Indoor Air Quality

Office of Risk Management

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INTRODUCTION

Indoor air quality (IAQ) is a delicate and complicated science; there is no standard for indoor air quality in the workplace. While there are established exposure values and guidelines for some workplace contaminants and physical conditions, there is a multitude of substances for which no exposure limit has been established.

Complicating matters are the manner in which various substances and matters can interact with each other and the individual nuances and susceptibilities that every person has. For example, some people may be perfectly comfortable in a particular environment, while others may find that adjustments are required for their comfort or, in some cases, to ensure their continued good health.

SCOPE

This document is intended as a guideline for members of the University community who conduct their work primarily in office-type environments. This does not exclude potential indoor air quality incidents in laboratory or workshop environments; however, these work locations typically have further engineered controls to mitigate potential airborne hazards. This document will briefly outline common symptoms of poor indoor air quality, potential causes and the investigation processes for supervisors to follow when situations of poor indoor air quality are reported to them.

While there is no specific law or regulation for indoor air quality, the University of Ottawa has a general duty to take every precaution reasonable in the circumstances for the protection of a worker.

This document does not supersede interventions when an immediate hazard or condition exists. For example, the discovery of a problem affecting a large contingent of building occupants (such as significant mould contamination) requires swifter and more immediate action—identification of such issues should be escalated to University management at the earliest opportunity. Examples of such conditions are summarized in table 1.

Category	Examples
Emergency, requires immediate action	Reported health effects, discovery of widespread mould contamination, evidence of flooding or water damage
Non-emergency, requires response in timely fashion	Maintenance-related issues, odours

Table 1. Examples of emergency and non-emergency conditions

DEFINITIONS

American Conference of Governmental Industrial Hygienists (ACGIH)

An American-based scientific organization that advances occupational and environmental health. ACGIH publishes an annual book of threshold limit values of hazardous substances (Ontario's *Regulation 833* references the 2015 version).

American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

A global society advancing human well-being through sustainable technology for the built environment. ASHRAE publishes consensus standards focused on building systems, energy efficiency, indoor air quality, refrigeration and sustainability.

Canadian Standards Association (CSA)
Standards development organization accredited in both Canada and the United States that publishes consensus-based standards in a variety of industries. Standards can be cited in legislation (i.e., enforceable) or referenced as industry best practices.

Ceiling (C)
The concentration of a substance that should not be exceeded during any part of the working exposure.

Joint Health and Safety Committee (JHSC)
Committee composed of worker and employer representatives who are mutually committed to improving health and safety conditions in the workplace.

Ministry of Labour (MOL)
The Ontario ministry responsible for enforcing the Ontario's *Occupational Health and Safety Act*.

Parts per million (PPM)
Denotes the number of parts per 1,000,000 parts. One part per million is equivalent to approximately one drop of water diluted in 50 litres or to approximately 32 seconds out of a year.

Parts per billion (PPB)
Denotes the number of parts per 1,000,000,000 parts. One part per billion is equivalent to approximately one drop of water diluted in 250 chemical drums or approximately 3 seconds out of a century.

Short-term exposure limit (STEL)
A 15-minute time-weighted average exposure that should not be exceeded at any time during a workday and should occur no more than four times per day, with at least a 60 minutes between exposures. This threshold is usually used in addition to the TWA (below) where there are recognized acute effects from a substance whose toxic effects are of a chronic nature.

Time-weighted average (TWA)
The concentration of a substance for a conventional eight-hour workday and a 40-hour work week to which it is believed nearly all workers may be repeatedly exposed day after day for a working lifetime without adverse health effect.

SYMPTOMS AND HEALTH EFFECTS

There are various symptoms and health effects that an individual may experience as a result of poor indoor air quality. Each individual may experience one or a combination of these or other symptoms. Complicating matters is the general nature of these symptoms, as some can be very common. Therefore, identifying a cause—let alone one attributable to the workplace—can be challenging.

It is therefore important to record when and under what conditions the symptom(s) appear in order to help identify possible cause(s) and to implement reasonable and appropriate corrective action. The Health and Wellness office has developed a template for affected workers to record their symptoms and indoor air quality concerns (see appendix 1). The affected worker(s) are to complete this form and return it directly to the Health and Wellness office. The form, once completed, is a confidential

document and is not to be provided to other workplace parties (e.g., managers, supervisors, other workers).

General symptoms to indoor air quality conditions can include, but are not limited to, chills, sweating, irritation of the eyes or mucus membranes, allergies, coughing, sneezing, nausea, general fatigue and irritation of bodily systems. In extreme cases, reactions may result in an individual not being able to function in the work environment when exposed to a condition. Some symptoms may not be immediately identifiable and the worker may require further medical consultation.

With the discovery of indoor air quality as a cause of some negative health effects, certain health conditions have been attributed to poor indoor air quality. Some of these conditions are listed below.

Sick building syndrome (SBS)
Situation in which non-specific symptoms are experienced by more than about 30% of a building's occupants; however, medical professionals cannot clinically diagnose SBS.

Building-related illness (BRI)
A general term for a medically diagnosable illness caused by, or related to, occupancy within a certain building.

Multiple chemical sensitivity (MCS)
A condition where, due to chronic exposure, an individual has (or develops) sensitivity to relatively low levels of certain chemicals substances found in the workplace.

FACTORS AFFECTING INDOOR AIR QUALITY

There are a number of factors—both direct and indirect—that may affect or give the perception of poor indoor air quality. This section describes the most likely factors that can occur at uOttawa but is not an exhaustive list.

Building design

At the core of indoor air quality is the physical nature and construction of the building, including the design elements. As recently as the energy crisis of the 1970s, building construction focused on the financial aspect of energy savings, which meant that buildings were constructed to be as airtight as possible. An airtight building—while able to minimize expenses associated with the conditioning of outdoor air—means that air is changed less frequently.

As information and understanding advanced, so too did building techniques. Recent advancements in building materials, furniture and other elements have, however, led to other hazards. All new buildings have centralized mechanical systems to distribute air and, in most cases, condition it (i.e., heat, cool, humidify). Mechanical systems must be given significant consideration in order to ensure the air in a building is properly distributed—otherwise there is potential for "dead spots," areas in which air movement is reduced or restricted. As a result, the location of air supply and return grills and ducting can have a major impact on a building's indoor air quality.

In addition to the actual design of the mechanical system, proper commissioning, balancing and maintenance of the system components are important. A mechanical system that has not been properly commissioned or balanced will lead to indoor air quality issues. Likewise, regular maintenance is required to ensure the system continues to function as intended.

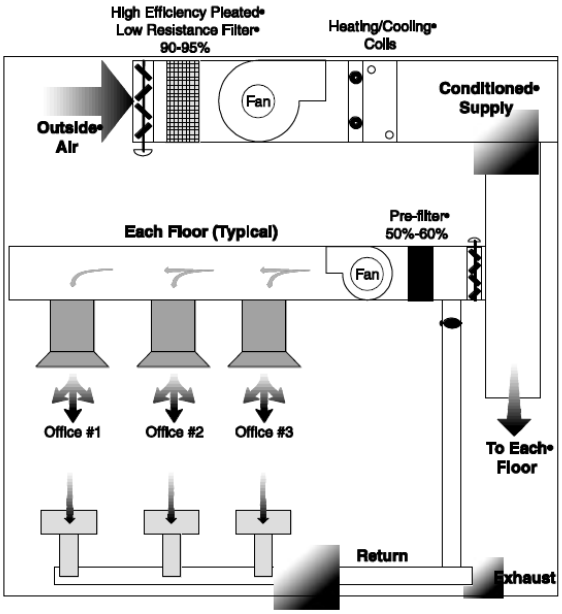


Figure 1. Sample building ventilation diagram

Building floor finishes should be carefully chosen in order to limit the installation of carpet in new—or renovated—spaces. Carpet is not an ideal floor finish as it traps dust and other allergens and requires additional, special cleaning procedures, even for regular maintenance cleaning. Carpet is also at risk of being damaged following water infiltration or floods. As a result, the University attempts to limit the installation of carpeting to the extent possible.

Temperature

Occupant satisfaction with the thermal comfort of their working environment is a major factor for both good health and work satisfaction. Factors affecting this comfort include radiant temperature (of surfaces), vertical temperature variations (at different physical heights), air temperature, air velocity, occupant garments and level of occupant's activity. Thermal comfort is achieved when the air temperature and movement of air are within a particular comfort range, which, for approximately 80% of occupants, is within defined parameters according to the seasonal climate.

The human body is highly sensitive to temperature variation and has the ability to differentiate temperatures fluctuations of 0.2 °C. CSA Standard Z412 (*Office Ergonomics*) and ASHRAE Standard 55-2013 (*Thermal Environmental Conditions for Human Occupancy*) suggest the following temperature ranges for normal, office-type environments.

Season	Temperature
Summer	23 °C to 26 °C at 50% humidity
Winter	20 °C to 23.5 °C at 50% humidity

Table 2. Suggested temperature ranges for office-type environments

Temperatures in excess of the above maximums have the potential to create discomfort, fatigue and the perception of low air movement in the workplace, while temperatures lower than the above minimums can also cause discomfort and lead to the perception of drafts. It should be noted that individual

nuances might require warmer or cooler temperatures to achieve occupant comfort; however, in situations involving excessive heat or cold periods, the intention is to provide the **feeling** of warmth or coolness. For example, during prolonged heat waves in summer, air conditioning system temperatures are usually turned down (i.e., set warmer) to limit major temperature fluctuations (i.e., from outdoors to indoors) and reduce expenses associated with the conditioning of hot (and humid) air.

There is no legislated maximum workplace temperature for office workers. However, Risk Management has developed a Thermal Comfort and Heat Stress Guideline to aid workers and supervisors. Temperatures in an office environment should normalize to a minimum of 18 °C within one hour of the start of the workday.

Relative humidity

People are generally also familiar with humidity and its effect on temperature. However, humidity also has an impact on indoor air quality. Excessively dry environments (i.e., below 20% humidity) are associated with increased occupant discomfort, the drying of mucous membranes and skin and increased static electricity. Similarly, excessively moist environments (i.e. above 70% humidity) can cause the perception of elevated temperatures, "musty feelings" and the lack of air movement. Environments with an elevated humidity level may also promote mould growth. The effect of humidity in sedentary-type work environments (such as an office) in reasonably moderate temperatures (i.e., 20–26 °C) is quite modest (CSA Standard Z412-00, *Office Ergonomics*)

Because of the required maintenance and potential to create additional hazards, **most campus buildings do not have humidification systems** unless specifically required for the type of work conducted therein. As part of CSA Z412, guidelines for indoor humidity levels are included in table 3.

Air velocity

Often overlooked in indoor air quality investigations is how fast (velocity) the air is moving in an area. In cases where little air movement is observed, the area may be perceived as stale or musty. Conversely, areas with more air movement can be perceived as drafty or chilly. ASHRAE Standard 62(*Ventilation for Acceptable Indoor Air Quality*) outlines the recommended velocity levels for air within the specified setting, which is often expressed as cubic feet per minute (CFM).

ASHRAE Standard 62 provides the following recommendation for the volume of air per person in the noted space.

Setting	CFM/Person
Auditoriums, theatres	10
Computer labs	10
Conference rooms	5
Dining areas	5
Hotel rooms	7.5
Lecture halls	5
Libraries	5
Main entry lobbies	5
Museums	7.5
Office space	5
Residential living areas	5
Retails stores	7.5

Setting	CFM/Person
School classroom	10
School laboratories	10

Table 3. Recommended volume of air (CFM) per person, ASHRAE Standard 62

A supervisor can visually verify velocity of air (either supply or return) quickly by placing a tissue on the air supply or return grill. The air supply grill should cause the tissue to blow slightly, while the return air grill should hold the tissue tightly against it. While this is not a scientific means of measuring air velocity, the supervisor can quickly assess general air velocity. If the tissue does not perform as above, the supervisor now has knowledge that may help address an indoor air quality problem.

Air pressure

A common method for controlling and managing contaminants is with the use of pressure, meaning that the relationship between rooms (pressure) is artificially or mechanically controlled. This control is accomplished by adjusting the air volumes supplied to or removed from each room. For example, if a higher volume of air is supplied to a room than is exhausted, the excess air seeps out of the space and the room is under **positive pressure**. If less air is supplied than is exhausted, air is pulled into the space and the room is under **negative pressure**. Most laboratory spaces on campus are under negative pressure to help contain any hazardous elements that may escape within the labs.

Carbon monoxide

Carbon monoxide, CO, is an odourless and colourless gas that is a by-product of combustion activities; it is also toxic. Carbon monoxide is most commonly found in parking garages and furnace rooms and in cigarette smoke. Carbon monoxide is a chemical asphyxiate—meaning molecules of CO interact with blood cells on a molecular level, inhibiting the body's ability to process oxygen. Prolonged exposure to low levels of CO may result in headaches, numbness, vision problems, sleep disturbances, etc.

Via the ACGIH, Regulation 833 establishes a TWA exposure limit of 25 ppm, meaning that this is the average exposure to which workers can be consistently exposed over a period of an eight-hour day or 40-hour week without adverse effects. Nevertheless, if carbon monoxide—including low levels—is detected in an office environment, it indicates a problem that requires further investigation.

Carbon dioxide

Carbon dioxide, CO_2, is a natural by-product of human respiration and combustion. The level of CO_2 in a building, compared with the naturally occurring level outside the building, is indicative of the freshness of the air being introduced into the building. ASHRAE Standard 62.1-2013, (*Ventilation for Acceptable Indoor Air Quality*) states that maintaining a CO_2 level "less than 700 parts per million (ppm) above the outdoor air concentration" will indicate that a most personnel will be satisfied with respect to "stuffiness" from human bioeffluents and work-related activities.

With respect to exposure limits established in Ontario, Regulation 833 states that carbon dioxide levels of 5,000 ppm (TWA) do not generally represent an occupational health risk. Levels of CO_2 approaching 1,000 ppm in excess of naturally occurring outdoor concentration have been linked to occupant discomfort, complaints of stale air, mild headaches, fatigue and prolongation of odorous conditions.

Early indoor air quality assessments were simply a comparison of outdoor air to indoor air. While that remains a part of assessments today, significantly more parameters and potential causes can now be explored.

Volatile organic compounds

Volatile organic compounds can originate from a variety of sources. They can be natural or synthetic and odorous or undetectable. There are several different types of chemical products present in indoor air—many of which can be difficult or impossible to identify—originating from a multitude of sources including perfumes and other scented products, new construction materials, textiles, furniture, cleaning products, printers, copiers, etc.

There are currently no provincial or federal standards specifically for VOC levels in industrial or office settings. Health Canada guidelines suggest target values of 1,000 µg/m3 (approx. 400 parts per billion, or 400 ppb) with an action limit of 5,000 µg/m3 (approx. 2,000 ppb).

Mould

Mould contamination is defined as the presence of mould spores that would not be native to the work environment and is typically the result of incomplete (or lack of) remediation efforts following water infiltration.

Air sampling for mould spores can be useful in determining whether there are hidden mould sites in the sampled area and in identifying the potential impact that mould may have on the occupants of the workplace. Mould spores that are not representative of the typical indoor fungal ecology have the potential to damage building materials, adversely affect the operation of building systems (i.e., ventilation) and, most importantly, cause adverse health effects in occupants.

It is important to note that there are currently no provincial or federal regulations for airborne mould; however, numerous guidelines recommend a comparison between indoor and outdoor mould species and total spore counts as part of an indoor mould assessment. The types of mould species found indoors should be comparable to the types of mould species found outdoors, with the spore counts also reasonably comparable. Mould species found indoors that are different from the mould species outdoors (and in sufficiently elevated counts) may indicate that there is microbial growth at the sampled location. The indoor presence and elevated spore count of indicator moulds (such as Aspergillus/Penicillium-like spores and Stachybotrys spores) is generally associated with the presence of moisture and mould issues.

Particulate

Particulate is solid matter with diameters ranging from 0.005 to 100 microns (µm). The size range of concern for human health and respiratory irritation is 0.1 to 10 µm. Generally, particles smaller than 0.1 µm are exhaled and most particles above 10 µm will be filtered by the body's natural defence mechanisms. Typical levels of particle mass in indoor environments can vary widely depending on a variety of factors, including the volume of the outdoor air intake on any given day and the efficiency and cleanliness of the filters. Sources of particulate include common dust, mists, fumes, smoke and other particulate by-products of combustion.

Odours

Like VOCs, odours can originate from a variety of sources. Individual perception and sensitivity can mean the difference between a common nuisance and a significant allergic reaction. Source of odours can include garbage, rodents, new furniture, paint, chemical products, dried plumbing traps, perfume, deodorant, breath, air fresheners and incense. A person can perceive an odour as pleasant, but not everyone may think or feel the same way. It is recommended to exercise discretion with odorous substances.

In the event a co-worker is the source of an odour considered offensive, the affected worker should report the matter to their supervisor. The supervisor or the Human Resources generalist or service can provide assistance in discussing the situation with the workers involved in a respectful fashion.

Ozone

Ozone, O_3 is an unstable form of oxygen that can be produced by some types of printers or copy machines during normal operation (i.e., ozone is not produced during standby). Ozone can be detected well below established exposure limits and is comparable to a sweet, clover-like odour. At higher concentrations, ozone irritates mucous membranes, including those in the eyes, nose and throat. A major difference between ozone and other workplace contaminants is that ozone will revert to the more stable oxygen compound, typically within minutes. Regulation 833 establishes a TWA exposure limit of 0.1 ppm and a STEL of 0.3 ppm.

In many work environments, such office equipment is located in dedicated, closed areas such as closets, enclaves or independent rooms. Suppliers (including the University's supplier of such equipment) are required to meet basic operational standards; nonetheless, the installation location of the equipment can be a major factor in indoor air quality.

Radon

Radon is an invisible, odourless, tasteless, radioactive gas. It is formed by the disintegration of naturally occurring radium, which is a decay product of uranium. Radon emits alpha particles and produces several solid radioactive products known as radon daughters. Some amounts of radon gas and radon daughters are naturally present everywhere in the soil, water Particularly high radon levels occur in regions where the soil or rock is rich in uranium. Radon can enter the indoor air, where it and its decay products accumulate in poorly ventilated areas, such as basements and crawl spaces. Radon daughters are inhaled and remain in the lungs, whereas alpha particles are absorbed by the lungs. According to the Canadian Centre for Occupational Health and Safety, the resulting radiation dose increases the risk of lung cancer.

Given the geographical location of the University of Ottawa campus, it is unlikely that radon is a significant contributor to poor indoor air quality. Risk Management has conducted studies in potential hazard areas (i.e., basements, sub-basements, etc.) and results have been below prescribed limits for taking action.

Additional factors

It is important to note that other factors may contribute to perceived poor indoor air quality, including workplace noise, lighting (e.g., glare and reflection), the ergonomic set-up of the workstation, job satisfaction (e.g., motivation, monotony), workplace conflict, etc. These causes are typically less direct and, in some cases, possibly overlooked during investigations. Nevertheless, such causes can produce health symptoms similar to those manifested when indoor air quality is poor. If a workplace indoor air quality assessment does not identify a cause, it is recommended the investigation be pursued with a greater focus on less-direct impacts) on indoor air quality, such as those indicated above.

REPORTING

As with all other health and safety concerns, the process starts with the worker reporting their concerns to their supervisor. The major difference with indoor quality reports is the lack of a defined event that led to the initial concern. A worker may not draw an immediate link between certain symptoms and the

workplace or may not be aware that other individuals are experiencing similar symptoms. In other cases, such symptoms—while readily apparent—may have developed over time and generally affects the worker only in the workplace. This can make identification and assessment of the cause difficult for the supervisor. Nevertheless, if there is a concern about a potential illness related to the work environment, the worker must report the situation to their supervisor and the supervisor must begin an investigation into the report.

A worker can make a report to the supervisor verbally; however, a written Accident, Incident, Occupational Disease or Near Miss Form is required in order to formally register the concern and report.

The worker's supervisor and management will make an effort to address all reported indoor air quality concerns; however, if the worker finds the response or action insufficient, the worker can report the situation to their representative with the applicable joint health and safety committee or their union or email the Office of Risk Management at safety@uOttawa.ca.

INDOOR AIR QUALITY INVESTIGATION PROCESS

After a supervisor has been informed of a worker's concern about the indoor air quality, the supervisor is responsible for following up on the report. A supervisor does not need to be an indoor air quality expert to be able to identify a problem. Common sense and reasoning will allow a person to identify potential problems in a given workspace. Even if a supervisor is not certain of the source of the problem, they can begin ruling out potential causes and thus narrow them down. See appendix 2 for a sample investigation flowchart.

Initial supervisor actions

Some of the initial actions a supervisor may take include but are not limited to:

1. Refer the worker to the Health and Wellness office of Human Resources if they have reported any health symptoms due to indoor air quality. All interactions a worker has with the Health and Wellness office are confidential. Encourage the worker to log (over the short term) their symptoms using the symptoms checklist (appendix 1). The Health and Wellness office will follow up with the worker about health-related matters. The office may involve Risk Management to help determine causes of reported symptoms. **The supervisor is not to ask the worker about medical-related information, which is confidential.**
2. Conduct a site walkthrough verification to observe the general working conditions. The supervisor is encouraged to make a diagram of the floor plan. A great deal of information can be gained from questioning individuals and observing the set-up of workstations. See appendix 3 for a sample checklist of possible sources of indoor air quality problems. The supervisor should pay special attention to:
    a. **The location of fresh air supply and air return grills**. Air supply grills can take different forms, such as fan bars, louvered grills or metal diffuser units. Air supply and air return grills are typically located on the ceiling. Air return grills are commonly referred to as "egg crates" as they often comprise 1 cm by 1 cm squares and bear a slight resemblance to an egg crate. The grills should be sufficiently spaced in the area in order to promote an even airflow pattern so that air sweeps across the work area.
    b. **Cleanliness of the grills**. Dusty or blocked grills can impede ventilation performance and lead to particulate or dust concerns.

c. **Potential sources of odours**. Odours can come from garbage cans, recycling centres, equipment processes, printers, incense burners and air fresheners, for example, and should be eliminated as much as possible.
d. **Indication of water infiltration or mould**. Presence of water spots or dark, circular discolouration indicate water has leaked into the area or mould is growing, respectively.
e. **The presence of visible dust on horizontal surfaces**. This could indicate poor cleaning service or insufficient air circulation.
f. **The presence of numerous portable heaters, fans or humidifiers**. This indicates a potential problem with the building's mechanical system.

3. If applicable, interview other workers in the workspace and get additional information about the work environment in question to help determine how extensive the problem may be; extensive problems will require the involvement of the Facility Manager / Building Management Agent. In many indoor air quality investigations, additional concerns are brought forward following the initial report. Relevant information to obtain during an interview can include:
    a. A description of how the worker is feeling in the workplace
    b. The dates and times the worker began to feel unwell and better
    c. Any significant life changes for the worker (e.g., moving or exposure to new materials, animals, everyday chemical products like laundry soap or cleansing products)
    d. Environmental factors (such as in parking and smoking areas), working in a recently renovated area, etc.
    e. Awareness of similar concerns by other workers
4. If warranted, initiate via the facility manager a work request for Facilities to conduct a visual inspection of the mechanical connections, ductwork and filters. If the inspection does not identify any physical cause, Facilities can assess ventilation performance. Using the Delta base building system, Facilities can remotely verify system performance very quickly. Depending on assessment results, corrective action may be implemented. This can include:
    a. Adjusting air volume and source (i.e., fresh vs. recirculated)
    b. Adjusting air temperature
    c. Changing filters
    d. Rebalancing the distribution of air
    e. Cleaning ductwork

Assessment conclusion

At the conclusion of the initial assessment, the supervisor or facility manager / building management agent should be able to identify the nature of the complaints and the number of individuals affected and possess basic information on the work environment and any obvious sources of internal or external pollutants. The supervisor can draw conclusions and implement initial corrective actions based on their findings. The supervisor can plot their findings on a building plan and identify areas of concern.

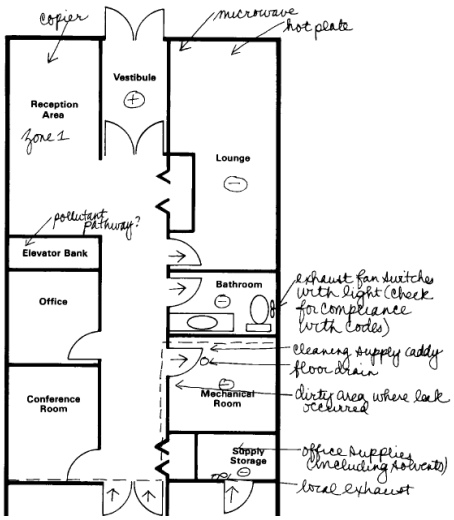


Figure 2 - Example floorplan markup

Corrective actions

Once ready to initiate any corrective actions, the supervisor will most often first communicate with their facility manager or building management agent and then contact the Facilities call centre to initiate a request for the necessary work. In rare cases, the situation may require the assistance of personnel outside the University, which will be coordinated through Office of Risk Management.

Once corrective action has been taken, the supervisor must evaluate the effectiveness of corrective action. To do so, the supervisor can have discussions with workers about the general environment to determine if the reported conditions have improved, etc. If measurements were taken prior to the corrective actions being implemented (e.g., indoor air quality sampling), these measurements should be repeated and compared to assess the effectiveness of the corrective action.

If after completing the initial assessment and implementing any corrective action, the supervisor is unable to identify a cause or if the corrective action was ineffective, the supervisor can email the Office of Risk Management at safety@uOttawa.ca for additional assistance to conduct a formal indoor air quality worksite evaluation. Information on any actions taken to date by the supervisor or Facilities (including work order numbers) should be provided. A time can then be scheduled to do a formal joint assessment of the workplace. The formal assessment should involve mimicking, to the extent possible, the conditions reported by the worker. The Office of Risk Management has the basic tools to assess comfort parameters of indoor air quality and can do so if necessary.

If a cause still cannot be found, it may be necessary to consult with external experts. All requests for external consultations or evaluation will be handled by the Office of Risk Management on a case-by-case basis with the applicable parties.

Communication

The supervisor is advised to keep all affected workers informed during the investigation process and on any actions explored or implemented).

RESOURCES

- Indoor Air Quality – General, Canadian Centre for Occupational Health and Safety

- Building Air Quality: A Guide for Building Owners and Facility Managers, United States Environmental Protection Agency
- Causes of Poor Indoor Air Quality, Government of Canada
- Indoor Air Quality in Office Building: A Technical Guide, Health Canada
- A Practical Guide to Indoor Air Quality Investigations (PDF), TSI Incorporated

APPENDIX 1 – SIGNS AND SYMPTOMS LOG

Occupant Symptoms and Health Effects
Air Quality Complaint

Name: Employee no.:

Date: Hall and room number where workstation is located:

Work schedule:

Symptoms and health effects	When did the symptoms start?	Frequency of symptoms	How do you manage the symptoms?	When do the symptoms disappear?	Do you have the same symptoms outside of work? If yes, where?	Other details

Type of work conducted at the time the symptoms and health effects started:

Types of products are used in the work area:

Is there new equipment in the work area? If yes, what equipment and when was it brought in?

Are there plants or air freshener in the work area? If yes, what are they and what date(s) were they introduced into the work area?

Was there a particular odour in the work area? If yes, please describe odour.

Occupant Symptoms and Health Effects
Air Quality Complaint

Are there carpets in the work area?

Are there window(s) in the work area? If yes, what type(s) of blinds or curtains are on them (fabric, vinyl, aluminum)?

How would you describe the temperature in the work area, e.g., cold, hot, stuffy, humid, dry?

Do you have allergies? If yes, to what? What type of treatment do you receive (e.g., medication, immunotherapy)?

Do you have asthma? Do you need to take your medication more often now?

Do you have a pre-existing medical condition that is being aggravated at this time? If yes, what?

Did you miss time from work for this reason? If yes, when were you absent?

Did you see your physician for this reason?

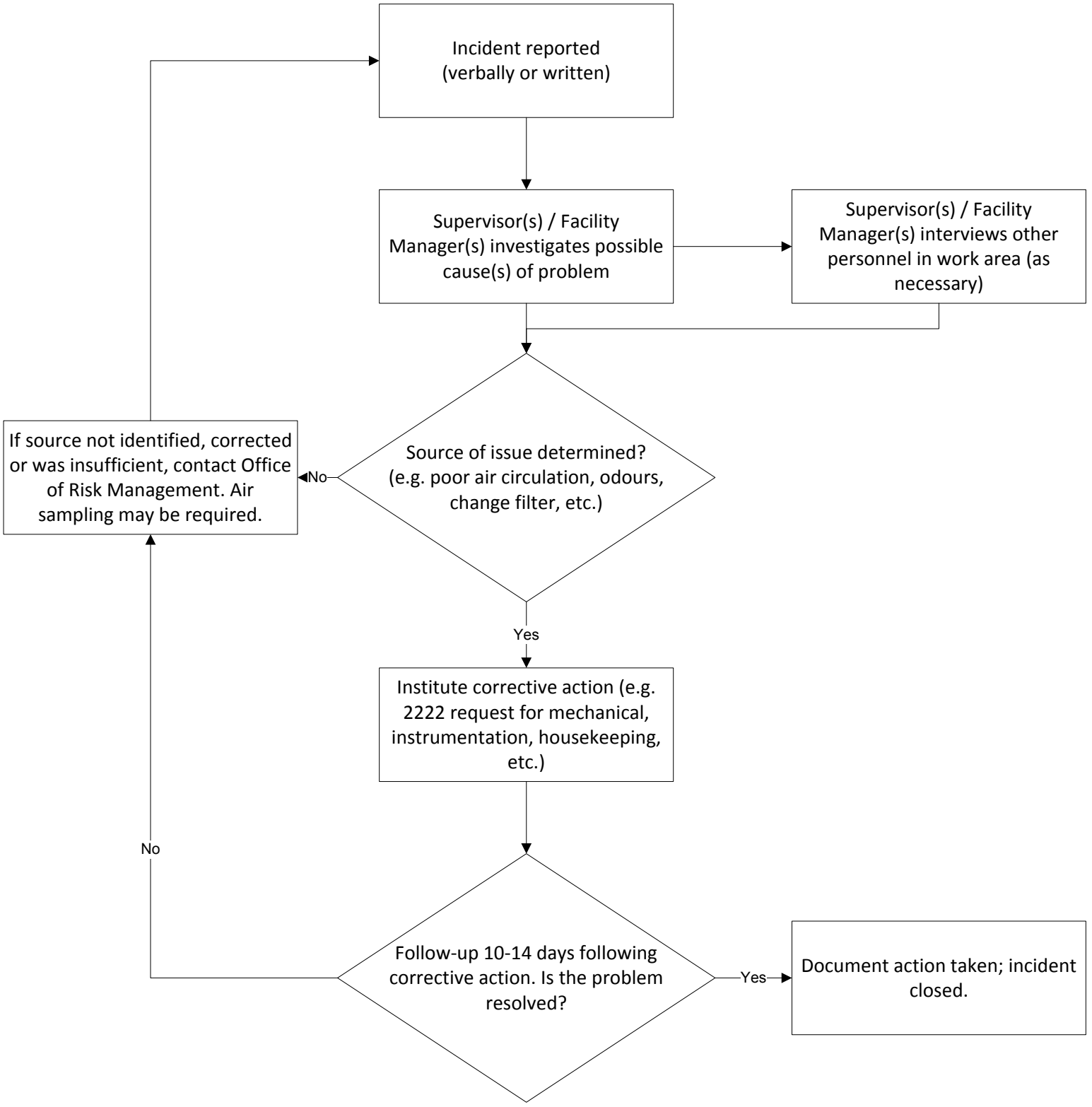
Other information:

Signature: _____

When completed, return by internal mail in a sealed envelope marked "Confidential" to Human Resources, Health and Wellness Sector, Tabaret Hall, Room 017, by email to HRhealth@uOttawa.ca or by fax to 613-562-5120.

APPENDIX 2 – INVESTIGATION FLOWCHART

Indoor Air Quality Investigation Flowchart



APPENDIX 3 – SUPERVISOR CHECKLIST

uOttawa

Université d'Ottawa | University of Ottawa

Bureau de la gestion du risque | Office of Risk Management

840-1 Nicholas Street

This checklist is intended as a supplemental aid for supervisors investigating complaints of indoor air quality in areas under their responsibility. The presence of any of the below materials or situations does not necessarily indicate it is the cause of a poor indoor air quality problem. This checklist will help supervisors develop a work space profile. The information collected by the supervisor—together with information reported by the worker—can help identify a likely cause or rule out unlikely causes of indoor air quality problems.

This checklist is not exhaustive. Supervisors may need to adapt the checklist to their needs.

Building:
Room:
Date:

General workplace observations

☐ Number of occupants
- i.e., is there sufficient space in the area for the number of assigned occupants?

☐ Use and condition of flooring
- e.g., carpet, is flooring past its useful life?

☐ There have been recent renovations or construction-related work in the area.
- e.g., the area was recently painted or new furniture or textiles were installed

☐ Odours
- e.g., there is a noticeable odour in the area

Walls, ceiling and floors

☐ Evidence of water infiltration
- e.g., water spots, stains, recent flooding

☐ Evidence of mould
- e.g., visible mould growth, musty odours, heavy and stale air

☐ Dust on horizontal surfaces
- e.g., visible dust on shelving, desks or other flat surfaces

☐ General cleanliness
- e.g., occupant maintains a well-kept and tidy area

☐ Operable windows
- e.g., windows are operated by the occupant(s)

Open concept locations

☐ Screen or wall dividers
- e.g., does height of dividers allow sufficient airflow (maximum height 1.5 metres)

Pollutant sources

☐ Photocopiers, printers

- e.g., location: in low-traffic areas, away from occupant workstations

☐ Waste collection stations
- e.g., located in general use areas such as hallways

☐ Chemical or general storage and handling areas
- e.g., located in dedicated use areas (such as separate rooms)

☐ Kitchen, food preparation areas
- e.g., located in low-traffic areas, away from occupant workstations

☐ Other individuals
- e.g., perfumes or personal hygiene

Contaminant sources

☐ Parking garages or lots
- i.e. odours and low-level carbon monoxide.

☐ Loading zones
- e.g., odours, low-level of carbon monoxide

☐ Smoking area
- e.g., odours, low-level of carbon monoxide

☐ Combustion equipment (furnace, water heater, etc.)
- e.g., odours, low level of carbon monoxide

Ventilation system (HVAC)

☐ Ventilation system
- e.g., noticeable alterations to the ventilation system (diffusers, shields, barriers, etc.)
- e.g., presence of independent heating or cooling devices
- e.g., diffusers or louvers are free from particulate accumulation

☐ Sufficient fresh air or air changes
- e.g., noticeable air movement in the workspace

☐ Filtering media
- e.g., filter (particulate, activated charcoal, etc.) is changed at required frequency

☐ Pollutant source at air intake
- e.g., pollutant source identified at air intake

☐ Cleanliness of air ducts and plenum (area above suspended ceiling)
- e.g., visual inspection of ducting or plenum

☐ Ventilation schedule
- e.g., schedule for ventilation system is within Facilities recommendations

☐ Other microbial sources
- e.g., condensate trays (for air conditioning) and cooling coils are free of standing water and slime

☐ Preventative maintenance activity, including last known maintenance activity
- e.g., Facilities conducts regular maintenance of the HVAC units serving the work area

Other observations: