Health and safety in cannabis cultivation

Cannabis cultivation is a dynamic industry. Working in cannabis cultivation, however, can be hazardous. Workers are at risk from improperly handled or stored chemicals, unsuitable lighting, or electrical accidents. They are also at risk of musculoskeletal injuries (e.g., sprains and strains). Workplace incidents can result in pain and suffering, disability, and stress. This can be financially devastating to workers and employers. Costs may include claims costs, increased insurance premiums, and damage to property.

As an employer, you are responsible for ensuring the health and safety of your workers, including contracted workers. This includes identifying hazards and assessing and controlling risks to effectively protect workers. You are also required to establish some form of occupational health and safety program. This information sheet will give you an overview of how to meet these requirements. It also describes specific hazards faced by workers in the cannabis cultivation industry.

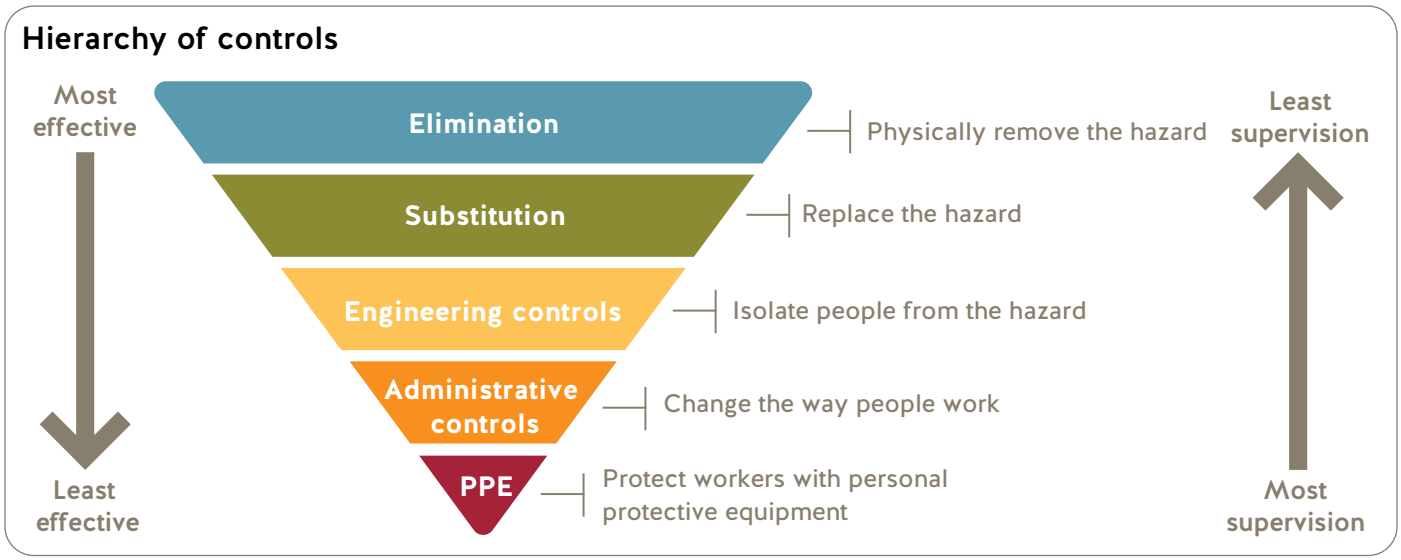
First, it is helpful to understand the difference between hazards and risks. A *hazard* is any source of potential harm, adverse health effects, or damage (to property, equipment, etc.). A hazard can be a chemical, a biological agent, or an inanimate object. *Risk* is the chance or probability that the harm, adverse effects, or damage could occur from the hazard. Without adequate controls, the risk increases.

By working with your joint health and safety committee and workers, you can identify hazards and assess risks in your work activities. You can then establish adequate controls to reduce the risks.

Managing health and safety risks

To manage health and safety risks in your cannabis cultivation operation, think about what could harm your workers. Then, determine whether you're taking reasonable steps to prevent that from happening. There are three steps to managing health and safety risks:

1. **Identify hazards.** This starts with a workplace inspection. You may also review safety data sheets and manufacturers' instructions. You should refer to set exposure limits, standards, or guides, if available. Observe how workers are doing their tasks. Talk to your workers about tasks or procedures that are awkward, uncomfortable, or raise any other health and safety concerns. You may come across the following hazards in your operation:
   - Cleaners
   - Sanitizers
   - Fertilizers
   - Pesticides
   - Bacteria
   - Moulds
   - Inhalable particulates
   - Ultraviolet lighting
   - Infrared lighting
   - Heat
   - Electricity
   - Carbon dioxide
   - Repetitive motions
   - Awkward postures
   - Heavy lifting



2. **Assess risks.** This will help you prioritize hazards that may require immediate attention. It will also help you determine where control measures may be needed. Look at how likely an incident is to occur and how serious it may be. Ask yourself the following questions:
   - Could this process or activity result in an incident?
   - If this were to happen, what is the worst-case scenario?
   - What could happen in emergency or upset conditions?

   To answer these questions, you may refer to incident investigations. You could research health and safety information. You may also need to monitor for exposures and take air or other samples to assess the risk.
3. **Control risks.** Next, you need to find ways to control and mitigate the risks. Address the hazards that have the highest risk first. Controls must meet the needs of the operation and be effective, reliable, and durable. Controls may use engineering practices such as local exhaust ventilation, audio and visual monitoring systems, or barriers. Some controls may be procedural and involve documented inspections, maintenance plans, or safe work procedures. If all other controls are not sufficient, personal protective equipment (PPE) may be required. Follow the hierarchy of controls (see graphic above) to make the most appropriate and reliable selection.

Hierarchy of controls

When considering how to reduce risks, there's a certain order you should follow. This is called the hierarchy of controls. If possible, eliminate the hazard entirely. If that's unrealistic, control risks as much as possible by systematically moving down the hierarchy. PPE options may seem easy, but they are the least effective, require the most supervision, and do not address the hazard directly. They should only be used when no other methods are available or adequate to control exposures.

Common hazards in cannabis cultivation

Cleaning and sanitizing chemicals

Many chemicals, such as cleaning solvents and sanitizers, are used in cannabis cultivation. Exposure to these chemicals can result in health effects ranging from minor skin irritation to serious injury or disease. You must implement effective controls for the safe storage and handling of these hazardous products. If flammable liquids are used for manual cleaning, you must try to find a substitute that is not flammable.

All B.C. workplaces that use hazardous products must follow the Workplace Hazardous Materials Information System (WHMIS). The system provides information on handling, storing, and disposing of hazardous products. This information is provided

on labels and safety data sheets (SDSs). You must ensure workers are trained in WHMIS 2015 as well as in the hazards, controls, storage, and use of hazardous products.

You may need an exposure control plan (ECP) for hazardous chemicals, biological agents, pesticides, and non-ionizing radiation. An ECP may be required if a worker may be overexposed or if the substance is a designated substance, such as a carcinogen, reproductive toxin, or sensitizer. (For more information on ECPs and designated substances, see **sections 5.54 and 5.57** of the Occupational Health and Safety Regulation.) An ECP is a good tool for training workers and can help ensure adequate controls are in place. You can find sample ECPs on worksafebc.com by doing a search for "exposure control plan."

Fertilizers and nutrients

Fertilizers often contain toxic chemicals that can be irritating to the skin and eyes. They may also pose a risk of fire if they are not handled properly. When incompatible materials are stored incorrectly or mixed, chemical reactions may result. These reactions can cause injury, illness, or fire. You need to identify the hazards specific to the fertilizers used at your workplace. You should understand how exposures, fires, or explosions may occur and implement effective controls. This information may be available in the manufacturer's instructions or in SDSs.

The Regulation has specific requirements for chemicals in Part 5, Chemical Agents and Biological Agents.

Controls to reduce the risk of exposure to hazardous chemicals

- Obtain SDSs and technical specifications for all chemicals used. An updated SDS is required every three years.
- Read and follow the SDSs and technical specifications.
- Substitute a less hazardous product if possible.
- Use engineering controls to reduce exposure. Examples of these controls include enclosed cleaning systems and nozzles that produce fewer aerosols (tiny airborne droplets).
- Put in place safe work procedures that follow the manufacturer's instructions for handling, mixing, use, and disposal.
- Label all containers, including containers that the product has been transferred into (such as spray bottles or buckets).
- Store chemicals in a properly ventilated area. Post warning signs for the chemical storage area. Store flammable chemicals in a well-ventilated area with approved fire protection. Control all sources of ignition in the area.
- Ensure storage materials are fire resistant and do not allow fluids to pass through them.
- Do not store incompatible materials near each other. For example, store acids and bases in separate areas.
- Limit quantities outside of the storage area. Only have the amounts that are readily needed.
- Use PPE as recommended by the manufacturer (e.g., respirators, goggles, face shields, boots, gloves, and splash-resistant clothing).
- Wash gloves under water before removing them. Wash hands after removing gloves.
- If required, ensure emergency eyewash stations and showers are near the chemical storage and mixing areas.
- Include in your emergency response plan an inventory of hazardous chemicals and their locations.
- Install equipment to contain spills. Examples include berms and barriers.
- Provide spill kits with instructions for cleanup and spill response.
- Implement an adequate first aid program and provide appropriate first aid supplies.

Pesticides

Pesticides can have mild to severe toxic effects on workers. Many pesticides (such as fumigants) are absorbed through the skin. They can also be inhaled or inadvertently ingested. Workers can even be exposed without knowing it. They can come into contact with a pesticide from spray drift when it is being applied. They can also be exposed through runoff from plants or soil, or if the application area is not sealed off.

You must ensure that workers follow manufacturers' instructions and the Regulation when using pesticides. Detailed information on pesticide safety is available in the *Standard Practices for Pesticide Applicators* manual at worksafebc.com. The manual provides the basic information to build and implement a pesticide safety program.

The Regulation has specific requirements for pesticides in Part 6, Substance Specific Requirements. Some of these requirements are outlined below. See sections 6.70 to 6.109 for more information.

Controls to reduce the risk of exposure to pesticides

In addition to the risk controls for hazardous chemicals, you must do the following when working with pesticides:

- Ensure that applicators have the required certifications, depending on the pesticides used.
- Train workers on the safe storage, mixing, and application of pesticides.
- Document dates, times, and locations of use, as well as information about mixing, application, personnel, and re-entry.
- Implement procedures to restrict entry into treated areas and procedures for when the restrictions can be removed. Entry-restriction signs must be clearly visible to warn workers.
- Label the storage area and ensure it is locked or secured.
- Ensure adequate hygiene facilities, such as handwashing stations and showers, are available for workers to properly decontaminate.

Biological agents, plant material particulates, and resins

The cultivation environment can be hot and humid. This can lead to the growth of bacteria, moulds, and the toxins they may produce. These biological agents are breathing hazards, and they can cause health problems if inhaled. In addition, plant materials such as resins, proteins, and terpenes can be allergens. They can cause asthma, hives, itchy skin, and swollen or puffy eyes.

When handling product such as buds, workers' hands and surfaces (like scissors and tables) may become contaminated with residues containing active ingredients (e.g., THC, CBD, and their derivatives). In most situations, these substances are not absorbed through the skin readily enough to cause intoxication. However, workers may accidentally ingest these substances if they touch their mouths or mucous membranes. Workers should use nitrile gloves and proper handwashing techniques to minimize this exposure route. Workers should clean up spills of product promptly while wearing appropriate gloves. They may need extra protection when cleaning up large spills.

Processing plant material (e.g., grinding or milling) can generate particulates (small solid particles) that can be suspended in the air. These particles are breathing hazards, and they can cause health problems if inhaled.

Controls to reduce the risk of exposure to biological agents, particulates, and resins

- Control temperature and humidity to prevent bacterial and mould growth. This can be regulated with atmospheric controls, ventilation, and dehumidifiers.
- Use activities or methods that reduce the disturbance of biological materials.
- Use local exhaust or filtered ventilation to reduce airborne concentrations.
- Clean and sanitize frequently to reduce buildup. (Follow good housekeeping practices.)
- Ensure workers wear PPE such as coveralls, gloves, respirators, and eye protection.

Carbon dioxide enrichment

Cultivation operations often promote plant growth with carbon dioxide (CO_2). This occurs by burning fuels (e.g., from boilers) or by adding the gas from tanks of pure CO_2. High concentrations of CO_2 can displace oxygen. This can cause breathing difficulty that may lead to suffocation.

Burning fuels can also introduce unintended hazards. These hazards can include carbon monoxide, nitrogen oxides, sulfur oxides, and combustible dusts. If your operations use CO_2 enrichment, you must understand and manage the risk relating to the following:

- The use of CO_2
- The potential unintended by-products from the process

You must have an ECP and an emergency plan to help protect workers from combustion hazards.

Controls to reduce the risk of combustion hazards

- Conduct risk assessments and work process evaluations.
- Perform frequent maintenance, servicing, and inspection of equipment.
- Use combustion engines outdoors or vent exhaust to the outdoors.
- Use emission controls on equipment.
- Monitor with audio and visual warning alarms.

Lighting

Various types of lighting are used in cannabis cultivation. Examples include metal halide lights, high-pressure sodium bulbs, light-emitting diodes (LED), sulfur plasma lamps, and germicidal lamps. These types of lighting can be hazardous. They may emit ultraviolet, infrared, and blue (visible) light radiation that may be harmful to the skin and eyes.

Lighting systems can operate at extremely high temperatures. As a result, they can burn workers and cause fires. Other potential hazards from lamps include electrocution and exploding bulbs. To control exposures and fire or explosion risks, you need to identify the hazards specific to the lighting systems used at your worksite.

Part 7 of the Regulation has specific requirements for non-ionizing radiation, which includes ultraviolet and infrared light. See **sections 7.17 to 7.25** of the Regulation for more information.

Controls to reduce the risk of exposure to lighting hazards

- Inspect and maintain bulbs and fixtures frequently.
- Store combustible materials away from light sources.
- Wear PPE such as eye protection and clothing that protects the skin.
- Substitute a less-hazardous light source. For example, UVA is less hazardous than UVC.
- Put in place work rotations and schedules that reduce workers' exposure.

Electrical systems

Designing electrical systems in a cultivation operation involves considering many factors. These include the size of the operation, load demands, wire location, and environmental conditions. In addition to immediate needs, you also need to prepare for potential future needs and for emergencies. If this is not done properly, workers can be exposed to electrical hazards. These hazards can result from the use of temporary wiring, extension cords, overloaded circuits, and electrical equipment in wet environments.

Controls to reduce the risk of exposure to electrical hazards

- Consult qualified B.C. electrical engineers and electricians for electrical design and installation.
- Use a qualified electrician to service and maintain your electrical system.
- Use ground-fault circuit interrupters (GFCIs) for wet and humid environments.
- Do not use extension cords long term. Extension cords are not rated for permanent use.
- Put in place an effective de-energization and lockout program for maintenance and repairs.

Musculoskeletal injuries

Many work processes in cannabis cultivation have physical demands that may increase the risk of sprains, strains, or other musculoskeletal injuries (MSIs). These processes may include physical risk factors such as the following:

- Force (exerting force on an object as part of a task)
- Repetition (doing a task that uses the same muscles over and over with little chance for rest or recovery)
- Long duration (doing a task for a long time each workday)
- Awkward work postures (the position of different parts of the body when taken outside of the comfortable range of motion)
- Local contact stress (a hard or sharp object coming in contact with the skin)

Other factors that also influence the risk of MSI include the following:

- Workplace and workstation layout (e.g., a workstation that is too high or too low)
- Characteristics of objects handled (e.g., objects that are slippery or have no handles)
- Environmental conditions (e.g., cold temperatures)
- The way in which work is organized (e.g., having little variety in tasks)

Cannabis cultivation work processes that may involve MSI risk factors include the following:

- Manual cultivating (e.g., moving materials, pruning, watering, soil mixing, cloning, inspecting)
- Harvesting (e.g., moving materials, cutting, bucking, hanging)
- Trimming (e.g., moving materials, manual trimming, loading and unloading automated trimmers, sorting)
- Packaging (e.g., moving materials, weighing product, positioning equipment, lifting)
- Shipping and receiving (e.g., moving materials, lifting or lowering)
- Cleaning and sanitizing (e.g., manually spraying sanitizer, cleaning walls, sweeping, mopping)

You can help prevent MSIs in your workers by determining the risk factors specific to the tasks at your workplace. Then, you need to control these risk factors by designing workstations, equipment, and work processes that fit a range of workers.

Educate your workers about MSI risk factors and controls, as well as the signs and symptoms of MSIs. Encourage workers to report these signs and symptoms to their supervisors. For information on MSI signs and symptoms, see the ***Understanding the Risks of Musculoskeletal Injury (MSI)*** book at worksafebc.com.

Part 4 of the Regulation has specific requirements for ergonomics (including MSIs). See **sections 4.46 to 4.53** of the Regulation for more information.

Controls to reduce the risk of musculoskeletal injuries

- Design the layout of the workspace to minimize manual handling.
- Reduce manual handling through the use of equipment such as hoists, carts, and conveyors.
- Minimize the weights and sizes of manually handled items.
- Store heavy and frequently accessed items between knee and shoulder height.
- Reduce repetition through the use of equipment and job rotation.
- Adjust work heights to maintain neutral postures and minimize reach distances.
- Use tools that minimize awkward postures, grip force, and contact-stress points and that dampen vibration.
- Use overhead supports to take the weight of tools and hoses.
- Schedule preventive maintenance for equipment and tools.
- Mock up, test, and modify controls before implementing them. This helps ensure the best fit for the workers and the workplace.

Health and safety programs

Ensuring health and safety is a legal requirement under the *Workers Compensation Act*. All businesses must have an occupational health and safety program or a less-formal health and safety program to prevent workplace injury and disease. The type of program you need depends on the number of workers you have and the hazards at your workplace. Health and safety programs must meet certain standards. And you must exercise due diligence in taking steps to meet those standards.

As part of your program, you need health and safety plans that address specific hazards in the workplace. The following are relevant for the cannabis cultivation industry:

- Exposure control plans
- Lockout programs
- Safeguarding programs
- Fall protection plans
- Hearing conservation programs
- Musculoskeletal injury prevention programs
- Personal protective equipment programs
- Emergency preparedness plans

Regulation requirements

The most relevant parts of the Regulation for cannabis cultivation are as follows:

- Part 4, General Conditions
- Part 5, Chemical Agents and Biological Agents
- Part 6, Substance Specific Requirements
- Part 7, Noise, Vibration, Radiation and Temperature
- Part 8, Personal Protective Clothing and Equipment
- Part 10, De-energization and Lockout
- Part 19, Electrical Safety

For more information

For more information on how to meet your health and safety requirements, you can do the following:

- Go to worksafebc.com/forms-resources for forms, publications, videos, and other resources.
- Go to worksafebc.com/law-policy for a searchable version of the Regulation.
- Go to worksafebc.com/health-safety-programs for information about creating a health and safety program.
- Go to worksafebc.com/ergonomics for information about ergonomics and MSIs.