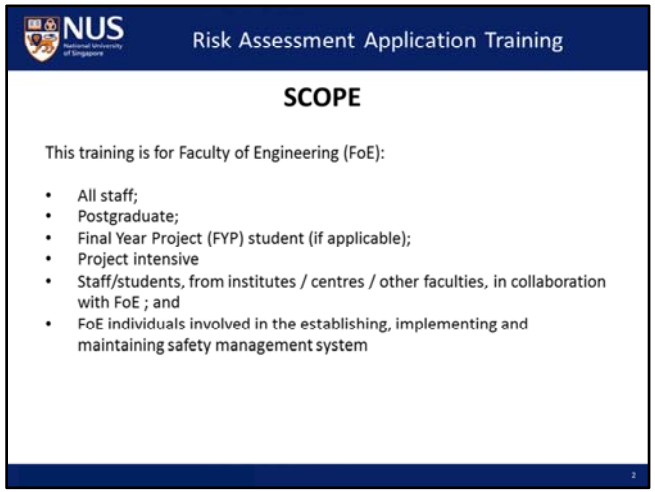
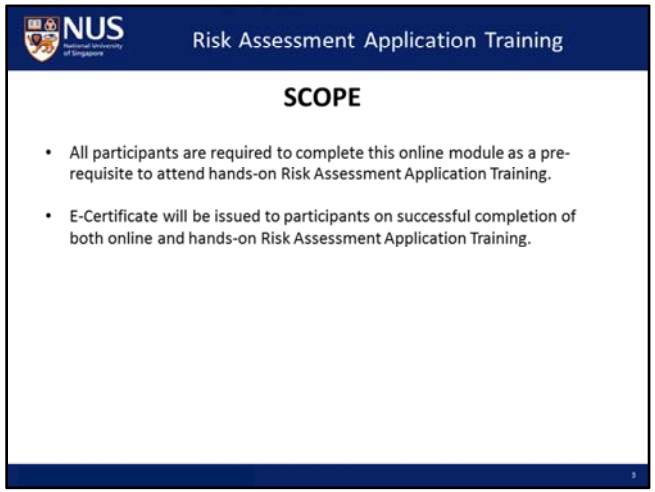
Welcome to Risk Assessment Application Training. In this Module we will be discussing on the concept of Risk Management and how to conduct risk assessment.



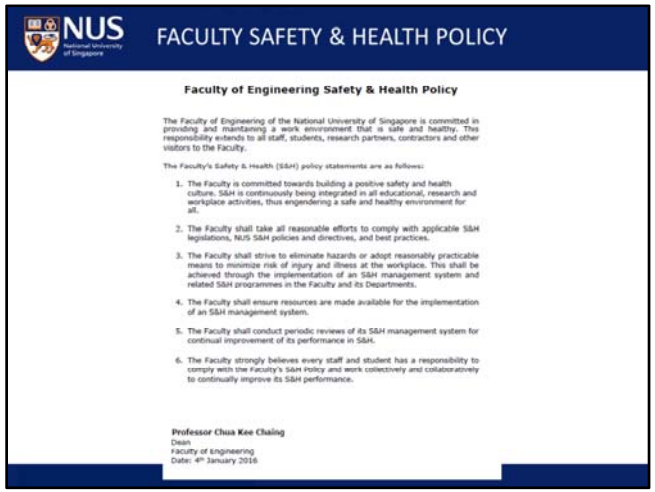
This training is for all Faculty of Engineering staff, postgraduate, project intensive FYP students, staff/students from other institutes/Faculties/centres working in Faculty of Engineering.
Those individuals who are involved in the establishing, implementing and maintaining safety management system.



This training is recommended for staff and students who are involved in conducting risk assessments for their laboratory activities.

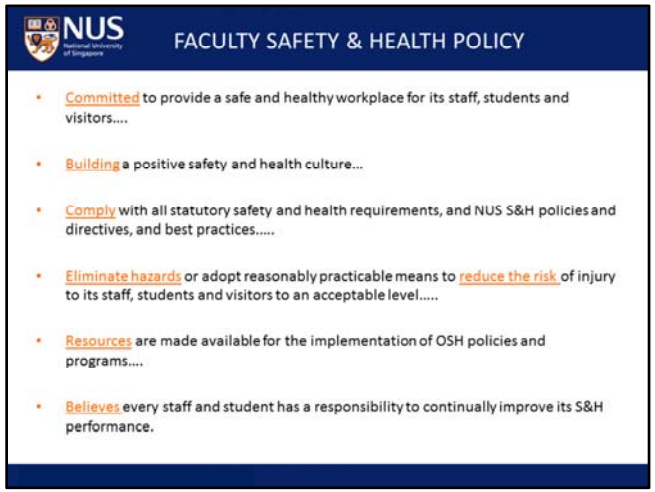
Safety leads are highly encouraged to attend this training.

Department Safety Coordinators are required to complete this online training as a pre-requisite before you attend the hands-on, train-the-trainer classroom “Risk Management for Laboratories & Workshops” training.

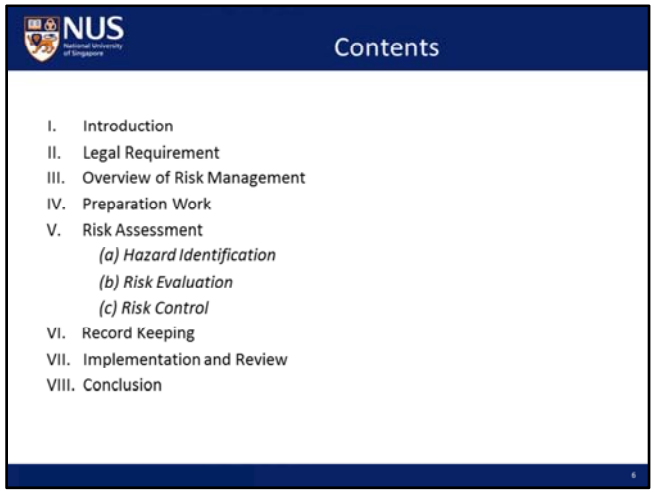


Faculty of Engineering Safety and Health Policy is signed by the Dean.

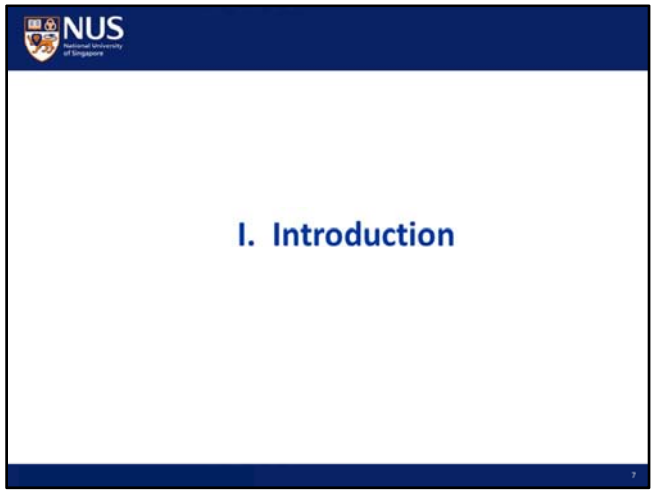
Generally, you may find the S&H policy posted on/near the entrance of laboratories/workshops.



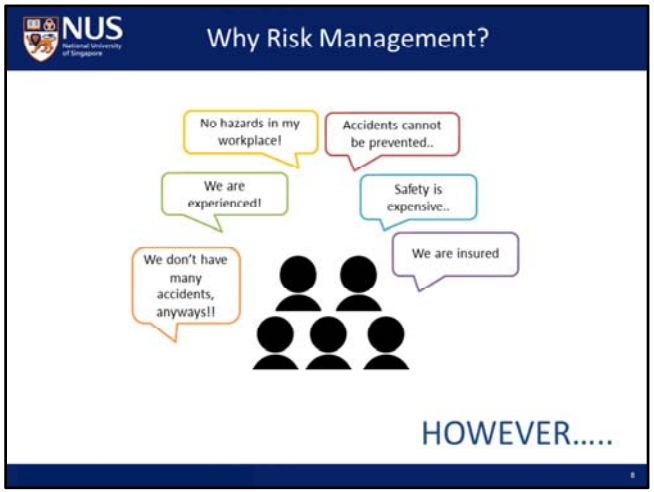
In summary, Faculty of Engineering Safety and Health Policy states
Faculty's commitment to provide a safe and healthy workplace for its staff, students and visitors….
Building a positive safety and health culture…
Comply with applicable statutory requirements, and NUS S&H policies and directives, and best practices…..
To eliminate hazards or adopt reasonably practicable means to reduce the risk of injury to its staff, students and visitors to an acceptable level…..
Faculty's commitment to ensure that resources are made available for the implementation of OSH policies and programs….
Every staff and student has a responsibility to continually improve its S&H performance.



The following topics will be discussed during this training.



Introduction



Common feedbacks from stakeholders but it is true? Let's take a look at the past accidents

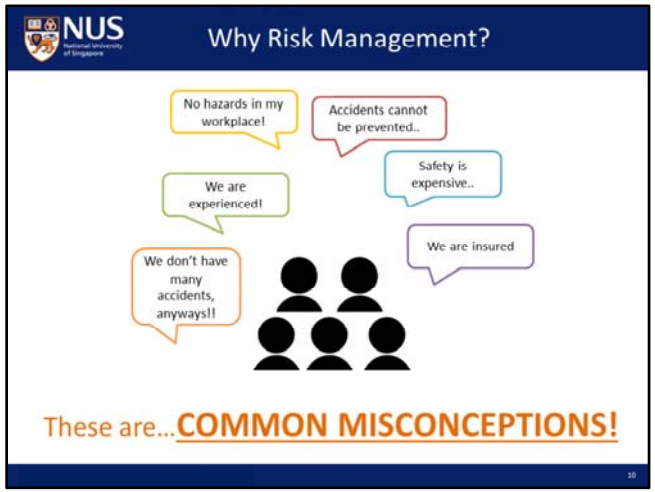
These are some of the laboratory accidents,

- Chemical fire in 2008
- Chemical explosion in 2010
- Hair caught by lathe machine om 2011

And other accidents which resulted in severe injuries and was fatal as well.

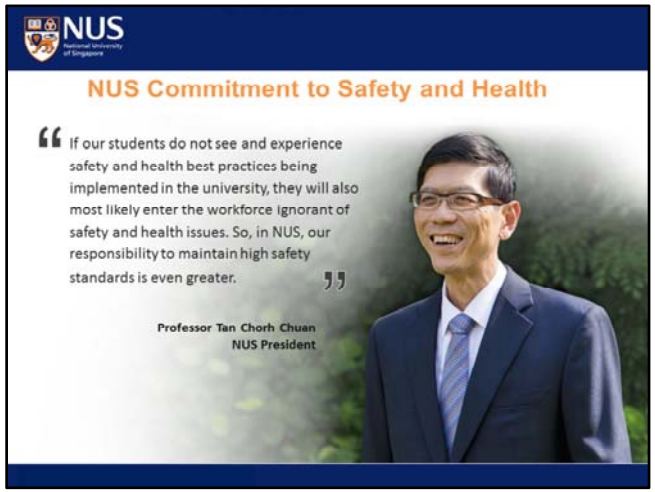
Slide 9

SG2 use more updated slides?
SG, 10/6/2016

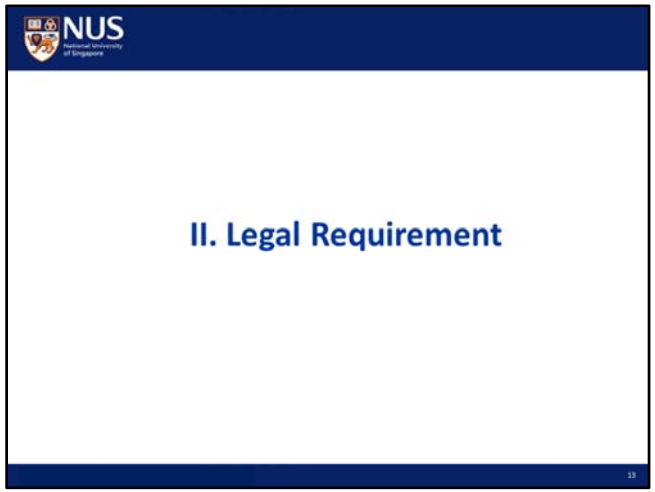


Revisit the feedbacks and do we still agree that it is true? Laboratory accidents do happen. Cases such as these are often reported in international media and could have a damning effect on the university's image. More importantly lab users are often injured in such cases and the extent of injuries may be severe.

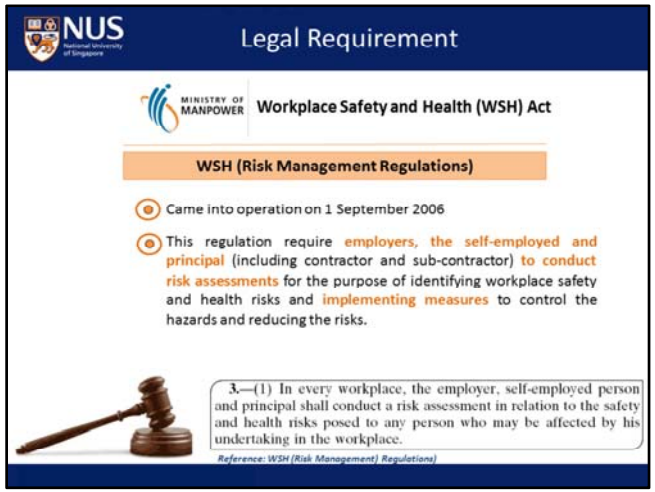
Risk management is important to,
- Prevent accidents & incidents
- Prevent injuries
- Assess the adequacy of control measures
- Assess if work process is safe
- Compliance with legal requirement



Accidents can be prevented through having the right mindset towards safety and health. Therefore in NUS, safety and health is embraced as one of our core values.
The importance of incorporating safety and health practices in our work is emphasized here by our senior management.
We would like you to embrace this safety culture, where everyone cares about safety, thinks about safety and behaves safely.

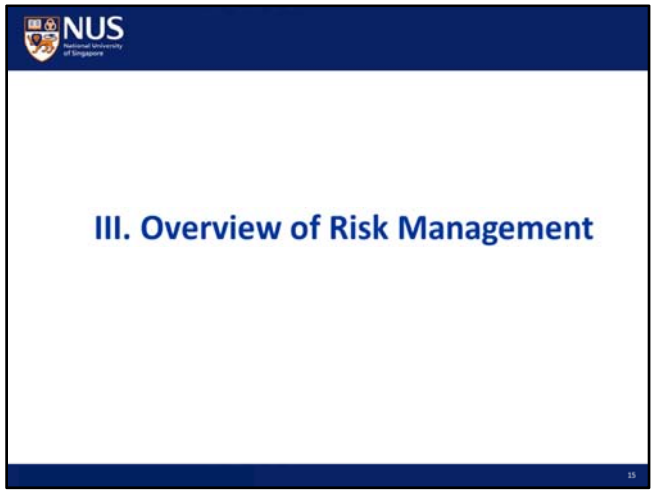


We will now go through the regulatory requirements for risk management.

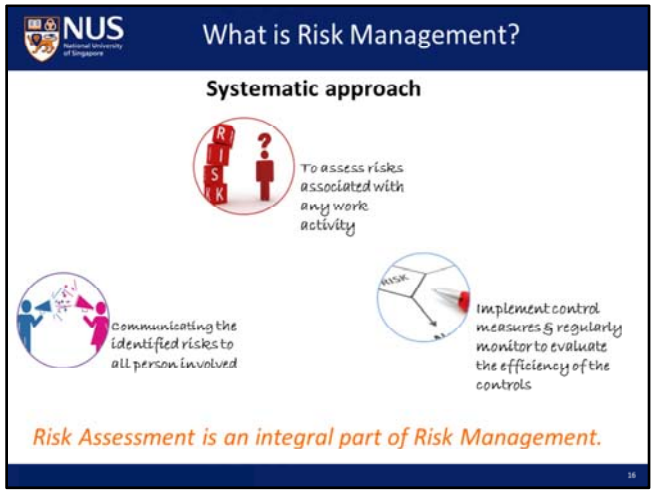


The Risk Management Sub –section under the WSH act came into effect on 1st September 2006,.

The WSH risk management regulations requires employer, self-employed person and principal to conduct a risk assessment in relation to the safety and health hazards at the workplace.



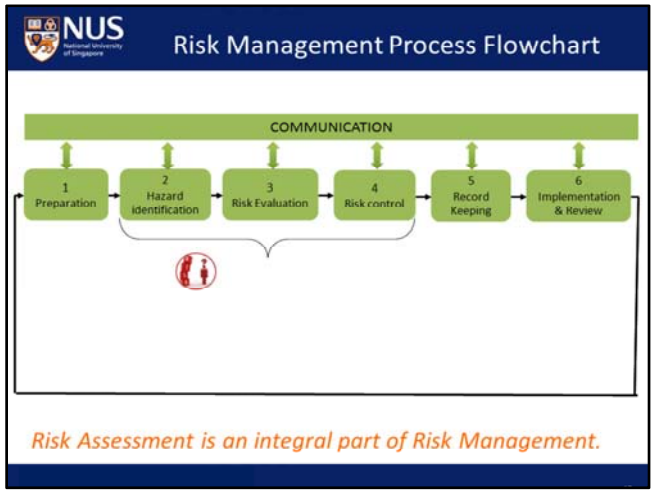
In this section, we will go through a brief overview of risk management.



Risk management is a systematic approach to,

- Assess the risks associated with any work activity (Risk Assessment)
- Communicating these risks to those involved
- Lastly to implement these controls and regularly monitor such risks

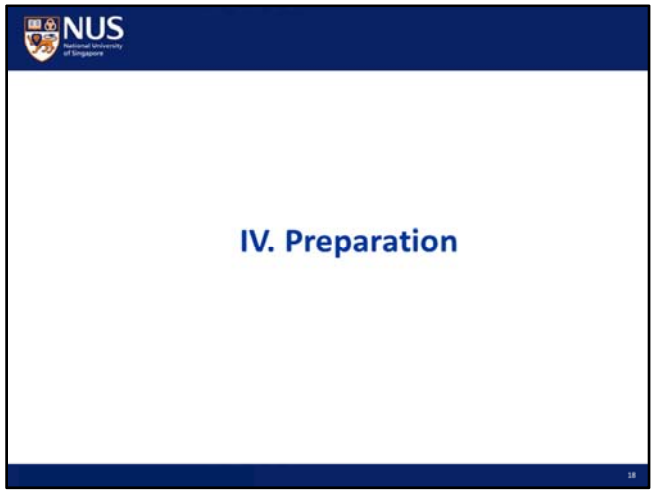
As you can see here, Risk assessment is an integral part of Risk Management.



In this slide you can see the risk management process flowchart.

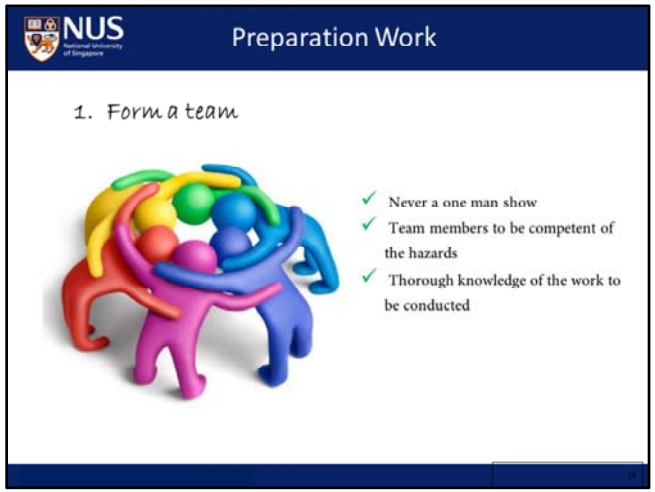
The various stages of risk management are:
- preparation,
- hazard identification,
- risk evaluation
- risk control
- record keeping
- implemention & review
- importantly, communication is required at all stages.

Hazard identification, risk evaluation and risk control portions of the risk management process flow can be referred to as the risk assessment.

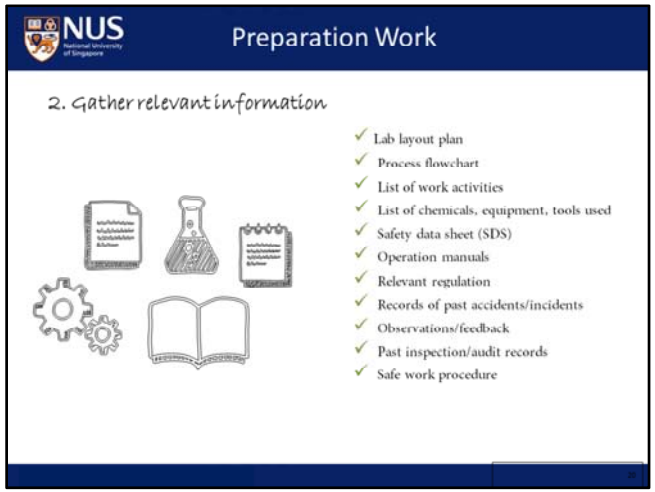


“Preparation is the key to success.” ~ Alexander Graham Bell.

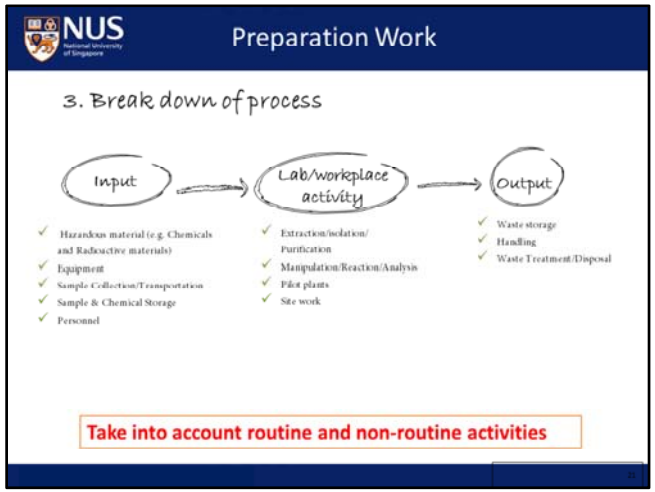
In this section, we will see how and what to prepare for conducting risk assessment.



Conducting risk assessment is never a one man show. First step is to form a team with members who are, Competent and are familiar with the processes.
This may include PI and the team members who have thorough knowledge of the work to be conducted.



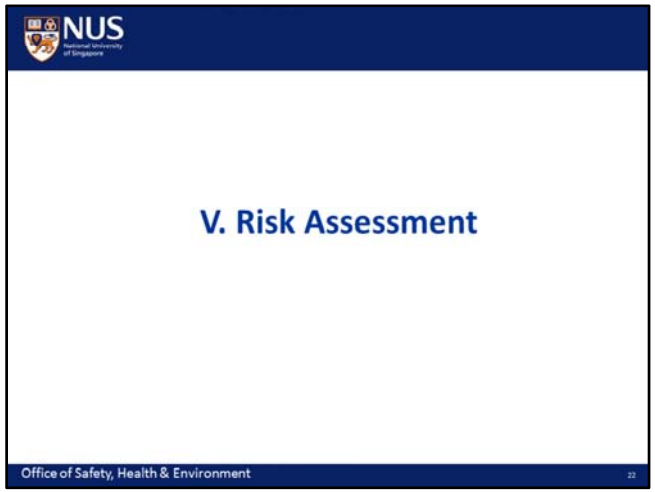
Once you have formed the team, gather relevant information about the process/activity.
These are some examples of information that you may require prior to conducting a risk assessment:
-Lab layout plan
-Process flowchart
-List of work activities
-List of chemicals, equipment, tools used
-Safety data sheet (SDS)
-Operation manuals
-Relevant regulation
-Records of past accidents/incidents
-Observations/feedback
-Past inspection/audit records
-Safe work procedure



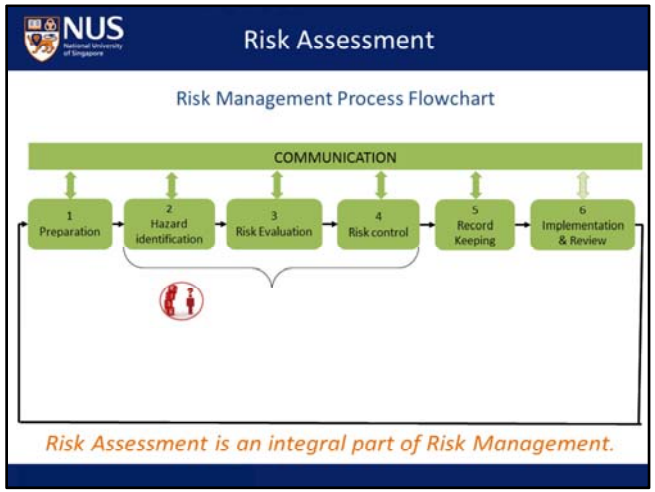
Break down each process/procedure into successive tasks.

The RA team should have a cradle to grave approach of the procedures. They should consider the hazards of all the material/equipment/processes inputs, the procedures itself and its resultant outputs such as waste and how the waste should be treated.

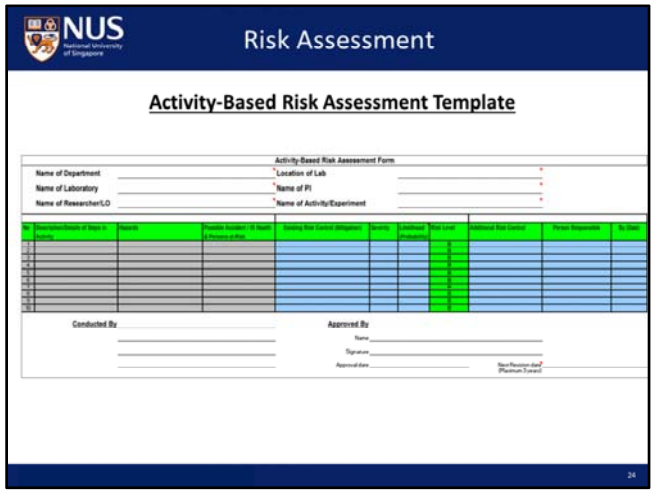
If the tasks are made too general, specific operations and related hazards may be missed.
Too many tasks may make the Risk Assessment impractical. As a Rule of Thumb: Most experiments can be described in less than 10 tasks, normally 6 – 8 tasks.



We have done the necessary preparation, now let's see how to conduct risk assessment.



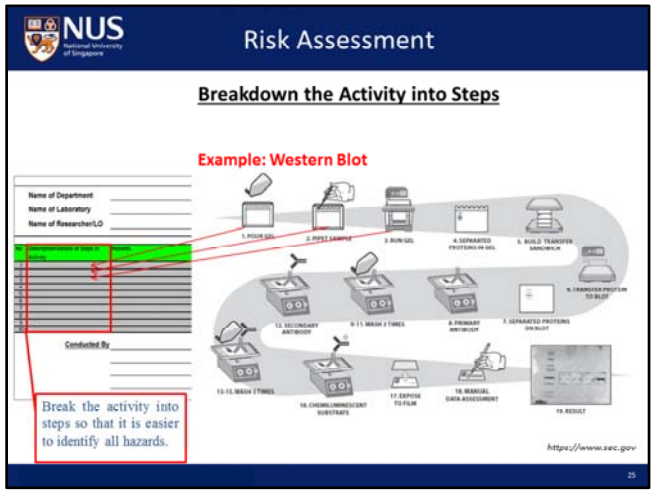
Risk Assessment is the process of
- identifying safety and health hazards associated with work, (Hazard Identification)
- assessing the level of risks involved, (Risk Evaluation)
- prioritizing measures to control the hazards and reduce the risks (Risk Control)



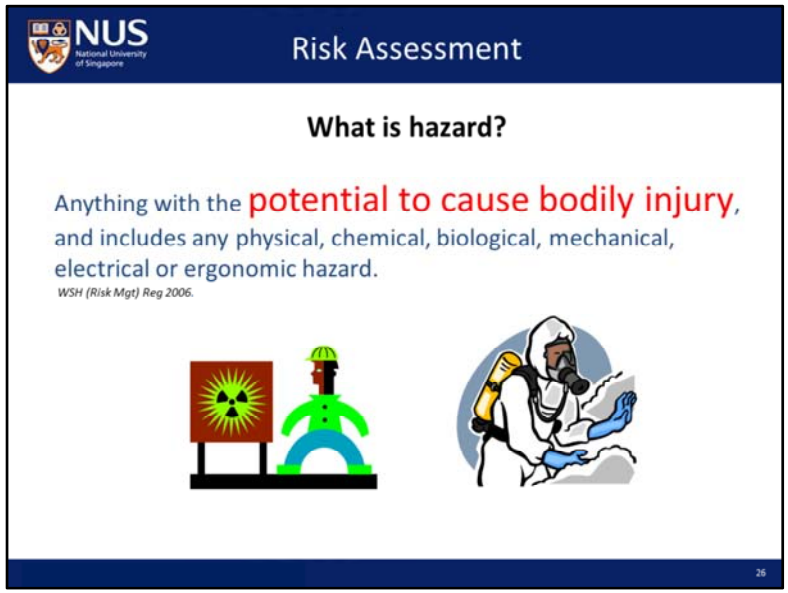
Hazards can be identified based on the

Activity-based;
Trade-based;
Project-based;
Procedure-based;
Equipment-based;
Material-based;
Location-based

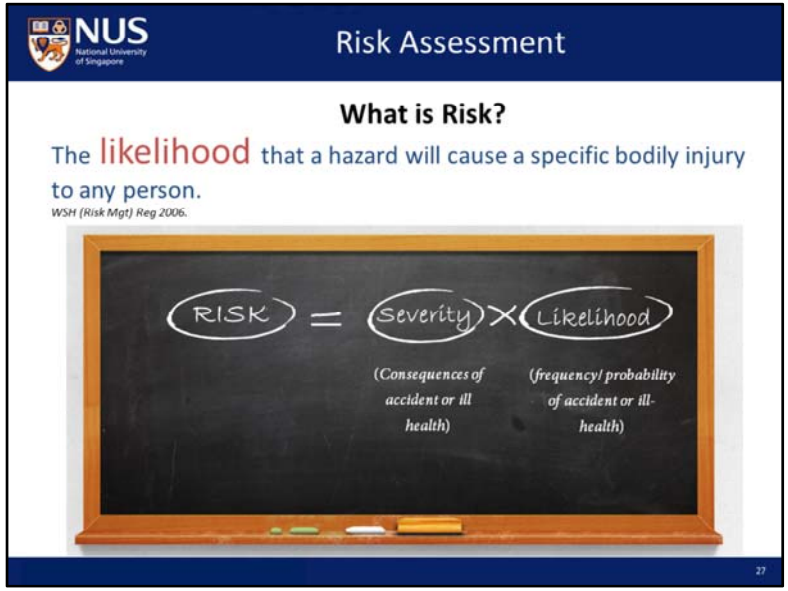
In NUS, activity and equipment based risk assessments are most most common.



The first thing you will need to do is to breakdown the entire procedure that you are assessing into its component steps. For example, if you are conducting an experiment involving western blot, you start by pouring a gel, after which you pipette the sample into the gel before you perform electrophoresis with a gel tank. By breaking the activity into its components, you are able to then proceed to identify the hazards that are associated with each of these steps.



Hazard is anything with the potential to cause bodily injury. It may be physical, chemical, biological, mechanical, electrical or ergonomic hazard.

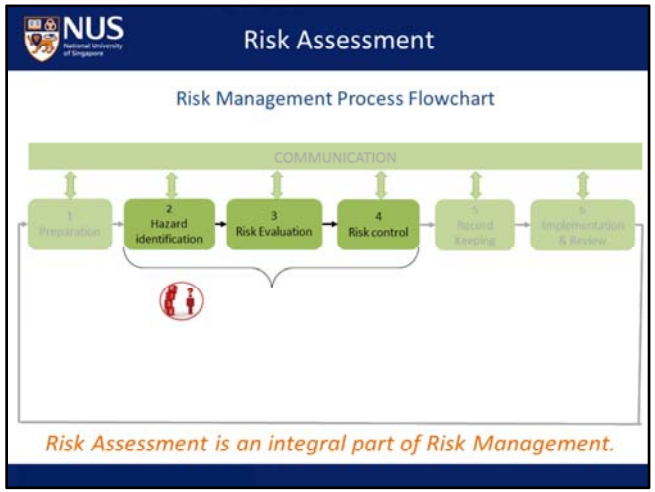


Risk is the degree or extent of injury or harm caused by hazard, or as a result of an accident.

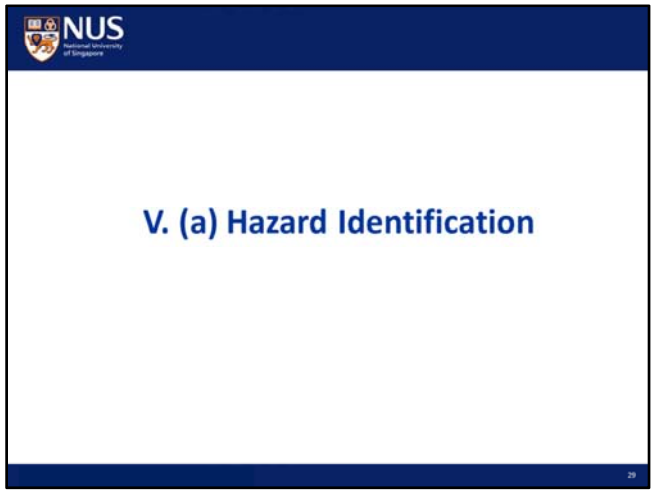
Risk evaluation is the process of estimating the risk levels of the identified hazards and to see if the risks can be accepted.

Risk is measured in terms of consequence and likelihood of accident/ill-health.

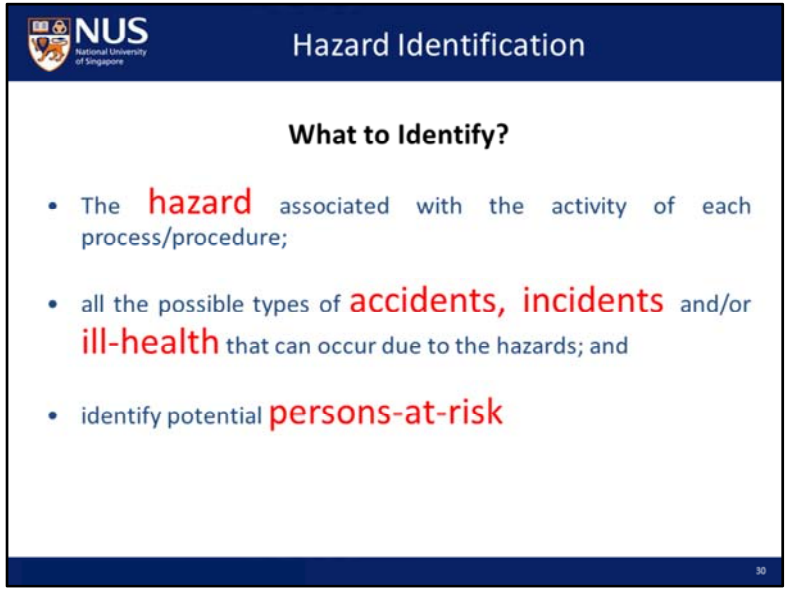
Risk level is used as a basis for prioritizing actions to control identified hazards and thereby, minimizing safety and health risks.



We now see in detail the main concepts of risk assessment.

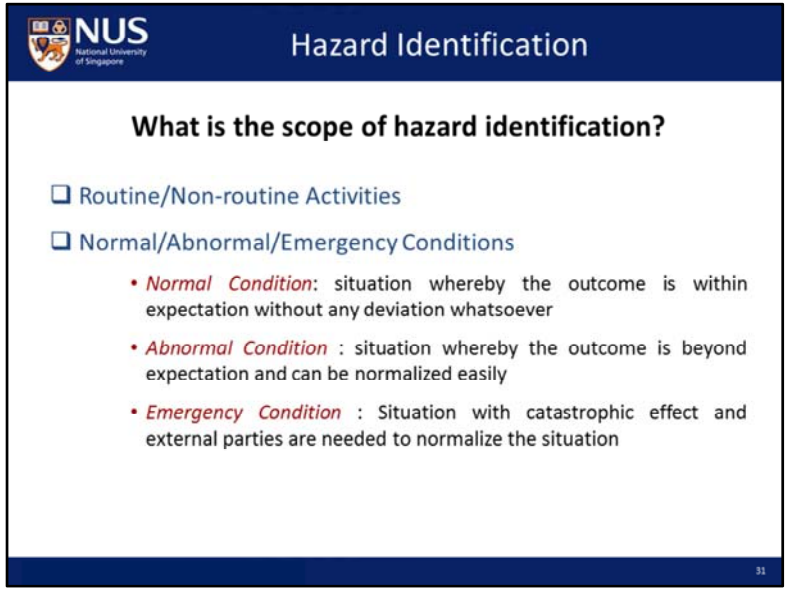


The first stage is hazard identification. Hazards can be controlled only if they are identified.



The RA team should strive to identify foreseeable hazards associated with the activity/process or procedure

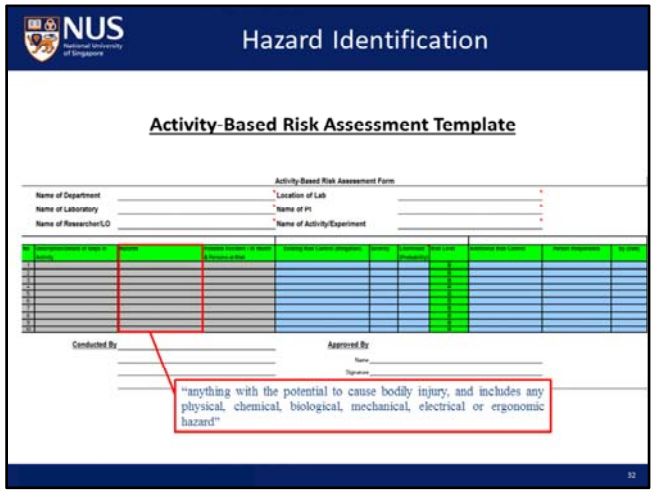
all the possible types of accidents, incidents and/or ill-health that can occur due to the hazards; and identify potential persons-at-risk



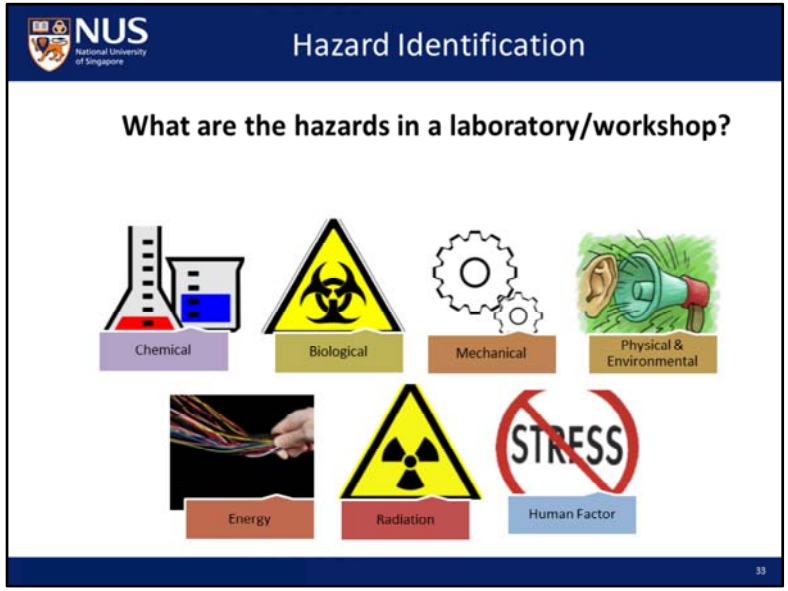
Scope of hazard identification has to be include:

Routine/Non-Routine activities
Non-routine activities would include start-up and shut-down activities.

Normal/abnormal/emergency conditions
The RA team should also include the conditions these activities can give rise to such as Abnormal and emergency conditions.

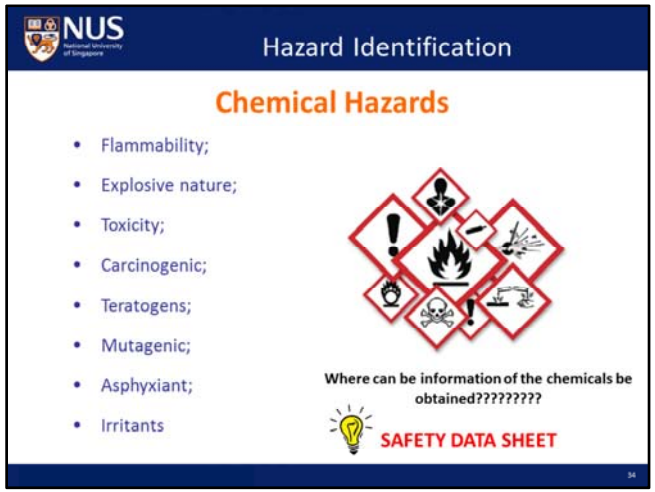


As you can see in this slide, hazards are identified for each tasks and will be filled in the "Hazard" column.



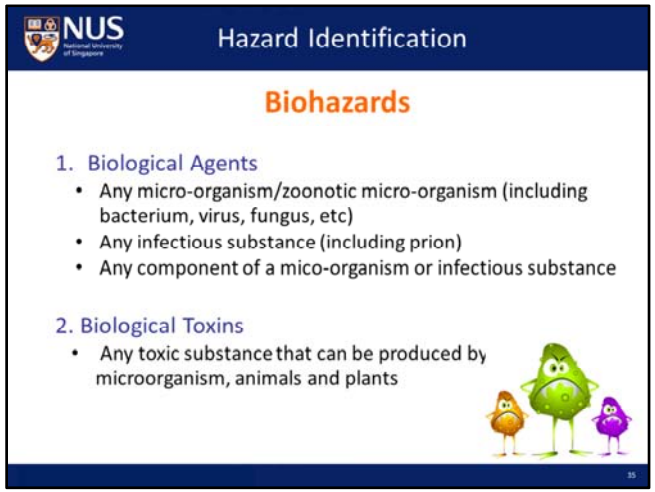
There is a plethora of hazards in the laboratory. Some of these are obvious while some are not so. It is important that they are all identified.
Generally, these hazards can be found in the laboratory/workshop:

-Chemical
-Biological
-Mechanical
-Physical
-Environmental
-Energy
-Radiation
-Human factor

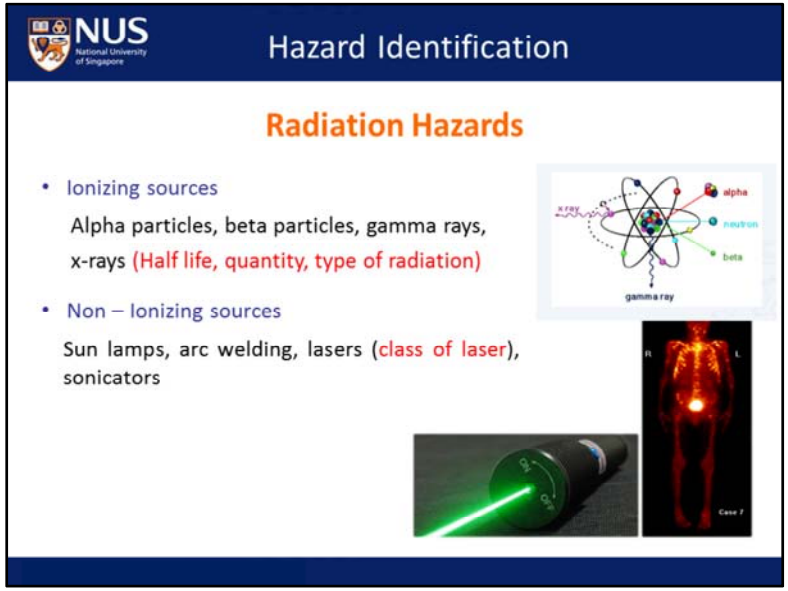


One should consult the safety data sheets (SDS) for the chemical properties of the chemicals used. The SDS will identify precautionary measures to be taken while handling, using, storing and disposing of the chemical.

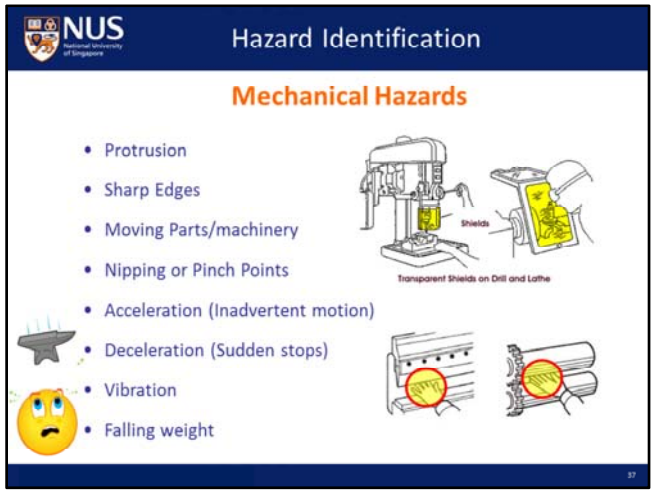
Example: Contact with Corrosive Sulphuric Acid when aliquoting acid to small containers



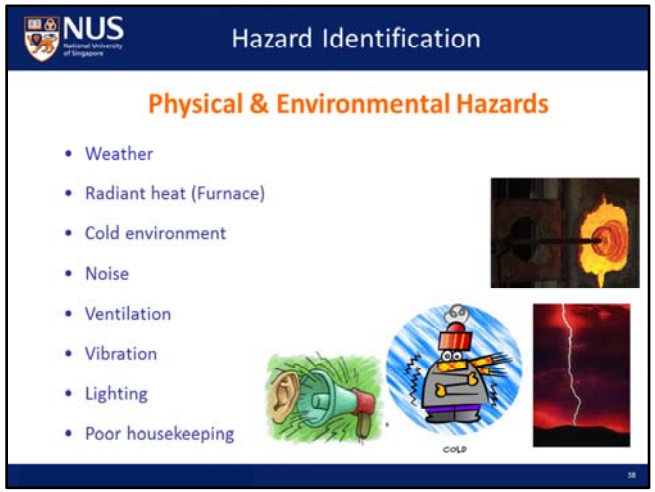
Biohazards are broadly defined as biological agents and toxins that have the potential to cause harm to humans, usually in the form of infections. These include zoonotic microorganisms that can be transmitted between species from animals to human



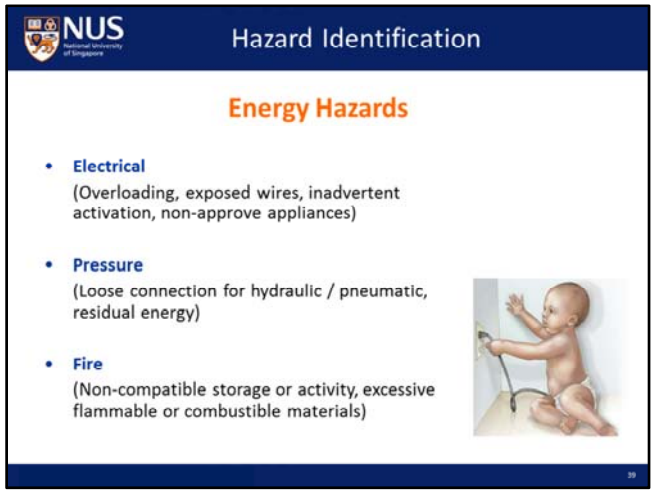
As for those working with radioactive materials, there are two groups of sources, ionizing and non-ionising. For ionizing sources we need to take into consideration the half life, quantity, type of radiation. For non ionizing sources such as lasers, we look at the wavelength of the laser, etc



These are some examples of the most common mechanical hazards. If you could recall the incident sharing at the beginning of this training, the accident where student's hair was caught in the moving parts of the machinery, is an example of mechanical hazard.

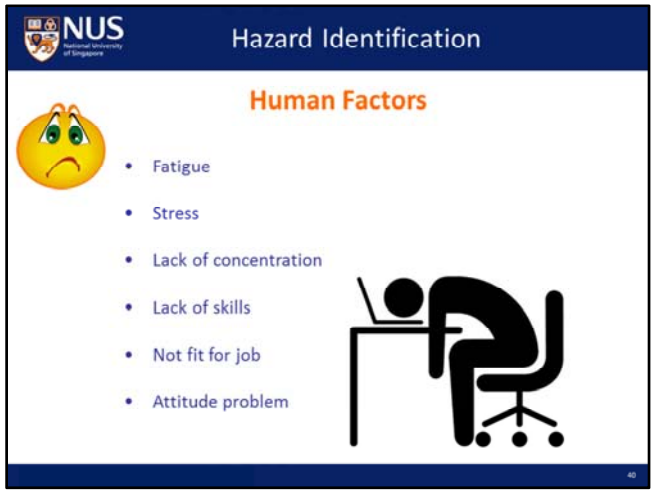


Physical and Environmental hazards include:
Extreme temperatures/weather conditions such as
-Heat or cold
-Noise
-Ventilation
-Vibration
-Lighting
-Poor housekeeping

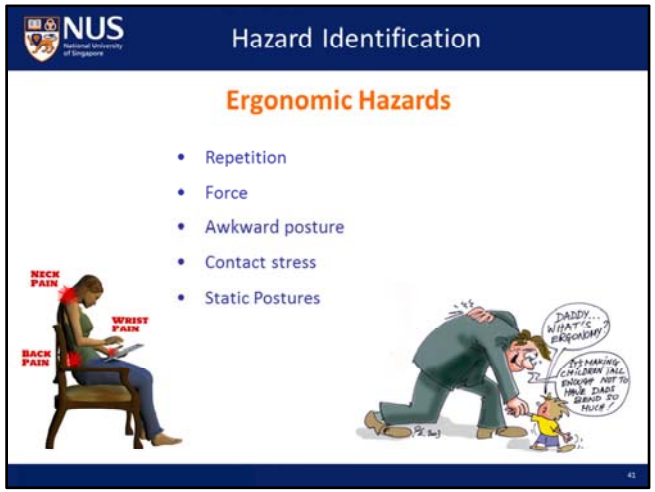


There are different types of energy hazards, it may include:
-Electrical
-Pressure
-Fire

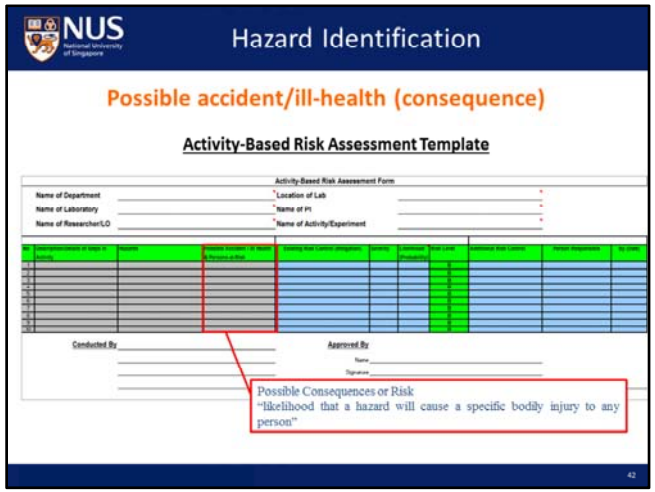
For example: Exposure to energized electrical component when switching on apparatus is an electrical hazard.



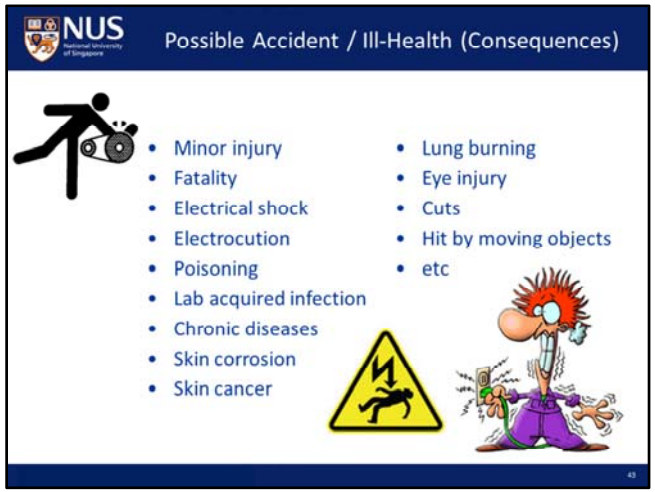
It is important to consider human factors in risk assessment as they could compromise the health and safety of employees. Example: Employees who are on drowsy medication are not as alert, hence it would be dangerous if they were to operate machinery or equipment.



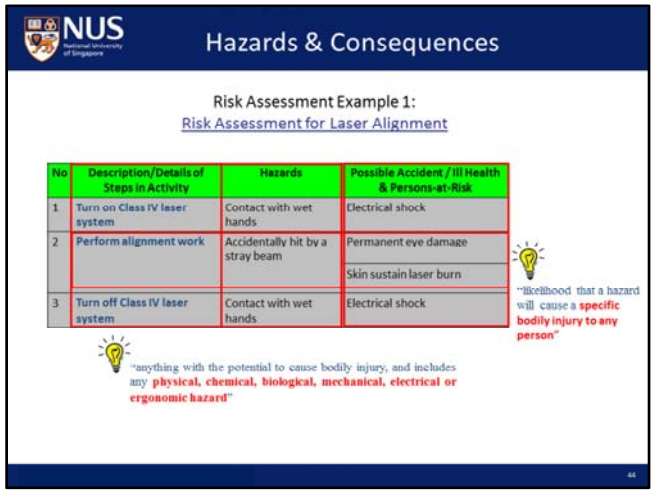
Ergonomic hazards: Occur when the type of work, body positions and working conditions put strain on your body.
Example: Lifting heavy load or frequent lifting may result in back injury.



After you have identified the hazards, list the consequence or ill-health that may arise due to the hazards.



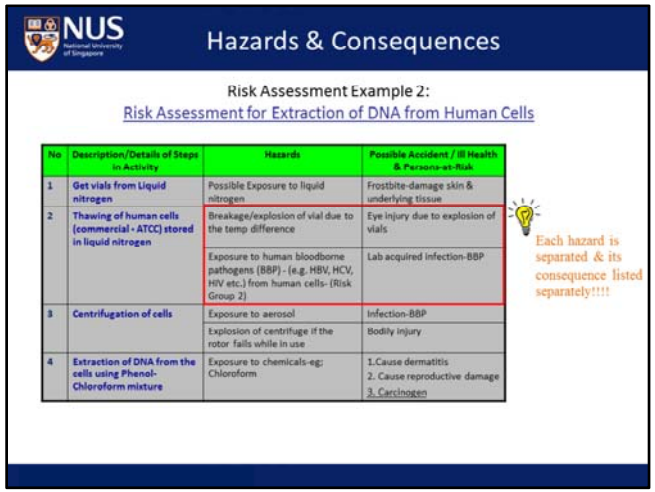
The different hazards identified previously may result in accidents or ill health if they are not controlled. These are some examples of possible accident and ill health resulting as a consequences of hazards.



In this example the RA team is trying to identify the hazards for laser alignment procedure and the potential accident or ill-health for each hazard.

Note that they have broken the procedure into 3 successive task.

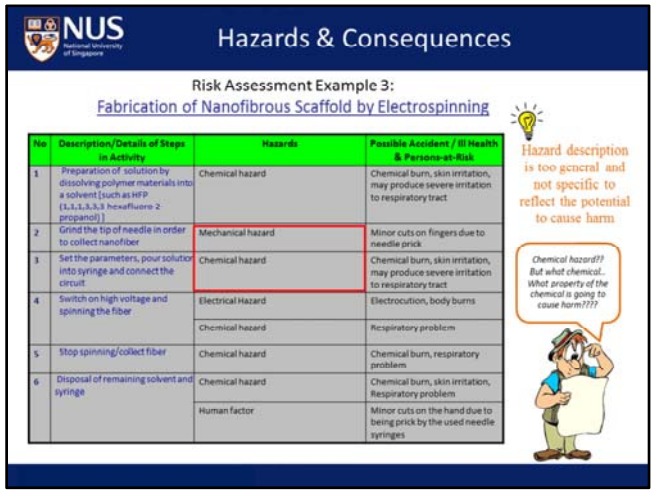
In each task, the team has identified the hazards associated with the task. Note that some hazards may have more than one possible accident or ill-health associated with it. For example in Task 2, while performing alignment work, hazard of being accidentally hit by a stray beam may cause permanent eye damage and also laser burn.



This is an example for the identification of hazards for the extraction of DNA from human cells

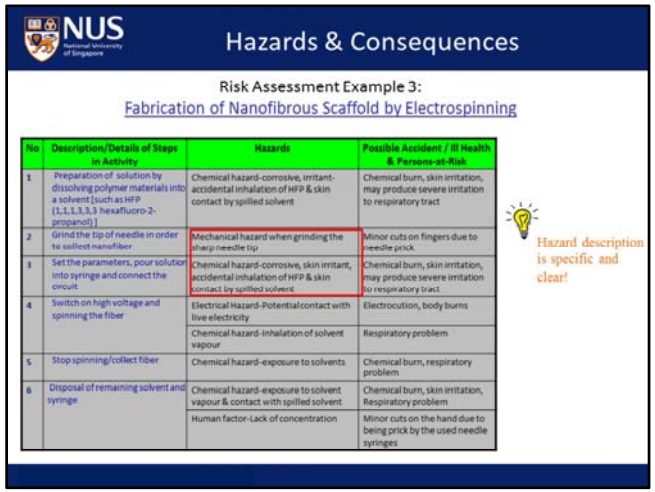
Notice that there could be more than one hazard associated with a particular task.

In this example, the lab members conducting the RA have separated the hazards in different rows. This is to facilitate the identification of controls later on in the process.



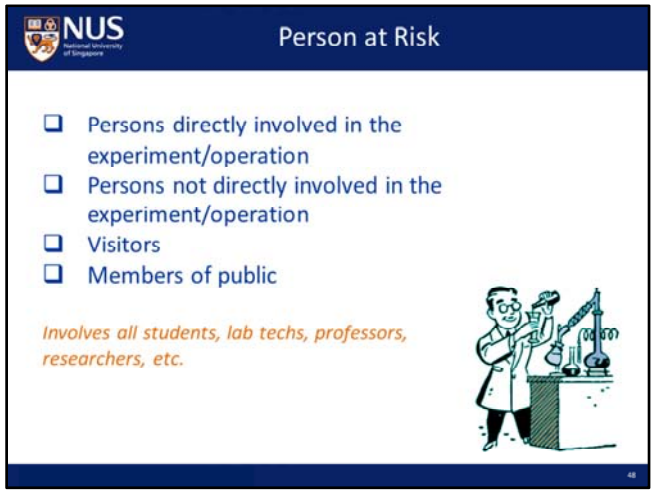
This is an example for the identification of hazards for the Fabrication of Nanofibrous Scaffold by Electrospinning.

If you take close look, you can hazards mentioned are too general to reflect the potential to cause harm.



Now, take a look at this RA for the same activity, Fabrication of Nanofibrous Scaffold by Electrospinning.

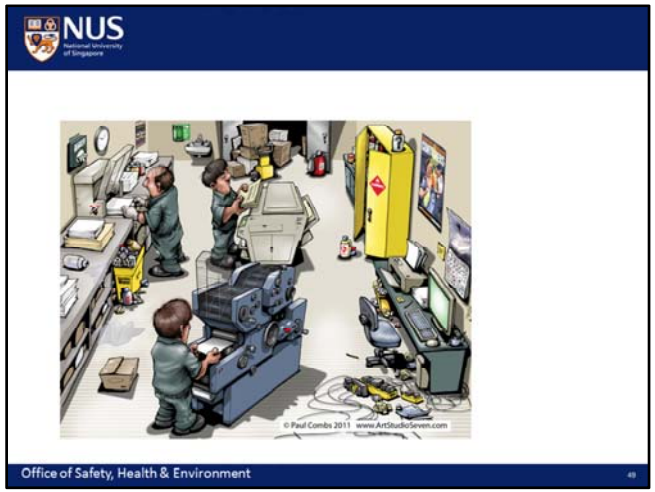
Hazard description is specific and clear.



The Risk assessment must also be able to identify the persons at risk.

The persons at risk can be anyone, directly or indirectly involved with the experiment. This may include visitors, contractors, cleaners or even members of the public

We recommend that all lab members are involved while conducting the Risk assessment.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Hazard Identification – Exercise

Can you spot the hazard?

Chemical hazard
– Incompatible chemicals i.e. Oxidizer and flammable chemicals stored together

Hazard Identification – Exercise

Can you spot the hazard?

Electrical Hazard
- Overloading of extension cord

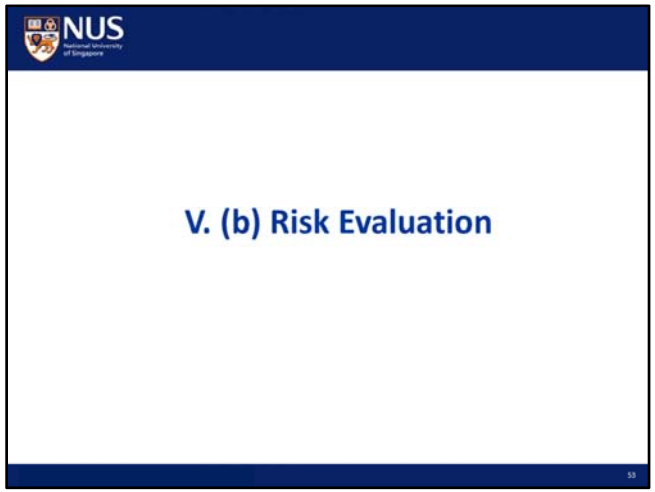
51

Hazard Identification – Exercise

Can you spot the hazard?

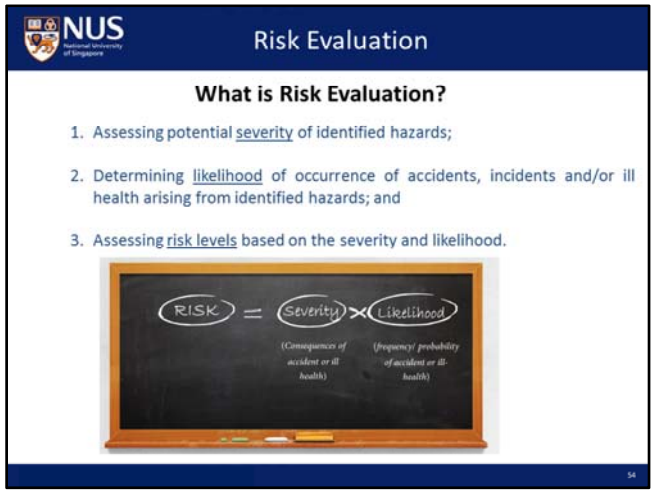
Slip, Trip and Fall Hazard

52

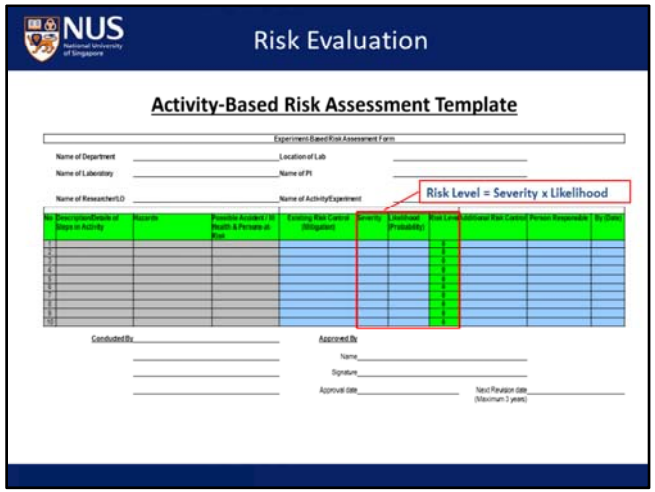


Next stage will be to evaluate the risk.

Let's see in detail about risk evaluation.

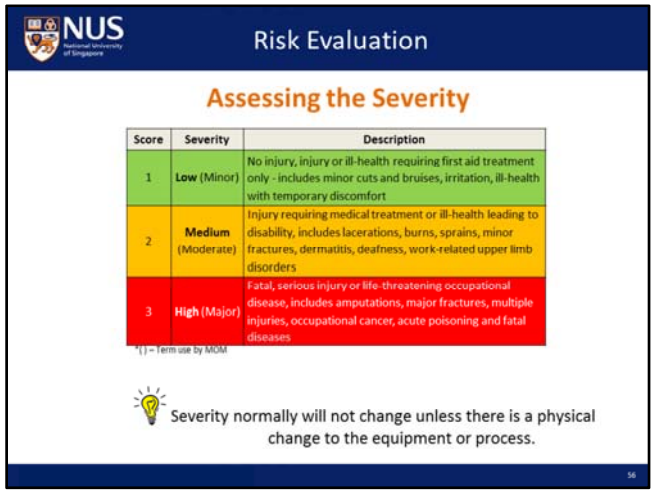


Risk evaluation is a process of:
- Identifying the existing control measures
- Assessing the potential severity
- Assessing the likelihood
- Determining the risk level



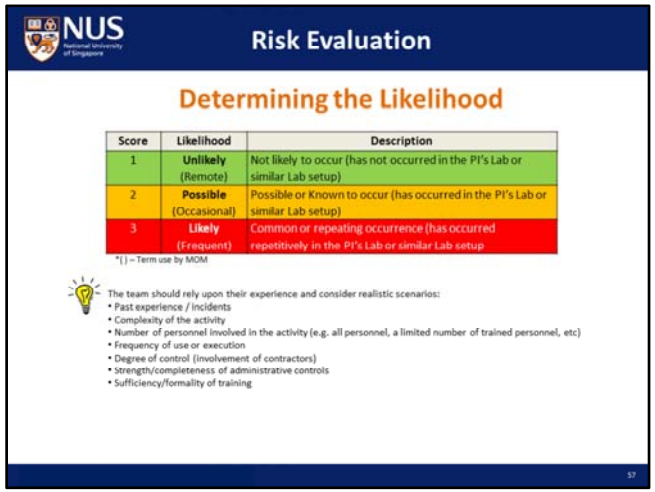
Risk in this essence is the product of Severity multiplied by Its likelihood.

This will only be possible when a quantitative entity is given to the degree of severity as well as likelihood.

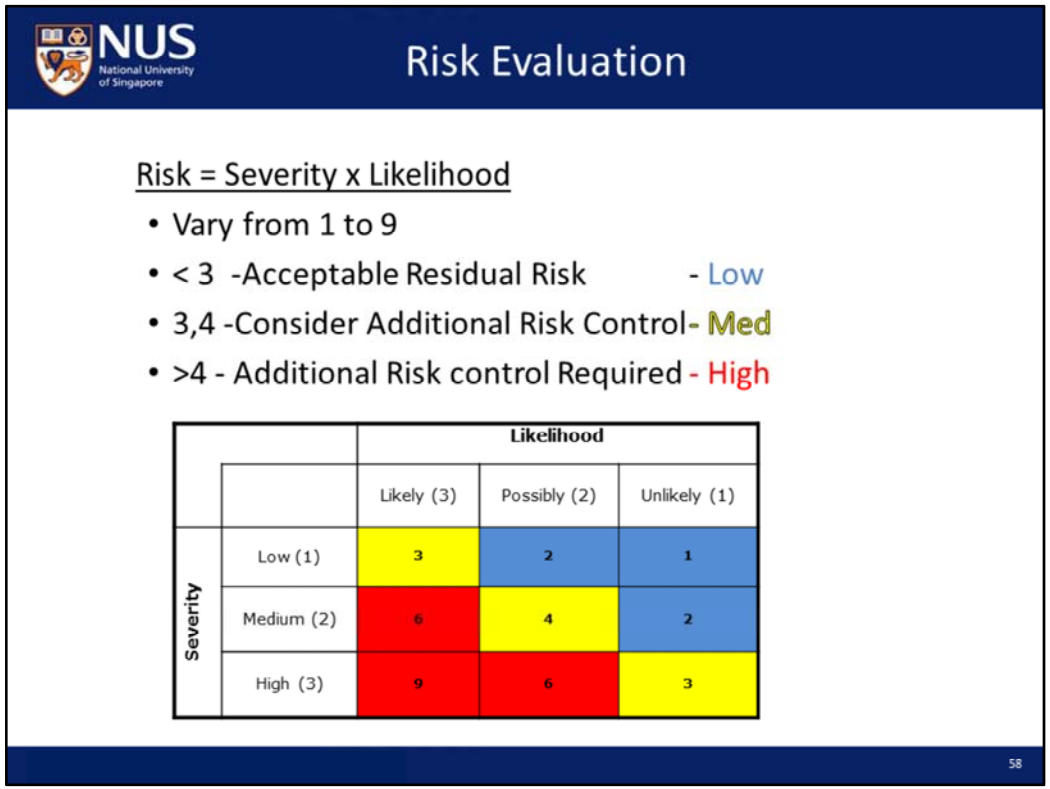


The assessment of severity can be charted against this table.

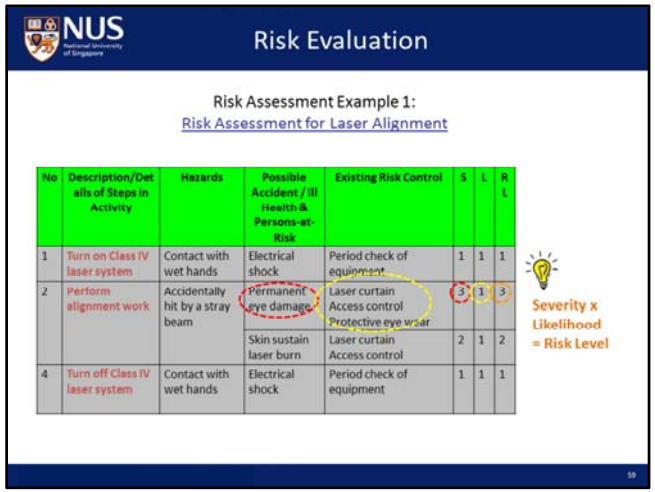
The lab should establish the reference for the assessment of severity so that the perception of the degree of severity between lab members can be normalized.
Here there are 3 different types of severity. Do note that each of the degree of severity is given an quantitative number.
The classification of the degree of severity seen here is from low severity to high severity.
Accidents leading to no injury, minor cuts and bruises as well as irritation can be ranked as that of a low severity with a score of 1
Accidents requiring requiring medical treatment or ill-health leading to disability, includes lacerations, burns, sprains, minor fractures, dermatitis, deafness, work-related upper limb disorders can be classified as medium severity level with a score of 2
And finally accident that may cause permanent disability of are fatal can be classified as High severity with a score of 3.



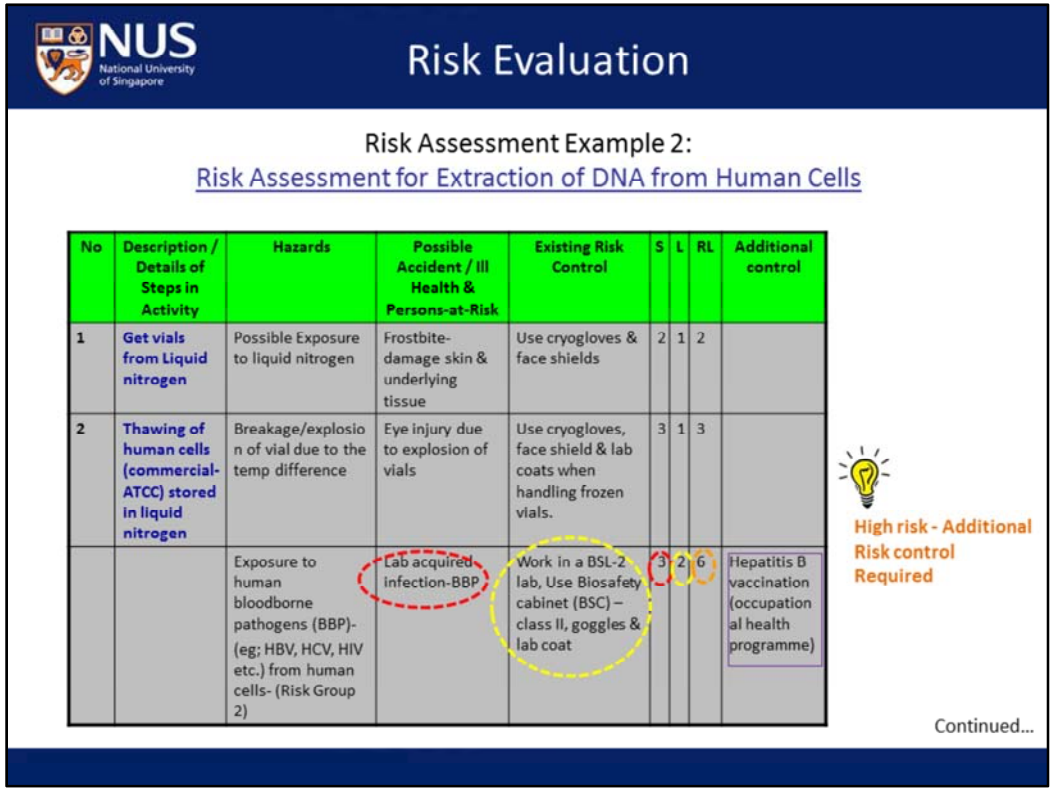
Similarly to severity, the likelihood of the accident occurring can be classified into 3 categories.
1 being unlikely, and 3 being very likely to happened.
PI should take into consideration the prevalence of a particular type of accident happening not only in his lab but also in NUS.
For example, if a needle stick injury has never occurred in a PI's Lab, he may rate the lilkelihood as unlikely, however, in NUS, the likelihood of getting a needle stick injury is very likely. In this case, the PI will have to re- assess the likelihood of a needle stick injury taking into consideration the statistics campus wide.



Once a quantitative value have been established for severity as well as likelihood, the risk level can be identified.
In this table.
Risk level lower that 3 is considered acceptable low risk.
Risk level between 3 and 4 is considered medium risk, additional risk control may be identified but it is not mandatory
Risk level exceeding 4 is considered as high risk. PI must identify additional risk control to reduce the risk level to at least that of moderate risk before carrying out the experiment. No one can conduct the task if any high risk level is identified.

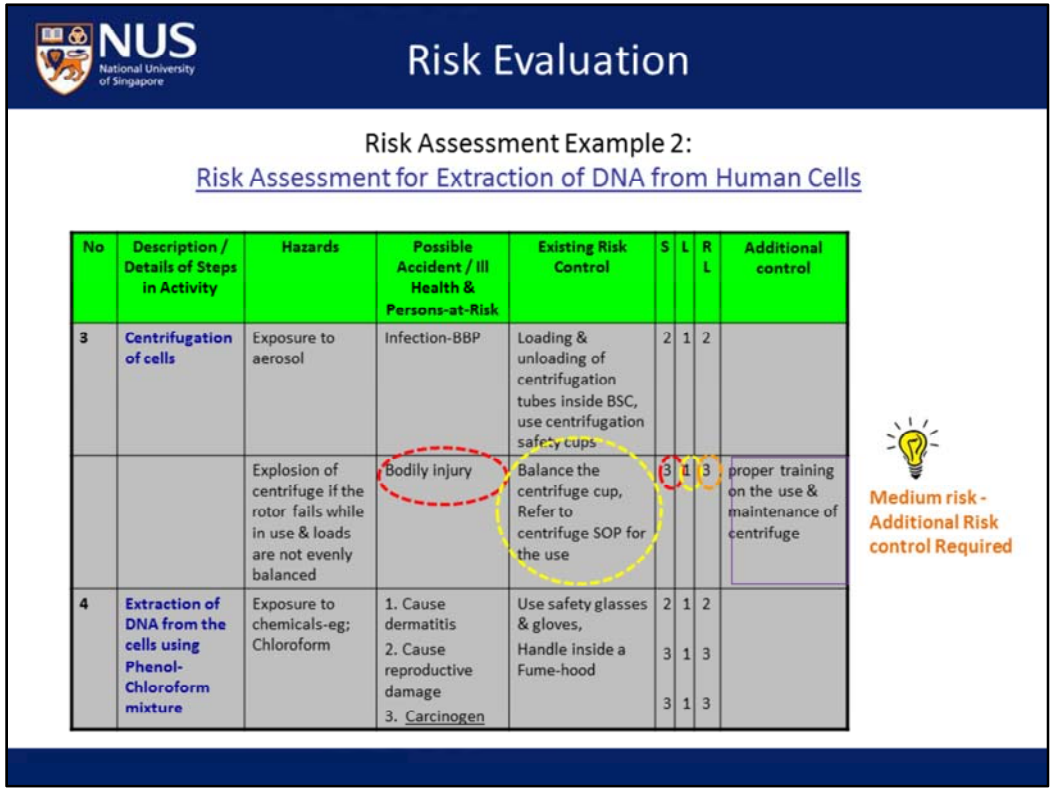


Do note that by using the risk matrix, the RA team proceeded to identify the severity and likelihood rating for each hazard identified after existing control measure have been implemented.
The risk level for the particular task is then calculated by multiplying the Severity against the likelihood.
For the task number 2, Performing alignment work, the hazards identified are accidentally hit by a stray beam which may cause permanent eye damage and skin burn.
Please note that the severity level differs between the 2 possible accident.
Lab members are encouraged to clearly delineate the possible accidents as the severity or likelihood of these accident happening may vary.

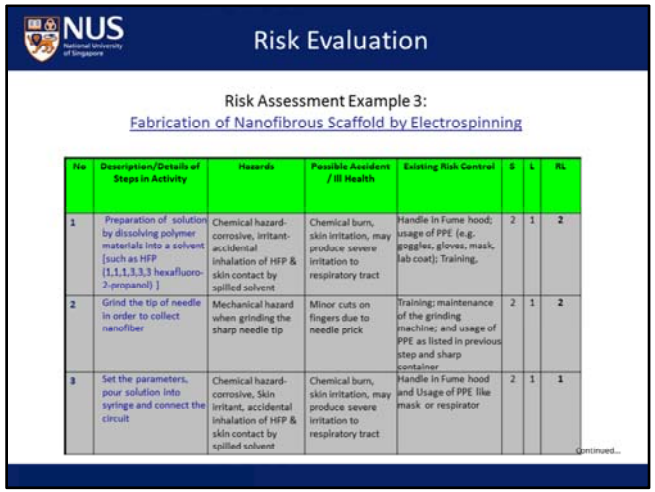


This is an example of a risk assessment of The extraction of DNA from Human Cells.

Severity is 6 for possible exposure to human blood borne pathogens. Hence, additional risk controls are required.



In the same risk assessment, the risk level for possible explosion of centrifuge if rotor fails, is 3 which is medium risk. Hence, additional risk controls can be considered.



Risk Evaluation

Risk Assessment Example 3:
Fabrication of Nanofibrous Scaffold by Electrospinning

No	Description/Details of Steps in Activity	Hazards	Possible Accident / Ill Health	Existing Risk Control	S	L	RL
1	Preparation of solution by dissolving polymer materials into a solvent [such as HFP (1,1,1,3,3,3 hexafluoro-2-propanol)]	Chemical hazard-corrosive, irritant-accidental inhalation of HFP & skin contact by spilled solvent	Chemical burn, skin irritation, may produce severe irritation to respiratory tract	Handle in Fume hood; usage of PPE (e.g. goggles, gloves, mask, lab coat); Training,	2	1	2
2	Grind the tip of needle in order to collect nanofiber	Mechanical hazard when grinding the sharp needle tip	Minor cuts on fingers due to needle prick	Training; maintenance of the grinding machine; and usage of PPE as listed in previous step and sharp container	2	1	2
3	Set the parameters, pour solution into syringe and connect the circuit	Chemical hazard-corrosive, Skin irritant, accidental inhalation of HFP & skin contact by spilled solvent	Chemical burn, skin irritation, may produce severe irritation to respiratory tract	Handle in Fume hood and Usage of PPE like mask or respirator	2	1	1

Continued...

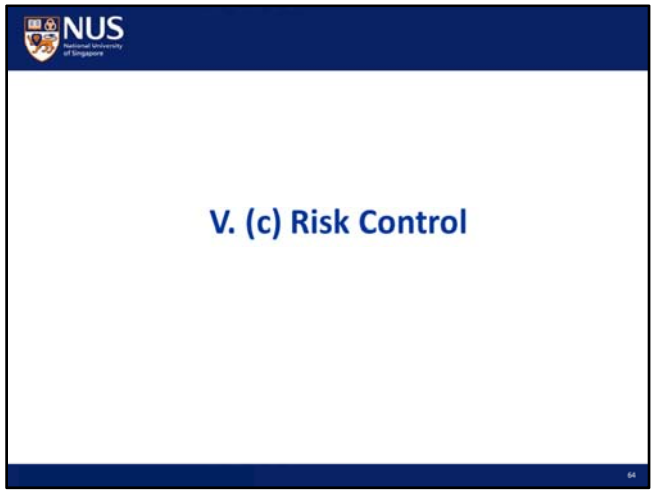
This is another example of RA, Fabrication of Nanofibrous Scaffold by Electrospinning where risk level has been evaluated.

Risk Evaluation

Risk Assessment Example 3:

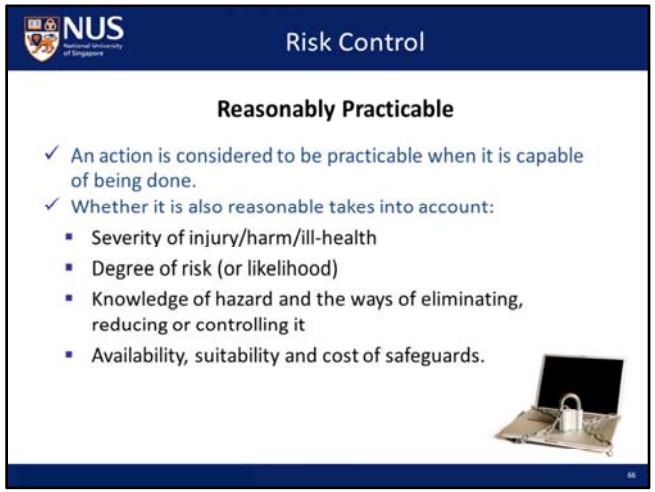
Fabrication of Nanofibrous Scaffold by Electrospinning

No	Activity	Hazards	Possible Accident / Ill Health	Existing Risk Control	S	L	RL
4	Switch on high voltage and spinning the fiber	Electrical Hazard-Potential contact with live electricity	Electrocution, body burns	Regular maintenance of the equipment; Attach warning sign near or on the equipment to remind people of the hazard.	3	1	3
		Chemical hazard-Inhalation of solvent vapour	Respiratory problem	Handle in Fume hood; usage of PPE like mask or respirator	2	1	2
5	Stop spinning/collect fiber	Chemical hazard-exposure to solvents	Chemical burn, respiratory problem	Usage of PPE; Leaving it in the fume hood for 20mins before collecting the fiber	2	1	2
6	Disposal of remaining solvent and syringe	Chemical hazard-exposure to solvent vapour & contact with spilled solvent	Chemical burn, skin irritation, Respiratory problem	Usage of PPE, Leaving it in the fume hood overnight; store in special container: disposal is later done by licensed collector	2	1	2
		Human factor-Lack of concentration	Minor cuts on the hand due to being prick by the used needle syringes	Stored used syringe in special container until final disposal	1	2	2

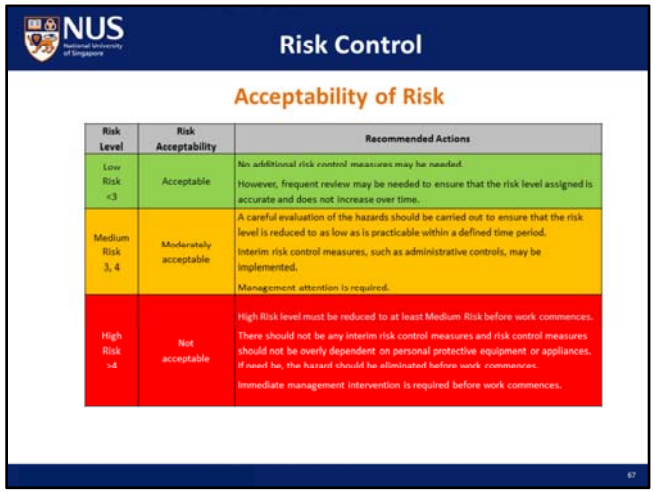


Now let's take a look at risk control measures.

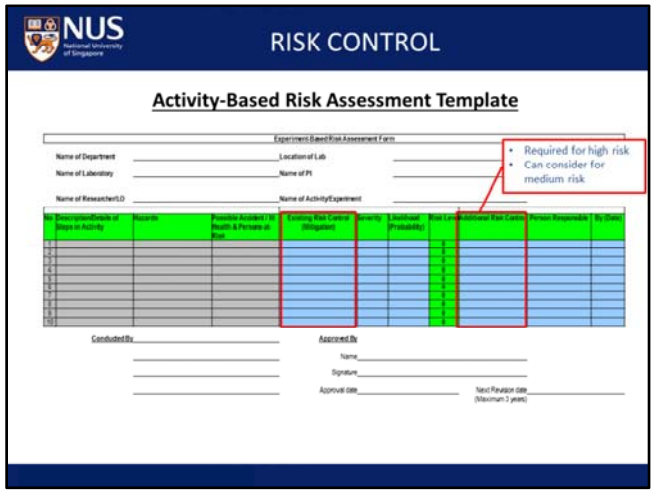
1. Identify all reasonably practicable measures by eliminating or reducing the risk level.
2. Implement the control measures.
3. Review continually to ensure their effectiveness.



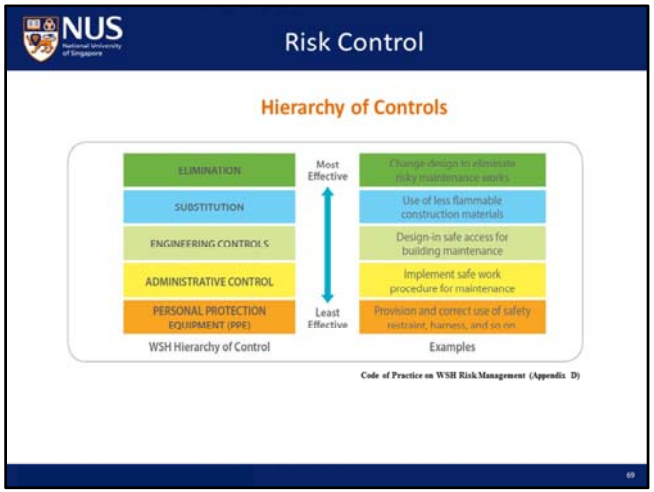
- An action is considered to be practicable when it is capable of being done.
- To determine whether it is reasonable take into account the following:
- Severity of injury/harm/ill-health
- Degree of risk (or likelihood)
- Knowledge of hazard and the ways of eliminating, reducing or controlling it
- Availability, suitability and cost of safeguards



- Based on the risk level, select additional risk control measures to reduce the risk level to an acceptable level.
- When the risk level is High, implement effective and practicable risk control to bring down the “High Risk” to at least “Medium Risk”.
- Please note that all high risk tasks are not to be conducted until the risk level is reduced to that of an allowable or tolerable level.



Fill in the additonal risk controls for high risk and can be considered for medium risk.



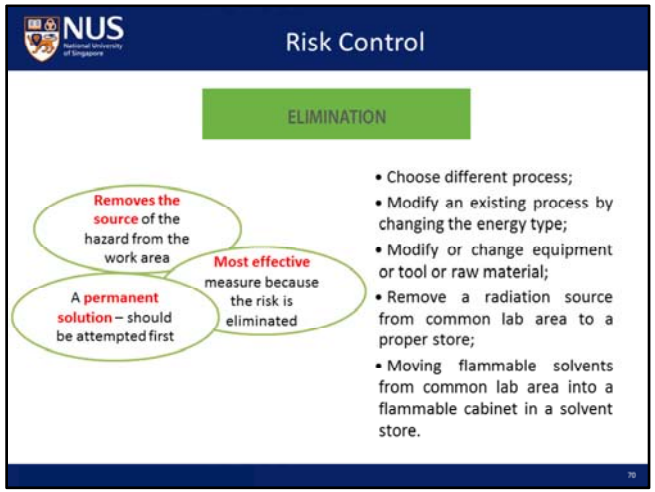
While selecting appropriate controls, Pis and lab members should take a methodical approach.

One should consider the hierachy of controls to sleect an appropriate controls for the hazards identified.

Should a hazard be present, one should try to best eliminate it or substitute it with something less hazardaous.

Should neither elimination nor substitution is possible, An enginnering control should be selected instead followed by administrative control and then finally Personal Protective Equipment.

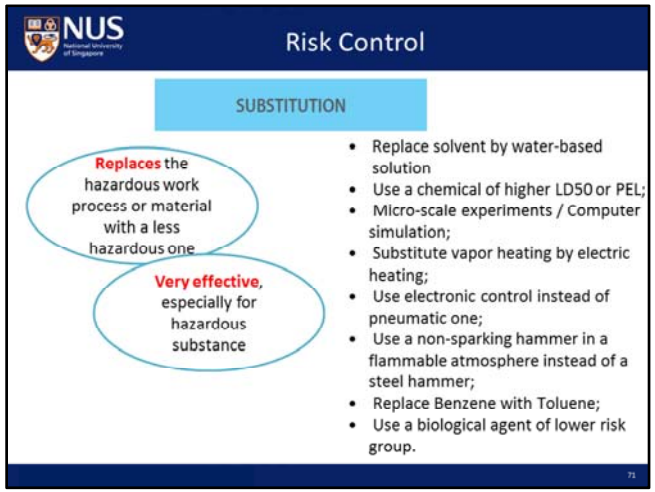
Please note that PPE s are the last line of defense against the hazard.



<u>Elimination</u>

- Removes the source of the hazard from the work area;
- Most effective measure because the risk is eliminated;
- A permanent solution – should be attempted first

Some example on how this can be achieved are:
Choose different process;
Modify an existing process by changing the energy type;
Modify or change equipment or tool;
Remove a radiation source from common lab area to a proper store;
Moving flammable solvents from common lab area into a flammable cabinet in a solvent store.



<u>Substitution</u>

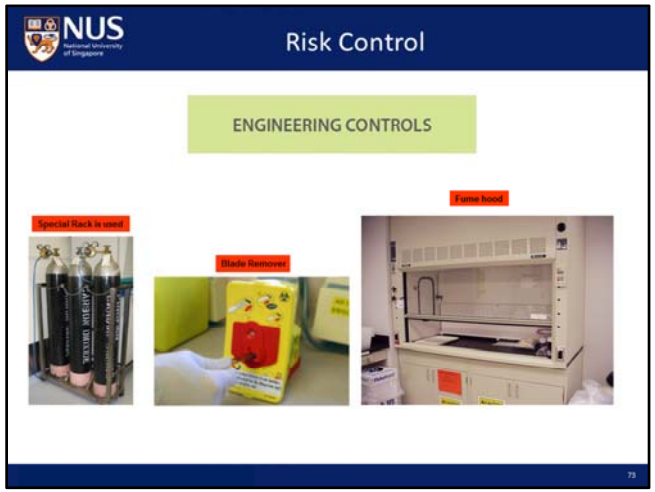
- Replaces the hazardous work process or material with a less hazardous one.
- Very effective, especially for hazardous substance.

Some examples on how this can be achieved:

- Replace solvent by water-based solution
- Use a chemical of higher LD50 or PEL; This may reduce the severity if users are accidentally exposed.
- Micro-scale experiments / Computer simulation;
- Substitute vapor heating by electric heating;
- Use electronic control instead of pneumatic one;
- Use a non-sparking hammer in a flammable atmosphere instead of a steel hammer;
- Replace Benzene with Toluene;

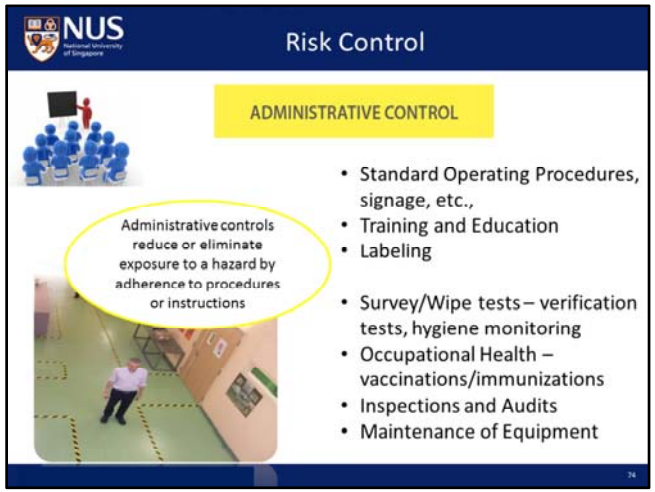
Engineering controls are physical means that limit the hazard

In the laboratory/workshop some common form of engineering controls are:
-Biological Safety Cabinet, Local Exhaust ventilation, Fume cupboard, etc.
-Centrifuges – safety cups
-Interlock systems for laser equipment
-Safety Guards
-Primary barrier to prevent exposure by containment
-Electrical Leakage Circuit Breaker (ELCB)
-Safety Alarms



These are some examples of engineering controls.

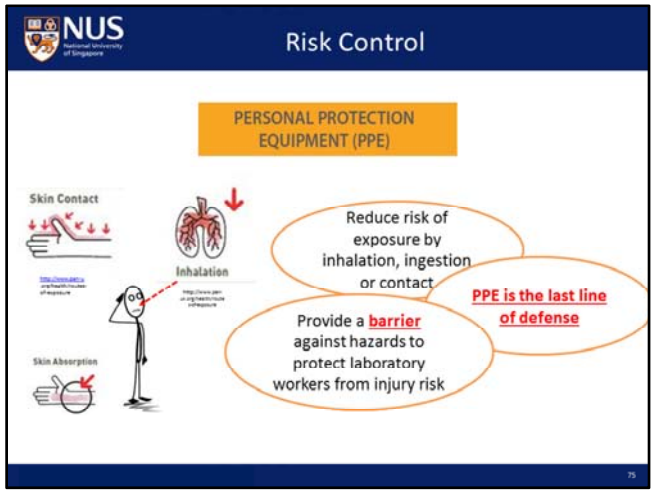
Chaining of gas cylinders, using blade remover for safe removal of sharps, using fumehood for handling chemicals.



Administrative controls reduce or eliminate exposure to a hazard by adherence to procedures or instructions.

These Procedures or instructions are usually communicated in the form of:
-Standard Operating Procedures, signage,
-Training and Education
-Labels on equipment or entrance to a lab.

Other forms of administrative controls may also include the following:
-Survey/Wipe tests – verification tests, hygiene monitoring
-Occupational Health – vaccinations/immunizations
-Inspections and Audits
-Maintenance of Equipment



PPE may be required to reduce the risk of exposure to personnel by contact, inhalation or ingestion of an infectious agent, toxic substance, or radioactive material.
It Provide a barrier against hazards to protect laboratory workers from injury risk

Please always remember that the PPE is the last line of defense.

All Users have to be aware of the limitations of their PPE and also to be informed of its proper usage.

Examples of Common PPEs.
-Head Protection
-Safety glasses and safety goggles
-Respirators
-Gloves
-Ear Plugs and Ear Muffs
-Lab coat
-Covered shoes & safety shoes

PPEs are usually worn in combination and are rarely exclusive. PPEs needed for the work activity has to be made available to the lab workers.

Also note that the provision and usage of PPE is governed under the WSH act.
PPEs are also very dependent on human intervention and improper usage may not provide the users with the intended level of protection.

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Are you really protecting yourself with the necessary Personal Protective Equipment (PPE)?

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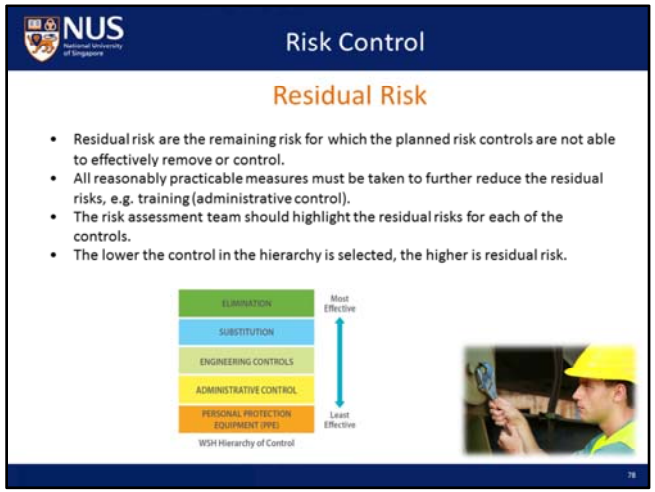
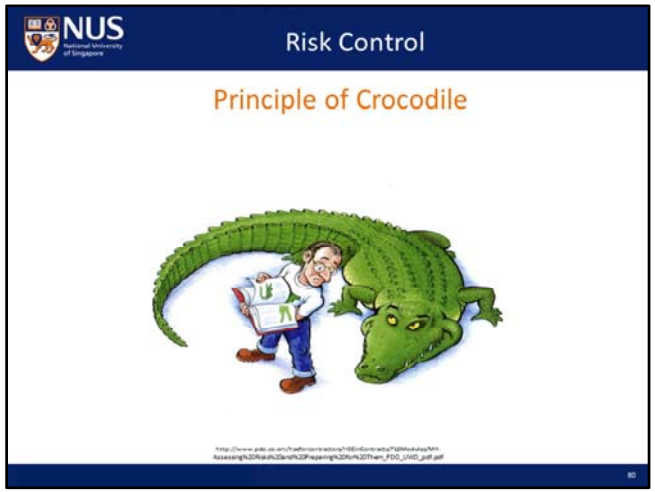


- Residual risk are the remaining risk for which the planned risk controls are not able to effectively remove or control.
- All reasonably practicable measures must be taken to further reduce the residual risks, e.g. training (administrative control).
- The risk assessment team should highlight the residual risks for each of the controls.
- The lower the control in the hierarchy is selected, the higher is residual risk.

Risk Control

To summarize risk control....

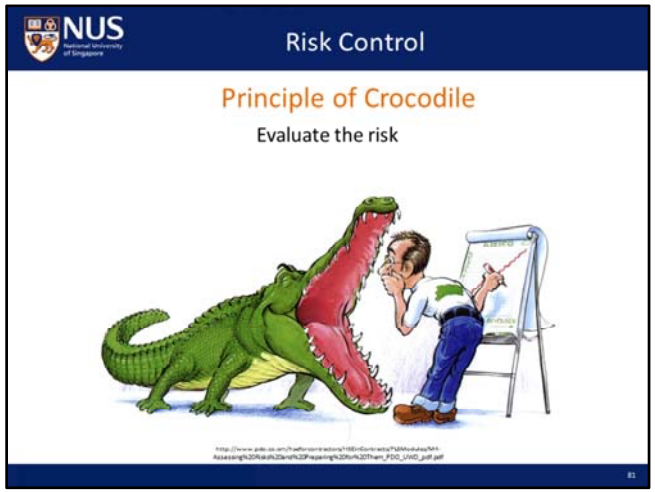


Identification of Risk is very important. If Hazards are not identified, its risk could not be evaluated

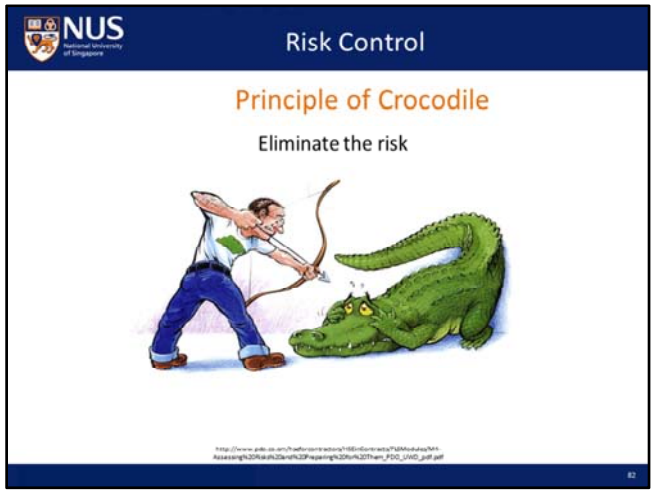
Slide 80

GHPF3 To prevent any copyright issue, will state the source of the pictures on the slides

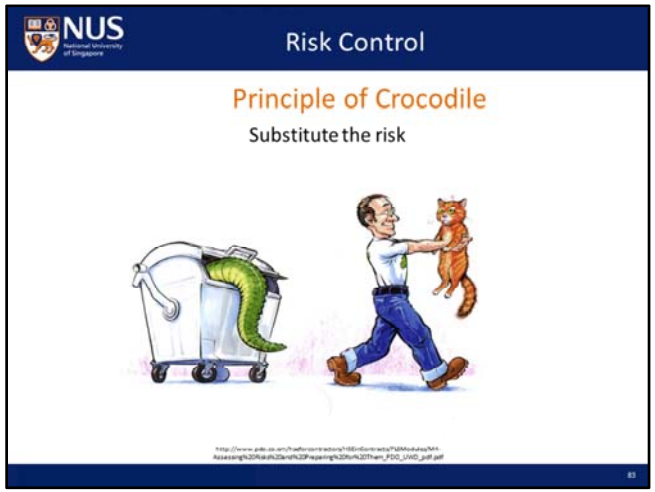
Gisela Ho Pui Fun, 7/1/2016



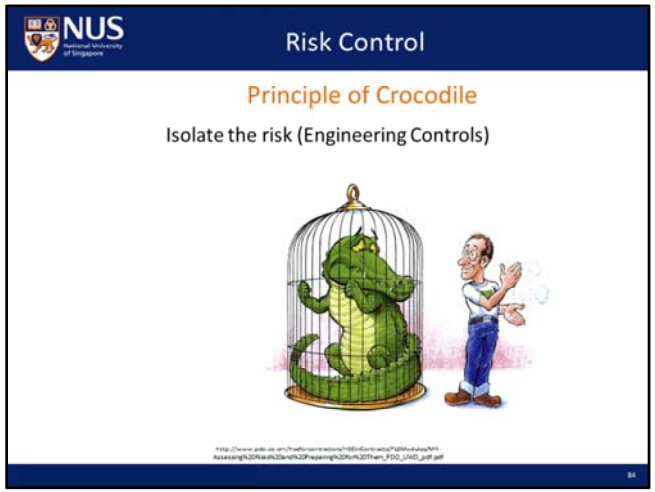
The risk has to be evaluated. Remember we shared the risk matrix? The risk level can be determined by multiplying the severity and the likelihood of the possible accident arising from the identified hazard.



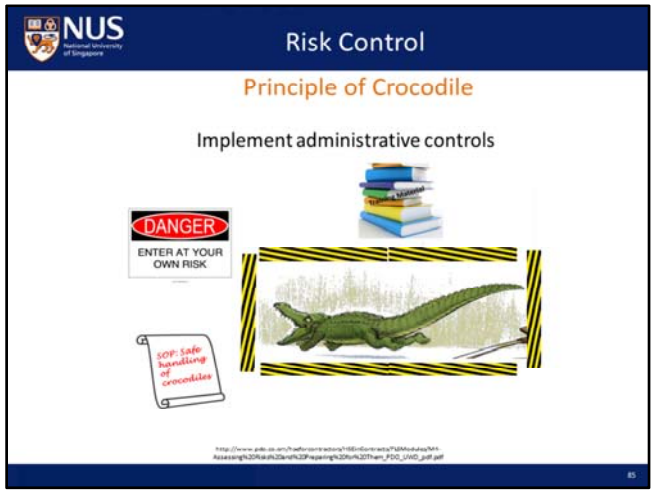
In the hierachy of control, elimination should be attempted first. One should ask oneself if a particular hazard can be eliminated altogether.



Substitution of a chemical to one which posses a lower degree of hazard is an example of sustitution.

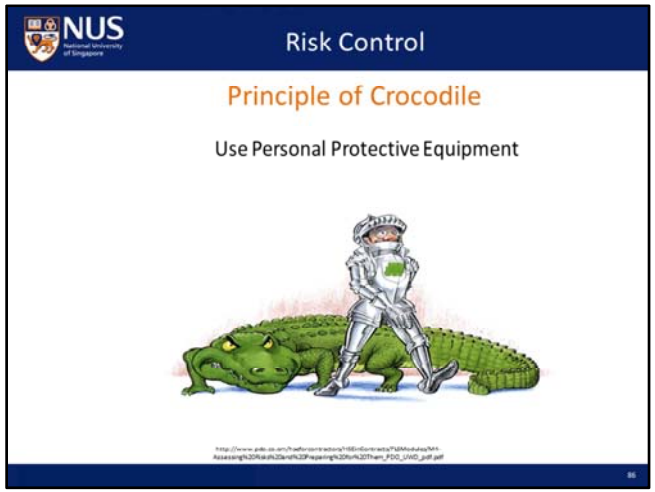


If nether elimination nor substitution is possible, it is always encouraged to explore the use of engineering controls to help manage the hazard. Example, using a fume hood to handle hazardous substances is a example of employing engineering controls.



Implement adminstrative controls.

For example, training, signages and safe operating procedures.

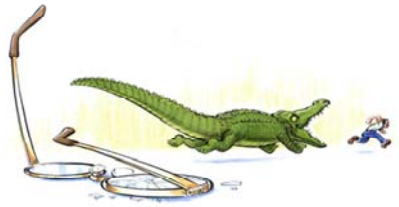


PPE is the last line of defense and should not be the only controls selected to contain the hazard. It is always encourage to be used in combination with other means of controls (e.g enginnering controls)

Risk Control

Principle of Crocodile

Or else.....Run away !



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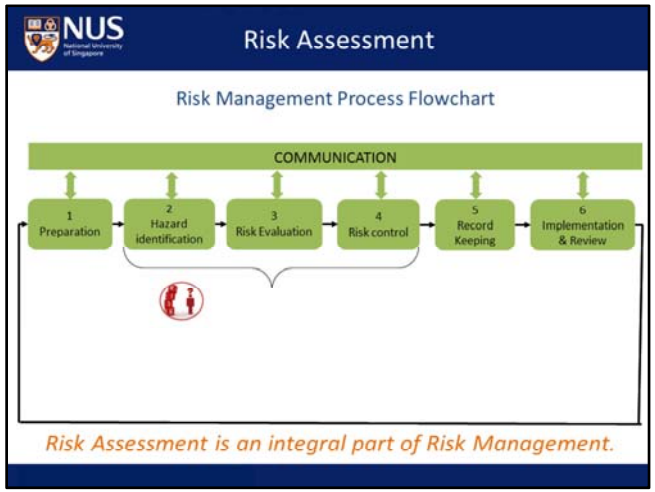
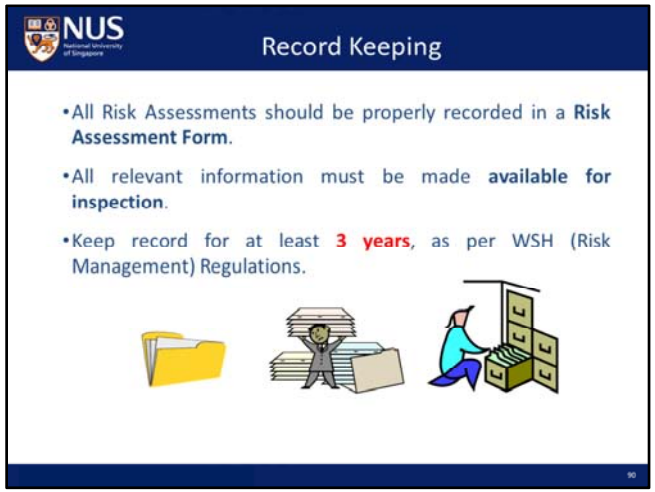
VI. Record Keeping

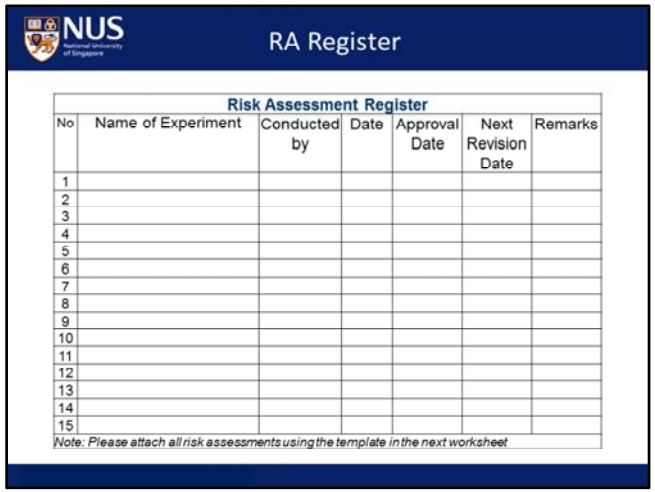


We have seen how to conduct risk assessment.

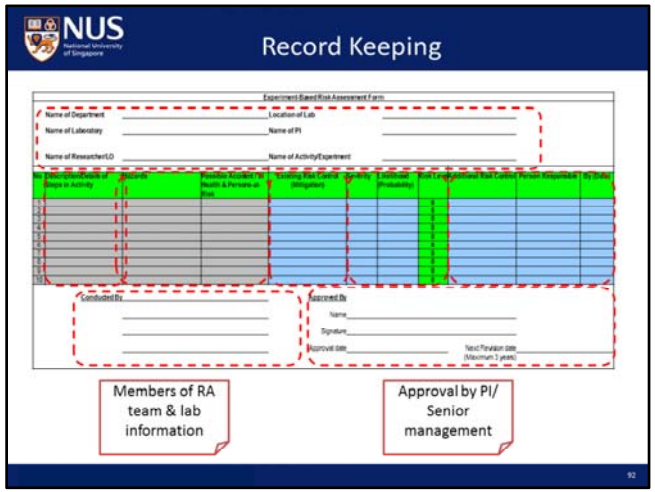
Now we shall see about record keeping of RAs.



- All Risk Assessments should be properly recorded in a Risk Assessment Form.
- All relevant information must be made available for inspection.
- Keep record for at least 3 years.

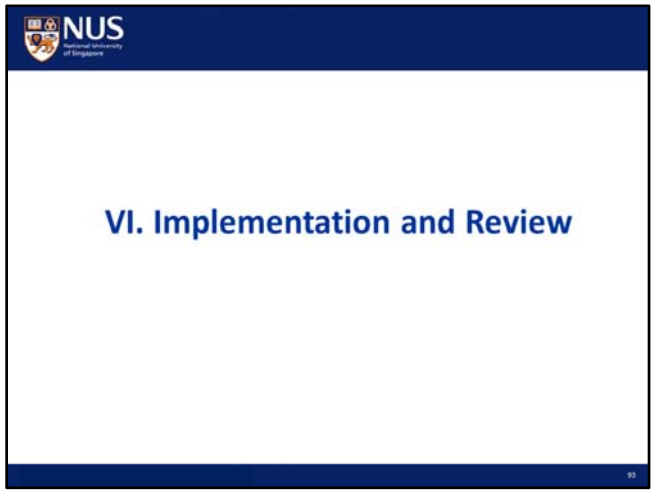


This is the risk assessment register template which can be used for tracking risk assessments.

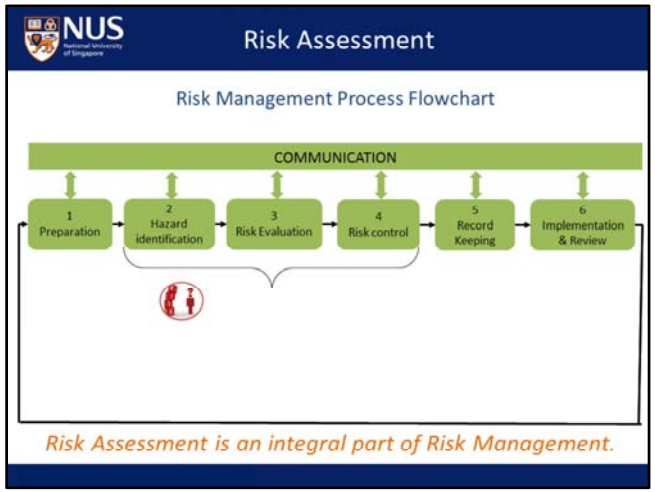


Records should be concise and include the following information:

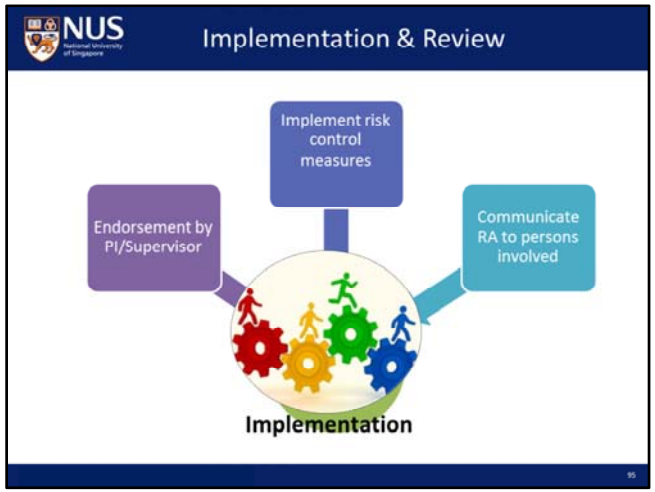
-Members of the Risk Assessment team,
-Processed/procedures/tasks/activities involved,
-Hazard identification and possible accident/ill-health and person at risk,
-Existing risk control measures,
-Risk level of each hazard,
-Recommendation on additional risk control measures,
-Persons responsible to implement the measures & completion date,
-Signature, date & designation of persons conducting the Risk Assessment;
-Signature, date & designation of management approving or endorsing the Risk Assessment.



Implementation and Review of risk assessment,



The next stage in risk management process is Implementation and Review.

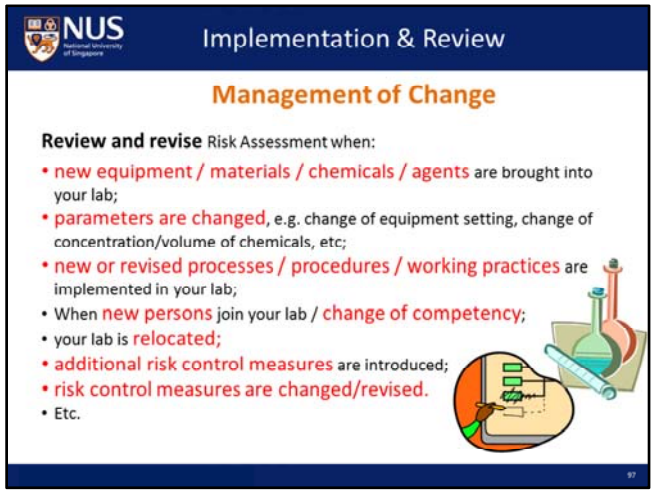


It is important that the result of the RA is approved and endorsed by the PI.

The PI should implement the recommended risk control measures without undue delay, as far as it is practicable.
Implement the risk controls by apply ALARP, As Low as Reasonably possible concept and the hierarchy of controls.
Train the affected staff/students on the Risk Assessment findings and the controls to minimize the risk of injury and ill-health with their awareness and support.
Establish an implementation schedule to ensure that the risk control measures are implemented in due time.

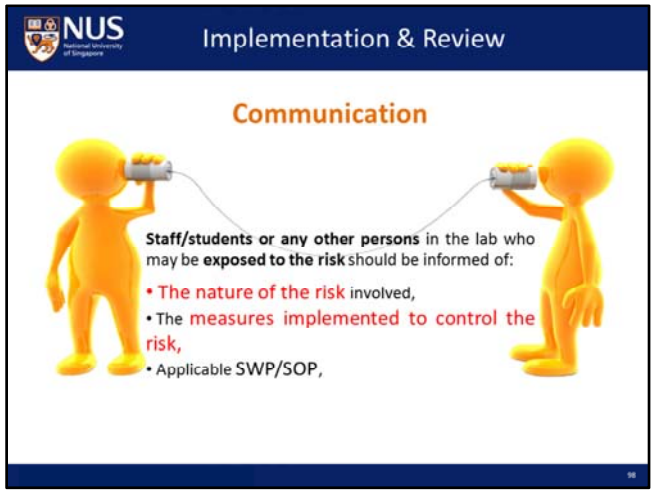
It is mandatory to review or revise the Risk Assessment:

1. At least once in every 3 years
2. After any accident or serious incident occurs
3. When there are changes in the Laboratory (Management of Change)



Review and revise Risk Assessment when:

- new equipment / materials / chemicals / agents are brought into your lab;
- parameters are changed, e.g. change of equipment setting, change of concentration/volume of chemicals, etc;
- new or revised processes / procedures / working practices are implemented in your lab;
- When new persons join your lab / change of competency;
- your lab is relocated;
- additional risk control measures are introduced;
- risk control measures are changed/revised.



Everyone, including but not limited to Staff/students or any other persons in the lab who may be exposed to the risk should be informed of:

The nature of the risk involved,

The measures implemented to control the risk,

Applicable SWP/SOP,

Whenever the risk assessment is revised, or when there is a significant change in work practices or procedures, the staff/students or other persons who may be at risk must be informed accordingly

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VI. Conclusion

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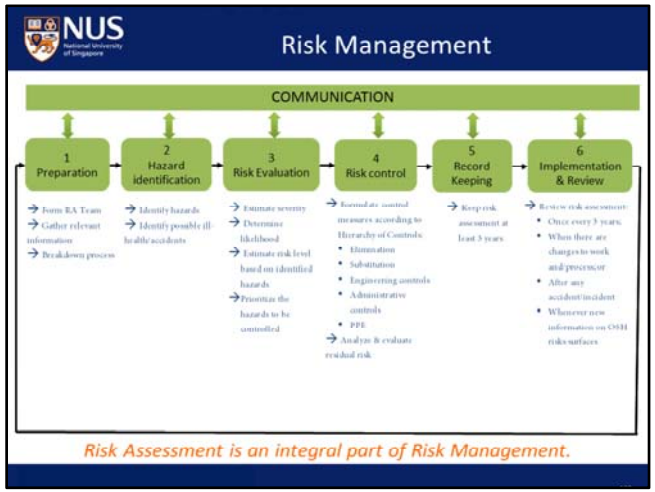
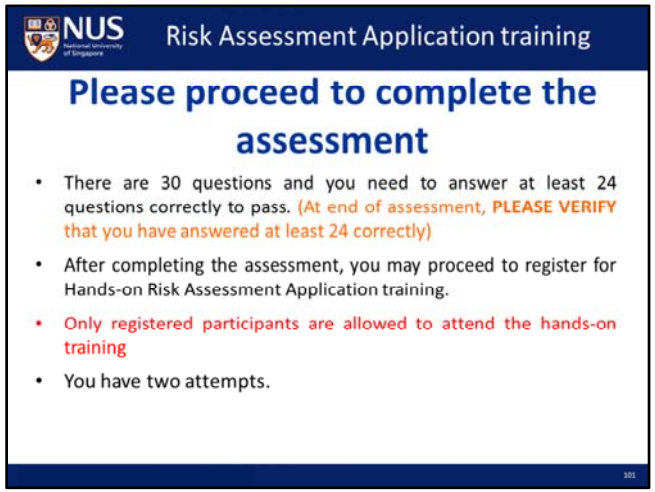


To summarize the various stages of Risk management are

Preparation.
Hazard Identification
Risk evaluation
Followed by risk control
Record Keeping
Implementation and Review

Finally it is important to communicate RA to staff/student or other persons who are at risk.



Please proceed to complete the assessment

There are 30 questions and you need to answer at least 24 questions correctly to pass. (At end of assessment, PLEASE VERIFY that you have answered at least 24 correctly)
You may contact the person-in-charge trainer for any questions or comments about this training
You have two attempts.

E-Certificate will be issued to participants on successful completion of:

1. Online Risk Assessment Application training module
2. Assessment (at least 24 questions to pass) and
3. Hands-on Risk Assessment Application training

You may contact Faculty Safety Unit for any enquiry regarding this training.