

# Indoor Air Quality: Investigating Concerns



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## Please note

This publication is intended to be used as a guide to understanding Saskatchewan's Occupational Health and Safety laws. It is not intended to be used in court. Refer to *The Saskatchewan Employment Act* and *The Occupational Health and Safety Regulations, 2020*.

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## Introduction

This guide is intended to assist workplaces in investigating and resolving common indoor air quality concerns. It is intended for workplaces such as offices, schools and retail outlets. It is not intended for home-based businesses, manufacturing or other industrial workplaces.

## Background

Indoor air quality (IAQ) can be defined as “the physical, chemical and biological characteristics of indoor air in non-residential workplaces with no internal processes or operations that can affect the comfort of the occupant.”<sup>1</sup>

Many IAQ concerns can be prevented by ensuring ventilation is adequate, temperatures and humidity levels are comfortable and by minimizing airborne contaminants.

Poor IAQ can lead to a number of physical symptoms and concerns. The most common include:

- headaches
- fatigue
- shortness of breath
- sinus congestion
- coughs, sneezing
- eye, nose, and throat irritation
- skin irritation
- dizziness and nausea

People with colds, the flu or respiratory allergies are more likely to be affected by the air quality and to have these symptoms. In some cases noise, overcrowding, improper lighting, poor ergonomic conditions and job stress can also lead to these symptoms and concerns. Frequently a combination of factors is involved.

Training, educating and forewarning workers about events that could affect air quality may also minimize concerns.

For example, employers could:

- Provide hazard and scheduling information to workers in advance of renovation, repair or other activities;
- Educate workers about the effects scents or other sensitizers have on individuals and ask colleagues to avoid using scents; and
- Train workers to avoid running vehicles near fresh air intakes.

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<sup>1</sup> *Indoor Air Quality in Office Buildings: A Technical Guide, Health Canada*

In Saskatchewan, *The Occupational Health and Safety Regulations, 2020* include a number of requirements related to IAQ. Meeting these requirements on an ongoing basis will minimize IAQ concerns. These requirements should also be used to guide IAQ investigations, as they represent the minimum standards that must be met. A list of some of the key requirements is included in Appendix A. Additional resources and publications related to IAQ can be found in the resources section of this guide.

## **Raising indoor air quality concerns**

A worker should alert their supervisor when they have a concern regarding air quality. A supervisor can check with the building staff to see if there is an obvious solution, such as adjusting the temperature, humidity or lighting levels.

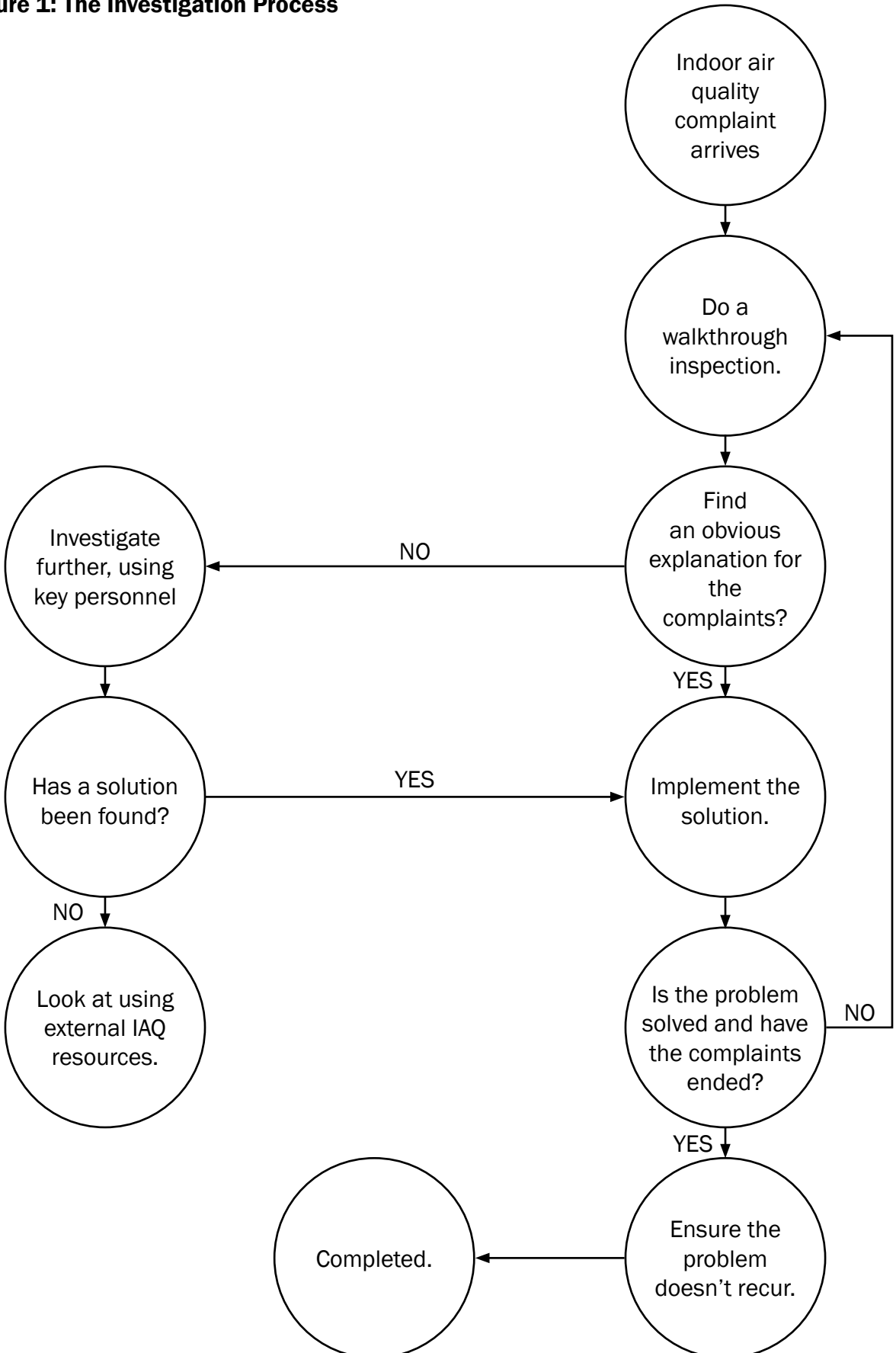
If there isn't an obvious explanation, the employer should be notified. The employer has a responsibility to ensure the concern is investigated and addressed in consultation with the Occupational Health Committee (OHC), occupational health and safety representative or workers. In the event that a worker is not satisfied with an employer's response to their concern, they can take the matter to the OHC. The OHC can then review the concern, make recommendations to the employer and monitor improvements/changes the employer is making to address the OHC's recommendations.

Staff members who are responsible for health and safety of facilities and maintenance should be involved in the investigation. Employers should ensure there is a process in place at every facility for contacting these individuals. It is estimated that up to 80 per cent of IAQ problems in Canada have been related to inadequate ventilation, so it is important to involve personnel that understand the building ventilation system, including how it works, how it should be maintained, possible problems and solutions. If in-house resources are unable to address or resolve an IAQ issue, expert resources may be sought.

Where there are multiple workplaces in one building, IAQ investigations may need the involvement of multiple employers and the building owner. A building owner shares responsibility for investigating and resolving IAQ concerns because some of the factors that affect IAQ may be beyond the control of an individual employer who is leasing a workspace. There may be varying levels of individual employer and owner control over IAQ parameters, depending on lease agreements.

An example process is illustrated on the next page.

**Figure 1: The Investigation Process**



## Factors that influence indoor air quality

To address IAQ problems and solutions, it is important to use strategies that address the factors that influence IAQ.

These factors include:

- building occupants
- sources of indoor air pollutants
- heating, ventilation, and air conditioning (HVAC) systems

### Building occupants

One of the first steps is to interview the affected worker or workers. A key question to ask is if their symptoms improve when they are away from work over a weekend or when they are on vacation or another type of leave.

A review of the interview responses can provide clues as to the cause of their concerns. For example, the source of an IAQ concern may be identified by looking at where most of the concerns originate relative to local conditions, or relative to the source and pathways of possible contaminants. The source may also be revealed by considering when the concerns occur relative to activities such as renovations, cleaning and pesticide applications.

It is important to have written documentation of IAQ concerns. Workers can use a journal or log book to keep track of days when they felt the air quality was poor and to describe the conditions on those days, such as unusual activities (e.g. construction), events or weather.

The solution may depend on how widespread the concerns are. If only one worker has an IAQ concern, it may be more appropriate to accommodate their individual working conditions and not those of all workers. If that worker has medical evidence of a sensitivity or unusual responsiveness to a substance present, there is a responsibility under section 2-17 of the regulations to provide additional protection to that worker, or on their request, assign them to work that is available and less hazardous to them. Additional protection may include eliminating certain chemicals from the workplace, introducing a scent-free policy or relocating the employee.

There are a number of useful forms and checklists that can be used to interview staff. An example is provided in Appendix B.

### Sources of indoor air pollutants

Indoor air contaminants may originate in a building or be drawn from outdoors. When assessing the potential sources of indoor air contamination, conduct a walkthrough inspection and consider sources such as the following:

- dust, dirt or mould located in the HVAC system or elsewhere
- visible mould
- spills of water or other liquids

- housekeeping activities such as cleaning and dusting
- off-gassing from new furniture, carpeting or structural materials
- maintenance activities such as painting, renovations and new construction
- office equipment such as laser printers, copiers
- industrial type processes such as dry cleaning, cooking and printing
- scented products
- plants
- garbage, recycling or composting containers
- food and beverage odours
- room sized humidifiers and air cleaners

Outdoor sources of contaminants which may be entering the building may include:

- vehicle exhaust
- unsanitary debris or dumpsters near an outdoor air intake
- pollen, dust or smoke
- contaminants from processes conducted by adjacent businesses and contractors
- exhausted air re-entering the building
- environmental spillage that seeps into the building
- materials tracked in or carried in by occupants

An inspection checklist similar to the one in Appendix C can be useful in identifying potential sources. Some of the items in these lists, such as HVAC system components, should be checked by qualified building staff.

## HVAC systems

Ventilation is usually provided by the heating, ventilation, and air conditioning (HVAC) system. The design and functioning of this system will have a major effect on the building's indoor air quality. The HVAC system is responsible for distributing outdoor air throughout a building, removing contaminants and odours, and controlling the indoor temperature and humidity.

### Fresh air supply

Good indoor air quality requires that an adequate amount of fresh outdoor air be supplied throughout the workplace. Refer to the standard *ANSI/ASHRAE 62.1-2019 Ventilation for Acceptable Indoor Air Quality*. The recommended value will depend on the location and what it is used for.

It is important to ensure that the outdoor air being drawn in is fresh. For example, outdoor intakes must not be located where they could draw in polluted air from loading docks, parking garages, garbage dumpsters, etc.

Complaints of poor air quality are often directly related to an inadequate supply of fresh outdoor air. Perhaps as many as 80 per cent of indoor air quality complaints in Canada are solved by increasing the supply of fresh outdoor air to a space. The increased amount of fresh air entering the building dilutes the airborne contaminants, and creates a more acceptable indoor environment.

Occupants of a space exhale carbon dioxide (CO<sub>2</sub>), which can build up in enclosed, occupied spaces. Many studies and surveys have demonstrated a direct relationship between occupant complaint rates and CO<sub>2</sub> concentrations.

| Measured CO <sub>2</sub> (ppm)* | Effective Ventilation Rate (cfm)** | Significance                                     |
|---------------------------------|------------------------------------|--------------------------------------------------|
| 350 – 400                       | fresh, outdoor air                 | typical outdoor level                            |
| less than 600                   | greater than 35 cfm/occupant       | few complaints                                   |
| 600 – 800                       | 20 – 35 cfm/occupant               | occasional complaints                            |
| 800 – 1,000                     | 15 – 20 cfm/occupant               | complaints increase                              |
| greater than 1,000              | less than 15 cfm/occupant          | complaints common, insufficient fresh air supply |

\* parts/million    \*\* cubic feet/minute

Measuring carbon dioxide (CO<sub>2</sub>) levels in the air is a useful way to determine if there is an adequate supply of fresh air for the number of building occupants. Direct reading detector tubes or direct reading instruments can be used to measure carbon dioxide levels in work areas. An image of a direct reading hand pump is shown below. These can be purchased from safety supply companies.

Measurements are best taken in a space after at least two hours of occupancy. Levels of 1,000 – 1,500 ppm suggest there is not adequate fresh air. This can be corrected by opening dampers, improving air mixing, and adjusting fresh air rates.

**Example gas detection tube with hand pump**



## Maintenance

Preventive maintenance programs conducted by specialized personnel may include:

- Regular inspections of all critical components of the ventilation system such as dampers, fans, belts, baffles, ductwork, diffusers, and control systems.
- Repair or replacement of malfunctioning and consumable components such as filters and belts.
- Periodic cleaning of air intakes and accessible parts of the distribution system, ducts, and dampers where warranted.
- Adequate treatment of open water systems associated with ventilation equipment and the cleaning and disinfecting components where standing water may have been present for extended periods, or where dirt, slime, or mould is observed. This includes humidifiers, electrostatic precipitators, cooling towers, fan coil units, air supply and exhaust ducts, air intakes, cooling coils, condensate drains, radiators, and induction units.
- Maintenance of combustion sources such as furnaces, space heaters, and water heaters. This maintenance should ensure the proper combustion and exhausting of waste gases and that gases will not be re-circulated into the workplace.
- Testing the volume of air supplied or returned through diffusers using air velocity or air flow instruments to ensure that the system is balanced. This testing is done by qualified building maintenance personnel or by a qualified external company.
- Calibrating sensors and devices that control airflow, temperature and humidity.
- Inspecting heat exchangers when it is suspected that combustion gases are escaping into an air plenum.
- Inspecting and cleaning ductwork and, where ceiling spaces are used as supply or return air plenums, replacing damaged or missing tiles.

Written records of inspections, maintenance and cleaning of HVAC systems must be kept and made available to the committee, health and safety representative, or where there is no committee or representative, the workers.

A more detailed HVAC inspection checklist can be found in *Indoor Air Quality: A Guide for Building Owners, Managers, and Occupants* by WorkSafeBC.

## Resources

Occupational Health and Safety publications, *The Saskatchewan Employment Act*, and *The Occupational Health and Safety Regulations, 2020* can be viewed and downloaded from [publications.saskatchewan.ca](http://publications.saskatchewan.ca).

Additional titles that may interest you are:

- Canadian Centre for Occupational Health and Safety (CCOHS) – [Indoor Air Quality – General](#) (fact sheet)
- Government of Canada – [Air Quality and Health](#) (website)

Additional IAQ guides can be viewed and/or downloaded at the following website addresses.

| Organization                                                                                  | Website Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Canadian Centre for Occupational Health and Safety (CCOHS)</b>                             | <p><a href="http://www.ccohs.ca/topics/hazards/physical/iaq">www.ccohs.ca/topics/hazards/physical/iaq</a></p> <ul style="list-style-type: none"> <li>• Indoor Air Quality – General (fact sheet)</li> <li>• Indoor Air Quality – Mould and Fungi (fact sheet)</li> <li>• AirAssess – Improve Indoor Air Quality at Work (app)</li> <li>• Indoor Air Quality – An introduction (e-course)</li> <li>• Indoor Air Quality Health and Safety Guide (publication)</li> <li>• Thermal Comfort for Office Work<br/><a href="http://www.ccohs.ca/oshanswers/phys_agents/thermal_comfort">www.ccohs.ca/oshanswers/phys_agents/thermal_comfort</a></li> </ul> |
| <b>WorkSafe BC</b>                                                                            | <p><a href="http://www.worksafebc.com">www.worksafebc.com</a></p> <ul style="list-style-type: none"> <li>• <i>Indoor Air Quality: A Guide for Building Owners, Managers, and Occupants</i>, Worksafe BC (This guide includes a useful problem-solving section on page 30.)</li> </ul>                                                                                                                                                                                                                                                                                                                                                               |
| <b>WorkSafe Alberta</b>                                                                       | <p><a href="http://ohs-pubstore.labour.alberta.ca/gh015">ohs-pubstore.labour.alberta.ca/gh015</a></p> <ul style="list-style-type: none"> <li>• <i>Indoor Air Quality Tool Kit</i>, Work Safe Alberta, 2009</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)</b> | <p><a href="http://www.ashrae.org">www.ashrae.org</a></p> <ul style="list-style-type: none"> <li>• <i>Ventilation for Acceptable Indoor Air Quality</i><br/>See ANSI/ASHRAE Standard 62 .1, 2016</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## **Appendix A: The Occupational Health and Safety Regulations, 2020**

### **Sanitation**

6-1(1) An employer, contractor or owner shall ensure that a place of employment is sanitary and kept as clean as is reasonably practicable and shall ensure, to the extent that is reasonably practicable, that:

- (a) dirt and debris are removed at least daily by a suitable method from all floors, working surfaces, stairways and passages;
  - (b) floors are cleaned at least once each week by washing, vacuum cleaning or any other effective and suitable method; and
  - (c) all inside walls, partitions, ceilings, passages and staircases are clean and are suitably finished and maintained.
- (2) If a worker may be exposed to refuse, spills or waste materials that may pose a risk to the worker's health or safety, an employer or contractor shall ensure that the refuse, spill or waste material is removed by a suitable method from the worksite as soon as is reasonably practicable.

### **Ventilation and air supply**

6-2 An employer, contractor or owner shall:

- (a) ensure the adequate ventilation of a place of employment; and
- (b) to the extent that is reasonably practicable, render harmless and inoffensive, and prevent the accumulation of, any contaminants or impurities in the air by providing an adequate supply of clean and wholesome air and maintaining its circulation throughout the place of employment.

### **Mechanical ventilation**

6-3(1) An employer, contractor or owner shall provide a mechanical ventilation system in a place of employment that is sufficient and suitable to protect the workers against inhalation of a contaminant and to prevent accumulation of the contaminant and ensure that the mechanical ventilation system is maintained and properly used, if any work, activity or process in the place of employment gives off:

- (a) a dust, fume, gas, mist, aerosol or vapour or other contaminant of a kind and quantity that is likely to be hazardous to workers; or
  - (b) substantial quantities of contaminants of any kind.
- (2) An employer, contractor or owner who provides a mechanical ventilation system at a place of employment, whether required by subsection (1) or not, shall ensure that the system provides sufficient fresh and tempered air to replace the air exhausted by ventilation.

- (3) If practicable, an employer, contractor or owner shall ensure that a mechanical ventilation system required by subsection (1):
  - (a) includes local exhaust ventilation that is installed and maintained at or near the point of origin of the contaminant so as to prevent effectively the contaminant from entering the air of the place of employment; and
  - (b) is equipped with a device that will provide a warning to workers when the system is not working effectively.
- (4) An employer, contractor or owner shall ensure that contaminants removed by a mechanical ventilation system required by subsection (1) are:
  - (a) exhausted clear of the place of employment; and
  - (b) if reasonably practicable, prevented from entering any place of employment.
- (5) An employer, contractor or owner shall ensure that effective provision is made for the immediate protection of workers in the event of failure of a mechanical ventilation system required by subsection (1).
- (6) If an air cleaning system is used to clean recirculated air, an employer, contractor or owner shall ensure that the air cleaning system is designed, installed and maintained to remove particulate and gaseous contaminants at a rate that is sufficient to protect the health and safety of workers and, if it is reasonably practicable, to render the air inoffensive.

## **Cleaning and maintaining ventilation systems**

- 6-4(1) An employer, contractor or owner shall ensure that:
- (a) the mechanical ventilation system, including any humidification equipment, is constructed and maintained to minimize the growth and dissemination of microorganisms, insects and mites through the ventilation system; and
  - (b) if reasonably practicable, the components of a mechanical ventilation system are readily accessible for cleaning and inspection.
- (2) An employer, contractor or owner shall ensure that a competent person inspects and maintains all parts of a mechanical ventilation system, cleans all louvres and replaces or adequately cleans all filters at a frequency that is sufficient to protect the health and safety of the workers.
  - (3) An employer, contractor or owner shall keep all ventilation openings free of any obstruction or source of contamination.
  - (4) An employer, contractor or owner shall ensure that a record of all inspections, maintenance and cleaning of a mechanical ventilation system required by subsection 6-3(1):

- (a) is made by the competent person who performs the work; and
- (b) is readily available for examination by the committee, the representative or, if there is no committee or representative, the workers.

## Space

6-5(1) An employer or contractor shall ensure that no part of a place of employment is overcrowded to a degree that may cause risk of injury to workers.

- (2) Without limiting the generality of subsection (1), an employer or contractor shall ensure that there is at least 10 cubic metres of space for each worker employed at any one time at a worksite.
- (3) For the purposes of subsection (2), no space that is more than 3 metres from the floor and no space occupied by solid objects are to be taken into account.

## Thermal conditions

6-7(1) Subject to subsection (3), in an indoor place of employment, an employer, contractor or owner shall provide and maintain thermal conditions, including air temperature, radiant temperature, humidity and air movement, that:

- (a) are appropriate to the nature of the work performed;
  - (b) provide effective protection for the health and safety of workers; and
  - (c) provide reasonable thermal comfort for workers.
- (2) At an indoor place of employment where the thermal environment is likely to be a health or safety concern to the workers, an employer, contractor or owner shall provide and maintain an appropriate and suitably located instrument for measuring the thermal conditions.
  - (3) If it is not reasonably practicable to control thermal conditions or if work is being performed outdoors, an employer, contractor or owner shall provide and maintain measures for:
    - (a) the effective protection of the health and safety of workers; and
    - (b) the reasonable thermal comfort of workers.
  - (4) Measures for the purposes set out in subsection (3) may include, but are not limited to, the following:
    - (a) frequent monitoring of thermal conditions;
    - (b) the provision of special or temporary equipment, including screens, shelters and temporary heating or cooling equipment;
    - (c) the provision of suitable clothing or personal protective equipment;
    - (d) the provision of hot or cold drinks;

- (e) the use of acclimatization or other physiological procedures;
  - (f) the use of limited work schedules with rest and recovery periods, changes in workloads, changes in hours or other arrangements for work;
  - (g) frequent observation of workers by a person who is trained to recognize the symptoms of physiological stress resulting from extreme temperatures;
  - (h) the provision of emergency supplies for use when travelling under extremely cold or inclement weather conditions.
- (5) If a worker is required to work in thermal conditions that are different from those associated with the worker's normal duties, an employer or contractor shall provide, and require the worker to use, any suitable clothing or other personal protective equipment that is necessary to protect the health and safety of the worker.

## Smoking

6-14(1) In this section:

**“enclosed place of employment”** means a place of employment that is within a building or another enclosed place and includes:

- (a) a vehicle; and
- (b) any of the following areas of an underground mine:
  - (i) a mine shaft;
  - (ii) a refuge station required pursuant to *The Mines Regulations*;
  - (iii) a lunch room;
  - (iv) any area, other than one mentioned in subclauses (i) to (iii), that is within 10 metres of where a worker, self-employed person, employer, contractor or owner is present;

**“enclosed work-related area”** means a work-related area that is within a building or another enclosed place;

**“enclosed worksite”** means a worksite that is within a building or another enclosed place;

**“smoke”** means to smoke, hold or otherwise have control over ignited tobacco;

**“tobacco”** means tobacco in any form in which it is used or consumed, and includes snuff and raw leaf tobacco, but does not include any food, drug or device that contains nicotine to which the Food and Drugs Act (Canada) applies.

- (2) Subject to subsections (3) and (4), an employer, contractor or owner shall ensure that no person smokes in:
- (a) an enclosed place of employment;
  - (b) an enclosed work-related area; or
  - (c) any other place of employment where smoking is prohibited by law.

(3) Subsection (2) does not apply to the following places or persons:

- (a) an enclosed place of employment or enclosed work-related area while it is being used with the consent of the proprietor for traditional Aboriginal spiritual or cultural practices or ceremonies, if the use of tobacco is an integral part of the traditional Aboriginal spiritual or cultural practices or ceremonies being carried out in the enclosed place of employment or enclosed work-related area;
- (b) residents or persons visiting residents in an enclosed place that:
  - (i) is ventilated separately from the rest of the enclosed place of employment or enclosed work-related area;
  - (ii) is within:
    - (A) a facility designated as a special-care home pursuant to *The Facility Designation Regulations*; or
    - (B) a personal care home as defined in *The Personal Care Homes Act* that offers care and accommodation to more than 10 persons; and
  - (iii) meets the requirements set out in *The Tobacco Control Act* and the regulations made pursuant to that Act.

(4) No person while at work shall smoke in any enclosed place of employment or enclosed work-related area where smoking is prohibited pursuant to this section unless:

- (a) the person is:
  - (i) a self-employed person in a place of employment that:
    - (A) is ventilated separately from other places of employment or work-related areas; and
    - (B) is owned by the self-employed person;
  - (ii) a worker in a vehicle who has the permission of the owner or lessee of the vehicle to smoke in the vehicle; or
  - (iii) a self-employed person or worker who is the sole occupant of a work camp living accommodation if:
    - (A) the living accommodation is ventilated separately from other places of employment or enclosed work-related areas; and
    - (B) the self-employed person or worker has the permission of the owner or operator of the work camp to smoke in the living accommodation;
- (b) no other worker, self-employed person, employer, contractor or owner is present on a frequent and regular basis in any of the places of employment or enclosed work-related areas mentioned in clause (a); and
- (c) no other worker, self-employed person, employer, contractor or owner is present when the person mentioned in clause (a) is smoking.

(5) Subject to subsection (6), a worker may refuse to enter an enclosed worksite if:

- (a) visible tobacco smoke is present; or

- (b) fewer than 30 minutes have passed since a tobacco product was extinguished in the enclosed worksite, whether or not visible tobacco smoke is present.
- (6) Subsection (5) does not apply if the worker is required to enter the enclosed worksite to prevent imminent injury or damage to persons or property located within the enclosed worksite.
- (7) If smoking is permitted pursuant to subsection (3) or (4), an employer, contractor or owner shall:
  - (a) restrict workers' exposure or self-employed persons' exposure to second-hand tobacco smoke to the extent that is reasonably practicable; and
  - (b) inform workers and self-employed persons of the risk to their health from second-hand tobacco smoke.
- (8) An employer, contractor or owner shall ensure that in every enclosed place of employment where smoking is prohibited:
  - (a) signs are posted in locations that are clearly visible to those entering the enclosed place of employment that indicate that smoking is prohibited; and
  - (b) no ashtray or other receptacle designed to be used as an ashtray is present within the enclosed place of employment.

## Standing

6-16(1) If workers are required to stand for long periods in the course of their work, an employer or contractor shall provide adequate anti-fatigue mats, footrests or other suitable devices to give relief to workers.

- (2) If wet processes are used, an employer or contractor shall ensure that reasonable drainage is maintained and that false floors, platforms, mats or other dry standing places are provided, maintained and kept clean.

## Protection of certain workers

21-7 If a chemical substance or biological substance is present at a place of employment in a form and to an extent that may be harmful to a worker who is pregnant, has become sensitized to the substance or is unusually responsive to the substance, an employer shall, as soon as is reasonably possible after the worker has notified the employer of the worker's condition:

- (a) if reasonably practicable, take steps to minimize the exposure of the worker to the substance; or
- (b) on the worker's request, assign the worker to less hazardous alternate work if that work is available.

## Appendix B: Sample health survey

This questionnaire is intended to collect information about the impact that indoor air quality in your workspace may be having on your personal well being. The form, when completed, contains personal information that is subject to protection under privacy legislation. This information is being collected in order to determine what action, if any, can be taken to address concerns with respect to indoor air quality. By completing and submitting this form you consent to the collection and use of this information.

The information contained in this form will only be used to help address possible problems with air quality. Appropriate steps will be taken to protect your identity if it becomes necessary to share your responses with consultants when assessing indoor air quality and when planning and implementing improvements. This form will be retained for a period not exceeding two years and will be destroyed promptly thereafter. You may request the amendment or destruction of this record at any time.

|                                                                                                                                                  |                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Health survey - confidential                                                                                                                     |                              |
| Name:                                                                                                                                            | Department/position:         |
| Survey date:                                                                                                                                     | Interviewer (if applicable): |
| Work location/building area:                                                                                                                     |                              |
| <b>Background information</b>                                                                                                                    |                              |
| How long have you been working for your employer?                                                                                                |                              |
| How long have you been working in this building?                                                                                                 |                              |
| Where do you spend most of your time at work?                                                                                                    |                              |
| Have there been any changes in the building recently? E.g., new location, renovation, cleaning practices, spills, fires, floods or other events? |                              |

## Symptoms & patterns

Check () all the symptoms or discomforts you experience and associate with your work environment.

Headache

Nausea

Dizziness

Tiredness / fatigue

Irritation of eyes, nose, throat

Breathing problems

Coughing

Sneezing

Wheezing

Shortness of breath

Blurred vision

Sinus congestion

Difficulty in concentrating

Pain and discomfort of:

Back

Neck

Hands

Wrist

Shoulders

Other \_\_\_\_\_

Do you have any other health conditions that may make symptoms worse? E.g., allergies, immune system disorders, or chronic cardiovascular or respiratory disease.

Have you seen a doctor for these symptoms?

Circle the answer that best describes your situation.

Yes

No

(Do you wish to provide general details?)

## Timing

When do you notice these symptoms and how often do they occur?

On average, when you notice the symptoms, how long have you been at work? Circle the answer that best describes your situation.

Less than 1 hour    2-4 hours    > 4 hours    1 day    After    days

Has there been any change to the symptoms or patterns (e.g., time of week, shift or season)? Circle the answer that best describes your situation.

Yes

No

If yes, please explain:

When do the symptoms go away? Circle the answer that best describes your situation .

Overnight

After a week away

Rarely

Never

Can you provide more information?

Has the pain or discomfort caused you to take time off work? Circle the answer that best describes your situation.

Yes

No

Are you aware of other people with similar symptoms or concerns? Circle the answer that best describes your situation.

Yes

No

If yes, can you provide more details?

### Suspected or potential causes

Check (☐) any of the following that are true just prior to experiencing symptoms or at the time you are experiencing symptoms.

- |                                                                     |                                                                       |
|---------------------------------------------------------------------|-----------------------------------------------------------------------|
| <input type="checkbox"/> Are there any unusual odours?              | <input type="checkbox"/> Is the work area too warm?                   |
| <input type="checkbox"/> Does the air seem stuffy?                  | <input type="checkbox"/> Is the work area too cool?                   |
| <input type="checkbox"/> Is the air dry?                            | <input type="checkbox"/> Does the temperature vary from room to room? |
| <input type="checkbox"/> Is it dusty?                               | <input type="checkbox"/> Are there drafts where you work?             |
| <input type="checkbox"/> Do you get shocks from static electricity? |                                                                       |

Do you think any of the following might be causing problems at your workstation? Check (☐) any of the following.

- |                                                                     |                                                      |
|---------------------------------------------------------------------|------------------------------------------------------|
| <input type="checkbox"/> Air circulation                            | <input type="checkbox"/> Machinery or equipment      |
| <input type="checkbox"/> Humidity                                   | <input type="checkbox"/> Cigarette smoke             |
| <input type="checkbox"/> Dryness                                    | <input type="checkbox"/> Overcrowding                |
| <input type="checkbox"/> Air conditioning                           | <input type="checkbox"/> Dividers or wall partitions |
| <input type="checkbox"/> Temperature                                | <input type="checkbox"/> Dusts and particles         |
| <input type="checkbox"/> Noise                                      | <input type="checkbox"/> Pesticide spraying          |
| <input type="checkbox"/> Lighting / glare                           | <input type="checkbox"/> New furnishings / carpet    |
| <input type="checkbox"/> Odours                                     | <input type="checkbox"/> Other                       |
| <input type="checkbox"/> Air contaminants                           | <input type="checkbox"/> I don't know                |
| <input type="checkbox"/> Activities of co-workers or cleaning staff |                                                      |

Have you noticed other events (e.g., weather, temperature, humidity, or activities in the building) that occur around the same time as your symptoms?

Have there been any changes in the work environment? (E.g., duties, equipment, products)

### Additional information

Please provide any comments or suggestions about how to improve the air quality in the workplace.

## Appendix C: Walkthrough inspection checklist

It is important to include other individuals who may have important information to provide in this investigation. These include the supervisor of the area being investigated and a member of the occupational health committee. The building occupants who have concerns should also be consulted. The nature and timing of their symptoms as well as any suspected causes should be discussed. Be prepared to take measurements, if necessary, using thermometers, direct reading carbon dioxide meters, or other equipment.

Date \_\_\_\_\_

Name of inspector(s)

---

---

Building, department or location inspected

---

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Reason for inspection

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| Inspection activity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Notes |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Walls, ceilings and floors</b> <ul style="list-style-type: none"><li>• Evidence of water leaks or stagnant water pools that would promote the growth of micro-organisms</li><li>• Walls, ceilings, and windows free of mould</li><li>• Indoor plants free of mould and odour</li><li>• Flat surfaces dust free</li><li>• Thermostats in enclosed offices</li><li>• Shower facilities and washrooms clean and free of mould</li><li>• Drain traps liquid-filled to prevent the entry of sewer gases</li></ul> |       |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p><b>Open-concept offices - cubicles</b></p> <ul style="list-style-type: none"> <li>• Screen heights (max. 1.5 metres)</li> <li>• Screens do not touch floor</li> </ul>                                                                                                                                                                                                                                                                                                        |  |
| <p><b>Diffusers</b></p> <ul style="list-style-type: none"> <li>• Diffusers are unobstructed</li> <li>• Diffuser condition (mould, dust, dirt)</li> </ul>                                                                                                                                                                                                                                                                                                                        |  |
| <p><b>Air exhaust louvers</b></p> <ul style="list-style-type: none"> <li>• Louvers are unobstructed</li> <li>• Louver condition clean (mould, dirt, dust)</li> </ul>                                                                                                                                                                                                                                                                                                            |  |
| <p><b>Pollutant sources</b></p> <ul style="list-style-type: none"> <li>• Photocopiers</li> <li>• Chemical storage/handling area</li> <li>• Paper storage and handling areas</li> <li>• Check for common triggers of allergic reactions such as mould, dust, dead animals/insects, animal droppings or dander, or scented products such as aftershaves or perfumes</li> </ul>                                                                                                    |  |
| <p><b>Carbon monoxide (CO) sources</b></p> <ul style="list-style-type: none"> <li>• Air does not enter building from: <ul style="list-style-type: none"> <li>• parking garage</li> <li>• loading dock</li> <li>• other (describe)</li> </ul> </li> <li>• Check that combustion sources are effectively exhausting to the outside (such as propane, natural gas, or oil as used in fireplaces)</li> </ul>                                                                        |  |
| <p><b>Volatile organic compounds</b></p> <ul style="list-style-type: none"> <li>• Cleanliness/condition/location of: <ul style="list-style-type: none"> <li>• chemical laboratories</li> <li>• chemical storage areas</li> </ul> </li> <li>• Recent renovations or additions involving new furniture, rugs, window coverings. New plywood, particle board or carpeting</li> <li>• Check for other sources such as solvents, paints, adhesives, and cleaning products</li> </ul> |  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p><b>Ventilation system (HVAC)</b></p> <ul style="list-style-type: none"> <li>• Adequate outdoor air intake for the number of building occupants</li> <li>• Air intake clear of pollution sources</li> <li>• Cleanliness of ducts and plenum</li> <li>• Ventilation shut-down (nightly/weekends)</li> <li>• Air filter condition</li> <li>• Check thermostat settings</li> <li>• Check that thermostats, diffusers, fans, and dampers are clean and operating properly</li> <li>• Check the outdoor air intake for mould, stagnant water, blockage, or nearby sources of contaminants</li> <li>• Check for changes to the airflow that may occur in new building or HVAC system design</li> </ul> |  |
| <p><b>Humidifiers</b></p> <ul style="list-style-type: none"> <li>• Pans and wetting media are free of slime</li> <li>• Ducts free of mould</li> <li>• Fans free of hard water deposits</li> <li>• Volatile chemicals used for humidifiers</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <p><b>Air conditioning system</b></p> <ul style="list-style-type: none"> <li>• Condensate trays free of slime</li> <li>• Cooling coils free of slime</li> <li>• Absence of mouldy odours</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <p><b>General maintenance, design</b></p> <ul style="list-style-type: none"> <li>• Windows can be opened</li> <li>• Alterations to ventilation system</li> <li>• Number of occupants in area</li> <li>• Usage/condition of carpeting</li> <li>• Work areas repainted</li> <li>• Presence of odours</li> <li>• Drafts or unwanted air currents</li> </ul>                                                                                                                                                                                                                                                                                                                                           |  |

|                                                                                                                                                                                                                                                           |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p><b>General</b></p> <ul style="list-style-type: none"> <li>• Check that lighting is adequate</li> <li>• Question staff about other factors such as workload and ergonomics</li> <li>• Check if the noise level is reasonable for office work</li> </ul> |  |
| <p><b>Maintenance records</b></p> <ul style="list-style-type: none"> <li>• When was the system last calibrated and adjusted?</li> <li>• When was preventive maintenance last performed?</li> </ul>                                                        |  |

Possible causes of the problem

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Recommended corrective action

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Corrective action taken?    Yes    No

Additional investigation required?    Yes    No

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