# **TORONTO** STAFF REPORT

August 31, 2006

To:	Planning and Transportation Committee
From:	Dr. David McKeown, Medical Officer of Health
Subject:	Health Risks and Legislative Authority of the Medical Officer of Health Regarding Marijuana Grow Houses and Clandestine Drug Laboratories in Toronto - REVISED

## Purpose:

The purpose of this report is to identify any health effects that may be associated with environmental mould in Marijuana Grow Operations and to describe the legislative authority of the Medical Officer of Health (MOH) under the Health Protection and Promotion Act (HPPA) in relation to health hazards in marijuana grow houses and clandestine drug laboratories.

Financial Implications and Impact Statement:

There are no financial implications.

#### Recommendation:

It is recommended that this report be referred to the Board of Health for information.

#### Background:

Following a report from the Transportation and Planning Committee dated November 8, 2004 to City Council, the Medical Officer of Health in consultation with the City Solicitor, was directed to report on the following:

- (1) The health risks posed by the types of mould and fungus that are commonly found in Marijuana Grow Operations and what are the thresholds for the MOH to be able to deem a dwelling to be unsafe for human habitation; and
- (2) The extent to which the city can rely on the unique legislative authorities in the HPPA given to the Medical Officer of Health to protect the public from the health hazards

associated with marijuana "grow houses" and clandestine drug laboratories that are likely to have an adverse effect on the health of any person.

This report highlights the role of Toronto Public Health in dealing with the problem of illegal drug laboratories and marijuana grow houses. It also includes current research on the health effects of indoor mould (see Attachment 1) compiled from both Canadian and American sources including Toronto Public Health, Region of Peel Public Health, the Ministry of Health and Long-Term Care, Health Canada, the Centers for Disease Control and Prevention, and the New York City Department of Health and Mental Hygiene.

The report also highlights the range of legal options available to the Medical Officer of Health in order to protect the public from health hazards. Five key sections of the Health Protection and Promotion Act are discussed:

- (1) Definition of a health hazard
- (2) Right of entry
- (3) Issuing orders
- (4) Placards (prohibit occupancy)
- (5) Cost recovery issues

#### Comments:

Municipal Licensing and Standards Division (ML&S), in consultation with the Toronto Police Service (TPS) and Toronto Public Health (TPH) and other City partners has developed a protocol in responding to reports of marijuana grow houses. This protocol establishes a mechanism for notification as well as a role for TPH that draws on its environmental and public health expertise while complementing the enforcement capability of TPS and ML&S.

Since November 2004, ML&S has issued orders under the property standards provisions of the Building Code Act to the owners of properties that had been used as marijuana grow operation. The orders require written assessment from a professional engineer about the air quality, electrical and structural safety within the dwelling. If a mould problem is identified, a written remediation plan for its removal is also required (see Attachment 2).

ML&S orders are issued solely upon the receipt of a police report and not as a result of a site inspection by ML&S inspectors. This is a result of serious concerns by ML&S about occupational health and safety risks to ML&S staff and complex rights of entry issues, which led to the current policy of issuing orders based solely on police reports. The Health and Safety hazards associated with marijuana grow operations may include; alterations to the electrical system, structural changes to the premises, poor air quality and booby-traps designed to cause injury to unsuspecting intruders. Also noteworthy, the Toronto Police Services enter premises used as a grow operation wearing protective HAZMAT suits because of the potential presence of toxic mould and volatile chemicals.

ML&S is hampered by limitations in their right to enter a premises. The Building Code Act requires an ML&S officer to request the right to enter a premise from the owner or tenant. However, the owner or tenant may not be available or may even be in jail after a police raid. If the right to enter can not be obtained or is denied, a search warrant from a Justice of the Peace

may be obtained. However, in the absence of an inspection the officer will have little or no information about possible deficiencies within the premises and therefore limited or no basis for a search warrant.

A further limitation identified with ML&S enforcement was their inability to prohibit occupancy of premises with potential health or safety risks through the issuance of orders under the property standards provisions of the Building Code. As a result ML&S and the Building Division recently agreed to a revision to the current protocol to include orders issued by the Chief Building Official to prohibit occupancy in accordance with the provisions of Section 15 (6) of the Building Code Act, where they are considered Unsafe, as defined by the Act.

Based on this agreement, it was expected that orders to prohibit occupancy under the Building Code Act would be issued more frequently as a result of mould, where it is considered to be "in a condition that could be hazardous to the health or safety of persons in the normal use of the building" based on sufficient information provided by the TPS or documentation in a report by a qualified professional obtained through the issuance of an unsafe order. However, orders to prohibit occupancy may also be issued where the building is structurally inadequate or faulty for the purpose for which it would be used.

Under authority of the HPPA, if a Medical Officer of Health or a Public Health Inspector is of the opinion that a health hazard exists with respect to a marijuana grow house or illegal drug laboratory, an order may be served requiring the owner of the premises to take certain action in respect of the health hazard. The order may require placarding the premises, remediating the health hazard and prohibiting occupancy of the premises. Steps may also be taken to recover costs incurred by the Medical Officer of Health to remediate the health hazard if the owner fails to do so.

Since the Medical Officer of Health will be issuing orders requiring the owner to vacate these premises where a health hazard exists the Chief Building Official will only be issuing orders prohibiting occupancy for properties identified as structurally inadequate, as part of the protocol.

See Attachment 3 for details about the powers of the MOH under the HPPA.

#### Marijuana Grow Houses:

TPH has worked collaboratively with the TPS and ML&S since 2004. The role of TPH under the protocol is to review all environmental assessment reports and remediation plans in marijuana grow operations that are received from ML&S as a result of the orders they have issued. If there are concerns, TPH will provide comment and direction and confirmation that the recommended remediation plans are completed.

Currently TPH staff do not inspect marijuana grow operations and have the same occupational health and safety concerns and rights of entry issues noted by ML&S. If, after reviewing Toronto Police Service reports, the Medical Officer of Health or Public Health Inspector forms the opinion, on reasonable and probable grounds, that a health hazard exists, an order will be prepared and served on the owner of the premises. The order may include placarding the premises or prohibiting occupancy of the premises until such time as the Medical Officer of Health or Public Health Inspector determines the health hazard no longer exists.

Illegal Drug Laboratories:

The potential presence of known hazardous, toxic and flammable substances associated with clandestine labs, presents an immediate and continuing risk to anyone exposed to these substances. The variety of dangerous chemicals used in drug labs include: phosphene, anhydrous ammonia, hydrochloric acid, hydrochloric gas, acetone, lye, and sulphates. These chemicals are known to be dangerous and pose an immediate threat to the public. To date, TPH has not received notification of the presence of clandestine drug labs in Toronto.

If a Medical Officer of Health or a public health inspector forms an opinion after reviewing TPS reports that a health hazard exists with respect to an illegal drug laboratory, an order will be served requiring the premises be closed and/or vacated. The order could also require the premises to be placarded to give notice of the closure/vacate order. The closure order remains in effect as long as the health hazard continues to exist.

#### Health Risks Posed By Mould:

Mould is commonly found outdoors and indoors in most Ontario homes and may pose a problem to susceptible individuals such as those who are immunocompromised, the elderly, the very young and people who are allergic (see Attachment 1 for Health Risks associated with mould). TPH recommends the remediation of all visible mould. TPH staff investigate complaints about mould contamination in residential dwellings (other than illegal operations). In cases of mild or moderate contamination, advice or an order to remediate may be issued. In the majority of cases closure of the dwelling is not warranted. However, in cases where there is extensive mould contamination, the dwelling may be deemed uninhabitable and steps are taken to vacate and placard the dwelling pursuant to an order under the HPPA.

Marijuana grow operations are distinct from typical types of premises contaminated with mould in that they have been used for criminal activities that may have resulted in the creation, not only of environmental hazards, but electrical and structural hazards as well.

#### Conclusions:

Toronto Public Health is working in collaboration with TPS, ML&S and other partners to protect the health and safety of the public from the risks of illegal drug laboratories and marijuana grow houses. The role of TPH in this regard is one that relies on public health expertise in reviewing assessment reports conducted under order of Municipal Licensing and Standards or the Chief Building Official.

To augment current actions taken by TPH, if a health hazard exists, the Medical Officer of Health will also serve orders in respect of marijuana grow houses and illegal drug laboratories prohibiting occupancy of premises and requiring the placarding of the premises Contacts:

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List of Attachments:

Attachment 1: Health Risks Related to Mould in Marijuana Grow Houses Attachment 2: Toronto Guidelines on Assessment and Remediation of Fungi in Indoor Environments (Revised June 15, 2005) Attachment 3: The Health Protection and Promotion Act (HPPA)

#### Attachment 1

## Health Risks Related to Mould in Marijuana "Grow Ops"

Health effects of mould can range from being insignificant to causing allergic reactions and illness. Exposure to mould does not necessarily lead to any ill health effect. Reaction to moulds depends on the amount and degree of exposure as well as the overall health and age of an individual. Further, reported symptoms occur most often in susceptible individuals. For example, the elderly, pregnant women, small children, people with allergies or chronic respiratory illness and/or chemical sensitivities and those with weakened immune systems are more at risk from exposure to moulds.

Moulds belong to a kingdom of fungi that also include mushrooms, mildew and yeasts. There are an estimated 50,000 to 250,000 different species of mould. Of these, less than 200 have been associated with causing illness. Moulds are present everywhere, both indoors and outdoors. They are easily brought indoors from the outside via open windows and doors, on clothing, pets, food or furniture. They need water and nutrients and will grow indoors in wet or damp areas with elevated humidity. Mould commonly grows indoors on wallpaper, ceiling tiles, carpets, insulation material, wood and drywall. More than 270 species of mould have been identified in Canadian homes.

Indoor exposure occurs when mould, or fragments of mould, are released into the air and either inhaled, physically contacted (dermal exposure) or ingested. Potential health effects from mould (fungal spores) falls into three general categories. Mould may cause:

- (1) Allergic (immunological) reactions;
- (2) Toxic effects; and
- (3) Infections.

The most common symptoms from indoor exposures include runny nose, eye irritation, cough, congestion, aggravation of asthma, headache and fatigue. These are known as non-specific symptoms because they may be attributed to many different pathogens. Non-specific symptomolgy makes it very difficult to diagnose mould as the cause of an illness because a number of other viral or bacterial pathogens may cause the same symptoms.

#### Allergic (immunological) Reactions:

Allergic reactions include asthma, Hypersensitivity Pneumonia (HP), and allergic rhinitis. Contact with mould may also lead to dermatitis. The most common symptoms associated with allergic reactions are runny nose, eye irritation, cough, congestion and aggravation of asthma. HP may occur after repeated exposure to mould and can result in permanent lung damage. Thus far, HP has been associated with repeated heavy exposures in agricultural settings as well as several office settings in the United States.

#### Toxic Effects:

A wide variety of symptoms have been attributed to the toxic effects of mould. For example, fatigue, nausea, headaches, as well as respiratory and eye irritation. Some reported symptoms are

non-specific and include discomfort, inability to concentrate and fatigue. Several severe illnesses, such as Organic Dust Toxic Syndrome (ODTS) and pulmonary hemosiderosis have also been attributed to fungal exposures primarily in agricultural settings. However, in general, the higher the level of exposure, the higher the probability of health effects.

ODTS is an abrupt onset of fever, flu-like symptoms and respiratory symptoms in the hours following a single heavy exposure to dust containing mould. It differs from HP in that it is not an allergic response and does not require repeated exposures. ODTS may be caused by a variety of biological agents including common species of mould, e.g. Aspergillus and Penicllium. However, ODTS is of greater concern among farm workers handling contaminated materials, and it may also be of concern to workers performing renovations in heavily contaminated buildings.

There may also be a link between the fungi, Stachybotrys Chartarum (SC) and pulmonary hemosiderosis in infants less than six months old. This is an uncommon condition leading to bleeding of the lungs. Its cause is unknown, but is believed to be a combination of environmental contaminants including second hand smoke, moulds, a water damaged home and other airborne contaminants. To date, the association with SC remains unproven.

Infectious Disease:

Infections due to mould are highly unlikely to cause illness in a healthy person. However, it may cause serious illness in an immunosuppressed person. The most common infection of this type is Aspergillosis caused by the species Aspergillus fumigatus.

Threshold Limits to Exposure:

Currently, there are insufficient data to establish threshold levels of exposure to most fungal, including mould organisms. This means that it is not possible to determine a level at which intervention should occur to permit avoidance of all health effects. The issue is complicated by the fact that whether or not symptoms develop in people exposed to mould depends on several variable factors:

- (1) Type of mould;
- (2) Amount of exposure; and
- (3) Susceptibility of exposed person.

While it is known that these are the factors that probably contribute to symptoms, a great deal is still unknown about how moulds affect people, how to standardise and measure exposure as well as how to test for exposure. Over time, it is likely that estimates of dose will be clarified, although estimates of response will require further development given the non-specific nature of many complaints. For these reasons, it is not possible to determine "safe" or "unsafe" threshold levels of exposure for the general population.

Even though health based thresholds cannot be set, mould may pose either an immediate or eventual health hazard. It remains a pending health hazard if the underlying conditions that lead to mould proliferation are not remediated. In this situation, mould growth and worsening contamination will continue to a level that eventually does pose an immediate health hazard. This is the underlying reason for the policies of Toronto Public Health (TPH), as well as Centers for Disease Control and Prevention (CDC), Environmental Protection Agency (EPA), Federal Emergency Management Agency (FEMA), New York City (NYC), Health Canada (HC), Canada Mortgage and Housing Corporation (CMHC) to remediate all mould regardless of the extent or type present.

#### Remedial Actions:

Toronto Public Health recommends the presence of mould be corrected immediately in accordance with the Toronto Guidelines (*please see Appendix 3*). In addition, sources of water accumulation or excess humidity must be rectified or else mould growth will recur.

The size of the mould-contaminated area determines the type of remediation. There are four levels of abatement for private residences as follows:

- (1) Level 1: Small Isolated Areas (10 sq.ft.or less)
- (2) Level 2: Mid-Sized Isolated Areas (10–30 sq. ft.)
- (3) Level 3: Large Isolated Areas (30 100 sq. ft.)
- (4) Level 4: Extensive Contamination (greater than 100 contiguous sq. ft.)

Currently, Levels 1 and 2 can be remediated by using household cleaners and wearing a disposable dust mask and rubber gloves. Levels 3 and 4 should be remediated by reputable professionals.

#### Air Monitoring:

Air monitoring is generally not recommended, nor is it required in most cases to determine an appropriate remediation strategy. Visual inspections are usually adequate to determine the extent of mould and how to remedy the problem. However, an air sample may be required to aid in the medical diagnosis of a fungal exposure such as pulmonary hemorrhage/hemosiderosis and aspergillosis.

#### Attachment 2

#### Toronto Guidelines on Assessment and Remediation of Fungi in Indoor Environments (Revised June 15, 2005)

- 1. Introduction
- 2. Health Issues
- 3. Environmental Assessment
- 4. Remediation
- 5. Hazard Communication
- 6. Conclusion
- 7. Notes and References

**Executive Summary:** 

Toronto Public Health has adopted the following Guidelines on Assessment and Remediation of Fungi in Indoor Environments.

On May 7, 1993, the New York City Department of Health (NYCDOH), the New York City Human Resources Administration (NYCHRA), and the Mt. Sinai Occupational Health Clinic convened an expert panel on *Stachybotrys atra* in Indoor Environments. The purpose of the panel was to develop policies for medical and environmental evaluation and intervention to address *Stachybotrys atra* (now known as *Stachybotrys chartarum* (SC)) contamination. The original guidelines were developed because of mould growth problems in several New York City buildings in the early 1990's. This document revises and expands the original guidelines to include all fungi (mould). It is based both on a review of the literature regarding fungi and on comments obtained by a review panel consisting of experts in the fields of microbiology and health sciences. It is intended for use by building engineers and management, but is available for general distribution to anyone concerned about fungal contamination, such as environmental consultants, health professionals or the general public.

We are expanding the guidelines to be inclusive of all fungi for several reasons:

- (1) Many fungi (e.g., species of *Aspergillus, Penicillium, Fusarium, Trichoderma*, and *Memnoniella*) in addition to SC can produce potent mycotoxins, some of which are identical to compounds produced by SC. Mycotoxins are fungal metabolites that have been identified as toxic agents. For this reason, SC cannot be treated as uniquely toxic in indoor environments.
- (2) People performing renovations/cleaning of widespread fungal contamination may be at risk for developing Organic Dust Toxic Syndrome (ODTS) or Hypersensitivity Pneumonitis (HP). ODTS may occur after a *single heavy* exposure to dust contaminated with fungi and produces flu-like symptoms. It differs from HP in that it is not an immune-mediated disease and does not require repeated exposures to the same causative agent. A variety of biological agents may cause ODTS including common species of fungi. HP may occur after repeated

exposures to an allergen and can result in permanent lung damage.

(3) Fungi can cause allergic reactions. The most common symptoms are runny nose, eye irritation, cough, congestion, and aggravation of asthma.

Fungi are present almost everywhere in indoor and outdoor environments. The most common symptoms of fungal exposure are runny nose, eye irritation, cough, congestion, and aggravation of asthma. Although there is evidence documenting severe health effects of fungi in humans, most of this evidence is derived from ingestion of contaminated foods (i.e., grain and peanut products) or occupational exposures in agricultural settings where inhalation exposures were very high. With the possible exception of remediation to very heavily contaminated indoor environments, such high-level exposures are not expected to occur while performing remedial work.

The health effects of mould can be found in office workers who work in offices contaminated with mouldy surfaces and in residents of homes contaminated with fungal growth. Symptoms, such as fatigue, respiratory ailments, and eye irritation were typically observed in these cases. Some studies have suggested an association between *Stachybotrys chartarum* (SC) and pulmonary hemorrhage/hemosiderosis in infants, generally those less than six months old. Pulmonary hemosiderosis is an uncommon condition that results from bleeding in the lungs. The cause of this condition is unknown, but may result from a combination of environmental contaminants and conditions (e.g., smoking, fungal contaminants and other bioaerosols, and water-damaged homes), and currently its association with SC is unproven.

The focus of this guidance document addresses mould contamination of building components (walls, ventilation systems, support beams, etc.) that are chronically moist or water damaged. Occupants should address common household sources of mould, such as mould found in bathroom tubs or between tiles with household cleaners. Mouldy food (e.g., breads, fruits, etc.) should be discarded.

Building materials supporting fungal growth must be remediated *as rapidly as possible* in order to ensure a healthy environment. Repair of the defects that led to water accumulation (or elevated humidity) should be conducted in conjunction with or prior to fungal remediation. Specific methods of assessing and remediating fungal contamination should be based on the extent of visible contamination and underlying damage. The simplest and most expedient remediation that is reasonable, and properly and safely removes fungal contamination, should be used. Remediation and assessment methods are described in this document.

The use of respiratory protection, gloves, and eye protection is recommended. Extensive contamination, particularly if heating, ventilating, air conditioning (HVAC) systems or large occupied spaces are involved, should be assessed by an experienced health and safety professional and remediated by personnel with training and experience handling environmentally contaminated materials. Lesser areas of contamination can usually be assessed and remediated by building maintenance personnel. In order to prevent contamination from recurring, underlying defects causing moisture buildup and water damage must be addressed. Effective communication with building occupants is an essential component of all remedial efforts.

Fungi in buildings may cause or exacerbate symptoms of allergies (such as wheezing, chest tightness, shortness of breath, nasal congestion, and eye irritation), especially in persons who have a history of allergic diseases (such as asthma and rhinitis). Individuals with persistent health problems that appear to be related to fungi or other bioaerosol exposure should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures. Decisions about removing individuals from an affected area must be based on the results of such medical evaluation, and be made on a case-by-case basis. Except in cases of widespread fungal contamination that are linked to illnesses throughout a building, building-wide evacuation is not indicated.

In summary, prompt remediation of contaminated material and infrastructure repair is the primary response to fungal contamination in buildings. Emphasis should be placed on preventing contamination through proper building and HVAC system maintenance and prompt repair of water damage.

This document is not a legal mandate and should be used as a guideline. Currently there are no regulations for evaluating potential health effects of fungal contamination and remediation. These guidelines are subject to change as more information regarding fungal contaminants becomes available.

#### 1. Introduction

This document contains a discussion of potential health effects; medical evaluations; environmental assessments; protocols for remediation; and a discussion of risk communication strategy. The guidelines are divided into four sections: 1. Health Issues; 2. Environmental Assessment; 3. Remediation; and 4. Hazard Communication.

Fungi are present almost everywhere in indoor and outdoor environments. The most common symptoms of fungal exposure are runny nose, eye irritation, cough, congestion, and aggravation of asthma. Although there is evidence documenting severe health effects of fungi in humans, most of this evidence is derived from ingestion of contaminated foods (i.e., grain and peanut products) or occupational exposures in agricultural settings where inhalation exposures were very high.<sup>13, 14</sup> With the possible exception of remediation to very heavily contaminated indoor environments, such high level exposures are not expected to occur while performing remedial work.<sup>15</sup>

There have been reports linking health effects in office workers to offices contaminated with mouldy surfaces and in residents of homes contaminated with fungal growth.<sup>12, 16, 17, 18, 19, 20</sup> Symptoms, such as fatigue, respiratory ailments, and eye irritation were typically observed in these cases.

Some studies have suggested an association between SC and pulmonary hemorrhage/hemosiderosis in infants, generally those less than six months old. Pulmonary hemosiderosis is an uncommon condition that results from bleeding in the lungs. The cause of this condition is unknown, but may result from a combination of environmental contaminants and conditions (e.g., smoking, other microbial contaminants, and water-damaged homes), and currently its association with SC is unproven. The focus of this guidance document addresses mould contamination of building components (walls, ventilation systems, support beams, etc.) that are chronically moist or water damaged. Occupants should address common household sources of mould, such as mould found in bathroom tubs or between tiles with household cleaners. Mouldy food (e.g., breads, fruits, etc.) should be discarded.

This document is not a legal mandate and should be used as a guideline. Currently there are no regulations for evaluating potential health effects of fungal contamination and remediation. These guidelines are subject to change as more information regarding fungal contaminants becomes available.

## 2. Health Issues

#### 2.1 Health Effects

Inhalation of fungal spores, fragments (parts), or metabolites (e.g., mycotoxins and volatile organic compounds) from a wide variety of fungi may lead to or exacerbate immunologic (allergic) reactions, cause toxic effects, or cause infections.

There are only a limited number of documented cases of health problems from indoor exposure to fungi. The intensity of exposure and health effects seen in studies of fungal exposure in the indoor environment was typically much less severe than those that were experienced by agricultural workers but were of a long-term duration. Illnesses can result from both high level, short-term exposures and lower level, long-term exposures. The most common symptoms reported from exposures in indoor environments are runny nose, eye irritation, cough, congestion, aggravation of asthma, headache, and fatigue.

The presence of fungi on building materials as identified by a visual assessment or by bulk/surface sampling results does not necessitate that people will be exposed or exhibit health effects. In order for humans to be exposed indoors, fungal spores, fragments, or metabolites must be released into the air and inhaled, physically contacted (dermal exposure), or ingested. Whether or not symptoms develop in people exposed to fungi depends on the nature of the fungal material (e.g., allergenic, toxic, or infectious), the amount of exposure, and the susceptibility of exposed persons. Susceptibility varies with the genetic predisposition (e.g., allergic reactions do not always occur in all individuals), age, state of health, and concurrent exposures. For these reasons, and because measurements of exposure are not standardized and biological markers of exposure to fungi are largely unknown, it is not possible to determine "safe" or "unsafe" levels of exposure for people in general.

#### 2.1.1 Immunological Effects

Immunological reactions include asthma, Hypersensitivity Pneumonitis (HP), and allergic rhinitis. Contact with fungi may also lead to dermatitis. It is thought that these conditions are caused by an immune response to fungal agents. The most common symptoms associated with allergic reactions are runny nose, eye irritation, cough, congestion, and aggravation of asthma. HP may occur after repeated exposures to an allergen and can result in permanent lung damage. HP has typically been associated with repeated heavy exposures in agricultural settings but has

also been reported in office settings. Exposure to fungi through renovation work may also lead to initiation or exacerbation of allergic or respiratory symptoms.

## 2.1.2 Toxic Effects

A wide variety of symptoms have been attributed to the toxic effects of fungi. Symptoms, such as fatigue, nausea, and headaches, and respiratory and eye irritation have been reported. Some of the symptoms related to fungal exposure are non-specific, such as discomfort, inability to concentrate, and fatigue. Severe illnesses such as Organic Dust Toxic Syndrome (ODTS) and pulmonary hemosiderosis have also been attributed to fungal exposures.

ODTS describes the abrupt onset of fever, flu-like symptoms, and respiratory symptoms in the hours following a *single, heavy* exposure to dust containing organic material including fungi. It differs from HP in that it is not an immune-mediated disease and does not require repeated exposures to the same causative agent. ODTS may be caused by a variety of biological agents including common species of fungi (e.g., species of *Aspergillus* and *Penicillium*). ODTS has been documented in farm workers handling contaminated material but is also of concern to workers performing renovation work on building materials contaminated with fungi. Some studies have suggested an association between SC and pulmonary hemorrhage/hemosiderosis in infants, generally those less than six months old. Pulmonary hemosiderosis is an uncommon condition that results from bleeding in the lungs. The cause of this condition is unknown, but may result from a combination of environmental contaminants and conditions (e.g., smoking, fungal contaminants and other bioaerosols, and water-damaged homes), and currently its association with SC is unproven.

## 2.1.3 Infectious Disease

Only a small group of fungi have been associated with infectious disease. Aspergillosis is an infectious disease that can occur in immunosuppressed persons. Health effects in this population can be severe. Several species of *Aspergillus* are known to cause aspergillosis. The most common is *Aspergillus fumigatus*. Exposure to this common mould, even to high concentrations, is unlikely to cause infection in a healthy person. Exposure to fungi associated with bird and bat droppings (e.g., *Histoplasma capsulatum* and *Cryptococcus neoformans*) can lead to health effects, usually transient flu-like illnesses, in healthy individuals. Severe health effects are primarily encountered in immunocompromised persons.

# 2.2 Medical Evaluation

Individuals with persistent health problems that appear to be related to fungi or other bioaerosol exposure should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures. Infants (less than 12 months old) who are experiencing non-traumatic nosebleeds or are residing in dwellings with damp or mouldy conditions and are experiencing breathing difficulties should receive a medical evaluation to screen for alveolar hemorrhage. Following this evaluation, infants who are suspected of having alveolar hemorrhaging should be referred to a pediatric pulmonologist. Infants diagnosed with pulmonary hemosiderosis and/or pulmonary hemorrhaging should not be returned to dwellings until remediation and air testing are completed.

Clinical tests that can determine the source, place, or time of exposure to fungi or their products are not currently available. Antibodies developed by exposed persons to fungal agents can only document that exposure has occurred. Since exposure to fungi routinely occurs in both outdoor and indoor environments this information is of limited value.

## 2.3 Medical Relocation

Infants (less than 12 months old), persons recovering from recent surgery, or people with immune suppression, asthma, hypersensitivity pneumonitis, severe allergies, sinusitis, or other chronic inflammatory lung diseases may be at greater risk for developing health problems associated with certain fungi. Such persons should be removed from the affected area during remediation (see Section 3, <u>Remediation</u>). Persons diagnosed with fungal related diseases should not be returned to the affected areas until remediation and air testing are completed.

Except in cases of widespread fungal contamination that are linked to illnesses throughout a building, a building-wide evacuation is not indicated. A trained occupational/environmental health practitioner should base decisions about medical removals in the occupational setting on the results of a clinical assessment.

#### 3. Environmental Assessment

The presence of mould, water damage, or musty odors should be addressed immediately. In all instances, any source(s) of water must be stopped and the extent of water damaged determined. Water damaged materials should be dried and repaired. Mould damaged materials should be remediated in accordance with this document (see Section 3, Remediation).

## 3.1 Visual Inspection

A visual inspection is the most important initial step in identifying a possible contamination problem. The extent of any water damage and mould growth should be visually assessed. This assessment is important in determining remedial strategies. Ventilation systems should also be visually checked, particularly for damp filters but also for damp conditions elsewhere in the system and overall cleanliness. Ceiling tiles, gypsum wallboard (sheetrock), cardboard, paper, and other cellulosic surfaces should be given careful attention during a visual inspection. The use of equipment such as a boroscope, to view spaces in ductwork or behind walls, or a moisture meter, to detect moisture in building materials, may be helpful in identifying hidden sources of fungal growth and the extent of water damage.

#### 3.2 Bulk/Surface Sampling

- a. Bulk or surface sampling is not required to undertake a remediation. Remediation (as described in Section 3, Remediation) of visually identified fungal contamination should proceed without further evaluation.
- b. Bulk or surface samples may need to be collected to identify specific fungal contaminants as part of a medical evaluation if occupants are experiencing symptoms which may be related to fungal exposure or to identify the presence or absence of mould if a visual

inspection is equivocal (e.g., discoloration, and staining).

c. An individual trained in appropriate sampling methodology should perform bulk or surface sampling. Bulk samples are usually collected from visibly mouldy surfaces by scraping or cutting materials with a clean tool into a clean plastic bag. Surface samples are usually collected by wiping a measured area with a sterile swab or by stripping the suspect surface with clear tape. Surface sampling is less destructive than bulk sampling. Other sampling methods may also be available. A laboratory specializing in mycology should be consulted for specific sampling and delivery instructions.

## 3.3 Air Monitoring

- (i) Air sampling for fungi should not be part of a routine assessment. This is because decisions about appropriate remediation strategies can usually be made on the basis of a visual inspection. In addition, air-sampling methods for some fungi are prone to false negative results and therefore cannot be used to definitively rule out contamination.
- (ii) Air monitoring may be necessary if an individual(s) has been diagnosed with a disease that is or may be associated with a fungal exposure (e.g., pulmonary hemorrhage/hemosiderosis, and aspergillosis).
- (iii) Air monitoring may be necessary if there is evidence from a visual inspection or bulk sampling that ventilation systems may be contaminated. The purpose of such air monitoring is to assess the extent of contamination throughout a building. It is preferable to conduct sampling while ventilation systems are operating.
- (iv) Air monitoring may be necessary if the presence of mould is suspected (e.g., musty odors) but cannot be identified by a visual inspection or bulk sampling (e.g., mould growth behind walls). The purpose of such air monitoring is to determine the location and/or extent of contamination.
- (v) If air monitoring is performed, for comparative purposes, outdoor air samples should be collected concurrently at an air intake, if possible, and at a location representative of outdoor air. For additional information on air sampling, refer to the American Conference of Governmental Industrial Hygienists' document, "Bioaerosols: Assessment and Control."
- (vi) Personnel conducting the sampling must be trained in proper air sampling methods for microbial contaminants. A laboratory specializing in mycology should be consulted for specific sampling and shipping instructions.
- 3.4 Analysis of Environmental Samples

Microscopic identification of the spores/colonies requires considerable expertise. These services are not routinely available from commercial laboratories. Documented quality control in the laboratories used for analysis of the bulk/surface and air samples is necessary. Canada does not currently have an accreditation system for laboratories who conduct mould analysis. Property

owners should satisfy themselves that consultants contracted to conduct assessment and remediation of mould are accredited from existing American Associations or have followed the Toronto Guidelines on Assessment and Remediation of Fungi in Indoor Environments.

Evaluation of bulk/surface and air sampling data should be performed by an experienced health professional. The presence of few or trace amounts of fungal spores in bulk/surface sampling should be considered background. Amounts greater than this or the presence of fungal fragments (e.g., hyphae, and conidiophores) may suggest fungal colonization, growth, and/or accumulation at or near the sampled location.<sup>30</sup> Air samples should be evaluated by means of comparison (i.e., indoors to outdoors) and by fungal type (e.g., genera, and species). In general, the levels and types of fungi found should be similar indoors (in non-problem buildings) as compared to the outdoor air. Differences in the levels or types of fungi found in air samples may indicate that moisture sources and resultant fungal growth may be problematic.

#### 4. Remediation

In all situations, the underlying cause of water accumulation must be rectified or fungal growth will recur. Any initial water infiltration should be stopped and cleaned immediately. An immediate response (within 24 to 48 hours) and thorough clean up, drying, and/or removal of water damaged materials will prevent or limit mould growth. If the source of water is elevated humidity, relative humidity should be maintained at levels below 60% to inhibit mould growth.<sup>31</sup> Emphasis should be on ensuring proper repairs of the building infrastructure, so that water damage and moisture buildup does not recur.

Five different levels of abatement are described below. The size of the area impacted by fungal contamination primarily determines the type of remediation. The sizing levels below are based on professional judgement and practicality; currently there is not adequate data to relate the extent of contamination to frequency or severity of health effects. The goal of remediation is to remove or clean contaminated materials in a way that prevents the emission of fungi and dust contaminated with fungi from leaving a work area and entering an occupied or non-abatement area, while protecting the health of workers performing the abatement. The listed remediation methods were designed to achieve this goal, however, due to the general nature of these methods it is the responsibility of the people conducting remediation to ensure the methods enacted are adequate. The listed remediation methods are not meant to exclude other similarly effective methods. Any changes to the remediation methods listed in these guidelines, however, should be carefully considered prior to implementation.

Non-porous (e.g., metals, glass, and hard plastics) and semi-porous (e.g., wood, and concrete) materials that are structurally sound and are visibly mouldy can be cleaned and reused. Cleaning should be done using a detergent solution. Porous materials such as ceiling tiles and insulation, and wallboards with more than a small area of contamination should be removed and discarded. Porous materials (e.g., wallboard, and fabrics) that can be cleaned, can be reused, but should be discarded if possible. A professional restoration consultant should be contacted when restoring porous materials with more than a small area of fungal contamination. All materials to be reused should be dry and visibly free from mould. Routine inspections should be conducted to confirm the effectiveness of remediation work.

The use of gaseous, vapor-phase, or aerosolized biocides for remedial purposes is not recommended. The use of biocides in this manner can pose health concerns for people in occupied spaces of the building and for people returning to the treated space if used improperly. Furthermore, the effectiveness of these treatments is unproven and does not address the possible health concerns from the presence of the remaining non-viable mould. For additional information on the use of biocides for remedial purposes, refer to the American Conference of Governmental Industrial Hygienists' document, "Bioaerosols: Assessment and Control."

- 4.1 Level I: Small Isolated Areas (10 sq. ft or less) e.g., ceiling tiles, small areas on walls
  - (a) Remediation can be conducted by regular building maintenance staff. Such persons should receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).
  - (b) Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.
  - (c) The work area should be unoccupied. Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons recovering from recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).
  - (d) Containment of the work area is not necessary. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.
  - (e) Contaminated materials that cannot be cleaned should be removed from the building in a sealed plastic bag. There are no special requirements for the disposal of mouldy materials.
  - (f) The work area and areas used by remedial workers for egress should be cleaned with a damp cloth and/or mop and a detergent solution.
  - (g) All areas should be left dry and visibly free from contamination and debris.
- 4.2 Level II: Mid-Sized Isolated Areas (10 30 sq. ft.) e.g., individual wallboard panels
  - (a) Remediation can be conducted by regular building maintenance staff. Such persons should receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).
  - (b) Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.

- (c) The work area should be unoccupied. Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons having undergone recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).
- (d) The work area should be covered with a plastic sheet(s) and sealed with tape before remediation, to contain dust/debris.
- (e) Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.
- (f) Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. There are no special requirements for the disposal of mouldy materials.
- (g) The work area and areas used by remedial workers for egress should be HEPA vacuumed (a vacuum equipped with a High-Efficiency Particulate Air filter) and cleaned with a damp cloth and/or mop and a detergent solution.
- (h) All areas should be left dry and visibly free from contamination and debris.
- 4.3 Level III: Large Isolated Areas (30 100 square feet) e.g., several wallboard panels

A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for the project.

The following procedures at a minimum are recommended:

- (a) Personnel trained in the handling of hazardous materials and equipped with respiratory protection, (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.
- (b) The work area and areas directly adjacent should be covered with a plastic sheet(s) and taped before remediation, to contain dust/debris.
- (c) Seal ventilation ducts/grills in the work area and areas directly adjacent with plastic sheeting.
- (d) The work area and areas directly adjacent should be unoccupied. Further vacating of people from spaces near the work area is recommended in the presence of infants (less than 12 months old), persons having undergone recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).
- (e) Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.

- (f) Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. There are no special requirements for the disposal of mouldy materials.
- (g) The work area and surrounding areas should be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution.
- (h) All areas should be left dry and visibly free from contamination and debris.

If abatement procedures are expected to generate a lot of dust (e.g., abrasive cleaning of contaminated surfaces, demolition of plaster walls) or the visible concentration of the fungi is heavy (blanket coverage as opposed to patchy), then it is recommended that the remediation procedures for Level IV are followed.

4.4 Level IV: Extensive Contamination (greater than 100 contiguous square feet in an area)

A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for the project. The following procedures are recommended:

- (a) Personnel trained in the handling of hazardous materials equipped with:
  - i. Full-face respirators with high efficiency particulate air (HEPA) cartridges;
  - ii. Disposable protective clothing covering both head and shoes; and
  - iii. Gloves.
- (b) Containment of the affected area:
  - i. Complete isolation of work area from occupied spaces using plastic sheeting sealed with duct tape (including ventilation ducts/grills, fixtures, and any other openings)
  - ii. The use of an exhaust fan with a HEPA filter to generate negative pressurization
  - iii. Airlocks and decontamination room
- (c) Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons having undergone recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).
- (d) Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. The outside of the bags should be cleaned with a damp cloth and a detergent solution or HEPA vacuumed in the decontamination chamber prior to their transport to uncontaminated areas of the building. There are no special requirements for the disposal of mouldy materials.

- (e) The contained area and decontamination room should be HEPA vacuumed and cleaned with a damp cloth and/or mop with a detergent solution and be visibly clean prior to the removal of isolation barriers.
- (f) Air monitoring should be conducted prior to occupancy to determine if the area is fit to reoccupy.
- 4.5 Level V: Remediation of HVAC Systems
- 4.5.1 A Small Isolated Area of Contamination (<10 square feet) in the HVAC System
  - (a) Remediation can be conducted by regular building maintenance staff. Such persons should receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).
  - (b) Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA espiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.
  - (c) The HVAC system should be shut down prior to any remedial activities.
  - (d) The work area should be covered with a plastic sheet(s) and sealed with tape before remediation, to contain dust/debris.
  - (e) Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.
  - (f) Growth supporting materials that are contaminated, such as the paper on the insulation of interior lined ducts and filters, should be removed. Other contaminated materials that cannot be cleaned should be removed in sealed plastic bags. There are no special requirements for the disposal of mouldy materials.
  - (g) The work area and areas immediately surrounding the work area should be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution.
  - (h) All areas should be left dry and visibly free from contamination and debris.
  - (i) A variety of biocides are recommended by HVAC manufacturers for use with HVAC components, such as, cooling coils and condensation pans. HVAC manufacturers should be consulted for the products they recommend for use in their systems.
- 4.5.2 Areas of Contamination (>10 square feet) in the HVAC System

A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for remediation projects involving more than a small isolated area in an HVAC system. The following procedures are recommended:

- (a) Personnel trained in the handling of hazardous materials equipped with:
  - i. Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended.
  - ii. Gloves and eye protection
  - iii. Full-face respirators with HEPA cartridges and disposable protective clothing covering both head and shoes should be worn if contamination is greater than 30 square feet.
- (b) The HVAC system should be shut down prior to any remedial activities.
- (c) Containment of the affected area:
  - i. Complete isolation of work area from the other areas of the HVAC system using plastic sheeting sealed with duct tape.
  - ii. The use of an exhaust fan with a HEPA filter to generate negative pressurization.
  - iii. Airlocks and decontamination room if contamination is greater than 30 square feet.
- (d) Growth supporting materials that are contaminated, such as the paper on the insulation of interior lined ducts and filters, should be removed. Other contaminated materials that cannot be cleaned should be removed in sealed plastic bags. When a decontamination chamber is present, the outside of the bags should be cleaned with a damp cloth and a detergent solution or HEPA vacuumed prior to their transport to uncontaminated areas of the building. There are no special requirements for the disposal of mouldy materials.
- (e) The contained area and decontamination room should be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution prior to the removal of isolation barriers.
- (f) All areas should be left dry and visibly free from contamination and debris.
- (g) Air monitoring should be conducted prior to re-occupancy with the HVAC system in operation to determine if the area(s) served by the system are fit to reoccupy.
- (h) A variety of biocides are recommended by HVAC manufacturers for use with HVAC components, such as, cooling coils and condensation pans. HVAC manufacturers should be consulted for the products they recommend for use in their systems.
- 5. Hazard Communication

When fungal growth requiring large-scale remediation is found, the building owner, management, and/or employer should notify occupants in the affected area(s) of its presence. Notification should include a description of the remedial measures to be taken and a timetable for completion. Group meetings held before and after remediation with full disclosure of plans and results can be an effective communication mechanism. Individuals with persistent health problems that appear to be related to bioaerosol exposure should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures. Individuals seeking medical attention should be provided with a copy of all inspection results and interpretation to give to their medical practitioners.

## 6. Conclusion

In summary, the prompt remediation of contaminated material and infrastructure repair must be the primary response to fungal contamination in buildings. The simplest and most expedient remediation that properly and safely removes fungal growth from buildings should be used. In all situations, the underlying cause of water accumulation must be rectified or the fungal growth will recur. Emphasis should be placed on preventing contamination through proper building maintenance and prompt repair of water damaged areas.

Widespread contamination poses much larger problems that must be addressed on a case-by-case basis in consultation with a health and safety specialist. Effective communication with building occupants is an essential component of all remedial efforts. Individuals with persistent health problems should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures.

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## Attachment 3

## The Health Protection and Promotion Act (HPPA)

The HPPA defines a health hazard as:

- (a) a condition of a premises,
- (b) a substance thing, plant or animal other than man or,
- (c) A solid, liquid, gas or combination of any of them, that has, or is likely to have an adverse effect on the health of any person.

As noted above, in occupied dwellings where there is gross or extreme mould contamination may be considered a health hazard. In moderate or mild cases of mould contamination, or in cases where a dwelling is unoccupied, an order may be issued to remediate the mould contamination.

Issuing Orders under the HPPA:

The HPPA authorises a Medical Officer of Health or a Public Health Inspector to issue orders in the case of a health hazard. Normally, an investigation is conducted before an order is issued. Health hazard investigations often includes interviews, inspections, and assessments. Once a health hazard is confirmed, the order is addressed to the responsible party and specifies the action to be taken to reduce or eliminate the health hazard.

In relation to a residence, an order may specify the following:

- (1) Vacate the premises;
- (2) Close the premises;
- (3) Placard the premises;
- (4) Do specific work to the premises;
- (5) Remove or eliminate a health hazard; and
- (6) Clean and, or disinfect.

Serving orders pursuant to the health hazard provisions in the HPPA to remediate mould contamination in tenant occupied premises where mould exists as a result of flooding and long standing plumbing problems reflects standard public health policy. These orders are not uncommon. Health hazard orders served in connection with marijuana grows houses and/or illegal drug laboratories would also have to meet the requirements of the health hazards requirements in the legislation. Reports forwarded to TPH staff involving marijuana grow houses are for the most part about vacant premises that have been secured by Municipal Licensing and Standards (ML&S). The conditions reported by Toronto Police Service (TPS) in marijuana cultivation reports involve potential structural and electrical hazards, environmental hazards including mould and chemical contamination in the form of pesticides and fertilizers.

These types of premises are not in the same category as the routine mould investigations conducted by TPH.. The conditions existing in marijuana grow houses pose serious occupational health and safety issues for staff. If, after reviewing TPS reports, an MOH or a public health inspector (PHI) forms the opinion, on reasonable and probable grounds, that a health hazard

exists, an order could be prepared and served on the owner of the premises. The order could require the placarding of the premises and prohibiting occupancy of the premises until such time as the MOH or PHI determines the health hazard no longer exists. Rights of Entry:

The HPPA provides the right of entry in order to enforce the Act, however it does not include the right to enter a private residence without the consent of the occupant. If an occupant does not give consent, the legislation allows for the application of a warrant to enter premises. To obtain a warrant, it must be established that there are reasonable and probable grounds that a health hazard exists. For example, there must be a basis for stating that the conditions within a premises are/or may adversely affect the health of the residents. In the case of a vacant dwelling, evidence that the condition existing within the premises may affect adjoining neighbours or the community is usually required. The decision to apply for a warrant to enter is made on a case by case basis.

Cost Recovery:

In cases where an owner is uncooperative and refuses to carry out an order, the MOH may direct that the work is done by a qualified expert at the City's expense. Depending on the extent of the remediation required, costs may be high. There is currently no municipal budget allocated for this purpose. The HPPA provides that these costs can be recovered either through litigation or by adding the costs to the municipal tax roll and collected in the same manner as municipal taxes. However, cost recovery may be delayed and is not assured.