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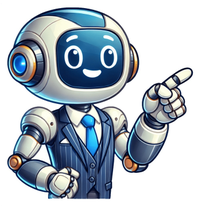

Back to top Needlestick injuries are wounds caused by needles that unintentionally puncture the skin.These injuries can occur at any time when people use, disassemble, or dispose of needles. When not disposed of properly, needles can hide in linen or garbage and injure other workers who encounter them unexpectedly. Back to top "Sharps" include needles, as well as items such as scalpels, lancets, razor blades, scissors, wires, retractors, clamps, pins, staples, cutters, and glass items. Essentially, any object that is able to cut the skin can be considered a "sharp." Back to top Infected needlesticks and sharps may transmit infectious diseases, especially blood-borne pathogens (germs like viruses that cause disease). Concerns include the Human Immunodeficiency Virus (HIV), which leads to AIDS (Acquired Immune Deficiency Syndrome), hepatitis B, and hepatitis C.Incidental punctures by contaminated needles can inject hazardous fluids and pathogens into the body through the skin. There is potential for injection of hazardous drugs, but contact with infectious fluids, especially blood, is by far the greatest concern. Even small amounts of infectious fluid can spread certain diseases effectively.Sharps can create a cut in the skin which allows contact between blood or fluids.The risk of infection after exposure to infected blood varies by bloodborne pathogen. It is estimated that the hepatitis B virus has a 6% to 30% chance of causing an infection from a needlestick injury if the person is not vaccinated. In comparison, the risk of HIV transmission is about 0.3% and the risk for hepatitis C is about 1.8%. These are estimates. Regardless of the probability, it is always good practice to eliminate or reduce the risk of infection. Sharps have transmitted many other diseases involving viruses, bacteria, fungi, and other microorganisms to healthcare workers, laboratory researchers, and veterinarian staff. The diseases include:BlastomycosisBrucellosisCryptococcosisDiphtheriaHerpesMalariaMycobacteriosisMycoplasma caviaeRocky Mountain spotted feverSporotrichosisStaphylococcus aureusStreptococcus pyogenesSyphilisToxoplasmosisTuberculosisMany of these diseases were transmitted in rare, isolated events. However, they demonstrate that needlestick and sharps injuries can have serious consequences. Back to top Injuries can occur at every stage of their use, disassembly, or disposal.Injuries involving hollow-bore needles (such as syringe needles) can occur:During use:Accessing IV line.Collision with sharp or worker.Insertion or removal of the needle.During or after disposal:Improper handling during disposal (for example, holding needles with hands)Dropping unintentionallyDuring disposal.After use, before disposal: Not using safety-engineered sharps or not using them correctlyRecapping needle.During clean-up.Injuries involving solid sharps (such as scalpel blades) can occur:During use of the item:Collision with sharp or worker.Handling or passing the sharp.Having another hand or body part close to the sharp while using it.or after disposal:Improper handling during disposal (for example, holding a scalpel blade with hands).Dropping unintentionally.After use, before disposal:Sharp left in an unusual location.During clean-up.Equipment design, nature of the procedure, condition of work, and staff experience are all factors that influence these occurrences. Back to top Preventing injuries is the most effective way to protect workers. A comprehensive sharps injury prevention program would include:Recommended guidelines.Improved equipment design.Effective disposal systems.Employee training.Safe recapping procedures, where necessary.Surveillance programs.The Centre for Communicable Diseases and Infection Control at the Public Health Agency of Canada (PHAC) reviews, publishes, and updates guidelines to protect staff from exposure to all infection-causing agents in healthcare settings. The current guideline is titled "Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings".Preventing injuries from sharps and needlesticks is considered a part of the routine practices used by healthcare workers.Workers who use sharps require education and training as part of a sharps injury prevention program. Workers should be educated in how to protect themselves during use, and to protect others who may encounter the sharps during or after procedures.The use of safety-engineered devices such as protected needle devices, or needle-free systems with self-sealing ports and syringes is encouraged. PHAC states that use of such safety devices is required by some jurisdictions. Using these devices must take into consideration both the safety of the health care worker and the patient.PHAC recommends that:Needles should not be recapped (unless there is a legal requirement). Used items should be placed immediately in a designated puncture-resistant container that is easily accessible at the point of care.Eyes, nose, and mouth should be protected if splashes with blood or body fluids are anticipated.Immediately perform first aid if someone has been exposed to blood or body fluids. First aid should include:Thoroughly rinsing the injury site with running water, and gently cleaning with soap and water if possible.Flushing the eyes, nose, or mouth with running water if they have been exposed.Broken skin should be rinsed thoroughly.Report the incident and exposure immediately to your employer.Follow instructions for further treatment and follow-up from medical professionals, where necessary.The "Workbook for Designing, Implementing & Evaluating a Sharps Injury Prevention Program" resource from the Centres for Disease Control and Prevention (CDC) can be used in program design.. A sharps injury prevention program should use a hierarchy of control approach, including:Elimination - find ways to eliminate or reduce needle use during procedures, medication delivery, and specimen collection.Engineering controls - isolate the hazard by using sharps disposal containers or other devices that have an integrated injury prevention feature. Instruments can be used to grasp needles and scalpels to avoid direct contact. Safety devices must be chosen with care as no one device or strategy will work in every situation.Administrative controls - promote safe work practices (through education, training, procedures, and signs) such as avoiding hand-to-hand passage of sharps, separating sharps from other waste, and not carrying garbage or linen bags close to the body.Personal Protective Equipment (PPE) - PPE should be used as the last control approach, where appropriate. Puncture- and cut-resistant gloves could be used (such as during waste disposal).In situations where recapping is considered necessary, develop safe approaches that workers can follow. Workers should never move an exposed needle tip toward an unprotected hand. Recap by laying the cap on a flat surface and scoop it onto the tip of a syringe held in one hand. Keep the free hand away from the sheath and well behind the exposed needle.In addition, all eligible workers should be vaccinated against any disease they may be exposed to, such as Hepatitis B. Back to top An effective system for disposing of used needles and sharps is crucial to preventing injuries. Have disposal containers readily available. Workers should place needles in wide-mouth, puncture-resistant containers. The containers should ideally allow disposal while using only one hand to reduce the risk of injury to the user. Locate disposal containers specifically where needles and sharps are used to make safe disposal possible. Replace the containers before they are completely filled - sharps containers should be removed and replaced when they are threequarters full. Make sure they are sealed, collected, and disposed of according to local regulations for biomedical waste.All staff should report every incident in which they find needles or sharps left at the bedside or thrown into the regular garbage.In general, sharps disposal containers should:Be rigid and puncture-resistant. Containers do not need to be made of a specific material but should be able to resist punctures and function as designed throughout their lifespan (plastic and metal are common).Be tamper-resistant and do not have removable lids. Non-manual mechanisms should unlock closed containers.Be stable (that is, not likely to fall or fall over).Have an opening large enough to insert sharps but not large enough to insert a hand.Have a handle capable of holding the weight when it is full.Be resistant to leaking and breaking even after being dropped.Only be reused if designed to do so.Not stored near food or anywhere it could reasonably pose a hazard.Accessible to people who use them and take them for disposal.Be easy to use. Be clearly labelled:Sharps that pose a biohazard threat should display the biohazard symbol.Indicate the maximum fill level (usually about three-quarters full or as recommended by the manufacturer)."DANGER."Manufacturer information. The CSA Group standard CSA Z316.6 Sharps injury protection—Requirements and test methods—Sharps containers have more detailed requirements for sharps containers.Follow any legislated requirements for sharp disposal that apply to your workplace. Back to top Surveillance programs that provide in-depth analysis of incidents are an important tool for obtaining information. The goals of these programs should include:Determining the rate of injuries.Investigating the factors that cause the injuries or near misses (such as sharps being left in unusual locations).Ensuring that injured workers receive proper treatment.Identifying areas in which the prevention program needs improvement.Develop practical strategies for dealing with the issue. Fact sheet last revised: 2024-11-08 Back to top Risk assessment is a term used to describe the overall process or method where of identifying hazards, assessing the risk of hazards, and prioritizing hazards associated with a specific activity, task, or job. It considers the probability or likelihood of harm from exposure and the potential consequence or severity of harm from exposure to a hazard. A risk assessment is a thorough look at your workplace to identify those things, situations, processes, etc. that may cause harm, particularly to people. After the identification of a hazard, it should be reviewed to determine how likely and severe the potential harm is. When this determination is made, you can decide what measures should be in place to effectively eliminate or control the harm from happening (hazard control).Some important terms related to risk assessments include:Hazard - a potential source of injury, adverse health effect, or damage to people, structures, equipment, or the environment. A common way to classify hazards is to categorize them as biological, chemical, ergonomic, physical, psychosocial, and safety hazards.Hazard identification – the process of finding, listing, and characterizing hazards.Risk - the combination of probability and severity that a person will be harmed or experience an adverse health effect if exposed to a hazard. Risk can also be applied to situations with property or equipment damage, or harmful effects on the environment.Probability - the extent to which an event is likely to occur. The probability of harm may also be referenced as the likelihood of harm. Severity - the seriousness of an incident, injury, or illness. Severity, or consequence, describes the highest level of damage possible from a hazard and is often described in terms such as catastrophic, critical, moderate, minor, or negligible. In general, risk can be expressed as: Risk = probability x severity Hazard control - control measure(s) and action(s) taken to reduce the risk of a hazard based on the risk assessment. Hazard control should also include monitoring, re-evaluation, and compliance with decisions (the term "controls" or "control measures" are also used and have the same meaning). Recommending or determining hazard controls may be incorporated into the risk assessment process, or completed separately following a risk assessment. For definitions and more information about what hazards and risks are, please see the OSH Answers document Hazard and Risk. Back to top Risk assessments are very important as they form an integral part of an occupational health and safety management plan. They help to:Create awareness of hazards and risks.Identify who may be at risk (e.g., workers, cleaners, visitors, contractors, the public, etc.).Determine whether a control program is required for a particular hazard.Determine if existing control measures are adequate or if more should be done.Prevent injuries or illnesses, especially when done at the design or planning stage.Prioritize hazards and control measures.Meet legal requirements where applicable. Back to top The aim of the risk assessment process is to evaluate hazards and then remove that hazard or minimize the level of its risk by adding control measures, as necessary. By doing so, you have created a safer and healthier workplace. The goal is to try to answer the following questions:What can happen, and under what circumstances?What are the possible consequences?How likely are the possible consequences to occur?How severe are the possible consequences?Has an adequate level of risk reduction been achieved, or is further action required? Back to top There may be many reasons a risk assessment is needed, including:Before new processes or activities are introduced.Before changes are introduced to existing processes or activities, including when products, machinery, tools, or equipment change.When new information concerning harm becomes available.When hazards are identified.Before working in a new environment.When new information on hazard controls or good practices becomes available.Before performing maintenance or commissioning of equipmentBefore completing routine or non-routine tasks.When the legislation requires a risk assessment to be done. Back to top In general, to do an assessment, you should:Assemble a risk assessment team. Assessments should be done by a competent person or team of individuals who have a good working knowledge of the situation being studied. Include the supervisors and workers who work with the process under review on the team or as sources of information, as these individuals are the most familiar with the operation. The health and safety committee or representative should also be consulted. Select the job or process to assess. Refer to the above section, "When should a risk assessment be done", to help prioritize your assessments. Ideally, risk assessments should be done for all jobs. Jobs or tasks with higher injury and illness rates, worker concerns, and other factors should be considered first. Break down the job or process into tasks. Divide the job or process into tasks or basic steps to better understand the hazards. Identify the hazards of each task. After the basic steps or tasks have been recorded, identify the hazards of each step or task. List the hazards based on observations and inspections, previous causes of incidents and injuries, feedback from workers and supervisors directly involved in the task, and other considerations.   Assess the risk of each hazard. For each hazard, determine the likelihood of harm, such as an injury or illness occurring, and its severity. Use a risk assessment method appropriate for your workplace (see further below for details on risk assessment methods). Consider normal operational situations as well as non-standard events such as maintenance, shutdowns, power outages, emergencies, extreme weather, etc. Review all available health and safety information about the hazard, such as Safety Data Sheet (SDS), manufacturer's literature, information from reputable organizations, results of testing, workplace inspection reports, records of workplace incidents (accidents), including information about the type and frequency of the occurrence, illnesses, injuries, near misses, etc. Make sure you understand the minimum legislated requirements for your jurisdiction.Control the risk of each hazard. Using the hierarchy of controls, identify the actions necessary to eliminate the hazard or control the risk.Evaluate the effectiveness of controls. Establish a review process for monitoring controls to ensure they remain effective. Communicate the results. Workers, supervisors, and other individuals involved with the job or process being assessed should be aware of the risk assessment results. Workers must be aware of every hazard associated with their job and the controls in place to protect them. Keep any necessary documents or records. Documentation may include detailing the process used to assess the risk, outlining any evaluations, or detailing how conclusions were made.When doing an assessment, also take into account:The methods and procedures used in the processing, use, handling, or storage of the substance, etc.The actual and the potential exposure of workers (e.g., how many workers may be exposed, what that exposure is or will be, and how often they will be exposed).The measures and procedures necessary to control such exposure by means of engineering controls, work practices, and hygiene practices and facilities.The duration and frequency of the task (how long and how often a task is done).The location where the task is done.The machinery, tools, materials, etc., that are used in the operation and how they are used (e.g., the physical state of a chemical or lifting heavy loads for a distance).Any possible interactions with other activities in the area and if the task could affect others (e.g., cleaners, visitors, etc.).The lifecycle of the product, process, or service (e.g., design, construction, uses, decommissioning).The education and training the workers have received.How a person would react in a particular situation (e.g., what would be the most common reaction by a person if the machine failed or malfunctioned).It is important to remember that the assessment must take into account not only the current state of the workplace but any potential situations as well.By determining the level of risk associated with the hazard, the employer and the health and safety committee (where appropriate) can decide whether a control program is required and to what level.See a sample risk assessment form. Back to top Overall, the goal is to find and record possible hazards that may be present in your workplace. It may help to work as a team and include both people familiar with the work area, as well as people who are not - this way you have both the experienced and fresh eye to conduct inspections and evaluations. In either case, the person or team should be competent to carry out the assessment and have good knowledge about the hazard being assessed, any situations that might likely occur, and protective measures appropriate to that hazard or risk.To be sure that all hazards are found:Look at all aspects of the work.Include routine and non-routine activities such as maintenance, repair, or cleaning.Look at the incidents, near-miss, and hazard reports.Include people who work off-site either at home, on other job sites, drivers, teleworkers, with clients, etc.Look at the way the work is organized or done (include the experience of people doing the work, systems being used, etc.).Look at foreseeable unusual conditions (for example: possible impact on hazard control procedures that may be unavailable in an emergency situation, power outage, climate event, etc.).Determine whether a product, machine or equipment can be intentionally or unintentionally changed (e.g., a safety guard that could be removed).Review all of the phases of the process or lifecycle.Examine risks to visitors or the public.Consider the knowledge, experience, training, and education of the individuals performing the work.Consider the groups of people that may have a different level of risk such as young or inexperienced workers, persons with disabilities, or new or expectant mothers.It may help to create a chart or table such as the following:Table 1: Hazards, risks, and controlsJob: Delivery DriverTask: Delivering Products to customers HazardsPotential OutcomesRiskPriorityHazard Controls Working aloneMay not be able to call for help if needed   Manually lifting and carrying boxesMusculoskeletal injuries (e.g., back or shoulder injury) due to manual material handling   Working long hoursFatigue, stress, short rest time between shifts, motor vehicle collision.   Driving in congested trafficMotor vehicle collision, stress   Please see further below for guidance on determining the risk and priority of each hazard, including the risk matrices in Table 2 and Table 3. Hazard mapping is a method of hazard identification that is performed by employees themselves.All of the employees from a work area, including supervisors and managers, get together and mark hazard locations on the building's floor plan. Later, the group discusses how to control these hazards and which ones should be dealt with first. This approach makes use of employees' knowledge and experience, empowers employees, and encourages involvement and cooperation.More information is also available in the OSH Answers on Hazard Identification. Back to top Each hazard should be studied to determine its level of risk. Understanding how likely it is that a hazard will cause harm and how severe that harm could be.To research the hazard, you can look at:Product information and the manufacturer documentation.Past experience (knowledge from workers, etc.).Legislated requirements and applicable standards.Industry codes of practice and good practices.Health and safety material about the hazard, such as safety data sheets (SDSs), research studies, or other manufacturer information.Information from reputable organizations.Results of testing (atmospheric or air sampling of the workplace, biological swabs, etc.).The expertise of an occupational health and safety professional or other technical experts.Information about previous injuries, illnesses, near misses, incident reports, etc.Observation of the process or task.Remember to include factors that contribute to the level of risk, such as:The work environment (layout, condition, weather, etc.).The procedures for performing a task.The range of foreseeable conditions.The way the source may cause harm (e.g., inhalation, ingestion, etc.).How often and how much a person will be exposed.The interaction, capability, skill, and experience of workers who do the work.The physical, psychological, or cognitive abilities and characteristics of workers.Individual worker factors such as age, height, disabilities, allergies, sensitivities, and pregnant or breastfeeding workers.The number of people that could be impacted.Working alone or in a remote area. Back to top Ranking or prioritizing hazards is one way to help determine which hazards are the most serious and, thus, which to control first. Priority is usually established by taking into account the probability of employee exposure to the hazard and the potential severity of an incident, injury or illness associated with the hazard. By assigning a priority to the hazards based on the risks, you are creating a ranking or an action list. Risk assessments with clearly defined parameters for probability and severity will make it easier to determine which hazards should be addressed first. Back to top Numerous methods exist to analyze risk, and the method used will depend on many factors, including the experience level of the risk assessment team, the scope, the data available, and the level of detail required to adequately understand the risks. There is no one simple or single way to determine the level of risk. Nor will a single method apply in all situations. The organization has to determine which method will work best for each situation. Ranking hazards requires knowledge of workplace activities, the urgency of situations, and, most importantly, objective judgment.For simple or less complex situations, an assessment can literally be a discussion or brainstorming session based on knowledge and experience. In some cases, checklists or a risk matrix can be helpful. For more complex situations, a team of knowledgeable personnel who are familiar with the work and risk assessment methodologies is usually necessary. Depending on the circumstances or situation being assessed, the legislation may specify how the risk assessment needs to be done, including what personnel need to be involved. Depending on the circumstances or situation being assessed, the legislation may specify how the risk assessment needs to be done, including what personnel need to be involved. Basic Qualitative MethodsThe basic qualitative method combines severity and probability parameters to produce a level of risk that is compared against pre-determined risk criteria. This method evaluates risk based on the inherent characteristics of the hazard without assigning a numerical value. As an example, consider this simple qualitative risk matrix. Table 2 shows the relationship between probability and severity and how a risk rating can be determined.Table 2: Example of a qualitative risk matrix Low SeverityMedium SeverityHigh SeverityLow ProbabilityVery Low RiskLow RiskMedium RiskMedium ProbabilityLow RiskHigh RiskHigh RiskHigh ProbabilityMedium RiskHigh RiskImmediately DangerousSeverity ratings in this example represent:High severity: fatal disease or injury, permanent disability, irreversible health effects, major fracture, poisoning, significant loss of blood, or serious head injuryMedium severity: sprain, strain, localized burn, dermatitis, asthma, injury requiring limited days off workLow severity: an injury that requires first aid only; short-term pain, irritation, or dizzinessProbability ratings in this example represent:High probability: likely to be experienced once a year or more by an individualMedium probability: may be experienced once every five years by an individualLow probability: may occur once during a working lifetimeThe priority for addressing hazards should be based on their risk rating. You can also develop general actions that correspond to the risk rating, such as:Immediately dangerous: stop the process and implement controls immediatelyHigh risk: investigate the process and implement controls immediatelyMedium risk: keep the process going; however, a control plan must be developed and should be implemented as soon as possibleLow risk: keep the process going, but monitor regularly. A control plan should also be investigated.Very low risk: keep monitoring the processLet's look at an example using criteria from Table 2: When painting a room, a step stool must be used to reach higher areas. The individual will not be standing higher than 1 metre (3 feet) at any time. The assessment team reviewed the situation and agrees that working from a step stool at 1 m is likely to:Cause a short-term injury such as a strain or sprain if the individual falls. A severe sprain may require days off work. This outcome is similar to a medium severity rating.Occur once in a working lifetime as painting is an uncommon activity for this organization. This criterion is similar to a low probability rating.When compared to the risk matrix chart (Table 2), these values correspond to a low risk rating.The workplace decides to implement hazard control measures, including the use of a stool with a large top that will allow the individual to maintain stability when standing on the stool. They also provided training to the individual on the importance of making sure the stool's legs always rest on the flat surface and are secure. The training also included steps to avoid excessive reaching while painting.Other types of qualitative risk assessments include hazard and operability (HAZOP) analysis, bowtie analysis, and other similar risk matrices.Semi-quantitative MethodsSemi-quantitative methods involve assigning numerical values or scores to various qualitative risk factors and then using these scores to rank or prioritize risk. This approach combines elements of both qualitative and quantitative risk assessment techniques. This method offers a middle-ground approach between qualitative and quantitative risk assessments, making it a flexible tool for a wide range of applications. Semi-quantitative methods involve assigning numerical values or scores to various qualitative risk factors and then using these scores to rank or prioritize risk. This approach combines elements of both qualitative and quantitative risk assessment techniques. This method offers a middle-ground approach between qualitative and quantitative risk assessments, making it a flexible tool for a wide range of applications. Below is an example of a semi-quantitative risk matrix (Table 3) that could be used. Table 3: Example of a semi-quantitative risk matrix Negligible Severity(1)Minor Severity(2)Moderate Severity(3)Major Severity(4)Catastrophic Severity(5)Rare Probability(1)Low(1)Low (2)Low (3)Moderate (4)Moderate (5)Unlikely Probability(2)Low (2)Moderate (4)Moderate (6)High (8)High (10)Possible Probability(3)Low (3)Moderate(6)High(9)High(12)Extreme (15)Likely Probability (4)Moderate (4)High (8)High(12)Extreme (16)Extreme (20)Almost Certain Probability(5)Moderate (5)High (10)Extreme (15)Extreme (20)Extreme (25)When using this method, it is important to clearly define the parameters for assigning scores for severity and probability, so all team members understand the scoring criteria. Using Table 3, a hazard assigned as having an unlikely probability of occurring (probability score of 2) and minor severity (severity score of 2) is a moderate riskwith a risk rating score of 4.Remember! Risk = probability x severity. The qualitative and semi-quantitative risk matrices above are just a couple of examples. These matrices can be customized to further refine risk by considering more detailed criteria for probability and severity. Quantitative methods are also sometimes used, which calculate risk based on data collected over a period of time or multiple situations. Examples include failure mode and effects analysis (FMEA) and decision tree analysis (these methods are not covered in this fact sheet). Field-level Risk Assessment A field-level risk assessment (FLRA) is another method that is commonly used in industries and workplaces where workers are exposed to dynamic and changing work environments. Field-level risk assessments can use qualitative or semi-quantitative methods for assessing risk, including the matrices shown above. The purpose of a field-level risk assessment is to identify, assess, and manage hazards and risks in real-time or on-site as work progresses, with a focus on ensuring the safety of workers. Field-level risk assessments are often completed in addition to formal risk assessments that have already been done before that specific day. Field-level risk assessments can also supplement safety meetings with teams as you work together through a common task, highlighting hazards and control measures that are currently in place. It can also be a good opportunity to brainstorm additional controls or better ways to complete the task. These risk assessments can help continue the safety conversation and avoid complacency. Similar to other risk assessments, each step of the task should be written down and hazards identified. The risk of each hazard can then be assessed based on the likelihood and severity of harm. Then, the team will determine if the current controls in place are adequate, or if further measures are needed prior to work beginning. An example of a table that may assist with a field-level risk assessment is shown in Table 4. Risk matrices similar to those in Table 2 or Table 3 can also be used to assess the risk for each hazard. Table 4: Field-level risk assessmentJob or work activity being assessed:____Step/task descriptionHazardsRiskPriorityCurrent controlsRecommended controls   Back to top It is important to know if your risk assessment was complete and accurate. It is also essential to be sure that any changes in the workplace have not introduced new hazards or changed hazards that were once ranked as lower priorities to higher priorities.It is good practice to review your assessment on a regular basis to make sure your control methods are effective. Back to top It is very important to keep records of your assessment and any control actions taken. You may be required to store assessments for a specific number of years. Check for local requirements in your jurisdiction.The level of documentation or record keeping will depend on:Level of risk involved.Legislated requirements.Requirements of any management systems that may be in place.Your records should show that you:Conducted a good hazard review.Determined the risks of those hazards.Implemented control measures suitable for the risk.Reviewed and monitored all hazards in the workplace. Fact sheet last revised: 2025-03-12 Back to top There are many definitions of hazard, but the most common definition when talking about workplace health and safety is "A hazard is any source of potential damage or harm to someone or something."The CSA Z1002 Standard "Occupational health and safety - Hazard identification and elimination and risk assessment and control" uses the following terms:Harm – physical injury or damage to health.Hazard – a potential source of harm to a worker.Basically, a hazard is the potential for harm or an adverse effect (for example, to people as health effects, to organizations as property or equipment losses, or to the environment).Please see the OSH Answers fact sheet on Hazard and Risk for more information. Back to top Hazard identification is part of the process used to evaluate if any particular situation, item, or thing may have the potential to cause harm. The term often used to describe the full process is risk assessment:Identify hazards and risk factors that have the potential to cause harm (hazard identification).Analyze and evaluate the risk associated with that hazard (risk analysis, and risk evaluation).Determine appropriate ways to eliminate the hazard or control the risk when the hazard cannot be eliminated (risk control).Overall, the goal of hazard identification is to find and record possible hazards that may be present in your workplace. It may help to work as a team and include both people familiar with the work area, as well as people who are not -this way, you have both experienced and fresh eyes to conduct the inspection. Back to top Hazard identification can be done:During design and implementationDesigning a new process or procedurePurchasing and installing new machineryBefore tasks are doneChecking equipment or following processesReviewing surroundings before each shiftWhile tasks are being doneBe aware of changes, abnormal conditions, or sudden emissionsDuring inspectionsFormal, informal, supervisor, health and safety committeeAfter incidentsNear misses or minor eventsInjuries Back to top There are many ways a workplace can identify hazards, including:To be sure that all hazards are found:Look at all aspects of the work and include non-routine activities such as maintenance, repair, or cleaning.Look at the physical work environment, equipment, materials, products, etc. that are used.Include the various steps that make up a task or activity.Look at injury and incident records.Talk to the workers: they know their job and its hazards best.Include all shifts and people who work off-site, either at home, on other job sites, drivers, teleworkers, or with clients.Look at the way the work is organized or done by different individuals (including the experience of people doing the work, systems being used, if alternate methods are being used, etc.).Look at foreseeable unusual conditions (for example, possible impact on hazard control procedures that may be unavailable in an emergency situation, power outage, etc.).Determine whether a product, machine, or equipment can be intentionally or unintentionally changed (such as a safety guard that could be removed).Review all of the phases of the lifecycle of processes, products, and services (such as design, transportation, construction, dismantling, and disposal).Examine risks to visitors or the public.Consider the groups of people that may have a different level of risk, such as young or inexperienced workers, persons with disabilities, or new or expectant mothers.Consider the psychosocial aspects of the job and the hazards that could be created. Back to top A common way to classify hazards is by category:Biological – bacteria, viruses, fungi, insects, plants, and animals.Chemical – depends on the physical, chemical, and toxic properties of the productErgonomic – repetitive movements, improper setup of workstations, etc.Physical – radiation, magnetic fields, temperature extremes, pressure extremes (high pressure or vacuum), noise, vibration, etc.Psychosocial – stress, violence, harassment, etc.Safety – slipping or tripping hazards, inappropriate machine guarding, equipment malfunctions or breakdowns. Back to top Another way to look at health and safety in your workplace is to ask yourself the following questions. These are examples only. You may find other items or situations that can be a hazard. List any item that should be examined. During the risk assessment process, the level of harm will be assessed.What materials or situations do I come into contact with? Possibilities could include:What materials or equipment could I be struck by?Moving objects (such as forklifts, overhead cranes, vehicles).Flying objects (such as sparks or shards from grinding).Falling material (such as tools and equipment from above).What objects or equipment could strike or hit my body, or that part of my body might be caught in, on, or between?Stationary or moving objects.Protruding objects.Sharp or jagged edges.Pinch points on machines (places where parts are very close together).Objects that stick out (protrude)Moving objects (conveyors, chains, belts, ropes, etc.)What could I fall from? (falls to lower levels)What could I slip or trip on? (falls on the same level)Obstructions on the floor and stairs.Surface issues (wet, oily, icy, uneven).Footwear that is in poor condition.How could I overexert myself?What other situations could I come across? Back to top It may be necessary to research what could be a hazard as well as how much harm that hazard might cause. Sources of information include:Safety Data Sheets (SDSs).Manufacturer's operating instructions, manuals, etc.Test or monitor for exposure (occupational hygiene testing such as chemical or noise exposure).Results of any job safety analysis.Experiences of other organizations similar to yours.Trade or safety associations.Information, publications, alerts, etc., published by reputable organizations, labour unions, or government agencies.Subject matter experts, stakeholders, and workers.Physical demands analysis, job demands analysis.Past experiences, statistics, and incident reports. Back to top If you are new to that task or to your workplace, to learn about the hazards of your job, you can:Ask your supervisor.Ask a member of the health and safety committee or your health and safety representative.Ask about standard operating procedures and precautions for your job.Check product labels and safety data sheets.Pay attention to signs and other warnings in your work.Watch for posters or instructions at the entrance of a chemical storage room that warn of hazardous products.Ask about operating instructions, safe work procedures, processes, etc.Ask to review the risk assessment and relevant procedures before starting work. Fact sheet first published: 2018-05-04 Fact sheet last revised: 2025-03-12 Back to top The hierarchy of controls is a step-by-step approach to eliminating or reducing workplace hazards. It ranks controls from the most effective level of protection to the least effective level of protection. When choosing a control method, start from the top of the inverted pyramid. Assess the feasibility of the first layer of controls (elimination) before moving on to the second layer (substitution). Continue this process until you reach the bottom of the pyramid and have identified as many controls as needed to adequately protect the worker from the hazard.The hierarchy of controls is shown in the graphic below.Figure 1: Hierarchy of ControlSome sources may use a variation of this hierarchy of controls. For example, the CSA Standard 1002-12 (R2022): Occupational health and safety – Hazard identification and elimination and risk assessment and control includes a layer called "systems that increase awareness of potential hazards". For example, visual or audible alarms or warning signs. This systems layer is placed in between engineering controls and administrative controls.Regardless of the number of layers included, the hierarchy should be considered in the order presented (it is always best to try to eliminate the hazard first, etc.). Back to top Elimination is the process of removing the hazard from the workplace. It is the most effective way to control a risk because the hazard is no longer present. It is the preferred way to control a hazard and should be used whenever possible.Examples of elimination control methods include:Purchasing equipment that is not noisyUsing a reach pole, where feasible, for window washing to eliminate working from heightsRemoving and properly disposing of products that are stored in the workplace and are no longer being usedAvoiding driving during extreme winter weather conditions Back to top If eliminating a hazard is not possible, substitution is the next control method that should be considered.Substitution is the act of replacing something with another thing… in this case, a hazard is replaced with a less hazardous one. The hazards and risks associated with an alternative must be thoroughly assessed to determine if it is an appropriate replacement. Care must be taken to make sure that the new hazard is actually lower, and that one hazard is not being replaced with another that is just as harmful or more harmful. Examples of substitution controls include:Replacing solvent-based paints with a water-based alternativeUsing a larger granule form of a product instead of a fine powder to reduce dust generationUsing electric motors rather than diesel ones to eliminate diesel exhaust emissionsSubstitution is often used when workers are exposed to hazardous products. Table 1 below provides some examples:Table 1: Sample Chemical SubstitutionsInstead Of:Consider:carbon tetrachloride (causes liver damage, cancer)1,1,1-trichloroethane, dichloromethanebenzene (causes cancer)toluene, cyclohexane, ketonespesticides (causes various effects on body)"natural" pesticides such as pyrethrinsorganic solvents (causes various effects on body)water-detergent solutionsleaded glazes, paints, pigments (causes various effects on body)versions that do not contain leadsandstone grinding wheels (causes severe respiratory illness due to silica)synthetic grinding wheels such as aluminum oxideRemember, however, that you need to make sure the substitute product will not cause any harmful effects, and to control and monitor exposures to make sure that the replacement product is below occupational exposure limits.Another type of substitution includes using the same chemical but to use it in a different form. For example, a dry, dusty powder may be a significant inhalation hazard but if this material can be purchased and used as pellets or crystals, there may be less dust in the air and therefore less exposure. Back to top Engineering controls are methods that will control the hazard at the source, before it comes in contact with the worker. Engineering controls can be built into the design of a plant, equipment, or process to minimize the hazard. Engineering controls are a very reliable way to control worker exposures as long as the controls are designed, used, and maintained properly. Examples of engineering controls are:Isolation – separating workers from the hazard by distance or the use of barriersEnclosures – placing the material or process in a closed system (e.g., enclosed machines, booths, etc.)Guarding and shielding – using guards around moving parts of machineryVentilation – using local exhaust or general dilution ventilation to remove or reduce airborne productsMechanical lifting devices– using mechanical methods to lift or move objects instead of manual liftingGuardrails – using guardrails to prevent a fallMore information on engineering controls includes the following:Process ControlProcess control involves changing the way a job activity or process is done to reduce the risk. Monitoring should be done before and as well as after the change is implemented to make sure the changes did, in fact, control the hazard.Examples of process changes include to:Use wet methods rather than dry when drilling or grinding. "Wet method" means that water is sprayed over a dusty surface to keep dust levels down or material is mixed with water to prevent dust from being created.Use steam cleaning instead of solvent degreasing (but be sure to evaluate the potential high-temperature hazard being introduced, such as heat stress).Float "balls" on open-surface tanks that contain solvents (e.g., degreasing operations) to reduce solvent surface area and lower solvent loss.Instead of conventional spray painting, try to dip, paint with a brush, or use "airless" spray paint methods. These methods will reduce the amount of paint that is released into the air.Decrease the temperature of a process so that less vapour is released.Use automation - the less workers have to handle or use the materials, the less potential there is for exposure.Use mechanical transportation rather than manual methods.Enclosure and IsolationThese methods aim to keep the chemical "in" and the worker "out" (or vice versa).An enclosure keeps a selected hazard "physically" away from the worker. Enclosed equipment, for example, is tightly sealed and it is typically only opened for cleaning or maintenance. Other examples include "glove boxes" (where a chemical is in a ventilated and enclosed space, and the employee works with the material by using gloves that are built-in), abrasive blasting cabinets, or remote control devices. Care must be taken when the enclosure is opened for maintenance as exposure could occur if adequate precautions are not taken. The enclosure itself must be well maintained to prevent leaks.Isolation places the hazardous process "geographically" away from the majority of the workers. Common isolation techniques are to create a contaminant-free or noise-free booth either around the equipment or around the employee workstations.VentilationVentilation is a method of control that "adds" and "removes" air in the work environment. General or dilution ventilation can remove or dilute an air contaminant if designed properly. Local exhaust ventilation is designed to remove the contaminant at the source so it cannot disperse into the work space, and it generally uses lower exhaust rates than general ventilation (general ventilation usually exchanges the air in the entire room).Local exhaust ventilation is an effective means of controlling hazardous exposures but should be used when other methods (such as elimination or substitution) are not possible.Figure 3 Example of Local Exhaust VentilationThe design of a ventilation system is very important and must match the particular process and product in use. Expert guidance should be sought. It is a very effective control measure but only if it is designed, tested, and maintained properly.Because products are exhausted to the outdoors, you should also check with your local environment ministry or municipality for any environmental air regulations or bylaws that may apply in your area. Back to top Administrative controls involve developing procedures to ensure the work is conducted in a way that minimizes the hazard. Examples include developing or changing policies, implementing or improving training and education, and developing or enhancing work practices and procedures.Administrative controls are ranked lower than elimination, substitution, and engineering controls because these methods do not necessarily remove or reduce the hazard from the workplace. For example, administrative controls limit workers' exposures by scheduling shorter work times in contaminant areas or by implementing other "rules". These control measures have many limitations because the hazard itself is not actually removed or reduced. Administrative controls should be used in combination with other control measures where possible. Methods of administrative control include:Using job-rotation schedules or a work-rest schedule that limits the amount of time an individual worker is exposed to a substance.Implementing a preventative maintenance program to keep equipment in proper working orderScheduling maintenance and other high-exposure operations for times when few workers are present (such as evenings and weekends).Restricting access to a work area.Restricting the task to only those competent or qualified to perform the work.Using signs to warn workers of a hazard.More information about types of administrative controls is provided below:Work PracticesElements of safe work practices include:Developing and implementing safe work procedures or standard operating procedures.Training and education of employees about the operating procedures as well as other necessary workplace training (including WHMIS).Establishing and maintaining good housekeeping programs.Keeping equipment well maintained.Preparing and training for emergency response for incidents such as spills, fire, or employee injury.Education and TrainingEmployee education and training on how to conduct their work safely is a critical element of any complete workplace health and safety program. Training must cover not only how to do the job safely but it must also ensure that workers understand the hazards and risks of their job, and the controls in place to protect them. It must also provide them with information on how to protect themselves and co-workers.Good HousekeepingGood housekeeping is essential to prevent the accumulation of hazardous or toxic materials (e.g., build-up of dust or contaminant on ledges, or beams), or hazardous conditions (e.g., poor stockpiling).For more information about workplace housekeeping, please see the OSH Answers document Workplace Housekeeping - Basic Guide.For more information about combustible dust, please see the OSH Answers document Combustible Dusts.Figure 4Emergency PreparednessBeing prepared for emergencies means making sure that the necessary equipment and supplies are readily available and that employees know what to do when something unplanned happens such as a release, spill, fire, or injury. These procedures should be written and employees should have the opportunity to practice their emergency response skills regularly.Please see the OSH Answers document on emergency planning for more information.Personal Hygiene Practices and FacilitiesPersonal hygiene practices are another effective way to reduce the amount of a hazardous material absorbed, ingested, or inhaled by a worker.Examples of personal hygiene practices include:Washing hands after handling material and before eating, drinking or smoking.Avoiding touching lips, nose, and eyes with contaminated hands.No smoking, drinking, chewing gum or eating in the work areas - these activities should be permitted only in a "clean" area.Not storing hazardous products in the same refrigerator as food items.Please see the OSH Answers documents on Workplace Housekeeping, Hand Washing: Reducing the Risk of Common Infections and Good Hygiene Practices - Reducing the Spread of Infections and Viruses for more information. Back to top Personal protective equipment (PPE) refers to anything workers wear to help protect them from workplace hazards. The use of PPE as the main method to control exposures should be limited to situations where elimination, substitution, engineering, or administrative controls are not practicable, or when:Additional protection is required because other control methods are not sufficient to reduce the hazardThe hazard is a result of a temporary or emergency conditionPPE limits exposure to the harmful effects of a hazard but only if the PPE is worn and used correctly. Examples of PPE include:Respiratory protectionSkin protection (e.g., coveralls, aprons, full body suits)GlovesEye protection (e.g., face shield, goggles)Foot protectionHearing protective devices (e.g., ear plugs, ear muffs)The choice of what type of PPE is required must be based on the specific hazard found at the workplace.No matter which type of PPE is used, it is essential to have a complete PPE program in place. For more information about PPE programs, please see the following document Designing an Effective PPE Program. Back to top Yes. Sometimes a hazard cannot be controlled using a single type of control method. If a hazard cannot be eliminated, a combination of controls may be required. For example:Using a scissor lift instead of a ladder (substitution). Workers should be trained on the safe use of the equipment and follow safe work procedures (administrative controls). When working at heights, workers should also use PPE, including a full body harness and lanyard attached to an anchor point, there is a risk of injury from falling. Driving in the winter for work. Controls may include not driving during extreme winter weather (elimination), determining if there are any other options for driving, such as public transit (substation), use of winter tires (engineering), and driver training (administrative). Back to top Yes. It is important to determine the effectiveness of the control methods implemented and adjust as required.Controls must not create new hazards. For example, if wearing PPE contributes to other hazards (e.g., heat stress), then it is important to review if other control methods are possible or if additional precautions are needed. Monitor both the hazard and the control method to make sure that the control is working effectively and that exposure to the hazard is reduced or eliminated. Consider the following questions:Have the controls effectively eliminated or reduced worker exposure?Have any new hazards been created?Are new hazards appropriately controlled?Are any other methods required?Are workers trained on the control methods?What else can be done to eliminate or reduce exposure?If there is a change at the workplace, does this impact the hazard or the control methods? Back to top After hazards are identified, the risks associated with those hazards should be systematically reviewed to ensure those things, activities, situations, processes, tasks, etc. that cause harm to people or property are controlled. One way to ensure that all risks are evaluated in the same way is to use a risk assessment form. This procedure should be carried out by someone who is experienced and fully familiar with the activity (e.g., a "competent person").Please note: see the OSH Answers Risk Assessment for more information about risk assessments in general, and how to rank hazards. Back to top There is no one way to assess risks, and there are many risk assessment tools and techniques that can be used. Choose the method that best matches your situation. In all cases, the risk assessment should be completed for any activity, task, etc. before the activity begins.StepActionDeliverable1Identify hazards and their potential for causing harm.An inventory of hazards.2Assess the risk of each hazard and rank hazards by priority (consider the probability of harm and severity of harm). A ranked list of hazards. This list will be useful in planning further action.3Determine hazard control measures.1. A record of hazard control measures at various locations.2. Evaluation of the adequacy of hazard control measures.Consider the hierarchy of controls, and controls required or recommended by legislation, standards, good practices, or organizational policies.4Implement hazard controls.Controls are in place and functioning appropriately.5Measure the effectiveness of controls.Monitor periodically to confirm controls continue to function effectively.6Make changes to improve continuously.Monitor for improvements. Back to top The following is a sample. Be sure to customize it for your needs at your workplace. How you actually assess the risks can vary from situation to situation, and may include the technique of brainstorming, or using a checklist or a risk matrix. Document the process used, and how decisions were reached.Sample Risk Assessment FormName of person(s) doing assessment:____Date:

____Location:____Job, activity, task or procedure being assessed:____Hazards, Risks, and Controls:List details about each identified hazard below, including the step or task they are associated with, what they are and who they may impact, what the potential consequences are if workers are exposed to the hazard, the level risk (e.g., can use risk matrix below), the priority (hazards with the highest risk should be the top priority to address), and what are the recommended hazard controls to eliminate or reduce the risk.   Step or taskHazardConsequences or harmRiskPriorityHazard ControlsEXAMPLE:Working at heights while on a ladderSafety hazard: falling from heights Serious injury due to a fall High risk 1 Follow the hierarchy of controls for working at heights Elimination: when possible, perform work from the ground.Engineering controls: use an elevating work platform when appropriate.Administrative controls: development of fall protection plans, safe work procedures, emergency response plans for working at heights, and adequate training (including working heights and fall protection training, elevating work platform training, ladder safety, training on safe work procedures and emergency response, etc.). Personal protective equipment: fall arrest system and equipment, head protection, high-visibility clothing, protective footwear, face and eye protection, emergency response equipment, and other appropriate equipment for the job.   Additional Notes:____Signature of health and safety committee or representative:____Signature of assessor(s):____Date completed:____Example Risk Matrix: Low SeverityMedium SeverityHigh SeverityLow ProbabilityVery Low RiskLow RiskMedium RiskMedium ProbabilityLow RiskHigh RiskHigh RiskHigh ProbabilityMedium RiskHigh RiskImmediately DangerousSeverity ratings:High severity: fatal disease or injury, permanent disability, irreversible health effects, major fracture, poisoning, significant loss of blood, or serious head injury.Medium severity: sprain, strain, localized burn, dermatitis, asthma, injury requiring limited days off workLow severity: an injury that requires first aid only; short-term pain, irritation, or dizzinessProbability ratings:High probability: likely to be experienced once a year or more by an individualMedium probability: may be experienced once every five years by an individualLow probability: may occur once during a working lifetime Fact sheet last revised: 2025-01-21 Back to top Housekeeping in a hotel is a very physically demanding job that includes many, varied tasks.NOTE: This document discusses the health and safety aspects of hotel housekeeping involving repetitive motion injuries (RMIs). If you are seeking a job in housekeeping, it is recommended that you contact the organization you wish to work for directly. Some job offers are available through services such as Job Bank Canada.Based on a case study, housekeepers were typically responsible for cleaning 16 rooms per shift. The actual amount of work depends on the size of the room and the number of beds. A housekeeper needs between fifteen and thirty minutes to do one room. A housekeeper carries out the following tasks:making beds (Figures 1a, 1b, 1c)tidying rooms (Figure 2)cleaning and polishing toilets, taps, sinks, bathtubs and mirrors (Figures 3a, 3b)washing floorsremoving stainsvacuumingFigure 2 - Tidying a roomFigure 3a - Cleaning Back to top The main risk factors for repetitive motion injuries (RMIs) in housekeeping are:heavy physical workload and excessive bodily motions which are a high risk for back injuriesforceful upper limb motions in awkward positions which are a high risk for neck or shoulder and arm injuriesSpace limitations require workers to use many uncomfortable postures. These are:standing or walkingstoopingsquattingkneelingstretchingreachingbendingtwistingcrouchingA housekeeper changes body position every three seconds while cleaning a room. If we assume that the average cleaning time for each room is twenty-five minutes, we can estimate that a housekeeper assumes 8,000 different body postures every shift.In addition, forceful movements while using awkward body positions include lifting mattresses, cleaning tiles, and vacuuming every shift. Housekeeping is a physically demanding and very tiring job. It can be classified as "moderately heavy" to "heavy" work because the energy required is approximately 4 kilocalories per minute (4kcal/min). Back to top Hotel housekeepers work in a unique place. Hotels are usually designed for the comfort of their guests rather than their housekeeping staff. This fact makes it very difficult to improve working conditions for housekeepers by means of better engineering. However, some improvements can be made by selecting more appropriate equipment.Lighter vacuum cleaners (preferably the self-propelling type), and lighter service carts with wheels designed for carpeted floors would ease the workload for their operators providing this equipment is always kept in good repair. When new vacuum cleaners are purchased, low noise emissions should be one of the criteria.Improving the body postures that pose a major risk for musculoskeletal disorders seems an unachievable task. Again, this fact results from the peculiarity of hotels as a workplace. To attract guests and remain competitive, hotel management pursues a policy that everything should be "so clean it sparkles". Floors, walls, windows, mirrors, and bathroom fixtures might be adequately cleaned with some form of an extension tool to reduce bending and over-stretching. However, the demand for spotless cleanliness and hygiene, management often requires their cleaning staff to spend extra time and effort cleaning by kneeling, leaning, squatting, crouching, slouching and stretching. These postures will, in time, contribute to new musculoskeletal injuries and aggravate old ones.New approaches, other than strictly ergonomic ones, need to be investigated. For example, action can be taken from the administrative level. Options for improvement include:job rotationjob enrichment and job enlargementteam workeducation and training on work practices Back to top Job rotation is one possible approach. It requires workers to move between different tasks, at fixed or irregular periods. However, it must be a rotation where workers do something completely different. Different tasks must use different muscle groups to allow muscles already stressed to recover. Back to top Another approach is job enlargement. This approach increases the variety of tasks built into the job. It breaks the monotony of the job and avoids overloading one part of the body. Job enrichment involves more autonomy and control for the worker. Back to top Team work can provide greater variety and more evenly distributed muscular work. The whole team is involved in the planning of the work. Each team member carries out a set of operations to complete the whole product, allowing the worker to alternate between tasks. This approach reduces the risk of RMI. Back to top A well-designed job, supported by a well-designed workplace and proper tools, allows the worker to avoid unnecessary motion of the neck, shoulders and upper limbs. However, the actual performance of the tasks depends on individuals.Training should be provided for workers who are involved with housekeeping activities. It is important that housekeeping staff be informed about hazards in the workplace, including the risk of injuries to the musculoskeletal system. Therefore, identification of the hazards for such injury at any given hotel is fundamental.Individual work practices, including lifting habits, are shaped by proper training. Training should encourage employers and workers to adopt methods that reduce fatigue. For example, it is advisable to plan one's workload and do the heavier tasks at the beginning of the workshift, rather than at the end, when fatigue is at its maximum. When a person is tired, the risk of injuring a muscle is higher.Training should also explain the health hazards of improper lifting and give recommendations on what a worker can do to improve lifting positions. Training should also emphasize the importance of rest periods for the workers' health and explain how active rest can do more for keeping workers healthy than passive rest. The effect of such training can reach far beyond occupational situations because the workers can apply this knowledge also in their off-job activities. Back to top In additional to the ergonomic hazards, hotel housekeepers are exposed to chemical, biological and physical hazards including: Back to top Know potential hazards of your workplace and the activities you perform.Learn and use safe lifting techniques.Wear proper protective equipment when handling cleaning products.Wash your hands frequently -- an important step in preventing infection.Always wear appropriate personal protective equipment for the task.Wear shoes with non-skid soles.Know emergency contact numbers and keep them immediately available.Keep carts in good repair, check wheels and weight distribution of supplies.Use long handled tools such as dusters and mops to avoid bending and stretching.Review safety data sheet (SDS) for cleaning products and follow instructions for safe use and storage.Provide training on bloodborne pathogens and practices to follow if needles or bodily fluids are encountered in the hotel room. Have a sharps disposal container on the cart for needles and sharps. Back to top Practice safe lifting techniques.Follow or establish safety procedures for working alone, or for avoiding working alone wherever possible.Get current training on chemical hazards, WHMIS and SDSs.Know basic and emergency first aid.Follow company safety rules.Know how to report hazards.Practice good housekeeping procedures.Follow routine practices when handling linens and towels.Alternate arms when performing manual tasks.Take scheduled breaks and stretch breaks as necessary.The Canadian Centre for Occupational Health and Safety in cooperation with the Government of Newfoundland and Labrador, Department of Employment and Labour Relations, Occupational Health and Safety Branch would like to acknowledge the participation of the staff at the Hotel Newfoundland (a Canadian Pacific Hotel) who so freely gave their time and resources to assist us in the development of this case study. This case study was organized to examine repetitive motion injuries. Fact sheet confirmed current: 2025-01-21 Fact sheet last revised: 2020-01-02 Back to top The meaning of the word hazard can be confusing. Often dictionaries do not give specific definitions or combine it with the term "risk". For example, one dictionary defines hazard as "a danger or risk" which helps explain why many people use the terms interchangeably. There are many definitions for hazard but the most common definition when talking about workplace health and safety is: A hazard is any source of potential damage, harm or adverse health effects on something or someone. Basically, a hazard is the potential for harm or an adverse effect (for example, to people as health effects, to organizations as property or equipment losses, or to the environment). Sometimes the resulting harm is referred to as the hazard instead of the actual source of the hazard. For example, the disease tuberculosis (TB) might be called a "hazard" by some but, in general, the TB-causing bacteria (Mycobacterium tuberculosis) would be considered the "hazard" or "hazardous biological agent". Back to top Workplace hazards can come from a wide range of sources. General examples include any substance, material, process, practice, etc. that has the ability to cause harm or adverse health effect to a person or property. See Table 1. Table 1 Examples of Hazards and Their Effects Workplace Hazard Example of Hazard Example of Harm Caused Thing Knife Cut Substance Benzene Leukemia Material Mycobacterium tuberculosis Tuberculosis Source of Energy Electricity Shock, electrocution Condition Wet floor Slips, falls Process Welding Metal fume fever Practice Hard rock mining Silicosis Behaviour Bullying Anxiety, fear, depression Workplace hazards also include practices or conditions that release uncontrolled energy like: an object that could fall from a height (potential or gravitational energy), a run-away chemical reaction (chemical energy), the release of compressed gas or steam (pressure; high temperature), entanglement of hair or clothing in rotating equipment (kinetic energy), or contact with electrodes of a battery or capacitor (electrical energy). Please see the OSH Answers on Hazard Identification for more information. Back to top Risk is the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard. It may also apply to situations with property or equipment loss, or harmful effects on the environment. For example: the risk of developing cancer from smoking cigarettes could be expressed as: "cigarette smokers are 12 times (for example) more likely to die of lung cancer than non-smokers", or "the number per 100,000 smokers who will develop lung cancer" (actual number depends on factors such as their age and how many years they have been smoking). These risks are expressed as a probability or likelihood of developing a disease or getting injured, whereas hazard refers to the agent responsible (i.e. smoking). Factors that influence the degree or likelihood of risk are: the nature of the exposure: how much a person is exposed to a hazardous thing or condition (e.g., several times a day or once a year), how the person is exposed (e.g., breathing in a vapour, skin contact), and the severity of the effect. For example, one substance may cause skin cancer, while another may cause skin irritation. Cancer is a much more serious effect than irritation. Back to top Risk assessment is the process where you: Identify hazards and risk factors that have the potential to cause harm (hazard identification). Analyze and evaluate the risk associated with that hazard (risk analysis, and risk evaluation). Determine appropriate ways to eliminate the hazard, or control the risk when the hazard cannot be eliminated (risk control). The OSH Answers document on Risk Assessment has details on how to conduct an assessment and establish priorities. Back to top It is common to see the process of identifying hazards and assessing the corresponding risk to be described in various ways, including "hazard assessment", "hazard and risk assessment", "all hazards risk assessment", etc. Regardless of the terminology used, the critical steps are to make sure the workplace has taken a systematic approach that looks for any hazards (existing or potential), has taken appropriate steps to determine the level of risk of these hazards, and then taken measures to control the risk or eliminate the hazard. Documentation from CCOHS will use the terms "hazard identification " and "risk assessment " to describe the process of first looking for hazards, then determining the level of risk from that hazard. Hazard control describes the steps that can be taken to protect workers and the workplace. Back to top A general definition of adverse health effect is "any change in body function or the structures of cells that can lead to disease or health problems". Adverse health effects include: bodily injury, disease, change in the way the body functions, grows, or develops, effects on a developing fetus (teratogenic effects, fetotoxic effects), effects on children, grandchildren, etc. (inheritable genetic effects) decrease in life span, change in mental condition resulting from stress, traumatic experiences, exposure to solvents, and so on, and effects on the ability to accommodate additional stress. Back to top Not necessarily. To answer this question, you need to know: what hazards are present, how a person is exposed (route of exposure, as well as how often and how much exposure occurred), what kind of effect could result from the specific exposure a person experienced, the risk (or likelihood) that exposure to a hazardous thing or condition would cause an injury, or disease or some incidence causing damage, and how severe would the damage, injury or harm (adverse health effect) be from the exposure. The effects can be acute, meaning that the injury or harm can occur or be felt as soon as a person comes in contact with the hazardous agent (e.g., a splash of acid in a person's eyes). Some responses may be chronic (delayed). For example, exposure to poison ivy may cause red swelling on the skin two to six hours after contact with the plant. On the other hand, longer delays are possible: mesothelioma, a kind of cancer in the lining of the lung cavity, can develop 20 years or more after exposure to asbestos. Once the hazard is removed or eliminated, the effects may be reversible or irreversible (permanent). For example, a hazard may cause an injury that can heal completely (reversible) or result in an untreatable disease (irreversible). Back to top A common way to classify hazards is by category: biological - bacteria, viruses, insects, plants, birds, animals, and humans, etc., chemical - depends on the physical, chemical and toxic properties of the chemical, ergonomic - repetitive movements, improper set up of workstation, etc., physical - radiation, magnetic fields, pressure extremes (high pressure or vacuum), noise, etc., psychosocial - stress, violence, etc., safety - slipping/tripping hazards, inappropriate machine guarding, equipment malfunctions or breakdowns. Fact sheet last revised: 2020-07-10 Back to top Machines are used to cut, shape, press, move, spin, or exert force. Industries that use machines include manufacturing, construction, machine shops with metalworking equipment, and woodshops with woodworking equipment. However, convenience, gas, food stores, department stores, warehouses and others have bread slicers, meat slicers, mixers, conveyors, cardboard crushing machines, and other similar devices that could be a hazard. Hazards associated with working near or on machinery vary depending on the exact machine used but can include exposure to:moving parts (e.g., risk of injuries from entanglement, friction, abrasion, cutting, severing, shearing, stabbing, puncturing, impact, crushing, drawing-in or trapping, etc.)energy (e.g., electrical, electromagnetic, magnetic, etc.)heat or coldnoisevibrationradiationgas or liquid under pressure (e.g., injuries from injection or ejection by hydraulic systems, pneumatic systems, compressed air, paint sprayers, etc.)psychosocial hazards (e.g., stress, job content, work organization, cognitive factors, etc.)Because there are many different types of machines and processes, a risk assessment should be conducted for each machine or situation, and in some cases, before each use. It may be necessary to involve individuals with specialized or technical expertise (i.e., engineer, safety professional, manufacturer, etc).Note: Please also see the OSH Answers on Safeguarding – General for more information. Back to top Each piece of powered equipment should be assessed using the following process:Understand how the machine is designed.Understand how to use the machine safely.Identify all tasks performed by and associated with the machine:What hazards may occur from the use and misuse of the machine?What moving parts and corresponding safeguards are currently in place?Identify who will be using the machine, and how often the machine will be used.Determine what materials are used with the machine (e.g., sheet metal, wood, metalworking fluid, oil, etc.).Estimate the risk of each hazard by considering the:The severity of possible injuries and or incidents, andProbability or likelihood of occurrence.Eliminate the hazard(s) where possible.Use protective measures to control the risk of each hazard including considering:the design,safeguarding and protective devices,administrative controls, orother measures.Re-assess to estimate the new risk level.Repeat the process if the risk level has not been eliminated or effectively controlled. Back to top The severity of the injury can be determined by asking two main questions:What type of mechanical or other hazard is involved?What type(s) of injury could happen?The probability of the injury should be determined by reviewing information about the machine's operation such as:exposure to a machine that could cause the injury while working with or around the machine (e.g., entanglement, contact with the blade, etc.)potential human behaviour while performing these tasksreports of machine breakdowns, etc.These three factors can be combined to determine the probability of injury from a particular task. Determine a risk rating for each type of injury by assuming no protective measures have been installed on the machine. This evaluation will help when determine if sufficient action has been taken to prevent injury. The OSH Answers on risk assessment has more information about the risk rating process. Back to top The following checklist will help identify hazards in your workplace. It is important to tailor the information to your workplace and add any additional items as necessary.Possible HazardCheck OneNotesOKNeeds InvestigationMachineIdentify the use and limits of the machine by considering: production rates and cycle timesintended use of the machinetypes of materials usedtypes of tools usedconsidering the parts of the machine operators and workers in the vicinity of the machine... Identify the expected life or wear of machine parts... Identify all the "in-running nip points" on the machine... Identify all points where a worker could come in contact with pressurized liquids or gases... Identify all the pinch points on the machine... Identify all sharp edges and angular parts that protrude... Identify all entanglement hazards... Identify all moving parts that could strike a worker... Identify all work that may need to be done on the machine during set up, maintenance, and cleaning... Identify where a worker could slip or fall... Identify other possible hazards, for example vibration or noise... Identify potential ergonomic issues in the operation of the machine. Make sure that the: worker does not have to reach excessivelyworker does not have to use excessive forceworker does not have to perform high frequency movementsmachine cycle is based upon worker capacity, not visa versaworker can perform work in several positions that promote a neutral body positionwork surface is adjustableworker has sufficient room to move without striking anything   Fact sheet first published: 2018-01-29 Fact sheet last revised: 2025-01-27