

# Identification of Occupational Asthma in Primary Care

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## Curriculum Vitae

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## Summary

*The diagnosis of occupational asthma, now a compensable disease, requires a knowledge of its potential causes and of the jobs in which it may occur. This paper is intended to assist the primary care practitioner to suspect and diagnose occupational asthma; practical lists and tables are given.*

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## Introduction

Occupational asthma is a reportable and compensable disease under the Compensation for Occupational Injuries and Diseases Act (COIDA)<sup>1</sup> which replaced the Workmen's Compensation Act in March 1994. Claims for medical expenses, temporary disablement and permanent disablement as a result of occupational asthma may now be submitted in terms of the COIDA.<sup>2,3</sup> The primary care practitioner, to whom these cases first present, is thus the essential link in the identification of this condition.

## KEYWORDS:

Physicians, Family;

Asthma;

Occupational Diseases.

## What is Occupational Asthma?

There are many possible connections between asthma and work.<sup>4</sup> Adults with asthma may complain that their condition is aggravated by some factor at work, such as strenuous effort, a draughty or wet workplace, dust or vapours from the materials they use, or tobacco smoke from colleagues. Strictly speaking, however, occupational asthma occurs



# Occupational Asthma

as a result of sensitisation by an identified substance at work. This implies that in a person not previously asthmatic, the symptoms of asthma commence after a period of exposure to the substance at work and have a demonstrable relationship to such exposure.

The number of agents capable of inducing occupational asthma is growing.<sup>5</sup> However, the COIDA lists those agents that will be recognised as causing occupational asthma (Table 1). This list can be used as a guide to diagnosis. Table 2 lists some of the workplaces in which these substances are found.

## What is the underlying mechanism of occupational asthma?

In some cases, eg flour or baker's asthma, the mechanism is a Type I hypersensitivity: the immune response is mediated by IgE antibodies to some antigenic component of flour. Tests such as skin prick testing with an antigenic extract of the substance, and serological tests such as the radioallergosorbent test (RAST) are thus useful in diagnosis, by confirming both exposure and immune reactivity.

In other cases, such as in isocyanate asthma, the mechanism is not properly understood. Isocyanates occur in the manufacture of polyurethanes, which find widespread use in the form of rigid and flexible foams, electrical insulation and as two-part exterior paints and varnishes. Spraypainters, among others, are thus at risk. Although IgE antibodies against isocyanate may be detected by a RAST, this test is positive in only a minority of cases of isocyanate asthma. Mention should be made also of the

situation in which a worker inhales a high concentration of a vapour or gas (such as chlorine or ammonia) which has irritant properties, as in an accidental leak in a factory. In such cases, recovery from the acute illness may be followed by a persistence of bronchial hyperreactivity and symptoms of asthma. This is the reactive airways dysfunction syndrome (RADS)<sup>6</sup> and should be treated as a type of asthma caused by a work accident.

## How can occupational asthma be diagnosed?

### Step 1: Suspect asthma:

The diagnosis may not be that obvious, as the patient may present with cough alone, "bronchitis" or a "seerbors," etc. One should therefore

Many possible connections between asthma and work

**Table 1. Substances listed under the Compensation for Occupational Injuries and Diseases Act as causing Occupational Asthma**

- Organic dusts: wood, grain, grain flour, tobacco.
- Isocyanates.
- Formaldehyde, anhydrides, amines and diamines.
- Metals: platinum, nickel, cobalt, vanadium, chromium salts.
- Soldering and welding fumes.
- Hardening agents, including epoxy resins.
- Acrylic acid and acrylates.
- Substances of animal or insect origin.
- Fungi and spores.
- Proteolytic enzymes.

suspect asthma in any situation of recurrent or persistent respiratory tract symptoms in a working adult.

Confirmation of asthma requires the demonstration of reversible airways obstruction. Since this obstruction is variable and may not be present at the examination, such demonstration may take some time. However, reversibility should be sought with at least a

The GP is often the very first link in identifying occupational asthma.



# Occupational Asthma

peak flow meter in the first instance. There is no consensus about the degree of reversibility of peak flow that points to asthma, but as a rule of thumb, an improvement of 15 to 20 percent or more should be shown following administration of an inhaled bronchodilator. In the presence of obstruction, however, a trial of asthma therapy over a few weeks may be required to show reversibility.

## *Step 2: Suspect occupational asthma:*

Concurrently with diagnosing or suspecting asthma, inquiry should be made about the person's job. Tables 1 and 2 can be used as checklists. Some of the exposures will be self-evident, such as those of a baker or woodworker. Table 2 is incomplete in that the substances in Table 1 may be found in other operations. Unfortunately all too often the employee, and even the employer, does not know the name of the materials used. One should try to make contact with the employer's supplier, company doctor or a union safety representative to obtain or confirm this information.

The practitioner should ask about the relationship between work and symptoms. The patient may give a clear history of symptoms precipitated by working with a particular substance, and improving on weekends and when on leave. However, the picture is often not that clear. For example, symptoms may come on after a delay of several hours after leaving work, producing nocturnal asthma. Also, once the asthma has set in, symptoms may persist through weekends, show early morning "dipping", be aggravated in a range of situations, and thus resemble general asthma.

At the stage of suspecting occupational asthma, it is advisable that contact be made with a centre with

facilities for and interest in diagnosing occupational asthma. Respiratory clinics in the larger hospitals should be capable of filling this role. In addition, the National Centre for Occupation Health in Johannesburg and the Workhealth Clinic at Groote Schuur Hospital, Cape Town, specialise in occupational diseases. Patients in the major centres can be referred directly. Where the patient does not have access to these services, the practitioner should take the investigation as far as possible and manage the case on the basis of reasonable suspicion. The following steps are also needed:

The number of agents capable of inducing occupational asthma, is growing.

**Table 2. Examples of jobs/industries in which occupational asthma is known to occur (with causative agents)**

- Bakeries, grain mills, farms (flour, mites, fungi, animals, insects)
- Furniture, cabinet makers, sawmills (wood dust, formaldehyde resin)
- Spraypainting or varnishing (isocyanates)
- Animal handlers: labs/vets (animals, formaldehyde)
- Jewellery manufacture (cobalt)
- Soldering (colophony flux)
- Plastics or foam manufacture (isocyanates, anhydrides, epoxy resins)
- Food processing (sulphites, prawns, coffee bean, soya bean)
- Pharmaceutical manufacture, mixing (penicillins, enzymes)
- Metal refining, plating or welding (platinum, chrome, nickel)
- Detergent manufacture (enzymes)
- Photography (ethylene diamine)
- Foundries (resins, isocyanates)
- Printing (vegetable gums)
- Hospital and medical laboratories (formaldehyde, enzymes)

## *Step 3: Demonstrate work-relatedness:*

This step requires the co-operation of the patient, the employer and the company doctor or occupational health nurse if one is available. The best way to demonstrate a work relation is to measure Forced Expiratory Volume in one second (FEV1) over the course of a few weeks, before, during and after each shift, and over a period of at least a week off work. If a spirometer is not



# Occupational Asthma

available, a serial peak flow record may be attempted, in which the patient is given a peak flow meter, and requested to perform the test at least six times daily, to be recorded on a chart. However, even with full cooperation by the patient over this lengthy period, interpretation may be difficult.<sup>7</sup>

## *Step 4: Identify the specific aetiologic agent:*

This step is based on the list in Table 1, which has the status of a presumptive list. In other words, the occurrence of asthma in someone exposed to a substance on the list creates a high index of suspicion that the asthma is caused by the substance. If the suspected substance is not on the list (or not identifiable in a multi-exposure setting), the burden of proof required under the COIDA is, in theory, stronger, and more stringent objective testing to establish the cause may be needed.

In those circumstances in which the suspected agent is unscheduled (or unidentified among a number of substances), in which it is important to confirm the diagnosis (because of the consequences), and in which the diagnosis is genuinely uncertain, a specific bronchial challenge test may be possible. This aims to reproduce the bronchospastic effect in a lung function laboratory by having the patient carry out a task with the material in a way which simulates the work situation. The test requires supervision for at least 24 hours in hospital and is not without risk.

## **How should occupational asthma be managed?**

- *Remove the patient from exposure.* After discussion with the patient, the practitioner should write a motivating letter to have the person

moved to a job which does not involve exposure. This is in practice often difficult, as alternative work may not be readily available, and the risk of job loss is genuine. However, the longer the exposure the poorer the prognosis.

- *Treat the asthma.* The treatment of occupational asthma is no different from that of asthma from other causes, with the use of an inhaled beta-2 agonist being the first line of treatment. Daily anti-inflammatory treatment such as inhaled corticosteroid may be needed if symptoms are persistent or severe. The more intensive the treatment required, the greater the need to assist the patient to cease exposure.
- *Submit a claim for workmen's compensation.* This should be done on a First Medical Report in the same way as for an injury on duty and on a Progress/Final Report for all subsequent visits if the person is absent from usual work ("temporary disablement"). Supporting documentation, including copies of all tests (and under current practice, a chest x-ray) must be provided.<sup>3</sup>
- *Notify the case.* The diagnosis of an occupational disease implies that a hazard to other workers may exist which requires investigation and action. Medical practitioners are now required under the Occupational Health and Safety Act (OHSA), 1993, to notify all cases of occupational disease to the Chief Inspector, Department of Manpower, and of course to the patient! It is not at present clear whether this requirement will be satisfied by the report submitted under the compensation act.

Suspect asthma: the diagnosis may not be so obvious

Contact his employer

Symptoms may come on several hours after leaving work



# Occupational Asthma

## Conclusion

A high index of suspicion of both asthma and occupational asthma, a good line of referral to a regional centre, willingness to contact the employer or other workplace parties, and to initiate and report claims for occupational disease, will all contribute to a satisfactory outcome for patients with this condition, and hopefully, to prevention of future cases in those workplaces.

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