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Occupational Health Clinics for Ontario Workers Inc.

WORK-RELATED ASTHMA:

Preventing Work-related Asthma in Higher Risk Industries

Acknowledgements

OHCOW and IAPA are non-profit organizations that have worked together in producing this booklet to create awareness of work-related asthma and help prevent it. The Ministry of Health and Long-Term Care funded this project with the collaboration of the Ministry of Labour.

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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Note: This booklet is intended for use by joint health and safety committees, employers, certified asthma educators and other health care professionals who educate asthma patients. It may also be useful to workers who are affected by work-related asthma. Workers are encouraged to share the information in the booklet with their joint health and safety committee, employer, union health and safety representative and health care provider.

Work-related Asthma:
Preventing Work-related Asthma in Higher Risk Industries

Work-related Asthma: What Higher Risk Workplaces Need to Know

Asthma is a serious chronic (long-term) lung disease that makes it difficult to breathe. Nearly one million children and adults in Ontario suffer from asthma. In adults with newly diagnosed asthma, exposures to asthma-causing agents at work need to be considered. [1]

There are more than 250 workplace agents (sensitizers) that are known to cause asthma. Asthma-causing agents can be found in many employment sectors and industries. The most common sectors (in alphabetical order) are: [1]

- agriculture
- automotive
- chemical and plastics
- cleaning and janitorial
- construction
- electronics
- food and beverage manufacturing
- forestry
- health care
- metals and mining, and
- pulp and paper.

People who work in these sectors may be at higher risk for work-related asthma.

The costs of unmanaged work-related asthma are high for both employers and workers. If left untreated, work-related asthma can result in disability and job loss. In Ontario, the Workplace Safety and Insurance Board (WSIB), accepted 1,051 claims of work-related asthma from all sectors, paying workers nearly $11 million in compensation, from 2001 to 2005 (WSIB, personal communication 2008). These costs can be largely prevented by incorporating a comprehensive prevention strategy in the workplace (Table 1).

Work-related asthma can be treated and managed if it is recognized early. Early recognition of asthma caused by work (occupational asthma) prevents the illness from getting worse because workers at high risk are removed from continued exposure to the source of the problem (e.g., exposure to the offending substance at work). Early recognition also makes it possible to reverse the course of the illness and may prevent occupational asthma in other workers. [1, 2]

Work-related asthma is largely preventable. This booklet is designed to help employers, workers and joint health and safety committees (JHSCs) in higher risk industries:

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

What is Asthma?

People who have asthma have increased sensitivity 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, coughing and wheezing, and chest tightness (Figure 1).

What is Work-related Asthma?

Asthma is work-related when it is caused or made worse by an agent that a person comes in contact with at work. These

Table 1: Possible Health-related and Financial Outcomes with and without a Work-related Asthma Prevention Strategy in the Workplace

Without a Work-related Asthma Prevention Strategy	With a Work-related Asthma Prevention Strategy
• Disability (morbidity and mortality)	• Less sick time
• Loss of work and income in workers who have work-related asthma	• Decreased economic burden for all taxpayers
• Reduced quality of life in workers who have work-related asthma	• Improved quality of life
• Loss of productivity	• Greater productivity
• Staff turnover	• Improved working conditions
• Increased insurance costs (including medical and drug-related costs)	• Reduced insurance premiums

workplace agents generally take the form of dusts, fumes, gases and vapours, and are classified as being either *sensitizers* or *irritants*. [3, 4] These agents get released into the workplace air and, when they are inhaled, they can lead to an asthmatic response, as seen in Figure 1.

Sensitizers: Sensitizers (usually allergens) cause a specific immune response. Once a person is sensitized, inhaling the sensitizer causes the affected person's airways to react, producing the symptoms of asthma (as seen in Figure 1). Examples of sensitizers found in workplaces include latex, diisocyanates and flour (see Table 2 for more examples).

Irritants: Irritants do not produce a specific immune (allergic) reaction. However, they irritate the tissue lining the airways and can *aggravate* asthma (Figure 1). Examples include fumes or smoke (see page 4 for more examples). These irritants most commonly aggravate existing asthma but very high accidental exposure to irritating chemicals can cause asthma.

There are two main types of work-related asthma:

- *occupational asthma*, and
- *work-aggravated asthma* (also called work-exacerbated asthma).

OCCUPATIONAL ASTHMA

Occupational asthma is the term used to describe asthma that is *induced* (asthma newly caused) by a workplace sensitizer or an irritant. The two types are described below.

Sensitizer-induced Occupational Asthma

Asthma induced by a workplace sensitizer is known as sensitizer-induced occupational asthma. When a sensitizer is inhaled, the body builds up its immune defences against the agent. This is known as sensitization. The process may take from 2 weeks up to 20 or more years to occur. This is called the latency period.

After a person has become sensitized, even tiny concentrations of the sensitizer can cause an asthmatic reaction. Asthma symptoms can be immediate (within minutes after repeated exposure to the agent) or late (usually 4–8 hours after exposure). In some cases, there may be a combination of immediate symptoms and later symptoms (4–8 hours later). [1]

People who work in certain occupations are more likely to develop sensitizer-induced occupational asthma than others, as they are exposed to job-specific sensitizers in the workplace (see Table 2). [2] Sensitizer-induced occupational asthma accounts for the majority of compensation claims for occupational asthma. [1, 3]

Irritant-induced Occupational Asthma

Reactive Airway Dysfunction Syndrome (RADS)

Asthma resulting from a *high-level exposure to an irritant* (gas, vapour, fume or smoke), may be diagnosed as RADS. [1, 5] RADS begins after a person's airways have become severely irritated (hyper-reactive) following a single high-level, often accidental, exposure to one or more workplace irritants (e.g., a chemical spill, such as chlorine).

Asthma symptoms usually start less than 24 hours after the airways become highly irritated. Often, the symptoms are severe enough to require first aid or emergency medical treatment. The symptoms can persist, and when they last three months or more, RADS is diagnosed.

Irritant-induced Asthma

Irritant-induced asthma is diagnosed if findings are similar to RADS but:

- there is a lag of more than 24 hours before the symptoms start, or
- there are repeated exposures to a workplace irritant over several days or weeks (rather than one single, massive exposure), or
- the symptoms last for a shorter period of time.

WORK-AGGRAVATED ASTHMA OR WORK-EXACERBATED ASTHMA

Work-aggravated asthma (also known as work-exacerbated asthma) occurs when a worker already has asthma (*pre-existing asthma*) and it is *worsened* by *irritants* or *common allergens*, or other factors in the workplace (listed below). Usually, the affected person's symptoms get worse and his or her need for medications to control the symptoms increases.

FIGURE 1: The common pathway in work-related asthma.

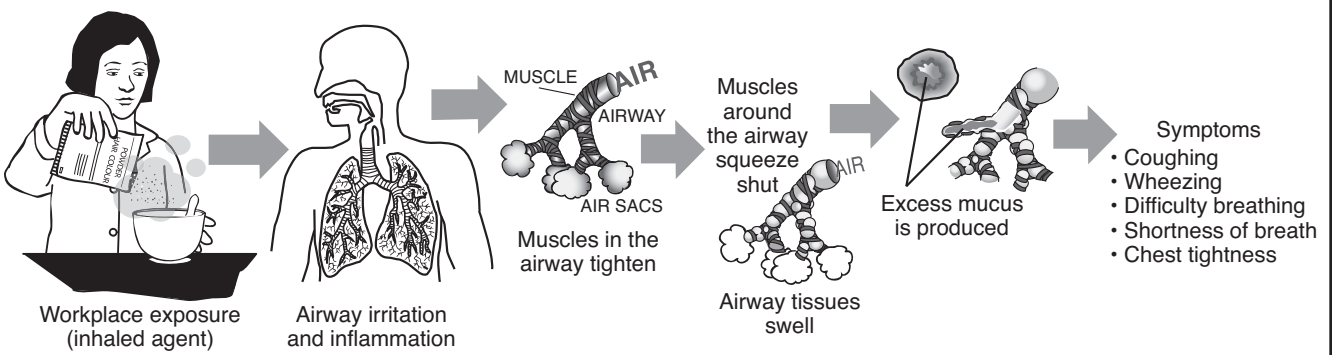

Table 2: Agents (Sensitizers) Known to Cause Occupational Asthma in Higher Risk Industries [1]	
Sector and Occupation	**Sensitizers**
HEALTH CARE, FOOD AND AGRICULTURE	
Bakery, milling and food production workers	Flour, amylase and other enzymes
Health care, animal health and dental care workers	Psyllium, latex, glutaraldehyde, methacrylates, formaldehyde, antibiotics and other medications, detergent enzymes
Laxative manufacturers and packers	Psyllium
Dental care, plastics workers, makers of hearing aids, prosthetics and orthotics	Acrylates (resins, glues)
Pharmaceutical employees	Enzymes and subtilisins such as lactase, glucose oxidase, lysosymes and lactoferrin
Seafood workers (crab, snow crab and prawn)	Shellfish proteins
Laboratory workers and animal researchers	Animal proteins
Animal breeding, farming and slaughterhouse workers, veterinarians and technicians	Chickens and other farm animals
METALS, MINING AND ELECTRONICS	
Jewellery, alloy and catalyst makers	Platinum
Alloy, catalyst and refinery workers	Chromium, cobalt
Solderers and electronics workers	Soldering flux (colophony)
Metal platers	Nickel sulphate and chromium
Welders, machinists and metallurgy workers	Metal-working fluids and metals
CHEMICALS, PLASTICS AND AUTOMOTIVE	
Polyurethane, insulation, foam coatings and adhesives producers and end users (e.g., spray painters, and foam and foundry workers) Automobile painters	Diisocyanates
Plastics, dye, insecticide and organic chemical makers	Phthalic anhydride, trimetallic trihydride (used in epoxy resins)
Foam workers, latex makers, biologists and hospital and laboratory workers	Formaldehyde
Textile workers and hairdressers	Dyes
Hairdressers and manicurists	Persulfates and acrylates (artificial nails)
Cosmetics workers	Latex, glutaraldehyde
Detergent formulators	Detergent enzymes such as protease, amylase and lipase
Printers	Gum arabic, reactive dyes and acrylates
CLEANING AND JANITORIAL	
Janitors, cleaning staff and others, such as health care workers, who clean and disinfect	Disinfectants such as quaternary ammonium compounds and chloramine T Pine products (colophony, tall oil)
CONSTRUCTION, PULP AND PAPER AND FORESTRY	
Cabinetmakers, woodworkers and furniture makers Pulp and paper, forestry and construction workers	Red cedar (plicatic acid) and other wood dusts

Irritants, Common Allergens and Other Factors that Can Trigger Work-aggravated Asthma

Irritants and common allergens that may trigger work-aggravated asthma are present in many workplaces. They include: [1]

- cleaning products (fumes, vapours, sprays and dusts)
- other fumes, vapours, dusts and sprays (e.g., those from industrial sources – particularly acids, chlorine, alkaline dusts, smoke and/or aldehydes; paints; perfumes and fragranced products; and second-hand cigarette smoke [a])
- other irritants and common allergens (e.g., irritant dusts from mineral sources such as cement dusts; common allergens from animal or plant sources, such as dust mites; and mould and fungal spores)
- viral respiratory infections
- indoor air pollution (inadequate ventilation), and
- outdoor air pollution or smog (for outdoor workers).

Other Factors

Other factors that may cause work-aggravated asthma in any workplace include:

- temperature and humidity extremes (cold and heat), and
- physical exertion.

In some industries, such as health care, construction, farm work and teaching, workers are often exposed to a mixture of sensitizers and irritants, which may interact to increase the risk of work-related asthma. [1]

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 the doctor right away to make sure the asthma is properly managed. Workers diagnosed with work-aggravated asthma are increasingly being compensated by the WSIB.

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

How to Recognize WRA

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 to asthma-causing agents become sensitized to them and they may be affected at different times. However, if one worker has occupational asthma, others 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. [1]

What Can Workers Do?

Workers can:

- assess their risk
- make an appointment with their doctor
- get a diagnosis, and
- talk to their supervisor, joint health and safety committee and union representative (e.g., in unionized workplaces).

ASSESS RISK

To help find out whether they may have work-related asthma, workers can ask themselves the following questions:

1. Do I have symptoms of asthma (cough, chest tightness, wheeze and/or shortness of breath)?

☐ Yes ☐ No

2. Did my symptoms of asthma first start, or become worse, after I began to work in this job or field of work?

☐ Yes ☐ No

3. Do my symptoms get worse as the workday or workweek goes on?

☐ Yes ☐ No

4. Do my symptoms decrease on holidays and/or when I am away from work?

☐ Yes ☐ No

5. Do I work with any asthma-causing agents listed in the table or any other known asthma-causing agents? [b]

☐ Yes ☐ No

6. Was there an unusual exposure at work (such as a chemical spill) within 24 hours before my symptoms started?

☐ Yes ☐ No

7. Do my co-workers have symptoms of asthma?

☐ Yes ☐ No

Workers need to be assessed by a doctor to determine whether their symptoms are work-related if they answer yes to questions 1 and 2. If the workplace has an employee health department, the worker should visit there, as well as going to his or her family doctor.

If a doctor suspects that the symptoms are work related, or the worker is concerned that they may be work related, the worker should tell his or her supervisor, complete an employee incident report (as applicable) and notify the joint health and safety committee and/or union representative.

[a] Second-hand smoke cases in Ontario are now reduced because of anti-smoking bylaws in workplaces. [1,6]

[b] An occupational hygienist or other occupational health professional can provide information on other known asthma-causing agents.

MAKE AN APPOINTMENT WITH THE DOCTOR

Workers who suspect that they have work-related asthma should make an appointment *right away* with their family doctor. Workers who do not have a family doctor can go to a walk-in clinic. They need to report:

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

The sooner the symptoms are recognized, the better. With early recognition, and accurate diagnosis and treatment, asthma can be managed. Allowing the disease to progress without medical management and workplace interventions can significantly affect the worker's activity level, productivity, ability to work and, most importantly, health and quality of life.

GET A DIAGNOSIS

The diagnosis of occupational asthma requires specialized tests, which may include skin testing to determine sensitization to a work substance and monitoring of breathing tests at work and off work. These tests usually need to be arranged by a specialist such as a respirologist, allergist or occupational health doctor who is knowledgeable and experienced in diagnosing occupational asthma. These tests can also help to determine whether asthma is caused or aggravated by the workplace, and this information is necessary for appropriate management.

What Can Workplaces do to Prevent Work-related Asthma?

IDENTIFY WORKPLACE SENSITIZERS AND IRRITANTS

Although there are more than 250 known sensitizers that can cause occupational asthma, (e.g., diisocyanates, latex, flour), new sensitizers are being discovered each year (see Table 2 for common sensitizers in different industries). In addition, some products used in workplaces contain ingredients that can be very irritating to the respiratory system and may aggravate asthma.

Products that contain ingredients that may cause or aggravate asthma may be identified by reviewing the material safety data sheets (MSDSs) for each product.

Material Safety Data Sheets (MSDSs)

Under WHMIS (Workplace Hazardous Material Information System) legislation, all hazardous substances (controlled products) require an MSDS, which provides detailed hazard and precautionary information in relation to the product. [7]

Employers must make sure that all controlled products have an up-to-date (less than three years old) MSDS when they enter the workplace. The MSDSs must be readily available to the workers who are exposed to the controlled product and to the health and safety committee or representative. If a controlled product is made in the workplace, the employer has a duty to prepare an MSDS for it.

MSDSs and Asthma

In Canada, the Controlled Products Regulations define a pure substance or a tested mixture as a *respiratory tract sensitizer* if evidence shows that exposure to it in the workplace causes *respiratory tract sensitization in people who have no history of pre-existing asthma*. [8] Therefore, whenever an MSDS indicates that a product is a respiratory tract sensitizer or causes respiratory sensitization, [c] the product can induce asthma in some people, and will usually list asthma as a possible health effect.

In some cases, the MSDS indicates that a product may cause respiratory sensitization but asthma is not listed as a possible health effect. In other cases, the MSDS may indicate that the product is a respiratory irritant and/or can cause "asthma-like" symptoms. In these situations, more information about the product may be needed to ensure that workers are properly protected, particularly if incidents of work-related asthma have increased since starting to use the product.

Worksite Evaluations

Trained occupational health professionals can conduct a worksite evaluation to identify workplace sensitizers and/or irritants, and provide specific recommendations for the worksite to reduce the exposures that may be causing work-related asthma. Worksite evaluations are particularly helpful when a workplace is experiencing increased cases of occupational asthma.

A team from the Occupational Health Clinics for Ontario Workers (OHCOW) can provide a free, on-site workplace visit and make recommendations to improve workplace conditions. The Industrial Accident Prevention Association (IAPA) regional consultant can also do an on-site assessment. A referral is required from the employer or the JHSC before staff from OHCOW or IAPA can respond. Check the back page of this booklet for contact information.

USE A PREVENTION STRATEGY

All employers and workers in higher risk industries need to work towards preventing work-related asthma in their workplaces. This preventive approach requires the cooperation of employers, workers and JHSCs.

If a prevention strategy is not already in place, the employer should establish one, in consultation with the JHSC.

A comprehensive prevention strategy consists of three parts:

- an exposure-control program
- medical surveillance, and
- management of work-related asthma.

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[c] WHMIS requires that any sensitizer be listed as hazardous, if it is present in the product at a concentration of 0.1% [1] or greater. See the Ministry of Labour website for labelling requirements for MSDSs. [9]

Exposure Control

Controlling exposure to sensitizers, irritants and common allergens in the workplace is the most critical step in preventing work-related asthma. The risk of work-related asthma is directly related to the level of workplace exposures: the higher (and longer) the exposure level, the greater the risk to workers. [1]

Exposure control is a step-by-step process. Below are general guidelines that can be used by employers and JHSCs.

1. With the help of an occupational health professional, **identify** all of the substances known to cause or worsen asthma in the workplace.
2. Try to **eliminate** each substance that is a known sensitizer by removing it from the workplace. For example, in health care, when radiology departments switch to digital imaging, workers are no longer exposed to glutaraldehyde, formaldehyde and other asthma-causing chemicals used in film processing.
3. If a sensitizer cannot be eliminated, **substitute** a product that is known to be less likely to cause sensitization. It can be difficult to find effective substitutes for some of the chemicals listed in Table 2, but substitutions have helped to minimize exposures in many industries. The substitution may involve replacing the substance or changing the form it takes. For example:
   - In health care, where latex gloves were used as the gold standard before 2000, **replacement by non-powdered latex-free gloves** (e.g., nitrile, vinyl, neoprene or polyurethane) has significantly reduced the incidence of work-related asthma from exposure to latex. [1]
   - In the detergent industry, **detergent enzymes have been encapsulated**, so workers are not exposed to the enzymes during manufacturing. Studies show that this has been effective in reducing work-related asthma in that industry. [1]
   - In any industry where there is a choice between a powdered formulation and a liquid one, it is generally safer to **choose the liquid formulation instead of the powdered form**, to prevent the release of fine dusts of the sensitizing-agent into the air, which can occur when powders are used. For example, in the bakery industry, substitute powdered enzymes with granulated or liquid enzymes.
   - For all industries, choose the product for the job with the **fewest sensitizers** (check MSDSs).

   The substitution of a "safer" chemical should be reviewed closely to ensure that it really is safer (i.e., that it has been well tested or researched for occupational hazards). Check MSDSs and ask for additional help from the product's supplier, your JHSC, the employee health department, or a qualified health and safety professional (e.g., from OHCOW or IAPA).
4. **Control exposures** to sensitizers, irritants and common allergens by using appropriate engineering designs in the workplace. These types of controls protect all workers. For example:
   - **Improve general ventilation** in all work areas where sensitizers are used, and in areas where there are uncontrolled exposures to fumes, smoke, dusts and other irritants or common allergens.
   - **Centralize** areas where sensitizers are used to a few key locations and **isolate** or **enclose** these areas. Provide local exhaust, whenever possible.
   - Provide **local exhaust ventilation** systems or a **closed ventilation system** to reduce exposure to airborne vapours or fumes from the sensitizer. [10] For example, in industries that use acid anhydrides (e.g., epoxy resin hardeners), workplace exposures and the risk of work-related asthma has been reduced by providing an enclosed area with local exhaust ventilation. [1]
5. Implement **administrative controls** (e.g., policies, procedures, safe work practices, job rotation) to minimize exposure time of workers.
6. Provide **personal protective equipment (PPE)**. PPE is the last line of defence and should not be used as the only method of exposure control when exposures are ongoing. PPE should 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.
7. Consider an **exposure-monitoring program** to measure exposure levels to sensitizers, irritants and common allergens. This will also test the effectiveness of the control measures. An occupational hygienist can help to 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 (as identified by an occupational hygienist), and
   - develop exposure profiles.

   Post the exposure levels for everyone to see.
8. From time to time, **review your exposure-control program** to assess its effectiveness.

It is not possible to avoid all potential asthma triggers (e.g., physical exertion, cold air, dusts, fumes, common allergens). To reduce exposure to irritants and common allergens, ensure good ventilation and humidity control. In addition, consider policies and procedures, such as the use of "green" cleaning products and programs that reduce exposure to scented products.

Prevention of work-aggravated asthma includes good control of asthma by taking environmental control measures at work and home and by optimizing asthma medication use. This is especially important for those who have moderate or severe asthma.

"Green" Cleaning Products and Workplace Policies

As workplaces strive to be more environmentally responsible, "green" and less toxic cleaning products, paints and other solvents are becoming the preferred choice. These may also be called no- or low-VOC products.

VOCs (volatile organic compounds) are organic gases and vapours that evaporate into the air. [11] Some VOCs may cause asthma, aggravate asthma or cause asthma-like symptoms in workers. [12–14]

No- and low-VOC products may be less harmful to the environment and less irritating to workers' skin, eyes and respiratory systems than conventional products. However, there is no guarantee that they won't act as sensitizers or non-specific irritants, which may lead to work-related asthma in some individuals. For example, any product that comes in a spray form will still expose workers to mists.

In some industries, workplaces have also adopted "scent-free" programs or policies. These programs incorporate the use of low- or no-VOC products (e.g., cleaning products and paint) and ask workers to refrain from wearing scented products (such as perfumes and colognes), which may cause asthma-like symptoms in some people. [1]

Choose "green" products, which are "third-party certified" as having fewer environmental and health effects. These products will carry an Environmental Choice (Canada) or a Green Seal (US) label, if they are made in these countries. Read the label and the MSDS to see what is in the product, how these ingredients might harm workers and how to protect the workers while using it. [15]

Training and Education

Employers, in consultation with the JHSC and their occupational health department, 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
- recognize the symptoms of work-related asthma, and
- understand the process of reporting concerns in the workplace and of seeking immediate medical attention.

Education on work-related asthma management and prevention is available from OHCOW clinics, and/or IAPA, as well as other occupational health and respiratory clinics. You may also want to speak with a certified asthma educator by contacting the Lung Association's Asthma Action Helpline at 1-800-668-7682 (see *For More Information* on page 9).

Medical Surveillance

Medical surveillance helps to screen workers for possible signs and symptoms of asthma, and it objectively detects any changes in their lung function. It can help to detect early signs of sensitization or sensitizer-induced occupational asthma early in its course before it progresses to permanent asthma.

Medical surveillance is suggested for workers who are exposed to agents that carry a relatively high risk of causing asthma, such as bakers, or workers exposed to diisocyanates, enzymes or complex platinum salts. Isocyanates (including diisocyanates) are designated substances, and medical surveillance is required when they are present. For a complete list of designated substances in Ontario, see *For More Information* on page 9 of this booklet.

Typically, medical surveillance consists of:

- a questionnaire, provided every at routine intervals (e.g., every 6 months or yearly), depending on the agent
- pulmonary (lung) function tests, if indicated by the questionnaire, and performed at intervals determined by the risk of exposure, and
- a health history, provided at routine intervals (e.g., every 6 months or yearly), depending on the agent.

Medical surveillance is done by the family doctor or an occupational health physician (e.g., from your occupational health department, OHCOW or other occupational health clinic). If the workplace offers a medical surveillance program, each worker can decide whether to take part in the program or choose his or her doctor. The doctor will inform the employer whether the worker is "fit" or "unfit" to work and the employer has the duty to accommodate the worker. Any further information, such as the results of the questionnaire or the medical tests, is confidential.

Not all workplaces are legally required to provide medical surveillance programs, even though they may use known sensitizers. [1] If a workplace has consistently high or increasing numbers of sensitizer-induced occupational asthma cases, we recommend that a medical surveillance strategy or pilot program be implemented and evaluated prospectively. [d]

Anyone who has been exposed to any sensitizer in the workplace should participate in the workplace's medical surveillance program, if a program is available. We recommend this even when the exposure is to an agent that does not legally require medical surveillance. A surveillance program can significantly protect the health of all workers and help to reduce work-related asthma in any industry where sensitizers are used.

You can get further information about starting a workplace medical surveillance program from OHCOW. Their staff of occupational health professionals can help your workplace implement the surveillance program. See *For More Information* on page 9.

MANAGE WORK-RELATED ASTHMA

Prevention of work-related 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.

d Medical surveillance is not recommended in cases of irritant-induced asthma (including RADS), because the disease process starts with one or a few high irritant exposures. [1]

Table 4: Summary of WRA Management Steps			
Step	**Sensitizer-induced Occupational Asthma**	**Irritant-induced Occupational Asthma and RADS**	**Work-aggravated Asthma**
1	Remove the worker from the source of exposure to the sensitizer immediately after the diagnosis has been confirmed by a specialist (recommended course of action). If job change or leaving the job is not an option, minimize exposure to the lowest level possible and ensure optimal medical treatment.	Reduce irritant exposures.	Reduce workplace exposures to common irritants (the worker should also reduce exposure to non-work asthma triggers in consultation with his or her doctor and/or other health care professionals, such as a certified asthma educator). The worker should visit the doctor immediately to ensure that he or she is receiving optimal medical treatment.
2	Have the doctor provide optimal medical treatment.	Have the doctor provide optimal medical treatment.	Have the doctor provide optimal medical treatment.
3	Provide medical surveillance of exposed workers.	Consider job change and retraining, if the worker's asthma does not improve (e.g., with reduced exposure) or becomes worse.	In severe or worsening asthma related to a workplace irritant, consider job change and retraining, if the worker's asthma does not improve or becomes worse.
4	Apply for workers' compensation.	Apply for workers' compensation.	Consider workers' compensation.
5	Take steps to prevent work-related asthma for other exposed workers.	Consider prevention for other exposed workers.	Consider prevention for other exposed workers.

Anyone who has work-related asthma also needs ongoing protection from sensitizers or irritants at work, even if the asthma is controlled with medications (workplace exposure reduction and medical treatment are both necessary). The law requires that the employer take every precaution reasonable in the circumstances to protect the worker. In addition, the employer should investigate the possibility of workers' compensation, if the worker is eligible.

Specific management depends on the type of work-related asthma that is involved: sensitizer-induced occupational asthma, irritant-induced occupational asthma and RADS, or work-aggravated asthma (see Table 4).

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

Sensitizer-induced OA

Employees who have a diagnosis of sensitizer-induced asthma should be accommodated by completely removing them from all exposure to the sensitizer. [3, 16, 17] Because these workers have been sensitized, inhaling even small amounts of the offending agent can start an asthmatic response.

In general, the sooner a worker who has a diagnosis of sensitizer-induced asthma is removed from the exposure, after confirming the diagnosis with a specialist, the more likely recovery will be possible. [1] The lung function of workers who have sensitizer-induced asthma improve after they are protected or removed from the sensitizer. However, when an affected worker does not have proper protection from the sensitizer, asthma symptoms usually become more severe with repeated exposure. [2] Long-term exposure can result in permanent lung changes (permanent asthma) and disability.

Removal from the exposure involves either:

- changing the affected worker's duties in the current job to eliminate exposure to the sensitizer, or
- changing jobs to one where he or she is not exposed to the sensitizer.

It may be necessary for the worker to leave the job temporarily on compensation for his or her health to improve. Each situation is different and needs to be discussed among the worker, union representative (as applicable), employer and doctor.

In some cases, improvement in occupational asthma has been seen when the worker was moved to an area (or job) where exposure is reduced, but may not be eliminated. [1] For example, health care workers who have occupational asthma due to natural rubber latex have been able to safely return to work in settings where they avoid personal use of these products, and where co-workers use powder-free, low-protein gloves. [1]

If a worker is unwilling or unable to leave a job (e.g., for financial reasons), the worker should see his or her doctor immediately to start optimum medical treatment for occupational asthma (i.e., anti-inflammatory and bronchodilation therapy) and be monitored regularly by the doctor to ensure that the occupational asthma is not becoming worse.

In these cases, the worker should be educated to understand that continued exposure to the sensitizer or sensitizers can worsen his or her asthma. Steps should be taken by the employer and JHSC, in consultation with the family doctor and/or occupational health or respiratory specialist, to ensure that the worker's exposure to the sensitizing agent or agents is minimized through exposure control, and that regular medical monitoring is taking place (including medical surveillance).

Whenever there are cases of sensitizer-induced occupational asthma in a workplace:

- medical surveillance should be considered, particularly if the cases of occupational asthma are increasing, and
- the employer and JHSC should ensure that appropriate exposure control measures are in place to prevent occupational asthma in other workers.

Irritant-induced Occupational Asthma and RADS

Workers who have RADS or other types of irritant-induced occupational asthma may also need modifications to reduce exposure to irritants in the workplace and, with RADS, to reduce the risk of future accidental exposures affecting the same worker or others. [3, 16, 17]

In some cases, irritant-induced occupational asthma can be controlled through optimal medical treatment. However, if there is ongoing exposure to an irritant or irritants, particularly if there is repeated exposure (e.g., ongoing poor indoor air quality), a change in job location or job retraining may be needed to avoid worsening asthma.

WORK-AGGRAVATED ASTHMA

In most cases of work-aggravated asthma, job change is not necessary. However, it is important for the employer and JHSC to reduce the worker's exposure to common irritants in the workplace as much as possible, and for the worker to see his or her physician to ensure optimal asthma management.

Summary

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

For More Information

For more information on OA in the higher risk industries, see the fact sheet *Work-related Asthma and You: Prevention in Higher Risk Industries*, available online from OHCOW (http://www.ohcow.on.ca/) and IAPA (http://www.iapa.ca) or at the addresses shown on the back page. Other titles in this series are shown in Table 5.

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

However, this booklet was designed to provide *general* guidelines for helping to reduce work-related asthma. 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 IAPA office or OHCOW clinic closest to you.

For more information about MSDSs, refer to the Ministry of Labour's *WHMIS: A Guide to the Legislation*. [7]

For more information about designated substances, refer to the Ministry of Labour. [9]

Table 5: Booklets and Fact Sheets on OA in Various Industries

Industry	Title	Format
Bakery	*Work-related Asthma and You: Preventing Work-related Asthma in Bakeries*	Booklet
	Baker's Asthma	Fact sheet
Health care	*Work-related Asthma and You: Preventing Work-related Asthma in Health Care Workers*	Booklet
	Work-related Asthma in Health Care: Recognition and Prevention	Fact sheet
Plastics, expanded foam, and auto parts manufacturing	*Work-related Asthma and You: Preventing Work-related Asthma in the Auto Parts Manufacturing and Foam and Expanded Plastic Industries*	Booklet
	Occupational Asthma in the Auto Parts Manufacturing and Foam and Expanded Plastic Industries	Fact sheet
Machinists and other industries where metal-working fluids are used	*Work-related Asthma and You: Preventing Work-related Asthma from Metal-working Fluids and Metal Dusts and Fumes*	Booklet
	Work-related Asthma in the Primary Metals Sector	Fact sheet

Occupational Health Clinics for Ontario Workers (OHCOW)

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

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

Industrial Accident Prevention Association (IAPA)

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)
Centre for Health and Safety Innovation
5110 Creekbank Road, Suite 300
Mississauga L4W 0A1
Tel: 905-614-4272
Toll-free: 1-800-406-IAPA (4272)
Fax: 905-614-1414, Toll-free: 1-800-316-4272

REGIONAL OFFICES

London
Century Centre Plaza
1069 Wellington Road, Suite 113
London N6E 2H6
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, Building A, Unit B
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

Ontario Safety Association for Community & Healthcare (OSACH)

Corporate Office
4950 Yonge St., Suite 1505
Toronto, ON M2N 6K1
Tel: 416-250-7444 or 1-877-250-7444
Fax: 416-250-7484
On the web: www.osach.ca

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 & 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

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