

REGIONAL MUNICIPALITY OF OTTAWA-CARLETON
MUNICIPALITÉ RÉGIONALE D'OTTAWA-CARLETON

REPORT
RAPPORT

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DATE 24 November 1998

TO/DEST. Community Services Committee

FROM/EXP. Medical Officer of Health

SUBJECT/OBJET **CSC INQUIRY NO.19(98): HEALTH CONCERNS RELATING
TO PORTABLE CLASSROOMS**

REPORT RECOMMENDATION

That the Community Services Committee receive this report for information.

BACKGROUND

Portable classrooms have recently been the target of media attention in Ontario due to concerns about mould growth in walls and cavities in the structures potentially affecting the health of some teachers and children who occupy them. Investigations in the Regional Municipalities of Halton and Peel revealed extensive contamination of their portables with mould growth.

As a result, Councillor Alex Munter, Chair of the Community Services Committee requested a report be prepared outlining what the environmental health risks of portable classrooms are and what is being done to address them. In addition, we were asked to address the issue of overcrowding in portables. This report addresses both of these issues.

There are 4 School Boards that operate schools in Ottawa-Carleton. Portable classrooms have been used in all four boards for over a decade to accommodate student populations that exceed the capacity of the schools. In total there are approximately 800 portable classrooms in the Region. The following is a breakdown of the approximate number of portable classrooms by School Board:

Ottawa-Carleton District School Board - 350 portable classrooms
Ottawa-Carleton Catholic School Board - 300 portable classrooms.
Conseil scolaire de district catholique du centre-est de l'Ontario - 92 portable classrooms.
Conseil des écoles publiques de l'est de l'Ontario - 56 portable classrooms.

JURISDICTIONAL RESPONSIBILITY FOR PORTABLE CLASSROOM ISSUES

There are many agencies that may become involved in ensuring a portable classroom is a safe environment for the students and staff who use it. Local School Boards have the primary responsibility for ensuring the health and safety of staff and students in their facilities. Regular inspection and maintenance of the school premises, including portable classrooms, is part of this mandate. This responsibility is assigned to local School Boards by the Education Act, part iv, section 170, subsections 6 and 8.

In addition, the Ontario Ministry of Labour is responsible for the occupational health and safety of those working on the school premises. School Board occupational health and safety officers are involved in ensuring workplace conditions meet the requirements of the Ontario Occupational Health and Safety Act.

Municipal building departments may be called upon to verify that school portables meet the current requirements of the Ontario Building Code.

Finally, Health Departments may become involved in the remediation of deficiencies in a portable classroom. They may be called upon to determine if a health hazard, as defined by the Health Protection and Promotion Act, exists. However, School Boards do not need this determination to undertake their responsibilities for assessment and remediation under the Education Act. In cases where a Health Department becomes involved, activities such as those listed below may assist the School Boards and the community in understanding and solving problems:

- assist in assessing the extent of a health problem at a specific site,
- provide interpretation of health information collected by members of the community from other sources, with a critical appraisal of what is or is not relevant to the situation,
- provide advice to School Boards on their plans for structural assessment and remediation
- refer them to other information sources or experts,
- provide advice to parents, school staff and the general community on health effects and risks of mould in school portables, and
- provide information and advice about other more prevalent sources of exposure to indoor air contaminants, such as, carbon dioxide, second hand smoke and dampness in homes.

ENVIRONMENTAL HEALTH CONCERNS IN PORTABLE CLASSROOMS

Indoor Air Quality

In theory, indoor air quality should not be a concern in portable classrooms. Almost every portable classroom has two doors, three windows and mechanical ventilation system. These six different means of ventilating the rooms provides more control than many classrooms located within a school. Despite this ability to provide good air quality, the Health Department has found elevated levels of carbon dioxide in portable classrooms. Carbon dioxide is the main by-product of human respiration. Elevated levels of carbon dioxide may cause headaches, nausea, and dizziness

in some people. It may also contribute to irritated eye and nose membranes, and affect people's ability to concentrate. When levels of carbon dioxide are found to be elevated, levels of other contaminants such as formaldehyde, solvents, bacteria, viruses and fungi may also be present. A carbon dioxide level of 1000 parts per million (ppm) or lower indicates sufficient fresh air is being provided in an indoor environment.

The Health Department conducted investigations of portables in all four School Boards this fall. Carbon dioxide levels in portable classrooms were usually in excess of 3000 ppm when fans and ventilation systems were not in use. With very few exceptions, when the ventilation system or fan was turned on, carbon dioxide levels were within acceptable limits. Ventilation systems will also ensure that temperature and humidity levels are within comfort zones. Unfortunately, it was the exception rather than the norm to find a portable classroom with the ventilation system in operation. Teachers complain that the systems are too noisy and therefore they turn them off, often over-riding automated timers and settings. It is the opinion of the Health Department and the Health and Safety staff at the School Boards, that the fans and ventilation systems when on low speed are not excessively noisy and are a very important factor in ensuring the comfort and safety of the occupants of the portables.

Ventilation systems should be operating to provide positive air pressure in the portables. This means that ventilation fans should be pushing fresh air into the classroom so that old stale air is forced out through cracks and openings in the portable structure. If a negative air pressure occurs where old air is simply vented out, fresh air will have to enter the portable via cracks and openings in the structure. This negative pressure situation would permit any mould spores that may be held in the framing of the structure to infiltrate into the classroom.

School Boards must find a way to ensure that portables are adequately ventilated and that teachers are educated in regards to the proper use of the ventilation systems provided.

Overcrowding or Class Size

There is a perception among some people that there are too many children in classrooms, and that this situation is causing poor air quality. Reports of 27 to 30 students per classroom have made some parents concerned that overcrowding is occurring. They suspect that poor indoor air quality is triggering asthma attacks and contributing to the spread of colds and other infectious diseases.

Information from the Ontario Ministry of Education and the Ontario Building Code indicates that classrooms and portables are sized to hold 35 students. The current funding formula for class size is a maximum of 35 students per elementary school teacher and 25 students per high school teacher. New legislation from the Ontario government is proposing capping class size at a board average of 25 students per teacher for elementary students and 22 students per teacher for secondary school classes. The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) recommends 15 cubic feet per minute (CFM) per person of outdoor air for school classrooms. Neither the current or proposed class sizes would pose a health problem, providing the portable ventilation systems are in operation to provide the necessary fresh air to the rooms.

Once again, proper maintenance and operation of the ventilation systems is essential in ensuring satisfactory indoor air quality.

Mould Growth

Leaks from roofs, doors or windows may result in water damage to portable classrooms. If they are not repaired in a timely fashion, this can provide an environment for the growth of mould which are naturally found in indoor and outdoor air. Some moulds, if permitted to grow in large numbers can produce spores and toxins which may cause a range of health problems for certain people. A fact sheet developed by the Health Department on Moulds in Indoor Air and their health effects, is attached to this report in Appendix A.

Several School Boards in southern Ontario have found as many as 90 % of their portable classrooms were contaminated with mould growth. This growth was attributed to water damage from leaks that were not repaired, permitting rampant mould growth to occur. Health Departments in Ontario have indicated that in areas where regular inspection and maintenance activities have taken place, there is little problem or concern about mould contamination in portable classrooms.

Despite this reassurance, and because each portable has a maintenance history which may or may not be traceable, each and every portable classroom must be considered on its own. All four School Boards operating in Ottawa-Carleton have committed to inspect every portable classroom it operates. The Ottawa-Carleton Catholic School Board and the Conseil des écoles publiques de l'est de l'Ontario have completed their inspections and developed mould management strategies. The Conseil scolaire de district catholique du centre-est de l'Ontario is planning to conduct inspections in 1998 and also plans to develop a mould management strategy. The Ottawa-Carleton District School Board has proposed to start inspecting each portable on an annual basis. In the meantime, they are responding to complaints, until their draft mould strategy is approved by their school board.

The findings of investigations by the School Boards and the Health Department have found mould contamination portables in all of the four School Boards.

- The Ottawa-Carleton Catholic School Board found mould in 31% of their portables. In the majority of the findings, the growth was very small, and confined to cavities outside of the classroom. Repairs were made as problems were identified. They have received approximately 10 requests for investigations of portables, the majority from teachers and not parents.
- The Conseil des écoles publiques de l'est de l'Ontario are currently removing mould from 8 portables and 3 portopak units (multiple portables joined together). The small size of the contamination found has not required classroom closures. They have not received any requests for investigation of mould in their portable classrooms.
- The Conseil scolaire de district catholique du centre-est de l'Ontario has closed one portable classroom this fall due to mould contamination. Students are taking classes in the school

library until their classroom is ready to be occupied. They have received one request for an investigation of mould in portables this fall.

- The Ottawa-Carleton District School Board has not closed any portables this year due to mould contamination. They make repairs to portables when moisture is found in the wall, ceilings or floors of the classroom. Staff and students are never present when repairs or clean-up is going on. They received approximately 11 requests to investigate portables for mould contamination this fall. As a result of these requests, 39 portables were inspected for mould contamination, and 5 portables had repairs to damaged building materials. .

Appendix B describes, in detail, the actions and strategies each of the four School Boards is undertaking to address concerns about mould in portables.

The Health Department conducted inspections of portable classrooms in all four School Boards with the purpose of assessing the preventive maintenance, and remedial maintenance strategies used by the boards; the inspection techniques used; and to gather some baseline data on indoor air quality in these classrooms. In addition, the Health Department has responded to approximately 10 complaints and 5 inquiries about mould in portables in 1998, the majority following a W5 television program aired on the topic in October 1998. In general, the findings of the investigations revealed no fresh air being introduced into the classes, contributing to poor indoor air quality. The Boards of Education have taken the initiative to hire specialists to do air and surface testing to determine if mould spores are present in the classrooms. When a moisture problem or evidence of mould growth is found, the school boards have taken immediate action to make repairs. The Health Department encourages anyone who suspects a problem in a portable classroom to report it to the Health and Safety Offices of the School Boards or to the Health Department for immediate investigation.

Mould is undoubtedly an issue in portable classrooms. Where water leaks have gone unreported and repairs not made, mould growth on surfaces such as drywall has been found in Ottawa-Carleton. The School Boards and the Health Department is confident that if the mould management strategies put in place by the School Boards are implemented that situations such as occurred in southern Ontario will not arise. All four Boards have always responded quickly to complaints of musty odour and water seepage in their schools. Some of the Boards have even taken extra steps in hiring private mycology services to ensure mould concerns were thoroughly investigated. The Health Department will also investigate any allegation of a health risk in a school.

With mould management strategies in place, education programs implemented and parents and teachers aware of the potential for mould be a problem, the Health Department is satisfied that the local School Boards are adequately addressing this potential health problem.

ACTIONS TO DATE

To date the following actions have been taken by the Health Department and the School Boards to ensure that those responsible for indoor environments in the schools are adequately aware and trained to deal with mould problems:

- **March 1994 - Mould Awareness Session.** A session was held by the Health Department to inform local agencies such as school boards, building departments, and health authorities about the risks of mould in indoor environments.
- **May 1998 - Mould Investigation Training Course.** A course was hosted by the Health Department to provide local agencies (School Boards included) with the necessary expertise to assess mould situations and react appropriately using protocols and techniques they learned at the session. Staff from all four School Boards attended this course.
- **Summer 1998 - Health Department Review of Mould in Portables Issue.** The Health Department reviewed information from other Health Departments and the Ontario Ministry of Health regarding mould problems and interviewed local School Board representatives to determine the current status in Ottawa-Carleton.
- **September-October 1998 - Meeting with School Board Health and Safety Personnel.** The Health Department met with School Board representatives to review the need for mould management protocols and strategies, to share experiences and expertise knowledge, and to and provide support and assistance to officials developing plans.
- **September-October 1998 - Reviewed School Board Mould Strategy Policies.** The Ottawa Catholic, Ottawa Public and French Catholic School Boards have completed formal mould management strategies to ensure that mould in portables does not become a problem in their jurisdictions. The strategies include requirements to inspect portables on an annual basis; provide training to health and safety committees at each school on identification of situations that could lead to mould growth in schools; training to superintendent staff; policies and procedures for dealing with mould when it is identified; and reporting and inspection protocols. The Health Department has reviewed these strategies and is satisfied with the proposals.
- **November 1998 - Mould Fact Sheet Developed.** The Health Department has developed a fact sheet addressing mould concerns in schools and home environments, for distribution to parents and other interested parties. These will be distributed through the School Boards and by the Health Department.
- **Ongoing.** The Health Department has made the following recommendations to the school boards and will continue to monitor their progress;
 - All school boards must have mould management strategies in place. The strategy should include a requirement for training and education of school officials and health and safety committees; outline reporting requirements when a water leak is detected; and information about handling materials when it is found.
 - Carpets should be removed from portable classrooms except for area rugs which can be lifted and cleaned on a regular basis.
 - Ventilation systems should be in operation at all times when portables are occupied to ensure acceptable air quality. When ventilation systems are not in use, windows or doors should be used to provide fresh air to classrooms. An aggressive education program targeting teachers, should be implemented to ensure that they are aware of the potential consequences of insufficient fresh air entering classrooms. The Health Department has offered to be of assistance in any education program on this topic.

COMMUNITY CONSULTATION

The Health Department spoke to many interested parties about mould in portables. The following organizations and people had input into the findings of this report:

- **Local Boards of Education** (Ottawa-Carleton District School Board, Ottawa-Carleton Catholic School Board, Conseil scolaire de district catholique du centre-est de l'Ontario, Conseil des écoles publiques de l'est de l'Ontario). Both Health and Safety and Physical Plant Departments sent representatives to meet with the Health Department. School superintendents, principals and vice-principals also provided information as the Health Department toured school portables.
- **The Environmental Illness Society of Canada.** This group represents people who have environmental sensitivities and/or allergies. Their input was sought on the topic of environmental health concerns in portable classrooms. Many people with environmental sensitivities also have a reaction to moulds. This issue is a big concern to this group. We attended a forum on Environmentally Sick School hosted by this group at the Ottawa Public Library in October 1998.
- **Parents of children in portables.** Approximately 15 parents who contacted the Health Department about portables were interviewed about their concerns.
- **Assembly of School Councils** - Interview with Sharon Quinn, with the Assembly of School Councils and the Chair of the Task Force on Overcrowding at Holy Trinity Catholic High School.
- **The School Council of Henry Larson School (Ottawa-Carleton District School Board).** The Health Department attended a school council meeting to hear the concerns of parents, teachers and school officials about portable classrooms.
- **Teachers that work out of portable classrooms.** The Health Department received information from many teachers as they toured portable classrooms in the four School Boards. In addition, several teachers were interviewed one-on-one about conditions in these classrooms.

FINANCIAL IMPLICATIONS

There are no financial implications associated with this report.

Approved by
Robert Cushman, MD, MBA, FRCPC

Appendix A

Fact Sheet on Mould in Indoor Environments

(Draft - Final Version Available in French and English)

What Are Moulds?

Moulds are members of the fungus family, along with mushrooms and yeasts. There are thousands of different types of moulds, and they are almost always present in air, indoors and outdoors. Moulds have very important roles in biological cycles, as they help compost decaying materials like plants. They also add flavour to blue cheese! But moulds can pose health risks as well.

How Do Moulds Grow?

Moulds can get inside buildings through doors, windows, heating, ventilation and air conditioning systems, and through small openings and cracks in walls and foundations. They can also be brought in on clothing, shoes and the skin and hair of people and pets.

Indoors, moulds need two things in order to grow: nutrients (food) and moisture. Nutrients available indoors include dust, lint, dander, building materials and furnishings. Moulds usually grow in areas which are damp or humid - in places like bathrooms, air ducts, humidifiers, porous insulation, fan coil units, and condensation or drip pans. They can also grow on building materials such as drywall, ceiling tiles, carpet, wallpaper, window casings, and foundation walls, especially if these are damp or wet.

How Can Moulds Affect Your Health?

When most kinds of moulds are present in indoor air at the same level as outdoors, they usually do not pose a health risk. Moulds that grow indoors are usually different from typical outdoor moulds, and can pose more risks to health.

Moulds can release spores (their offspring) and various chemicals into the air. When mould levels build up in indoor air and dust, this can trigger allergies and asthma in some people. Certain types of moulds can be even more hazardous, especially when they actually *grow* on indoor surfaces. Some moulds can produce toxins, which can poison indoor air and cause illness. Exposure to elevated levels of indoor moulds can affect health in four major ways:

Irritation, causing symptoms like eye, throat and skin irritation.

Allergies, including symptoms similar to hay fever, asthma attacks (between 10% and 30% of asthmatics are allergic to moulds), and dermatitis. Allergies to indoor moulds may not be detected by standard allergy tests, which measure reactions to outdoor moulds.

Toxicity, which can cause headaches and flu-like symptoms like fever and cough, diarrhea and fatigue. Breathing in mould toxins has been linked to serious illnesses and with sick building syndrome (SBS).

Infection, normally a risk only for people with severely weakened immune systems, such as those on chemotherapy and AIDS patients, and for victims of severe burns whose skin has been badly damaged. Only certain moulds can cause infection.

Because there are very many types of fungi, most of which have not been well studied, the health effects of exposure to indoor moulds are only beginning to be understood. Experts recommend that people should not live or work in mouldy buildings. If you or a family member experience symptoms which are severe or long-lasting, consult your doctor to determine if moulds are a possible cause.

Who is at Risk?

Anyone can be affected by moulds, but some people are more susceptible than others, including:

- people with asthma or allergies to moulds
- infants and young children, whose lungs are still developing
- people with weakened immune systems.

Factors that increase the risk to health include:

- exposure to high levels of moulds
- exposure to moulds for a long period of time, or repeated exposures to elevated levels for short periods
- exposure to those species of mould which can produce toxins (poisons).

What is *Stachybotrys*?

Stachybotrys atra (or *chartarum*) is one species of mould which can produce toxins (poisons). It is dark green to black in colour, and grows on cellulose-based materials like wood, paper and drywall when these have been damp or wet for prolonged periods of time. It does not grow on food or on materials like bathroom tiles, and does not grow in the body.

Stachybotrys has been linked to severe illness and deaths of several infants in Cleveland. The infants developed bleeding of the lungs. It is suspected, though not proven, that the infants were exposed to high levels of mould toxins by breathing *Stachybotrys* spores. The toxins produced by *Stachybotrys* can cause hemorrhage. Infants are more susceptible to airborne toxins than older children and adults because their lungs are growing very quickly.

Very little is known about this problem. There is also virtually no information about how commonly *Stachybotrys* occurs in indoor environments. Until more studies have been done, experts recommend that infants under 1 year of age should not be exposed to buildings with mould problems or unrepaired water-damage. This is good advice for people of all ages.

What Can You Do About Moulds?

The best way to reduce indoor mould contamination is to prevent or control conditions which encourage their growth. All surfaces and furnishings should be kept as clean and as dry as possible. Water leaks or condensation problems should be remedied without delay. Caution must be used during mould clean-up, which can release spores into the air. A professional can provide guidance on proper clean-up measures (see below).

For serious contamination problems, such as after a flood, professional advice is highly recommended. If you notice moulds or moisture accumulation in public buildings like schools, you should notify the principal or superintendent.

Where Can You Get More Information?

The following agencies can provide information on indoor moulds, their health effects, proper mould clean-up procedures, and advice on health problems related to indoor air quality. Further information is also provided the Ottawa-Carleton Health Department's *State of the Environment Report: Focus on Indoor Air Quality*, available from the Health Department and at public libraries throughout Ottawa-Carleton.

Ottawa-Carleton Health Department

Phone: (613) 722-2200

Canada Mortgage and Housing Corporation

Phone: (613) 748-2367

TDD: (613) 748-2447

Internet: <http://www.cmhc-schl.gc.ca/>

The Lung Association CAN-DO Program

1-800-97-CANDO

Appendix B

Actions to Date by Local School Boards

Ottawa-Carleton Catholic School Board - Have approximately 250 portable classrooms.

- Inspected all portables this summer and found that approximately 31% of portables were found to have mould growth. Of those 8% needed major work to ensure mould would not affect users. Work was completed upon detection of a problem. Generally the units that had problems were the older classrooms.
- Identified systemic issues that needed to be addressed to ensure future problems do not occur. They developed a mould management program to address areas of concern, that included:
 - proper placement and drainage of areas where portables are located;
 - adequate cross-ventilation underneath portables;
 - air vents inside units not blocked by users;
 - annual roof inspections of all portables; and
 - training courses delivered to caretakers, supervisors and safety committees at each school.
- The Health Department reviewed their Mould Management Program, made some suggestions and have endorsed the final product.

Ottawa-Carleton District School Board - Have approximately 350 portable classrooms

- About 20 % of them are inspected every year on a scheduled basis and approximately 16 are inspected due to a complaint or an incident such as a water leak. They are proposing to inspect every portable on an annual basis in co-operation with the health and safety office.
- One in six units inspected is found to have a minor problem with mould growth and 1 in 60 units inspected is found to have a serious mould problem.
- They use an outside laboratory service to test for mould, and in particular *Stachybotrys atra* where evidence suggests their may be a problem with mould contamination.
- The serious problems are usually found in older units. Newer units are equipped with better ventilation systems.
- Once a problem is found it is thoroughly investigated, cleaned and remedied and if necessary monitored to ensure the problem has been rectified.
- The Health Department has reviewed a draft copy of their report entitled “Guidelines on the Assessment and Remediation of Mould in Indoor Environments”. We are making some suggestions to this document.

Conseil scolaire catholique de district Centre-Est - Have approximately 83 portable classrooms.

- In the early 1990’s air exchange units were installed in all portables, to ensure proper air circulation was occurring. These exchangers also control humidity, lessening the risk of mould growth in the classrooms.
- Have recently replaced many portable roofs to eliminate the potential of water leaking into the classrooms.

- If a complaint is received about a portable, it is investigated and if a problem is found, it is repaired immediately.
- Inspected all of their portables this fall, and are in the process of contracting out work to repair areas where water damage and/or mould contamination was found. They used the services of an expert in mould at Health Canada to assist them in detection and analysis of their portables.
- Completed a report entitled “ Rapport des inspections - Programme de contrôle des moisissures”. The Health Department is reviewing this document and submitting comments.

Conseil des écoles publiques de l'Est de l'Ontario - Have approximately 40 portable classrooms.

- This summer they moved 22 of these portables and had the opportunity to give them a thorough inspection. As a result 3 units were re-built.
- All the roofs on the portable classrooms were recently replaced.
- Inspect portables on a complaint basis and repair as necessary. They are planning an inspection of their portables this year with a report and training of staff to follow.