal in solvent bottles must be destroyed and the bottles washed and dried before they are returned to stores. Sodium or potassium wire should be destroyed by lifting it out of the bottle with a wire hook and adding it in

small portions to propan-2-ol in a beaker. Calcium should be added gradually to water. Oxide coating on potassium is explosive.

- Paper and cardboard should not be stored on the floor, as this represents a potential fire hazard. Paper, cardboard or clothing fires should be tackled with a water extinguisher or hose; flammable solvent fires with CO_2, dry powder or foam, electrical fires with CO_2, powder or foam. Metals, hydrides and organometallic compounds must be attacked with special dry powder extinguishers.

Training courses are available concerning the use of fire extinguishers, and basic aspects of their use is covered in the online fire awareness training, which is compulsory for all staff.

(v) Ready access from workspaces and laboratories must be ensured. Fire exits are clearly marked and access to these must not be restricted.

In the event of a fire in the School the alarm bells will sound **CONTINUOUSLY** and occupants shall vacate the building quickly and quietly by the nearest available exit and **proceed to the car park behind Whitla Medical Building**. Personnel must not congregate near the main entrances as this restricts exit for those still inside, and the emergency services on arrival will require unimpeded access into the building. Note that planned maintenance of the fire alarm system will be pre-warned to occupants and shall consist of intermittent operation of the alarm. Emergency repairs may not be pre-notified.

In the event of a fire named staff (see below) are responsible for ensuring that defined areas within the School have been successfully evacuated. Details of this are shown below:

Location	Staff responsible for ensuring complete evacuation of the named location
Original Building: Ground Floor	David McQuade and Brian McCaw
Original Building: First Floor	Luc Belaid and Aine McGuckin
Original Building: Second Floor	Solenn Cariou and Ian Grant
Original Building: Third Floor	Kathi Edkins and Lynn Cairns
McClay Building: Ground Floor	Lynne Spence and Nicola Magill
McClay Building: First Floor	Vicky Kett and Andrew Gray
McClay Building: Second Floor	Louise Carson and Raj Thakur
McClay Building: Third Floor	Brendan Gilmore and Seamus O'Brien
Whitla Medical Building: Third Floor	Gavin Graham and Roberta Burden
MBC: Ground Floor	Helen McPhillips; David Vance and Judith McEvoy
MBC: Third Floor	Gail Carson and Andy Lee (CEM)
MBC: Fifth Floor	Luc Belaid & Mary-Carmel Loughery
Royal Victoria Hospital: Second Floor	Cathy Fenning, Larry Ma & Ryan Xi

The named staff members will check their designated areas as they are leaving the building and report to the Evacuation Controller at the assembly point (carpark behind Whitla Medical Building for Pharmacy buildings/ WMB, front MBC carpark for MBC buildings & pavement in front of the old QUB Microbiology building for RVH site).

7. Expectant mothers

All expectant mothers, including undergraduate students, should inform their line manager, personal tutor, or the Health and Safety coordinator, that they are pregnant so that proper

arrangements can be put in place to safeguard the expectant mother and her child. Arrangements will be put in place, either with input from Occupational Health, or through a personalised risk assessment, to ensure that all risks are minimised. For undergraduate and postgraduate students, this may mean limiting exposure to potentially dangerous substances, and making other adjustments.

8. Working with electricity

No staff, postgraduate or undergraduate student should work with live electricity. If you have any concerns about electrical equipment, or require electrical work to be carried out, this can be arranged through the Chief Technician, who will give advice, ensure work is carried out by qualified persons, and ensure safety testing as appropriate. Electrical equipment should be visually inspected by all users of such equipment regularly, and any issues reported immediately to the Chief Technician or the Health and Safety Coordinator.

9. Working with sharps

Accidents involving sharps are the most common reported incidents in the School of Pharmacy. Given the injury and potential infection risk they represent to you and others, such as cleaners, it is particularly important that they are handled with care and disposed of properly. Always think carefully when working with sharps, and **NEVER dispose of sharps in bins**; they must be disposed of in the appropriate, labelled sharps disposal container. In the past, cleaners have been injured with sharps incorrectly placed in bins – this is unacceptable. See the section on waste disposal below for further details.

10. Experiments using cytotoxic drug substances

By the very nature of these materials, additional care and procedures must be adhered to when their use is required. Researchers intending to use cytotoxic drug substances should prepared a detailed protocol that provides information on the drug itself, the nature of the experimental procedure, its intended location, duration and decontamination procedures. This information will be reviewed by the COSHH supervisor (Dr R Thakur), who may call an extraordinary meeting if further discussions are warranted. It is not permissible to proceed with experimental work without making the Safety Committee fully aware of this information.

All experiments using cytotoxic drug substances will be performed in a location with restricted admission and with availability to fume extraction measures. The location should be labelled to indicate that access is controlled and that cytotoxics are in use. A contact name and telephone number should be clearly visible, together with COSHH information. All solid and liquid waste generated in the course of proceedings must be gathered in labelled containers and sent for specialised disposal. Whenever possible, analytical equipment used to analyse samples containing cytotoxic drugs should be quarantined in the secure location. If this is not practical, then the instrument should be sealed to prevent unauthorised access and clearly labelled, as detailed above. Once the experiment is over, the instrument should be decontaminated using procedures outlined in the experimental protocol.

11. Ventilation and fume cupboards

Do not work with toxic gases (or any other toxic material) on a larger scale than is strictly necessary for the purpose in hand. Many preparations can be done on a very much smaller scale than in the original literature description, with economy and gain of speed, safety and convenience. Disposal problems are eased.

Make sure that any fume cupboard you propose to use is switched on **and functioning**. Except in those laboratories in which make-up air is provided, a window must be opened to enable fume cupboards to function properly. Do not evolve a vast amount of toxic material, e.g. HF, Br_2, benzene into the fume cupboard. It is not a vapour phase dustbin. You cannot be sure where the fumes will end up. If in doubt trap vapours in an appropriate manner. Airflow is inefficient in a cluttered cupboard.

Please note that the airflow in the fume cupboards is regularly inspected. Confirmation of performance and the date of the next inspection are shown on the front face of the fume cupboards. Staff must not use fume cupboards whose airflow performance has not passed the inspection process.

12. Explosion and implosion hazards

If you intend to work with quantities of a material with known or potential explosive properties exceeding about 0.1g, you need something more than the ordinary personal protection described in Section 5 above. Place a Perspex explosion screen between yourself and the apparatus and, if necessary, protect other workers by a second screen behind the apparatus. Wear a plastic face visor as well as eye protection.

The most common explosion hazard is due to use of peroxidised solvents. Some solvents, in particular ethers and olefins, form explosive peroxides on exposure to air and light. Before any solvent of this type is evaporated to dryness it must be tested for presence of peroxides with KI. Beware of peroxide encrustation around the caps of old ether bottles - diisopropyl ether is particularly notorious.

If organic liquids are used to wash out glassware, followed by drying in an oven, be sure to displace the organic vapour by a stream of air after removal from the oven. Always minimise flammable solvent introduction to ovens.

There is a danger of implosion when large glass vessels are evacuated. Do not use flat-bottomed flasks or suspect glassware for high vacuum work. Large glass bulbs on vacuum trains should be protected with Sellotape or by enclosure in heavy polythene bags or by wire gauze. Vacuum desiccators should either be covered with strips of Sellotape or placed in protective wire cages. After a vacuum distillation cool the apparatus to room temperature before admitting air. Beware of scaling up - consider if the heat of reaction can be dissipated.

If a trap cooled in liquid nitrogen is allowed to fill with air at atmospheric pressure, liquid oxygen will condense in it. In presence of combustible materials an explosion may then occur. ***Always allow traps to warm by a few degrees after removing liquid nitrogen flasks before admitting air*** from which oxygen may otherwise condense.

13. Chemical waste disposal

Waste solvents must normally be placed in the special waste solvent cans provided and ***not*** poured down sinks in laboratories. Reasonable amounts of harmless water-miscible solvents such as ethanol or acetone may be poured down the sink. See Appendix 2.

The safe disposal of other dangerous chemical wastes ***is the responsibility of the person who made them.*** The School Health and Safety Coordinator will gladly advise on how to treat wastes, but the disposal of wastes is not one of his/her duties. (See Appendix 3.) Separate considerations apply for the disposal of biological waste. Safe disposal of radioactive or biological waste is discussed in detail in sections covering radioactive

substances, microbiological experiments, the use of genetically-modified organisms, blood, human tissue and tissue culture.

14. Radioactive substances

These are subject to special governance. The Approved Code of Practice (ACOP) and Guidance document, entitled *Work with Ionising Radiation*, gives practical direction on the Ionising Radiations Regulations 1999. This publication gives advice on how to comply with legislation and further guidance on how to adhere to best practice as defined in the ACOP.

Those intending to use sources of ionizing radiation, either by way of sealed or unsealed sources, should contact the Radiation Protection Supervisor (RPS) in the School (Professor Ryan Donnelly). It is important to realise that the researcher cannot instigate the purchase chain. All purchases are initiated through the RPS, then onto the School's Chief Technician David McQuade, who relays the request through the University's Radiation Protection Adviser. All sources of radiation entering the School must proceed by this mechanism.

Intending users of radioactive materials should perform their work in close liaison with the School RPS . The RPS will ensure that the following information is understood fully by those intending to use ionising radiation.

a. The name of the appointed Departmental Radiation Protection Supervisor;
b. the identification and description of the area covered by the rules (lab/room number and building);
c. an appropriate summary of the working instructions to control exposure to ionising radiation:
    - control of access to the area;
    - general precautions, and good laboratory practice, eg lab coat, PPE, shielding etc;
    - storage, handling and disposal of radionuclides;
    - radiation and contamination monitoring;
    - record keeping;
    - personal dosimetry.
d. frequency of examination, testing and calibration of monitoring equipment.
e. decontamination procedures:
    - personnel;
    - clothing;
    - equipment, fixtures and fittings.
f. contingency plans:
    - spillage of an unsealed source;
    - damage to a sealed source;
    - fire;
    - loss or theft or a radioactive source.
g. special arrangements for pregnant and breast-feeding staff.

All purchases, usages and disposals of radiolabelled materials are recorded on ISOSTOCK. This software is maintained on a central server and is inspected regularly by the University RPA. The RPS will record all relevant movements of radiolabelled materials, so it is incumbent upon the researcher to ensure that accurate records detailing usages and disposals are kept in laboratory notebooks. It is the responsibility of the researcher to communicate this information to the RPS on a weekly basis.

Those users intending to employ nonparticulate radiation should contact the RPS in the first instance.

15. Experiments left unattended outside normal working hours

The following rules must be obeyed for experiments left unattended after 17.30 on weekdays or at any time at weekends or on holidays.

- Bunsen burners or gas rings must ***not*** be used for experiments left unattended.
- Rubber or plastic tubing must be checked for condition. Connections to glass must be wired on.
- Water pumps must not be left on except with special permission from the relevant supervisor.
- Experiments should be done in a fume cupboard where possible.

16. Microbiological experiments

When undertaking experiments which involve the use of microorganisms, it is essential to observe the following rules for your own and others safety. **A BioCOSHH form must be completed in addition to a COSHH form for all biological work. Please liaise with the Biological Safety Officer (Dr James Burrows) prior to beginning any such work.**

Personal hygiene and safety rules:

a. Clean laboratory coats must be worn in the laboratory at all times. The laboratory coat should have long sleeves and afford protection when the wearer is standing or seated. It is preferable that the laboratory coat worn has side or back closures, close-fitting cuffs and quick release studs or Velcro fastenings.
b. Safety glasses are provided and must be worn during practical classes.
c. Hands must be clean and nails kept short. Watches and rings should not be worn.
d. After completing any bacteriological work, and particularly when leaving the laboratory, the hands must be thoroughly washed.
e. Cuts and abrasions must be covered with a clean dressing.
f. All accidents, such as pricking or cutting a finger, are to be reported at once.
g. Eating (including chewing gum), drinking and smoking are forbidden **at all times** in the laboratory.

General laboratory rules:

a. Always keep your working area clean and tidy. The bench at which you are working should be swabbed using cotton wool at the start and end of each working day with disinfectant spray e.g. 70% alcohol.
b. All cultures used in the laboratory are to be regarded as potentially pathogenic and must be handled carefully. No culture may ever be removed from the laboratory. Inoculating loops and wires should be flamed before and after inoculation with a culture and safety devices must always be used when pipetting cultures - never suck them by mouth.
c. All broth cultures, petri dishes and tubes should be clearly labelled using a felt marker with your name and the date.
d. Make sure all Bunsens, waterbaths etc. are switched off at night.
e. Report any accidents to your supervisor or one of the technical staff as soon as

possible.

Contaminated items should be disposed of before the end of each working day as follows:

- *Reusable items e.g. glassware containing used cultures, autoclaveable plastics*
  Put in an autoclave bag in a metal bucket and place beside the large autoclaves in the Prep room for sterilization by technical staff. Fold over the top of the bag but do not seal it. Place a small piece of autoclave tape on the top of the bag. Do not fill the bag above the level of the top of the bucket otherwise it will not fit n the autoclave.

- *Disposable items e.g. petri dishes, plastic dropping pipettes, tips and microtitre trays*
  Keep disposable items separate from reusable items. Put in an autoclave bag in a metal bucket and place beside the large autoclaves in the Prep room for sterilization by technical staff. Microtitre trays should be individually wrapped in an autoclave bag before placing in the bucket. Fold over the top of the bag but do not seal it. Place a small piece of autoclave tape on the top of the bag. Do not fill the bag above the level of the top of the bucket otherwise it will not fit in the autoclave.

- *Small glass items e.g. colorimeter tubes, glass pasteur pipettes, scalpels*
  Place in a beaker containing a 1% VIRKON solution. When preparing this solution wear safety specs and a mask as the powder is irritating. At the end of your working day leave the beaker in the designated areas in the Prep room for washing by technical staff, clearly labelling it with the date and time it was left in the Prep room.

- *Pipettes*
  Place in one of the large canisters containing a 1% VIRKON solution. It is important that you use the correct concentration of VIRKON for the size of the canister. The large canisters are 6L and the narrower canisters are 3L.

- *Hypodermic needles*
  These must be placed in the yellow boxes specially designed for that purpose. There should be a yellow box in each laboratory.

It is extremely important that no metal buckets for autoclaving and beakers or canisters containing disinfectant are left in the laboratory overnight. It is also extremely important that no infected fluids such as broth cultures in flasks are ever poured down the sink but are disposed of as described above.

In the event of a spillage

a. **A small drop** e.g. from a dropping pipette can be swabbed with 70% alcohol and the paper used to do so placed in an autoclave bag for disposal.
b. **If a culture is spilled** or other liquids containing large numbers of microorganisms it should first be contained using dry 'Virkon' powder. Allow this to remain in contact with the culture for at least 30min then wipe up with damp paper towel and place in an autoclave bag for disposal. If no powder is available mop up the spill with paper towel placing it in an autoclave bag for disposal. The area should then be swabbed with 'Virkon' liquid allowing the liquid to remain in contact with the spill for at least 30min. The liquid should then be mopped up with paper towel which should be placed in an autoclave bag for disposal.
c. Should a spillage occur **outside the designated microbiological laboratories** you **MUST** inform one of the microbiological technicians immediately who will help deal with the spill.

17. Use of genetically modified organisms (GMOs)

A BioCOSHH form must be completed in addition to a COSHH form for all biological work. Please liaise with the Biological Safety Officer (Dr James Burrows) prior to beginning any such work.

Users of GMOs must take the following precautions.

- Work should be carried out at a designated work station which has been cleared of unnecessary equipment prior to commencement. Sufficient space must be allocated to ensure working practices are not compromised by lack of space. The workbench and any equipment on it should be disinfected after any spillage.

- A laboratory coat should be kept solely for this work and worn at all times when working with GMOs. It must be stored separately from other laboratory and personal clothing and should be cleaned at suitable intervals. If contaminated the coat should be removed and kept separately before being decontaminated and cleaned, or if necessary destroyed.

- Lesions on exposed skin should be covered with a waterproof plaster.

- A single pair of single use gloves should be worn at all times during this work. If in the course of this work the gloves are punctured or grossly contaminated they should be removed and disposed of. Gloves should not be worn when handling items likely to be touched by others (telephones etc). On completion of the work gloves should be removed and discarded and hands should be washed.

- Where there is a risk of splashing or the generation of an aerosol a microbiological safety cabinet should be used. If one is not available full face protection and a plastic apron should be worn.

- Where possible, the use of sharps (anything likely to puncture the skin: needles, scalpels, scissors, etc) and glassware should be avoided. If sharps are to be used handling procedures must be established to minimise the risk of skin punctures.

- Used sharps must be discarded immediately into a sharps bin. Sharps must not be left lying or disposed of into yellow bags. Hypodermic needles should not be re-sheathed before disposal and scalpels should not be used without a handle. Sharps bins must be filled more than 2/3 full and if suspected to contain pathogenic micro-organisms they should be autoclaved before being sent for incineration.

- Where possible, samples should be centrifuged in sealed buckets, ideally with transparent lids. If it is suspected that a sample has leaked or there has been a breakage during centrifugation, sealed buckets should be opened within a microbiological safety cabinet. When working with unsealed buckets, the centrifuge should not be opened until 30 minutes after the suspected spillage/breakage to minimise the risk of aerosols. The centrifuge and buckets should be decontaminated following a spillage/breakage before further work is carried out. Seals on buckets and rotors should be checked prior to use for wear and damage and replaced as necessary.

- Eating, drinking, chewing, smoking, taking medication, storing food and cosmetic application must not take place in the laboratory at any time.

- Mouth pipetting must not take place.

- Bench surfaces should be regularly decontaminated according to the pattern of work.

- Effective disinfectants should be available for routine disinfection and for the immediate use in the event of a spillage.

- There should be a means of safe collection, storage and disposal of contaminated waste; any GMO cell debris should be disinfected and autoclaved.

- Materials for autoclaving should be transported to the autoclave in robust containers without spillage.

- Contaminated waste should be suitably labelled before removal for incineration.

- Following an accident involving a sharp object which results in a puncture wound the following actions must be taken immediately:

  i. The wound should be encouraged to bleed
  ii. The wound should be washed with soap and water
  iii. The wound should be covered with a waterproof dressing
  iv. Any contaminated skin, conjunctivae or mucous membrane should be washed immediately
  v. Professional medical assistance should be sought if the likelihood of exposure to a pathogen is high
  vi. Any contaminated bench/floor/equipment should be disinfected. Caution should be exercised when clearing up the accident and those involved should be aware of any hazards involved and be trained in safe working practices. Particular care should be taken to avoid further puncture related wounds from any sharps involved
  vii. The source of contamination should identified and retained for testing if necessary

- All accidents should be reported the Chair of the School of Pharmacy Safety Committee and an accident report sheet completed.

18. Work involving blood or human tissue

A BioCOSHH form must be completed in addition to a COSHH form for all biological work. Please liaise with the Biological Safety Officer (Dr James Burrows) prior to beginning any such work.

Anyone working with blood or human tissue must adhere to the following considerations:

- Work should be carried out at a designated work station which has been cleared of unnecessary equipment prior to commencement. Sufficient space must be allocated to ensure working practices are not compromised by lack of space. The workbench and any equipment on it should be disinfected after any spillage
- A laboratory coat should be kept solely for this work and worn at all times when working with blood and tissue samples. It must be stored separately from other laboratory and

personal clothing and should be cleaned at suitable intervals. If contaminated the coat should be removed and kept separately before being decontaminated and cleaned, or if necessary destroyed.

- Lesions on exposed skin should be covered with a waterproof plaster
- A single pair of single use gloves should be worn at all times during this work. If in the course of this work the gloves are punctured or grossly contaminated they should be removed and disposed of. Gloves should not be worn when handling items likely to be touched by others (telephones etc). On completion of the work gloves should be removed and discarded and hands should be washed.
- Where there is a risk of splashing or the generation of an aerosol a microbiological safety cabinet should be used. If one is not available full face protection and a plastic apron should be worn.
- Where possible the use of sharps (anything likely to puncture the skin: needles, scalpels, scissors, etc) and glassware should be avoided. If sharps are to be used handling procedures must be established to minimise the risk of skin punctures.
- Used sharps must be discarded immediately into a sharps bin. Sharps must not be left lying or disposed of into yellow bags. Hypodermic needles should not be re-sheathed before disposal and scalpels should not be used without a handle. Sharps bins must be filled more than 2/3 full and if suspected to contain pathogenic micro-organisms they should be autoclaved before being sent for incineration.
- Where possible, samples should be centrifuged in sealed buckets, ideally with transparent lids. If it is suspected that a sample has leaked or there has been a breakage during centrifugation, sealed buckets should be opened within a microbiological safety cabinet. When working with unsealed buckets, the centrifuge should not be opened until 30 minutes after the suspected spillage/breakage to minimise the risk of aerosols. The centrifuge and buckets should be decontaminated following a spillage/breakage before further work is carried out. Seals on buckets and rotors should be checked prior to use for wear and damage and replaced as necessary.
- Eating, drinking, chewing, smoking, taking medication, storing food and cosmetic application must not take place in the laboratory at any time.
- Mouth pipetting must not take place.
- Bench surfaces should be regularly decontaminated according to the pattern of work
- Effective disinfectants should be available for routine disinfection and for the immediate use in the event of a spillage.
- There should be a means of safe collection, storage and disposal of contaminated waste.
- Materials for autoclaving should be transported to the autoclave in robust containers without spillage
- Contaminated waste should be suitably labelled before removal for incineration.
- Following an accident involving a sharp object which results in a puncture wound the following actions must be taken immediately:
    i. The wound should be encouraged to bleed
    ii. The wound should be washed with soap and water
    iii. The wound should be covered with a waterproof dressing
    iv. Any contaminated skin, conjunctivae or mucous membrane should be washed immediately
    v. Professional medical assistance should be sought if the likelihood of exposure to a blood borne pathogen is high
    vi. Any contaminated bench/floor/equipment should be disinfected. Caution should be exercised when clearing up the accident and those involved should be aware of any hazards involved and be trained in safe working practices. Particular care should be taken to avoid further puncture related wounds from any sharps involved

vii. The source of contamination should identified and retained for testing if necessary

- All accidents should be reported the Chair of the School of Pharmacy Safety Committee and an accident report sheet completed.

19. Work involving tissue culture

A BioCOSHH form must be completed in addition to a COSHH form for all biological work. Please liaise with the Biological Safety Officer (Dr James Burrows) prior to beginning any such work.

All tissue culture work must adhere to the following considerations:

- Work should be carried out within a class II microbiological safety cabinet which has been cleared of unnecessary equipment prior to commencement. Sufficient space must be allocated to ensure working practices are not compromised by lack of space. The cabinet and any equipment should be disinfected after any spillage
- A laboratory coat should be kept solely for this work and worn at all times when working with cultured cells. It must be stored separately from other laboratory and personal clothing and should be cleaned at suitable intervals. If contaminated the coat should be removed and kept separately before being decontaminated and cleaned, or if necessary destroyed.
- Lesions on exposed skin should be covered with a waterproof plaster
- A single pair of single use gloves should be worn at all times during this work. If in the course of this work the gloves are punctured or grossly contaminated they should be removed and disposed of. Gloves should not be worn when handling items likely to be touched by others (telephones etc). On completion of the work gloves should be removed and discarded and hands should be washed.
- Where possible the use of sharps (anything likely to puncture the skin: needles, scalpels, scissors, etc) and glassware should be avoided. If sharps are to be used handling procedures must be established to minimise the risk of skin punctures.
- Used sharps must be discarded immediately into a sharps bin. Sharps must not be left lying or disposed of into yellow bags. Hypodermic needles should not be re-sheathed before disposal and scalpels should not be used without a handle. Sharps bins must be filled more than 2/3 full and if suspected to contain pathogenic micro-organisms they should be autoclaved before being sent for incineration.
- Where possible, samples should be centrifuged in sealed buckets, ideally with transparent lids. If it is suspected that a sample has leaked or there has been a breakage during centrifugation, sealed buckets should be opened within a microbiological safety cabinet. When working with unsealed buckets, the centrifuge should not be opened until 30 minutes after the suspected spillage/breakage to minimise the risk of aerosols. The centrifuge and buckets should be decontaminated following a spillage/breakage before further work is carried out. Seals on buckets and rotors should be checked prior to use for wear and damage and replaced as necessary.
- Eating, drinking, chewing, smoking, taking medication, storing food and cosmetic application must not take place in the laboratory at any time.
- Mouth pipetting must not take place.
- Safety cabinets should be regularly decontaminated according to the pattern of work

- Effective disinfectants should be available for routine disinfection and for the immediate use in the event of a spillage.
- There should be a means of safe collection, storage and disposal of contaminated waste.
- Materials for autoclaving should be transported to the autoclave in robust containers without spillage
- Contaminated waste should be suitably labelled before removal for incineration.
- Following an accident involving a sharp object which results in a puncture wound the following actions must be taken immediately:
    i. The wound should be encouraged to bleed
    ii. The wound should be washed with soap and water
    iii. The wound should be covered with a waterproof dressing
    iv. Any contaminated skin, conjunctivae or mucous membrane should be washed immediately
    v. Professional medical assistance should be sought if the likelihood of exposure to a pathogen is high
    vi. Any contaminated bench/floor/equipment should be disinfected. Caution should be exercised when clearing up the accident and those involved should be aware of any hazards involved and be trained in safe working practices. Particular care should be taken to avoid further puncture related wounds from any sharps involved
    vii. The source of contamination should identified and retained for testing if necessary
- All accidents should be reported the Chair of the School of Pharmacy Safety Committee and an accident report sheet completed.

20. Use of centrifuges for processing pathological materials

Centrifuges processing pathological material can create considerable health risks by liquid spillage and droplet dispersion. It is important that they are properly designed, constructed, installed, operated and maintained. They should be sited such that operators can see into the bowl and can be easily loaded. Centrifuges should not be placed within a Class I or Class II microbiological safety cabinet, as their operation (exhaust etc.) can affect the operation of the cabinet.

Staff using centrifuges should:

- Use sealed buckets or rotors when processing blood, body fluids or *microbial suspensions*;
- Check that the bucket seals are intact so that they provide adequate protection against liquid dispersion in the event of an accident during use;
- Only use containers strong enough to withstand the centrifugal forces to which they will be exposed;
- Use good handling techniques when filling and emptying the buckets to prevent contamination;
- Fill the containers according to maker's instructions, normally leaving at least 2cm space between the fluid level and the container rim;
- Open sealed buckets containing *known or suspected hazard group 3* biological agents in a microbiological safety cabinet
- Inspect sealed rings ('O' rings) regularly and change them if they are damaged.

Pressures inside overfilled containers can lead to failure of the seal. Overfilled containers also expel liquid droplets when opened.

Staff should follow manufacturer's instructions for decontamination and cleaning to prevent the risk of infection and to ensure that equipment is not damaged. Only non-corrosive disinfectants and cleaners may be used on metal parts.

Arrangements for cleaning and decontaminating centrifuges:

- Remove any liquid spilt in or around the centrifuge;
- Clean and disinfect the rotors and centrifuge buckets regularly;
- Clean and disinfect the fixed parts at regular intervals

21. Complaints about safety matters

If you are dissatisfied with any aspect of safety in the School take your complaint, preferably in writing, to an appropriate member of the School Health & Safety Committee (see Appendix 1).

22. Labelling of chemicals, samples, cells and tissue

In accordance with COSHH and good laboratory practice it is mandatory that all samples are appropriately labelled to enable positive identification. In this context, the term sample refers to all chemicals (solid, liquid or gas), solutions, suspensions or solvents containing chemicals, biological and clinical samples (e.g. tissue samples, biological fluids), microbiological isolates (in either solid form or as microbial suspensions) and radioisotopes.

The following details must be included in the label:

i. Identification (description) of the sample
ii. Date of manufacture
iii. Expiry date
iv. Name of person responsible for the sample

Please note that the name/description of the sample must be sufficiently understood by non-trained personnel. Therefore, please avoid the use of abbreviations if these are specific for a particular scientific discipline.

23. Supervision of research students

Supervisors of research students are required to comply with the following:

- to provide, in collaboration with each student, a written COSHH assessment for each type of experiment carried out - see Appendix 6.
- to name an alternative supervisor if they are to be absent from the School for more than one week and to notify the Head of School of this,
- to regularly visit the laboratory where their student(s) is working

How to Cope With Accidents

(Emergency telephone numbers are summarised on the first page of this document and in Appendix 4).

1. <u>FIRE AND BOMB WARNINGS</u>. Learn the location of fire alarms, hoses, fire blankets and extinguishers. Be prepared to use the extinguishers for small fires and a hose for appropriate larger fires.

a. ON DISCOVERING A FIRE. If you discover a fire which cannot be controlled by **ONE** extinguisher or a fire blanket: **DO NOT LET THE FIRE GET BETWEEN YOU AND THE DOOR.**

I. **RAISE THE ALARM** by breaking the glass in the nearest fire alarm operating point.

II. **CALL THE FIRE BRIGADE** (dial 2222). Security will call the fire brigade on registering the alarm. Nevertheless, if a telephone is within reach the person discovering the fire should **ALSO** call the fire brigade. It does not matter if the call is duplicated.

III. **EVACUATE THE PREMISES** by the nearest available route. All persons evacuated **MUST ASSEMBLE IN THE DESIGNATED ASSEMBLY POINT FOR THE PARTICULAR BUILDING.** When the fire service arrive the fire officer in charge will require immediate information concerning persons unaccounted for. **DO NOT LEAVE THIS AREA** until instructed it is safe to do so by the authorities – someone else may mistakenly think you are still inside the building, necessitating entry by a fire fighter to search for you.

b. EMERGENCY EVACUATION

- **FIRE**

In the event of a fire in the School the alarm bells will sound **CONTINUOUSLY** and occupants shall vacate the building quickly and quietly by the nearest available exit and **proceed to the designated assembly point**. Personnel must not congregate near the main entrances as this restricts exit for those still inside, and the emergency services on arrival will require unimpeded access into the building. Note that planned maintenance of the fire alarm system will be pre-warned to occupants and shall consist of intermittent operation of the alarm. Emergency repairs may not be pre-notified.

- **BOMB SCARE EVACUATION**

a. **Where the location of the bomb is not known**
The fire siren will be operated continuously and occupants shall vacate the building quickly and quietly by the nearest available exit taking with them all personal possessions and **designated assembly point.**

b. **Where the location of the bomb is known**
Occupants (closest to the bomb first) shall be advised by word of mouth of the need to evacuate the building taking with them all personal possessions and shall be advised of the area(s) to avoid during the evacuation. **Assemble in the Belfast City Hospital car park.**

2. CASUALTIES

Do not become a casualty by choice. If a toxic gas or vapour escapes into your laboratory in amounts large enough to cause discomfort or danger ***get out*** first and ask questions afterwards.

First-aid treatment for minor injuries should be given on the spot if possible, utilising the nearest first-aid box. Please see Appendix 4 and ***make sure you know where the box nearest to your laboratory is situated***. Notify a member of academic staff immediately.

The trained first-aid staff within the School may treat minor accidents. For more serious cases the injured party should be taken **IMMEDIATELY** to the casualty department of the Royal Victoria Hospital.

Incidents involving eye damage from Class 3B or Class 4 lasers require medical attention. A grab sheet giving detailed information on wavelength, power and possible type of injury is available with such equipment and should be taken to the hospital or eye clinic. Contact details are also given on this grab sheet.

NOTE: Casualty department in the Royal Victoria Hospital is **ALWAYS OPEN. If transport is required dial 2222 and ask for an ambulance.**

Reporting Accidents

The proper recording of accidents is important. Such records help us to improve our safety arrangements and may be needed in the event of insurance claims or legal proceedings.

All accidents/near misses should be reported to David McQuade (Chief Technician) so that all information can be recorded on the IRIS reporting system.

The responsibility for reporting accidents lies with the most senior person present and uninjured, or, if there are no witnesses, with the first person to arrive on the spot.

Self-Assessment Quiz on Safety

Do you know what to do when...

1. A fire breaks out in your laboratory?
2. You hear the continuous sound of the alarm system?
3. A student in your laboratory is seriously injured and needs medical attention?
4. There is an escape of toxic gases or fumes in your laboratory and someone falls unconscious to the ground?

IF YOU CANNOT ANSWER ALL THESE QUESTIONS IMMEDIATELY, YOU NEED TO STUDY THIS BOOKLET AGAIN.

Appendix 1

School Safety Administration

Committee member	Particular responsibilities
Professor R.F. Donnelly	School Health & Safety Coordinator, Radiation Protection Officer
Dr R. Thakur	COSHH Supervisor for chemical work Chemical safety issues
Professor M. Tunney	COSHH Supervisor for microbiological work Microbiological safety issues
Mr D. McQuade	Chief Technician
Mr A. Gray	Technical staff representative COSHH support
Professor B.F. Gilmore	Microbiological safety issues
Professor H. McCarthy	Biological safety issues
Tara Browne	School Manager
Dr J. Burrows	COSHH Supervisor for biological work, GMO issues, BioCOSHH Supervisor
Mr G. Graham	School of Pharmacy Building Liaison Officer Monthly Safety Inspections Pharmacy Old Building & MBC Laboratories
Dr M. McCrudden	Research staff representative
Dr M. Zhou	Academic staff representative RVH site
Mr D. Vance	Technical staff Representative RVH site
Mr I. Grant	Technical staff representative

MPharm Year representatives will attend meetings of the Health and Safety Committee and the Head of School attends at least one meeting of the Health and Safety committee each year.

Appendix 2

Waste Disposal in the School of Pharmacy

The primary responsibility for disposal of dangerous chemical wastes lies with the producer ***NOT*** the School Health and Safety Coordinator, the University Safety Service or the School's Technicians. Senate has ruled as follows:

'Members of staff in charge of teaching or research in which dangerous chemicals are used are personally responsible for arranging the safe storage or consignment to waste of surpluses of these chemicals on completion of any course or project.'

As for reaction products and residues arising from research, the research supervisor concerned obviously has responsibility for their safe disposal or conversion to harmless materials, and would often be the only person with the specialist knowledge required. The following general suggestions for waste management are offered. Buy in as little as possible. ***Do not let*** your waste accumulate in quantities or forms which will make treatment ***difficult***: for instance, don't dump filter papers, mercury, cotton wool, glass wool, or broken glass and chemicals in the same container. Do not include with dangerous chemical wastes large quantities of harmless wastes which could alternatively go into a sink or dustbin. Clean up your glassware immediately after use, before stoppers get stuck. Note that broken glass must be put only in the specially-marked glass bins.

1. Disposal *via* drains

The following wastes, not exceeding 2 litres, may be put down drains ***if, and only if***, copiously diluted with many times their volume of water:

- water-miscible (<3%) organic substances of relatively low toxicity including methanol, ethanol, glycol, glycerol and other lower alkanols; formic acid, acetic acid and other lower alkanoic acids; formaldehyde and acetaldehyde; acetone and other lower alkanones; tetrahydrofuran and the 'glyme' ethers; dimethylformamide; dimethylsulfoxide: with the exception of chlorites, cyanides, sulfides, azides, borohydrides, and any other compounds capable of generating highly toxic or explosive gases in contact with acids, for which see Section (4) below. Large amounts of acid or base should be neutralised. "Chemical Safety Matters" quotes harmless cations and anions as : $A1^{3+}$, Ca^{2+}, Cu^{2+} , $Fe^{2+,\ 3+}$, Li^{+}, Mg^{2+} , Na^{+} ,

2. Waste organic solvents

Waste organic solvents must be collected in H.D.P.E. waste containers labelled 'organic solvent waste' or 'chlorinated solvent waste'. These should be emptied in the appropriate waste disposal drum(s) located at the back of stores in the MBC building. H.D.P.E. containers are available from stores. Seriously consider solvent recovery if feasible.

3. Solid water-insoluble materials

Quantities of up to 100g of inert, non-hazardous water-insoluble materials such as sundry organics, metal oxides, silicates, carbonates, sulfides, barium sulfate, etc., should be securely enclosed in strong valueless containers and placed in rubbish bins for disposal to municipal dumps. This method must not be used for reactive or flammable substances which might be capable of injuring untrained persons who handle rubbish.

4. Biological and radioactive waste

Much of the material relating to the safe disposal of radioactive or biological waste is discussed in detail in sections covering radioactive substances, microbiological experiments, the use of genetically-modified organisms, blood, human tissue and tissue culture. However, the following points should be noted: Infected instruments and apparatus must be sterilised

or disposed of satisfactorily *immediately after use.* Inoculating loops and wires must be flamed, pipettes placed in cylinders containing suitable disinfectant and slides, cover slips colorimeter tubes and syringes must be placed in beakers of disinfectant. Special receptacles are also provided for old cultures and these must always be used for the disposal of broth cultures and petri dishes. Infected fluids must never be poured down the sink. Used, but non-contaminated, apparatus must *not* be placed in the receptacles provided for contaminated apparatus. Any accidentally infected parts of the bench or floor must be swabbed at once with a suitable disinfectant.

5. Other waste

Materials which cannot be disposed of safely by the user will be disposed of by a professional waste-disposal firm. This disposal is arranged by the USS on an annual basis. All items for disposal must be clearly and permanently labelled as to identify, amount, user and laboratory of origin. They must be accompanied by a USS chemicals disposal inventory form. Since these collections are expensive, responsibility must be exercised in what is left for collection. Toxic metals such as Hg^{2+}, Cd^{2+} in dilute solution should be precipitated, *e.g.* as sulfide, filtered off and treated as in (4) or (5).

6. General laboratory waste guidelines

Non-toxic and uncontaminated non-sharp materials can be disposed of in municipal waste bins (black bags). Uncontaminated broken glass or glass waste must be placed in cardboard broken glass boxes. Broken glass boxes must be sealed with yellow warning tape and disposed of in the skip located outside MBC stores. Contaminated sharps (needles, broken glass) must be placed in yellow sharps boxes, labelled with School of Pharmacy, laboratory of origin and date. They must be removed to the MBC medical waste store to await disposal. **Never dispose of sharps with ordinary waste or broken glass boxes.** Empty Winchester/solvent bottles should be rinsed out and disposed of in the skip located outside MBC stores.

Accidents involving sharps are the most common reported incidents in the School of Pharmacy. Given the injury and potential infection risk they represent to you and others, such as cleaners, it is particularly important that they are handled with care and disposed of properly. Always think carefully when working with sharps, and **NEVER dispose of sharps in bins**; they must be disposed of in the appropriate, labelled sharps disposal container. In the past, cleaners have been injured with shaprs incorrectly placed in bins – this is unacceptable.

7. Clinical waste guidelines

Clinical waste is defined under many categories. Any waste that contains wholly or partly human or animal tissue, other body fluids, excretion, drugs or other pharmaceutical products, syringes, needles or other sharp instruments, being waste which unless rendered safe may prove hazardous to any person coming into contact with it.

A full key on how to dispose of clinical waste in the School of Pharmacy can be found at http://www.qub.ac.uk/schools/SchoolofPharmacy/DisposalofClinicalWaste/

TO SUM UP: ***Please*** design experiments to produce as little waste as possible. If you produce hazardous waste ***destroy*** **it** - a member of the Safety Committee will be pleased to give advice. Safety Officer will advise). Use option 6 as a last resort. It is good practice to survey chemical stocks regularly to cut out obsolete items and any chemicals that show signs of decomposition.

Appendix 3

Working with Chemical Carcinogens

Under the Carcinogenic Substances Regulations (NI) the following substances are ***prohibited*:**

a. 4-aminodiphenyl
b. benzidine (4,4'-diaminodiphenyl)
c. 2-naphthylamine
d. 4-nitrodiphenyl and their salts

The following compounds are ***controlled*:**

a. *o*-tolidine (4,4'-diamino-3,3'-dimethyldiphenyl) and their salts.

The regulations do not preclude the use of these compounds under proper conditions but they should not be worked with until approval for each item of work has been obtained from the Health and Safety at Work Inspectorate. Strict conditions are laid down for their use and initial application must be made through the School Health & Safety Coordinator.

There is no general international agreement yet on which other compounds should be included on lists of cancer suspects. An EU commission is examining the matter and it is likely that, in due course, the regulations will be updated.

Lists have been produced by, e.g. BDH Chemicals Ltd., MSF and the U.S. Occupational Health and Safety Administration.

The University Safety Committee has, in addition, produced a document entitled 'Guidelines for Work with Mutagens and Carcinogens'. Copies of the salient points have been sent to staff members.

A useful general rule for handling any suspect compound is that precautions must be taken to ensure that personnel are not put at risk of inhaling, ingesting or otherwise absorbing the material. Good COSHH assessments are vital.

Appendix 4

First Aid and emergency telephone numbers

Location of first-aid boxes in the School

There are three portable first aid boxes in the School which are kept in rooms 104, 202 and 305. In the interests of your own safety please report to the Chief Technician if any box needs re-stocking.

TRAINED FIRST-AIDERS

Name	Location	Internal Telephone
Gail Carson	**MBC 3rd Floor**	**2091**
Helen McPhillips	**MBC Teaching Lab**	**2665**
Andrew Gray	**M105**	**2333**
Gavin Graham	**WMB 03.030**	**2161**
Lynn Cairns	**317**	**2023**
Cathy Fenning	**RVH Clin Sci A**	**1667**
Lee-Anne Howell	**School Office**	**2358**
Lynne Spence	**School Office**	**5800**
Solenn Cariou	**205**	**2020**
Tomas McVeigh	**205**	**2020**
Ross Archibald	**School Office (Mon-Wed)**	**2354**
Deirdre Gilpin	**MBC 3rd Floor**	**2605**

Fire, Police, Ambulance, Cardiac Unit or Poisons Centre, 2222 from any telephone in the School.

University Health Service (7 University Terrace, BELFAST, BT7 1NP) extension 4634
University Safety Service (First Floor, 5 Lennoxvale, BELFAST, BT9 5BY) extension 4613

Appendix 5

Some Toxic Chemicals

These chemicals are highly toxic by inhalation or absorption:

acrylamide, acrylonitrile, benzene, buta-1,3-diene, 1,2-dibromoethane, 2,2'-dichloro-4,4'-methylenedianiline, ethylene oxide, formaldehyde, isocyanates (R-NCO), 2-methoxyethanol, vinyl chloride, vinylidene chloride, wood dust, acrolein, acrylaldehyde, allyl alcohol, aluminium alkyls, aromatic amines, 2-aminoethanol, anthracene and other PAHs, benzene thiol, *p*-benzoquinone, benzoyl peroxide, biphenyl, epoxides, bromoform, *n*-butylamine, 2-chloroacetophenone, 1-chloro-4-nitrobenzene chloro(nitro)anilines, cyanamide, di-*n*-butyl phosphate, dibutylphthalate, dichloroacetylene, diethylenetriamine, diglycidyl ether, dinitrobenzene (all isomers) dimethyl sulfate, diphenylamine, ethanethiol, ethanolamine, ethylchloroformate, ethylene chlorohydrin, ethylene glycol dinitrate, ethane thiol, epoxides, formic acid, formamide (foetal poison), 2-furaldehyde, alkylfluorophosphates, hydroquinone acrylates, ketene, mercaptoacetic acid, magic methyl, nitroaromatics, N-nitroso compounds, oxalic acid, pentachlorophenol, 2-chloroacetophenone, p-phenylenediamine, phosgene, phosphate esters, picric acid, piperazine dihydrochloride, prop-2-yn-1-ol, terphenyls, tetrachloronaphthylenes, tetraethylpyrophosphate, thioglycollic acid, tributylphosphate, fluoroacetates, chlorinated hydrocarbons (1,1,1-trichloroethane is least toxic), xylenes, arsenic compounds, asbestos, beryllium and compounds, cadmium compounds, carbon disulfide, hydrogen cyanide, lead compounds, antimony compounds, arsine, barium compounds, bismuth telluride, boron tribromide, boron trifluoride, bromine, carbon tetrabromide, carbon tetrachloride, chlorine, chlorine dioxide, chlorosulfonic acid, chromium(VI) compounds, cyanides, diborane, diphosphorus pentasulfide, peroxodisulfates, disodium disulfite, borax, vanadium pentoxide, germane, hydrogen fluoride, hydrogen peroxide, hydrogen selenide, hydrogen sulfide, hydrazine and derivatives, iodine, iron pentacarbonyl, lithium hydride, lead alkyls, mercury alkyls and compounds, nitrogen dioxide, osmium tetroxide, ozone, phosphorus-yellow-halides, phosphine, platinum salts, rhodium compounds, selenium and compounds, silica dust, silane, silver compounds, azides, sodium hydrogen sulfite, stilbene, sulfur dioxide, disulfur dichloride, tellurium and compounds, nickel carbonyl alkylsilicates, thallium compounds, tin compounds, organophosphates, tungsten and compounds, uranium compounds.

This list is obviously not exhaustive but draws attention to hazardous types.

Appendix 6

COSHH assessments and COSHH form

The Control of Substances Hazardous to Health regulations came into operation in N. Ireland on 11th April 1991 and require that work shall not be undertaken which is liable to expose staff or students to any substance hazardous to health unless a suitable and sufficient assessment has been made of the risks to health and the steps that need to be taken to meet the requirements of the regulations.

The School of Pharmacy requires completion of a COSHH risk assessment form which can obtained from the purchasing office. It **must be completed before any work begins** whenever a chemical which appears in various safety compilations or which features in the BDH, Aldrich or other catalogues with a hazard symbol and/or risk phrase is used. For all undergraduate practicals, completed COSHH forms relating to all experiments using hazardous compounds will appear on special notice boards in the laboratories or in manuals for specific courses.

The aim of the COSHH risk assessment is:

1. to identify the substances you are going to use in a particular procedure/process/experiment
2. to determine which of those substances are hazardous to health
3. to determine how those substances are hazardous and what effects they could have on your health or others' health
4. to estimate the risks of exposure to these substances when you use them in the procedure/ process/experiment.
5. to decide the precautionary measures you must take to either prevent exposure or adequately control the risk of exposure.

The precautionary measures must be implemented **before** you carry out this work.

With regard to project and research students, supervisors must complete COSHH forms for all experiments or related groups of experiments. Students should be encouraged to carry out assessments as part of their training but final responsibility for the content rests with the supervisor.

The COSHH assessment ensures that you have considered any risks that may be present and that appropriate steps are taken to deal with any dangers. This will include a full consideration of the use of such protective items, as gloves and fume hoods, for example.

Separate risk assessments are not needed for each substance used in a particular procedure/process/experiment. In fact, group (generic) risk assessments can be used satisfactorily where similar substances are used in similar jobs eg handling solvents in HPLC work, handling detergents in automatic dishwashers, research projects. In addition COSHH risk assessment can be used as a basis for drafting Safe/Standard Operating Procedures (SOPs).

Examples of current undergraduate COSHH forms are available from Professor Ryan Donnelly and he or the School Health and Safety Coordinator will be pleased to offer additional advice. Assessment should be reviewed immediately when there is evidence to suggest it is no longer valid.

Below is the new COSHH risk assessment form that must be filled out before beginning any practical work.

COSHH Risk Assessment Form

A COSHH risk assessment must be conducted before you commence work which could expose you to substances hazardous to health.

All sections of this form must be completed electronically and no sections are to altered/removed.

The form must be submitted prior to the commencement of the project or activity.

SECTION 1: PROJECT DETAILS

Undergraduate Practical / Project	Postgraduate	Postdoctoral	Staff	Other

Chemical	Biological	Microbiological

Group or teaching year ***(if applicable):***	
School / Centre:	
Title of project or activity:	
Location(s) of work: (building and room number)	
Person carrying out assessment:	Name: Telephone Extension: E-mail:
Principal Investigator / Supervisor:	
Assessment Date:	
Review Date: ***(if applicable)***	

Detailed description of work activity: (Include quantities of substances to be used and how they are to be used i.e. mixed, heated etc.)

SECTION 2: HAZARD SUMMARY SECTION

Hazard pictograms – select all that apply to the work activity								
								
Health Hazard	Toxic	Corrosive	Irritant	Flammable	Oxidising	Explosive	Compressed Gas	Dangerous for the environment

	
Biological	Radioactive

SECTION 3: HAZARDOUS SUBSTANCES INFORMATION

List all the substances you are going to use in the procedure you are assessing. All the information required to populate the table below can be found on the manufacturer's safety data sheet.

If none of the substances to be used are hazardous to health, the risk assessment is complete at this stage and should be signed off.

Name of substance	**Hazard Classification***	**Physical form** e.g. powder, dust, liquid, gas	**Route of exposure** e.g. ingestion, inhalation, absorption, injection	**WEL (mg/m3) or (ppm)**

* Please detail the level of health hazard i.e. Hazard statements and Carcinogenic / Mutagenic categories

Note A separate BioCOSHH / GM / Radiation Risk Assessment may be required depending on the work taking place

Hazards produced during / after reaction / experiment
List all the substances (if any) you are going to produce in the procedure you are assessing and the associated hazards.

How often will this work activity be carried out?			
Daily	**Weekly**	**Monthly**	**Other** (please specify)

How long will the process / work activity last?

Who might be at risk?	**Staff**	**PG**	**UG**	**New and Expectant Mothers**	**Cleaners**	**Contractors**	**Public**

Risk matrix can be found in Note 1.

Assessment of risk <u>PRIOR</u> to the use of controls	**Severity (1-5)**	**Likelihood (1-4)**	**Overall Risk Rating (Severity x Likelihood)**

SECTION 4: CONTROLS

If exposure cannot be prevented by using a different process, alternative substances or different forms of the same substance, consider the most effective precautionary measures needed to adequately control exposure which are proportionate to the risk.

Physical or Engineering controls:	**Glove Box**	**Fume Cupboard**	**Local Exhaust Ventilation**	**Open Doors / Windows**	**Other** (please specify)
Administrative controls: (including training requirements					
Out of hours controls: (if required)					

Personal Protective Equipment:							
	Lab Coat	Apron	Safety Footwear	Gloves*	Face Shield	Glasses / Goggles	RPE**
Storage requirements:							
Disposal procedures:							

*If protective gloves are required, please indicate which type is the most suitable for the substance handled.
**A person requiring RPE must be 'face-fit tested' to the RPE (Further advice on the selection of suitable RPE and face-fit testing is available from the Occupational Health and Safety Service).

	Yes	**No**	**Describe the findings of exposure monitoring or health surveillance**
Is exposure monitoring required? (See Note 2)			
Is health surveillance required?* (See Note 3)			

*If yes, please state date of referral to Occupational Health: _____

Assessment of risk <u>AFTER</u> the application of controls	**Severity (1-5)**	**Likelihood (1-4)**	**Overall Risk Rating (Severity x Likelihood)**

SECTION 5: EMERGENCY PROCEDURES

The purpose of this section is to provide easy access to emergency information for First Aid, Spillage and Fire.

First Aid	
If inhaled:	
In case of skin contact:	
In case of eye contact:	
If swallowed:	

Spillage	
Personal precautions, protective equipment and emergency procedures:	
Environmental precautions:	
Methods and materials for containment and clean up:	

Fire	
Suitable extinguishing media:	
Special hazards arising from the substances or mixture:	

SECTION 6: CONTACTS

Contact in the event of an emergency: (first aid, spillage, fire):	
Out of hours contact:	

SECTION 7: APPROVAL

I confirm that this is a suitable and sufficient risk assessment for the above described work activity

	Name	Signature	Date
Assessor (Student/PDRA):			
Principal Investigator / Supervisor:			
COSHH Supervisor: (Chemical)			
COSHH Supervisor: (Biological)			
COSHH Supervisor: (Microbiological)			

I have read and understood the information contained in this COSHH Risk Assessment and I agree to adopt the control measures and precautions as stated above:

For group practical(s), please complete the table below:

Name (Printed)	Signature	Date

This assessment should be reviewed at regular intervals and immediately if there is reason to suspect that it is no longer valid (for example after any accidents or incidents) or if there is a significant change in the work to which it relates.

Incomplete or unsigned forms will not be accepted.

Note 1: Risk Matrix

Hazard Severity	Risk Likelihood			
	Unlikely (1)	Possible (2)	Likely (3)	Very Likely (4)
Minor (1)	**1**	**2**	**3**	**4**
Moderate (2)	**2**	**4**	**6**	**8**
Serious (3)	**3**	**6**	**9**	**12**
Very Serious (4)	**4**	**8**	**12**	**16**
Extreme (5)	**5**	**10**	**15**	**20**

	Risk Rating
Low	**(1-5)**
Medium	**(6)**
High	**(8-10)**
Very High	**(12-20)**

Note 2 – Exposure Monitoring
Exposure monitoring provides assurance on the adequacy of your controls. It has nothing to do with the state of a workers health.

Note 3 – Health Surveillance
Health surveillance is appropriate where employees are exposed to carcinogenic and mutagenic substances, unless the risk assessment confirms that exposure is so adequately controlled that there is no reasonable likelihood of an identifiable disease or adverse effect resulting from the exposure or the quantities used are so small that even if control measures fail, the exposure is likely to be insignificant. It is also appropriate when the work involves the use of substances known to cause occupational asthma or severe dermatitis or if there is contact with chrome solution, electrolytes containing chromic acid or chromium salts and other substances which can cause skin cancer.

For office use only	
Date received by SOP Office:	
Received by: **(Print name)**	
Date authorised by supervisor:	
Date uploaded:	

The COSHH risk assessment should be reviewed at a frequency of not more than 5 years. The assessment should be reviewed immediately when there is evidence to suggest it is no longer valid.

COSSH APPENDIX A

Sources of Information of Toxicity Data:

Sigma-Aldrich Library of Chemical Safety Data, Vols I and II
Handbook of Identified Carcinogens and Noncarcinogens, Vol I and II, Soderman, CRC Press
Dangerous Properties of Industrial Materials, Vols I, II and III, Von Nostrand, Reinhold
The Merck Index, Merck and Co. Inc.
Registry of Toxic Effects of Chemical Substances, Vols I and II, NIOSH
Dictionary of Substances and their Effects (DOSE) Vols 1-7, Richardson & Gargoli, RSC
Biochem. Co., Special Publication No 5 "Safety in Biological Laboratories" D B Cater & E Martree 1977
Approved Supply List: Information approved for the classification and labelling of substances and preparations dangerous for supply, Chip 3, HSC
EH40/9(x) Occupational Exposure Limits 200(x), Health and Safety Executive (HSE)
1996 TLVs and BEIs American Conference of Governmental Industrial Hygienists (ACGIH)
The Technical Basis for COSHH Essentials: easy steps to control chemicals (HSE)
Databases
Registry of Toxic Effects of Chemical Substances (NIOSH)
Chemical Safety Newsbase (RSC)
Occupational Safety and Health (NIOSH)
Toxline (National Library of Medicine)
Medline (National Library of Medicine)
Sigma-Aldrich-Fluka, Material Safety Data Sheets on CD-ROM

COSHH APPENDIX B

Risk Phrases, R20 *etc.*
Indication of particular risks

20 Harmful by inhalation
21 Harmful in contact with skin
22 Harmful if swallowed
23 Toxic by inhalation
24 Toxic in contact with skin
25 Toxic if swallowed
26 Very toxic by inhalation
27 Very toxic in contact with skin
28 Very toxic if swallowed
33 Danger of cumulative effects
34 Causes burns
35 Causes severe burns
36 Irritating to eyes
37 Irritating to respiratory system
38 Irritating to skin
39 Danger of very serious irreversible effects
40 Limited evidence of a carcinogenic effect
41 Risk of serious damage to eyes
42 May cause sensitisation by inhalation

43 May cause sensitisation by skin contact
45 May cause cancer
46 May cause heritable genetic damage
48 Danger of serious damage to health by prolonged exposure

49 May cause cancer by inhalation
60 May impair fertility
61 May cause harm to the unborn child
62 Possible risk of impaired fertility
63 Possible risk of harm to the unborn child
64 May cause harm to breastfed babies
65 Harmful: may cause lung damage if swallowed
66 Repeated exposure may cause skin dryness or cracking
67 Vapours may cause drowsiness and dizziness
68 Possible risk or irreversible effects

Combination of particular risks

20/21 Harmful by inhalation and in contact with skin
20/21 Harmful by inhalation, in contact
/22 with skin and if swallowed
20/22 Harmful by inhalation and if swallowed
21/22 Harmful in contact with skin and if swallowed
23/24 Toxic by inhalation and in contact with skin
23/24 Toxic by inhalation, in contact with
/25 skin and if swallowed
23/25 Toxic by inhalation and if swallowed
24/25 Toxic in contact with skin and if swallowed
26/27 Very toxic by inhalation and in contact with skin
26/27 Very toxic by inhalation, in contact
/28 with skin and if swallowed
26/28 Very toxic by inhalation and if swallowed
27/28 Very toxic in contact with skin and if swallowed
36/37 Irritating to eyes and respiratory system
36/37 Irritating to eyes, respiratory system
/38 and skin
36/38 Irritating to eyes and skin
37/38 Irritating to respiratory system and skin
39/23 Toxic: danger of very serious irreversible effects through inhalation
39/23 Toxic: danger of very serious
/24 effects through inhalation and in contact with skin
39/23/ Toxic: danger of very serious
24/25 irreversible effects through inhalation, in contact with skin and if swallowed
39/23/ Toxic: danger of very serious
25 irreversible effects through inhalation and if swallowed
39/24 Toxic: danger of very serious irreversible effects in contact with skin
39/24/ Toxic: danger of very serious
25 irreversible effects in contact with skin and if swallowed
39/25 Toxic: danger of very serious irreversible effects if swallowed
39/26 Very Toxic: danger of very serious irreversible effects through inhalation
39/26/ Very Toxic: danger of very serious
27 irreversible effects through inhalation and in contact with skin
39/26/ Very Toxic: danger of very serious

27/28 irreversible effects through inhalation, in contact with skin and if swallowed
39/26/ Very Toxic: danger of very serious
28 irreversible effects through inhalation and if swallowed
39/27 Very Toxic: danger of very serious irreversible effects in contact with skin
39/27/ Very Toxic: danger of very serious

28 irreversible effects in contact with skin and if swallowed
39/28 Very Toxic: danger of very serious irreversible effects if swallowed
68/20 Harmful: possible risk or irreversible effects through inhalation
68/20/ Harmful: possible risk of irreversible
21 effects through inhalation and in contact with skin
68/20/ Harmful: possible risk of irreversible
21/22 effects through inhalation, in contact with skin and if swallowed
68/20/ Harmful: possible risk of irreversible
22 effects through inhalation and if swallowed
68/21 Harmful: possible risk of irreversible
effects in contact with skin
68/21/ Harmful: possible risk of irreversible
22 effects in contact with skin and if swallowed
68/22 Harmful: possible risk of irreversible effects if swallowed
42/43 May cause sensitisation by inhalation and skin contact
48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation
48/20/ Harmful: danger of serious damage to
21 health by prolonged exposure through inhalation and in contact with skin
48/20/ Harmful: danger of serious damage to
21/22 health by prolonged exposure through inhalation, in contact with skin and if swallowed
48/20/ Harmful: danger of serious damage to
22 health by prolonged exposure through inhalation and if swallowed
48/21 Harmful: danger of serious damage to health by prolonged exposure in contact with skin
48/21/ Harmful: danger of serious damage to
22 health by prolonged exposure in contact with skin and if swallowed
48/22 Harmful: danger of serious damage to health by prolonged exposure if swallowed
48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation
48/23/ Toxic: danger of serious damage to
24 health by prolonged exposure through inhalation and in contact with skin
48/23/ Toxic: danger of serious damage to
24/25 health by prolonged exposure through inhalation, in contact with skin and if swallowed
48/23/ Toxic: danger of serious damage to
25 health by prolonged exposure through inhalation and if swallowed
48/24 Toxic: danger of serious damage to health by prolonged exposure in contact with skin
48/24/ Toxic: danger of serious damage to
25 health by prolonged exposure in contact with skin and if swallowed
48/25 Toxic: danger of serious damage to health by prolonged exposure if swallowed

Radiation Safety

The School does not currently have a dedicated area for working with ionising radiation. Any person intending to work with ionising sources should contact our Radiation Protection Supervisor before commencing any work.

The Local Rules

The Local Rules are made in accordance with Regulation 17 of the Ionising Radiations Regulations 1999 and apply to all users of radiation employed by, or studying at, the School of Pharmacy, QUB. Compliance with the Local Rules is essential at all times. All workers must ensure that they are fully aware of all aspects of the Local Rules relevant to the execution of their individual duties. Further advice on any matters relating to the implementation of the Local Rules should be obtained from the Radiation Protection Supervisor or, when appropriate, the Radiation Protection Adviser.

These Local Rules are rules and procedures governing the safe use of ionising radiation in the School of Pharmacy. They are designed to enable work to be carried out safely and to minimise the risk to you, your colleagues, and any other person who may be affected by your use of radiation.

The University has a legal responsibility to ensure that any use of radiation by staff or students conforms to accepted safety regulations. Regulation 17 of the Ionising Radiations Regulations (1999) specifies that a written set of Local Rules is in place in order to demonstrate compliance. There are legal implications if these rules are not followed.

Radiation Protection Supervisor (RPS)

Each School, where ionising radiation is used, has a Radiation Protection Supervisor (RPS), appointed to oversee the safe use of ionising radiation. The RPS will ensure that the School's Local Rules are effective and being observed and to help optimise the safety of all use of radiation.

If ever you are unsure of what to do, need any guidance on any aspect of use of radiation, or are concerned about risks, you should consult with the RPS. In addition, the RPS will approve projects, handle orders for radionuclides, collate waste returns, arrange training and take charge of incidents, such as spills.

The RPS in the School is Professor Ryan Donnelly

Room M108

Phone 2251

Radiation Protection Adviser (RPA)

The University has appointed an expert to advise on all aspects of radiation safety within the scope of the work undertaken. The RPA is there to keep up to date with the current legislation and advise on how best to proceed in order to comply with that legislation. The RPA has to

regularly prove his competence to a certification body recognised by the Health and Safety Executive. Contact with the RPA is usually via the RPS. The RPA carries out regular inspections of all aspects of radiation protection procedures and practices.

The RPA in the University is Dr Lindsey Smith

Phone 4612