

WORK-RELATED ASTHMA AND YOU

Preventing Work-related Asthma in the Auto Parts Manufacturing
and Foam and Expanded Plastic Industries



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OHCOW is a multi-disciplinary team of health care professionals committed to promoting the highest degree of physical, mental and social well being for workers and their communities.

IAPA is Canada's leading health and safety organization. IAPA's mission is "to improve the quality of life in workplaces and communities we serve by being an internationally recognized leader in providing effective programs, products and services in the prevention of illness and injury."

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WORK-RELATED ASTHMA AND YOU:

Preventing Work-related Asthma in the Auto Parts Manufacturing and Foam and Expanded Plastic Industries

Do I Need to Know about Work-related Asthma?

If you work in auto parts manufacturing (APM) or the foam and expanded plastics industry, you should be aware of work-related asthma. According to the Workplace Safety and Insurance Board (WSIB) in Ontario, workers in these industries are more likely to get work-related asthma than most other workers.

Work-related asthma is a serious condition that can result in disability and job loss if it is not recognized and treated early enough. It is important for employers and employees to work together to prevent it from occurring in their workplace.

The costs of untreated work-related asthma are high for both employers and workers. These financial and health-related costs can be largely prevented by incorporating a comprehensive prevention strategy in the workplace, to help prevent work-related asthma before it occurs (Table 1).

Table 1: Comparison of Results from Untreated Work-related Asthma and a Work-related Asthma Prevention Strategy in the Workplace

Untreated Work-related Asthma	Work-related Asthma Prevention Strategy
<ul style="list-style-type: none"> • Loss of productivity • Staff turnover • Increased insurance costs (including medical and drug-related costs) • Disability (morbidity and mortality) • Loss of work and income 	<ul style="list-style-type: none"> • Greater productivity • Improved working conditions • Reduced insurance premiums
<ul style="list-style-type: none"> • Reduced quality of life 	<ul style="list-style-type: none"> • Less sick time • Decreased economic burden for all taxpayers • Improved quality of life

Work-related asthma can be treated and managed if it is recognized early. Early recognition prevents the illness from getting worse because workers at high risk are removed from further exposure to the source of the problem. Early recognition also makes it possible to reverse the course of the illness and plays an important role in preventing occupational asthma in other workers.

This booklet is designed to help employers and workers in your industries:

- recognize work-related asthma
- put in place general strategies that both employers and workers can use to help prevent work-related asthma, and
- know when, where and how to get professional help.

How Significant is the Problem?

Work-related asthma is a serious occupational health problem. Work-related asthma is the most common chronic occupational lung disease in industrialized countries. About 10–15% of all new asthma cases in adults are thought to be work-related.¹ However, these numbers may be underestimated due to low rates of reporting, recognition and diagnosis of work-related asthma.^{2,3}

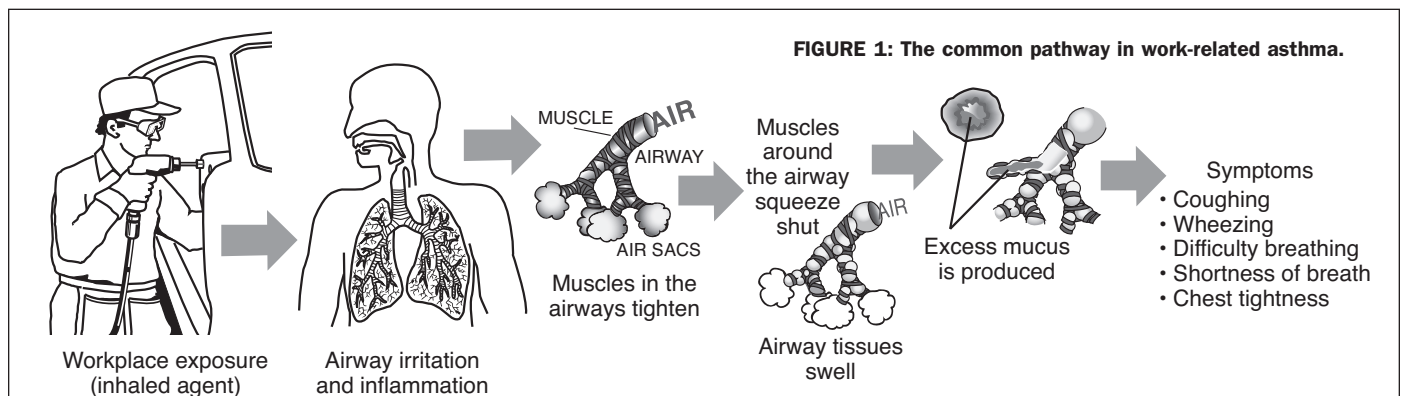
From 2000 to 2004, WSIB accepted 44 claims from the foam and expanded plastics and auto parts manufacturing industries, paying workers approximately one million dollars in compensation. Work-related asthma is preventable. These illnesses and costs can largely be avoided in the future.

What is Asthma?

People who have asthma have increased reactivity in the airways, called hyper-responsiveness. The airways become irritated and inflamed when substances that cause or provoke asthma are inhaled. Because of this inflammation:

- the muscles around the airway tighten
- the airway tissues swell, and
- excess mucus is produced.

All of these events can prevent the person from moving air freely in and out of the lungs, producing shortness of breath and chest tightness (see Figure 1, below).



The substances that cause or provoke the asthmatic response are called sensitizers (or allergens) and triggers.

- Sensitizers cause the development of a specific immune (allergic) response. Usually they are associated with an allergen (a substance that causes allergic symptoms). Inhaling the sensitizer causes the affected person's airways to react.
- Triggers are referred to as non-specific irritants as they do not produce a specific immune (allergic) reaction. However they irritate the respiratory tract and aggravate the tissue lining the airways.

Both sensitizers and triggers can cause symptoms of asthma, such as coughing, wheezing, difficulty breathing and chest tightness.

What is Work-related Asthma?

Asthma is work-related when it is induced or triggered by an agent that a person comes in contact with at work. These workplace agents take the form of dusts, fumes, gases and vapours.^{4,5} Some of the agents found in your industry are listed in Table 2, page 3. When they are inhaled, these agents can cause the airways to tighten, the tissues to swell and the airways to fill with mucus.⁵ All of these responses decrease the ability to breathe. In addition, you may get occupational asthma if you become sensitized to an agent (such as isocyanates) as a result of skin exposure.

Work-related Asthma

There are two main types of work-related asthma: occupational asthma and work-aggravated asthma.

Occupational Asthma

Asthma due to Allergens in the Workplace

When a sensitizer is inhaled, the body builds up its immune defenses against the agent. This is known as sensitization. This "allergic" response is often caused by one of the sensitizers listed in Table 2. The process may take from two weeks up to 30 years to occur. This is called the latency period. After a person has become sensitive, even tiny concentrations of the sensitizing agent can cause a reaction. This type of occupational asthma accounts for the majority of compensation claims for work-related asthma.⁶

Asthma due to Irritants

Asthma resulting from an irritant is also referred to as reactive airway dysfunction syndrome (RADS). RADS begins after a person's airways have become severely irritated by a high-level, often accidental, exposure to a workplace irritant, such as a chemical. RADS usually occurs after one high-level exposure, seen with spills, but can also appear after several exposures.

Symptoms of RADS usually start less than 24 hours after the airways become highly irritated. Symptoms can persist. When symptoms last three months or more, RADS, as a form of occupational asthma, is diagnosed.

Work-aggravated Asthma

Workers who already have asthma (pre-existing asthma) can get work-aggravated asthma when the asthma is worsened by non-specific irritants in the workplace, such as dusts, smoke, fumes and sprays, cold temperatures, dry air or exertion at work. A worker who has pre-existing asthma needs to pay particular attention to whether symptoms increase during the workday or workweek. If so, the worker should see a doctor right away, to make sure the asthma is properly managed. The doctor should be reminded about workplace exposures. The WSIB may also compensate workers who have work-aggravated asthma.

Regardless of the type of work-related asthma you have, you must take action right away!

How do I Recognize Work-related Asthma?

Common symptoms of asthma (including work-related asthma) are:

- coughing
- wheezing
- difficulty breathing
- shortness of breath, and
- chest tightness.

These symptoms may not occur until early the next morning or towards the end of the workweek.

Usually, only some of the workers who are exposed will become sensitized to asthma-causing agents and they may be affected at different times. However, if one worker has occupational asthma, other workers are likely exposed to the asthma-causing agent or agents and may be affected now or in the future. Therefore, the presence of one worker who has occupational asthma is a sign (sentinel event) that intervention is needed to protect other workers.

What Can You Do?

Assess Your Risk

To help find out whether you may have work-related asthma, ask yourself the following questions:

1. Do I work with any of the chemical agents listed in Table 2 or any other asthma-causing agents?
 Yes No
2. Do I have symptoms of asthma?
 Yes No
3. Did my symptoms of asthma first start after I began to work in this job or field of work?
 Yes No
4. Do my symptoms get worse as the workday goes on?
 Yes No
5. Do my symptoms improve on holidays and/or when I am away from work?
 Yes No
6. Do my co-workers have symptoms of asthma?
 Yes No

Table 2: Agents in the Auto and Plastic and Foam Industries Known to Cause or Aggravate Work-related Asthma

Job Categories	Sensitizing and Triggering Agents
Users and makers of flexible and rigid foams or coatings: <ul style="list-style-type: none"> • Foam producers and installers • Spray painters in auto industry 	<ul style="list-style-type: none"> • Isocyanates: <ul style="list-style-type: none"> – TDI (toluene diisocyanate) – HDI (hexamethylene diisocyanate) – MDI (methylene diphenyl diisocyanate) – NDI (naphthalene diisocyanate) – IPDI (isophorone diisocyanate) – BIC (1,3-bis cyclohexane pre-polymer) • Aliphatic amines: <ul style="list-style-type: none"> – 4-methylmorpholine – N,N Dimethylethanolamine
Users and makers of plastics, epoxy resins and adhesives	<ul style="list-style-type: none"> • Acid anhydrides: <ul style="list-style-type: none"> – maleic anhydride – phthalic anhydride – trimethyl anhydride – TCPA (tetrachlorophthalic anhydride) – HHPA (hexahydrophthalic anhydride) – himic anhydride – pyromellitic anhydride • Acrylates and methacrylates: <ul style="list-style-type: none"> – methyl 2-cyanoacrylate • Styrene
Mechanics, machinists and metallurgists	<ul style="list-style-type: none"> • Metal dust and fumes: <ul style="list-style-type: none"> – cobalt – vanadium – chromium – platinum – nickel
Welders and grinders	<ul style="list-style-type: none"> • Metal dust and fumes • Colophony flux
Mould makers	<ul style="list-style-type: none"> • Metal dust and fumes • Isocyanates (from above list)
Foundry workers	<ul style="list-style-type: none"> • Metal dust and fumes • Isocyanates • Formaldehyde
Core makers	<ul style="list-style-type: none"> • Isocyanates • Amines: <ul style="list-style-type: none"> – EPO 60
Metal parts manufacturing	<ul style="list-style-type: none"> • Metal-working fluids (MWF): <ul style="list-style-type: none"> – coolant mists including biocides, microbiologic and other contaminants in the mists of lubricants and coolants
Others in the APM industry	<ul style="list-style-type: none"> • Acid mists or fumes • Furans • Furfuryl alcohol • Aldehydes: <ul style="list-style-type: none"> – formaldehyde • Catalysts: <ul style="list-style-type: none"> – triethylene diamine (TEDA)
Users of latex gloves in this industry (e.g., janitorial staff, first aid attendants, occupational health nurses and others)	<ul style="list-style-type: none"> • Natural rubber latex

Get Treatment for Yourself and Help for the Workplace

If you answered yes to question 1, and yes to at least one other question, talk to your family doctor and/or an occupational health professional such as an occupational health nurse or doctor. Tell him or her:

- your symptoms (and those of your co-workers)
- where you work
- what substances (chemicals and materials) you are exposed to, and
- how long you have worked with these substances (throughout your working life).

The sooner you recognize the symptoms, the better. With early recognition and treatment, asthma can be managed. The lung function of workers who have sensitizer-induced asthma improves after they are protected or removed from the sensitizer.⁷ However, when an affected worker does not have proper protection from the sensitizer, asthma symptoms usually become more severe with repeated exposure.⁷ Long-term exposure can result in permanent lung changes and disability.

Early diagnosis, treatment and workplace interventions can stop the disease before permanent lung change (permanent asthma) occurs. Neglecting the signs and symptoms can lead to serious long-term health complications. In some cases, untreated occupational asthma has even resulted in death.

Allowing the disease to progress without medical management and workplace interventions can significantly affect the activity level, productivity, ability to work and, most importantly, the health and quality of life of you and your co-workers.

What Can Workplaces do to Prevent Work-related Asthma?

Identify Asthma-causing Agents

In addition to seeing your doctor, you should notify your joint health and safety committee (JHSC) if you answered yes to more than one question above. The committee can look for the agents that are causing asthma in the workplace and work towards managing and preventing it.

Agents other than those listed in Table 2 can lead to asthma in the workplace. New asthma-causing agents are being discovered each year. Material safety data sheets (MSDS) are a good place to start.

Occupational health professionals, such as occupational health doctors, nurses and, in particular, occupational hygienists, can help identify agents in your workplace that may be asthma sensitizers or triggers. At the request of the JHSC or employer, a team from the Occupational Health Clinics for Ontario Workers (OHCOW) can provide a free, on-site workplace assessment and make recommendations to improve workplace conditions. The Industrial Accident Prevention Association

(IAPA) provides a free consultation from an occupational hygienist, and technical services, such as air sampling and substance assessments, for a fee, to help control hazards to make your workplace healthier (see listings on back page for contact information).

Prevention Strategy

All employers and workers in the auto parts manufacturing and foam and expanded plastic industries need to work towards preventing work-related asthma in their workplaces. If a prevention strategy is not already in place, the employer should set up a prevention strategy, in consultation with the JHSC. A comprehensive prevention strategy consists of three parts:

- 1) An exposure-control program
- 2) Medical surveillance
- 3) Management of work-related asthma.

Exposure Control

One component of preventing work-related asthma is being able to recognize early symptoms and identify the potential workplace exposures (Table 2). More importantly, the prevention strategy should include an exposure-control program in the workplace.

The risk of work-related asthma is directly related to the level of workplace exposures: the higher the exposure level, the greater the risk to workers. Therefore, removing or reducing workers' exposure to the sensitizing agent or agents can reduce the incidence of occupational asthma in the workplace. This preventive approach requires the cooperation of employers and workers.

An exposure-control program identifies the risk to workers from asthma sensitizers and triggers. Once the risk of exposure is known, it can be controlled.

An exposure-control program is a step-by-step process. Below are general guidelines that can be used by employers and JHSCs to prevent workers from being exposed to asthma-causing agents.

1. With the help of an occupational health professional, **identify** all of the hazardous substances in the workplace.
2. Try to **eliminate** each hazardous substance by removing it from the workplace.
3. If a hazardous substance cannot be eliminated, **substitute** a less hazardous chemical. It can be difficult to find effective substitutes for the chemicals listed in Table 2, but some successful substitutions have helped to minimize exposures in these industries. The substitution may involve replacing the substance or changing the form it takes. For example:
 - The isocyanate MDI is often used as an alternative to another isocyanate, TDI. They have similar reactive properties but MDI is less volatile. Therefore, the risk of exposure is lower. But, remember that MDI is still an asthma-causing chemical so precautions must still be taken.
 - Try liquid formulations rather than aerosol sprays, and granulated pellets instead of fine powders. Fine aerosol sprays that form mists can easily be inhaled. Similarly, fine powders increase the risk of inhalation exposure.

- Try substituting vegetable oil metalworking fluids (MWFs) for conventional fluids. They work well in a number of applications. Vegetable oil MWFs are less volatile; therefore, less mist is created. They are better lubricants than conventional machining fluids; therefore, you need to use less fluid and reduce your exposure. And finally, vegetable oils are much more biodegradable than conventional fluids; therefore, they are much better for the environment.

The substitution of a "safer" chemical should be reviewed closely to ensure that it really is safer.

4. Regardless of the level of exposure, **control** it by using appropriate engineering designs in the workplace. These types of controls protect all workers. For example:
 - isolate any work process that produces or uses hazardous substances by enclosing it; for example,
 - enclose machines such as CNC machines that cut or shape metal
 - enclose tank farms and pour head areas, and
 - isolate MDI and TDI containers from the active work area, and
 - install local exhaust ventilation systems in all enclosed areas that use or produce hazardous substances to capture emissions and vent them away from the workplace, for example, from demold to component areas.
5. Provide **personal protective equipment (PPE)**. PPE is the last line of defence, to be used when exposures are not already prevented or significantly reduced by elimination, substitution and control. All workers using PPE should receive training in its proper use and care. When respirators are indicated, provide a detailed respiratory protection program that includes proper respirator selection, training in its use, fit testing and respirator maintenance.
6. Incorporate an **exposure-monitoring program** to measure exposure levels to isocyanates and other hazardous substances. This will also test the effectiveness of the control measures. An occupational hygienist can help you set up a comprehensive exposure-monitoring program. To determine the compliance of your program with standards:
 - identify potentially hazardous areas
 - measure levels of exposure and compare them with standards, and
 - develop exposure profiles.Post the exposure levels for everyone to see.
For isocyanates, warning monitors can be installed at strategic locations so that a warning sound and light goes off automatically to tell workers to evacuate the area when levels are exceeded.
7. From time to time, **review** your exposure-control program to assess its effectiveness.

Training and Education

Employers and/or JHSCs should provide training and education to workers to help prevent and manage work-related asthma. A thorough training program should help workers to:

- identify the agents that can cause work-related asthma
- follow safe work practices to reduce exposure to these agents, see below
- recognize the symptoms of work-related asthma, and
- understand the importance of seeking medical attention, and of notifying their JHSC and employer right away.

Safe Work Practices
<ul style="list-style-type: none"> – practise good chemical balance for coolant systems to avoid adding too much biocide – do not use compressed air to clean machines or equipment – do not open doors of equipment such as CNC machines before the machinery has completely stopped – leave metalworking fluid systems circulating over the weekend to ensure that bacteria do not build up (and avoid that Monday morning smell) – clean the machines extremely well each time the metalworking fluids are changed because trace amounts can contain bacteria or fungus that can contaminate the new coolant – ensure that tramp oil such as hydraulic fluid does not leak into the coolant system, and – do not enter enclosed areas, such as tank farm and pour head until these areas are contaminant free.

Education on occupational asthma management and prevention is available, through this project, from OHCOW clinics and IAPA offices. You may also want to speak to a certified asthma educator by contacting the Lung Association’s Asthma Action Helpline at 1-800-668-7282. (see **“For More Information”** on the back page)

Medical Surveillance

Medical surveillance helps to screen workers for possible symptoms and signs of asthma, and it objectively detects any changes in their lung function. All workplaces using a designated substance are required to have a medical surveillance program.

Isocyanates are commonly used in the auto parts manufacturing and foam and expanded plastic industries. They are controlled through the Designated Substance Regulation under the *Occupational Health & Safety Act* (R.R.O. 1990, Reg. 842 as amended by O. Reg. 518/92). Medical surveillance for isocyanates consists of:

- questionnaires every 6 months
- pulmonary function tests, if indicated by the questionnaire and at intervals determined by the risk associated with exposure, and
- health evaluation, as determined by the doctor, on the basis of the questionnaire results and tests.

A doctor administers all the elements of the program.⁸ Each worker can decide whether to take part in the program and choose his or her doctor. The employer will be informed whether the worker is “fit” or “unfit” to work. Any further information, such as the results of the questionnaire or medical test results, is confidential. The tests are paid for by the employer.

We recommend that all workplaces that use asthma-causing agents establish a medical surveillance program. A surveillance

program can significantly improve the health of all workers and help to reduce the incidence of work-related asthma in the auto parts manufacturing and plastic and foam industries.

If you have been exposed to any asthma-causing agents in the workplace, we strongly recommend that you participate in a surveillance program. We recommend this even when the exposure is to an agent (unlike isocyanates) that does not legally necessitate such a program.

You can get further information about starting a workplace medical surveillance program from the Occupational Health Clinics for Ontario Workers Inc. (OHCOW) or the Industrial Accident Prevention Association (IAPA). OHCOW’s clinics and IAPA’s regional offices are conveniently located across the province (see listings on the back page for contact information). Their staff of occupational health professionals can help your workplace implement the surveillance program.

Managing Work-related Asthma

Preventing occupational asthma by controlling workplace exposures is always the primary objective of a workplace asthma prevention strategy. However, if a worker does develop work-related asthma, he or she needs medical treatment and protection from the offending agent or agents to keep the disease from getting worse.

Medical treatment is prescribed by a doctor. This usually consists of short- and long-acting medications that are taken to control inflammation and constriction in the airways. All workers with work-related asthma should consult their doctors to receive the appropriate medical care and monitoring.

Anyone who has work-related asthma also needs ongoing protection from asthma sensitizers or triggers at work, even if the asthma is controlled with medications. The law requires employers to take every action necessary to protect their workers. Employees who have a diagnosis of sensitizer-induced asthma must be accommodated by completely removing them from all exposure to the sensitizer.⁶ Because these workers have been sensitized, inhaling even small amounts of the offending agent can start an asthmatic response.

The sooner a worker who has a diagnosis of sensitizer-induced asthma is removed from the exposure, the more likely complete recovery will be possible. Removing a worker from the exposure involves either 1) changing the affected worker’s duties in the current job to eliminate exposure to the offending agent or 2) changing jobs to one where he or she is not exposed to the agent. It may be necessary for the worker to leave the job temporarily on compensation to fully recover. Each situation is different and needs to be discussed between the worker, union representative (as applicable), employer and doctor.⁹

Workers who have a work-aggravated asthma or RADS may also need modifications to reduce exposure to aggravating irritants in the workplace and, in the case of RADS, to reduce the risk of future accidental exposures affecting the same worker or other workers.⁶

Work-related asthma can be largely prevented. Employers, industry agencies, workers, unions, joint health and safety committees and health care professionals need to work together to help prevent work-related asthma and its consequences.

For More Information

For more information on occupational asthma in the auto parts manufacturing and foam and expanded plastic industries, see the accompanying fact sheet, *Occupational Asthma in the Auto Parts Manufacturing and Foam and Expanded Plastic Industries*, available from OHCOW and IAPA as listed below.

For more information on work-related asthma, see the Workers Safety and Insurance Board (WSIB) fact sheet, *Asthma and Work, Facts for Workers in Ontario*, available at [http://www.wsib.on.ca/wsib/wsibsite.nsf/LookupFiles/OccDiseaseAsthma/\\$File/Asthma%20and%20work.pdf](http://www.wsib.on.ca/wsib/wsibsite.nsf/LookupFiles/OccDiseaseAsthma/$File/Asthma%20and%20work.pdf).

Our primary goal for this booklet is to improve the health and working conditions for all employees in these industries. We want to help you to reduce the number of people affected by work-related asthma in your industry.

However, this booklet was designed to provide *general* guidelines for helping to reduce work-related asthma in the auto parts manufacturing and the plastics and foam industries. If you have symptoms of work-related asthma, see your family doctor right away.

To speak with an occupational health professional about questions or concerns specific to your place of employment, contact the OHCOW clinic or the IAPA office closest to you.

Occupational Health Clinics for Ontario Workers (OHCOW)

On the web: <http://www.ohcow.on.ca/> or by telephone at these locations.

CLINICS

Hamilton Clinic

848 Main Street East
Hamilton L8M 1L9
Tel: 905-549-2552 or 1-800-263-2129
Fax: 905-549-7993
Email: hamilton@ohcow.on.ca

Sarnia-Lambton Clinic

171 Kendall Street
Point Edward N7V 4G6
Tel: 519-337-4627, Fax: 519-337-9442
Email: sarnia@ohcow.on.ca

Sudbury Clinic

1300 Paris Street, Suite 4
Sudbury P3E 3A3
Tel: 705-523-2330 or 1-800-461-7120
Fax: 705-523-2606
Email: sudbury@ohcow.on.ca

Toronto Clinic

970 Lawrence Avenue West, Suite 110
Toronto M6A 3B6
Tel: 416-449-0009 or 1-888-596-3800
Fax: 416-449-7772
Email: toronto@ohcow.on.ca

Windsor Clinic

3129 Marentette Avenue, Unit #1
Windsor N8X 4G1
Tel: 519-973-4800 or 1-800-565-3185
Fax: 519-973-1906
Email: windsor@ohcow.on.ca

PROVINCIAL OFFICE (Toronto)

15 Gervais Drive, Suite 601
Don Mills M3C 1Y8
Toll Free: 1-877-817-0336
Email: info@ohcow.on.ca

Industrial Accident Prevention Association

On the web at: <http://www.iapa.ca> or by telephone at 1-800-406-IAPA (4272) or by fax: 1-800-316-IAPA (4272) or at these locations.

HEAD OFFICE (Mississauga)

The Centre for Health and Safety Innovation
5110 Creekbank Road, Suite 300
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Tel: 905-614-4272, Fax: 905-614-1414

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London

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1069 Wellington Road, Suite 113
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Tel: 519-686-9698, Fax: 519-686-9125

Ottawa

Carleton Technology & Training Centre,
Suite 3100, Carleton University
1125 Colonel By Drive
Ottawa K1S 5R1
Tel: 613-230-5313, Fax: 613-230-1430

Sudbury

PO Box 2010
2141 Lasalle Boulevard,
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Sudbury P3A 4R8
Tel: 705-560-3340, Fax: 705-560-4370

Thunder Bay

883 Tungsten Street, Unit 1
Thunder Bay P7B 6H2
Tel: 807-345-3003, Fax: 807-345-0021

For further information on work-related asthma, contact:

The Lung Association's Asthma Action Helpline: 1-800-668-7682

The Lung Association: www.on.lung.ca or 1-888-566-5864

The Asthma Society of Canada: www.asthma.ca or 1-866-787-4050

Workplace Safety and Insurance Board: www.wsib.on.ca or 1-800-465-5606

Workers Health and Safety Centre: www.whsc.on.ca or 1-888-869-7950

Ministry of Labour
health and safety information:
www.labour.gov.on.ca/english/hs/index.html or 1-800-268-8013

References

1. American Thoracic Society Statement: Occupational contribution to the burden of airway disease. *Am J Respir Crit Care Med* 2003; 167:787-97
2. Milton DK, Solomon GM, Rosiello RA, Herrick RF. Risk and incidence of asthma attributable to occupational exposure among HMO members. *Am J Ind Med* 1998; 33(1):1-10
3. Arnaiz NO, Kaufman JD. New developments in work-related asthma. *Clin Chest Med* 2002; 23(4):737-47
4. Cartier A. Diagnosing occupational asthma. *Journal of the World Allergy Organiz* 2003; 15(5):197-201
5. Chan-Yeung M. and Malo J. Occupational asthma. *The N Engl J Med* July 1995; 333(2):107-12
6. Tarlo S, Liss G. Occupational asthma: an approach to diagnosis and management. *Can Med Assoc J* April 2003;168 (7):867-871
7. Chan-Yeung M. Occupational asthma – the past 50 years. *Can Resp J* Jan/Feb 2004;11(01):21-6
8. Canadian Centre for Occupational Health and Safety. (June 17, 1983). Code for medical surveillance of isocyanates exposed workers.
9. Dewitte JD, Chan-Yeung M, Malo JL. Medicolegal and compensation aspects of occupational asthma. *Eur Respir J* 1994;7:969-80