



Occupational Asthma



Introduction

This section seeks to provide useful information to enable employers to manage the prevention of occupational asthma in workplaces. It describes occupational asthma – the different types and the substances that cause it. It also gives practical advice on complying with health and safety legislation, including the carrying out of a risk assessment and health surveillance measures.

What is asthma?

Asthma is an inflammatory disorder of the airways. When an asthma attack occurs, the muscles surrounding the airways become tight and the lining of the air passages swell. This reduces the amount of air that can pass through, and can lead to wheezing sounds. Most people with asthma have wheezing attacks separated by symptom-free periods. Other symptoms include shortness of breath, coughing and chest tightness. Asthma attacks can last from minutes to days and can be dangerous if the airflow becomes severely restricted.

What is work-related asthma?

Work-related asthma accounts for about 10 per cent of all adult onset asthma. Asthma related to the workplace can be categorized into two distinct subsets:

- Work-aggravated asthma.
- Occupational asthma.

What is work-aggravated asthma?

Employees with work-aggravated asthma usually have a history of pre-existing asthma and may be on treatment now or have been on treatment in the past. Some but not all of this latter group may give a history of childhood asthma that they have 'grown out' of. They may tell of recurrent asthmatic episodes that are triggered by cold temperatures, excessive exertion or exposure to irritant aerosols, including dusts, fumes, vapours and gases. They may get wheezy or have other symptoms at work. The problem can often be eliminated by improving the work environment or avoiding the irritant.

What is occupational asthma?

Occupational asthma is caused as a direct result of workplace exposure. There are two forms of occupational asthma:

- *Irritant-induced occupational asthma* usually develops after a single, very high exposure to an irritant chemical. It is a direct 'burn' effect on the airways and is not related to the immune system. Examples of causal agents include ammonia, acids and smoke. The high levels of exposure required are usually the result of accidents or some major failure of controls, often in enclosed spaces. Employees nearly always manifest asthma symptoms within twenty-four hours of the exposure (i.e. there is no latent period). Symptoms will tend to improve over time and may go away entirely, but if symptoms last beyond six months then persistent problems are possible.



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- *Allergic occupational asthma* is caused by sensitisation or becoming allergic to a specific chemical agent in the workplace over a period of time. This is the mechanism for the vast majority (over 90 per cent) of cases of occupational asthma. The sensitisation process does not occur after one exposure but develops over time (i.e. there is a latency period). Latency periods are variable and can be as short as several weeks or as long as thirty years. If exposure is consistent, the period of greatest risk is the first two years of exposure but the risk does not go away after that, although it may reduce somewhat.

Can an employee recover from occupational asthma?

If exposure to the causative agent ceases completely, the condition will nearly always improve. If this happens within the first two years of the development of the condition, then complete recovery is usual. The longer the exposure continues, however, the more the condition is likely to worsen, and the less likely it is that there will be a complete recovery, although a cessation of exposure is nearly always of benefit. For these reasons identifying a case of occupational asthma as early as possible is of paramount importance, and hence the reason for health surveillance (see below).

What are respiratory sensitisers?

A respiratory sensitiser is a substance which, when breathed in, can trigger an allergic reaction in the respiratory system. Initial sensitisation does not usually take place immediately, it happens after a period of perhaps weeks or months inhaling the sensitiser. Respiratory sensitisers have

the following risk phrase and number in chemical Safety Data Sheets 'may cause sensitisation by inhalation (R42)'. Many are also identified by the 'Sen' notation in the 2007 Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001.

The risk of development of sensitisation is usually dose-related, i.e. the higher the exposure the more likely the

employee will become sensitised. Smokers may also be more vulnerable. For most substances the chances of becoming sensitised are much lower, but not completely absent, if the chemical is controlled below the occupational exposure limit (OEL).

Once the sensitisation reaction has taken place, further exposure to the substance, even to the smallest amounts will produce symptoms. That

Table 9.1: Respiratory Sensitisers

Substance Groups	Common Activities
Isocyanates	Vehicle spray painting, foam manufacture
Flour/grain/hay	Handling grain at docks, milling, malting, baking
Electronic soldering flux	Soldering, electronic assembly, computer manufacture
Latex rubber	Performing medical procedures, laboratory work
Laboratory animals	Animal testing
Wood dusts	Saw milling, woodworking, furniture manufacture
Glues/resins	Curing glues and epoxy resins in joinery and construction
Gluteraldehyde	Health care
Hair dyes	Hairdressing
Penicillins/cephalosporins	Pharmaceutical work
Chromium compounds	Welding stainless steel
Platinum salts	Catalyst manufacture
Cobalt	Hard metal production, diamond polishing
Nickel sulphate	Electroplating
Subtilisin/enzymes	Detergent manufacture

is, the OEL does not protect an employee who is already sensitised. Once sensitised, the symptoms can happen immediately when the employee starts working with the substance or soon afterwards. The symptoms can sometimes occur some hours after the work period. This delayed reaction is quite common with isocyanates, for example. The symptoms typically improve when the employee is away from the workplace on days off or holidays.

Several hundred workplace substances have been found to be respiratory sensitisers, and more are being identified. Table 9.1 gives a broad indication of the types of substance that are known respiratory sensitisers and their associated common work activities.

What are my responsibilities as an employer?

You must ensure a safe working environment where exposure to substances that can cause asthma is prevented or controlled. You should have or provide:

- An up-to-date safety statement.
- A risk assessment.
- Adequate control measures.
- Information to employees.
- Health surveillance where appropriate.

How is a risk assessment carried out?

Please see Section 2 of this Toolkit on the five-step risk assessment process. The risk assessment will identify whether respiratory sensitisers that can cause asthma are being used in the workplace. It should be able to answer the following questions:

- Are you using a respiratory sensitiser, e.g. one of the substances listed in Table 9.1?

- Does the risk phrase 'may cause sensitisation by inhalation (R42)' appear on the Safety Data Sheet of any substance in use?
- Are any of the substances used listed with the 'Sen' notation in the 2007 Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001?
- Is there a close chemical similarity with a known respiratory sensitiser?
- Is the sensitiser likely to become airborne in use?
- Who is likely to be exposed?
- To what concentrations?
- For how long?
- How often?
- Does the exposure exceed the daily occupational exposure limit (OEL) specified in the Chemical Agents Regulations?

It may be necessary for the employer to have the work air monitored or measured to detect the amount of the airborne substance and whether the exposure of employees is likely to be above the allowed OEL specified in the Chemical Agents Regulations. Monitoring must be carried out by a competent occupational hygienist with the right equipment.

How can I prevent or control exposure?

If the risk assessment identifies that employees are being exposed to a respiratory sensitiser, you should stop using the sensitiser and replace it with a safer alternative.

If that is not possible, you should consider segregating the work so as to minimise the number of employees exposed and/or totally enclosing the process. If this is not possible, partially enclose the process and provide local exhaust ventilation.

If, after carrying out the above control measures, there is still exposure, provide suitable personal respiratory protection to employees. If there is dependence on personal protective equipment (PPE), this equipment must be suitable for the task and work effectively. Fit testing is usually necessary.

Where substitution is not possible and there is still a risk of exposure despite the implementation of control measures, health surveillance must be provided.

What information should I give to employees?

Employees are entitled to information about hazards in the workplace and to know what is contained in the risk assessment. They are also entitled to information on the protective and preventive measures to be taken. Employees who are likely to work with and be exposed to respiratory sensitisers need information, instruction and supervision so that they know and understand:

- Labels and Safety Data Sheets for chemicals used in the workplace.
- Which substances are respiratory sensitisers in the workplace.
- Results of the risk assessment.
- Proper use of control measures, including PPE if relied upon.
- The need to report any failures in control measures.
- Risks to health.
- Symptoms of sensitisation.
- The importance of reporting symptoms at an early stage.
- Role of health surveillance.

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What is the role of health surveillance?

Health surveillance is used to detect the early onset or symptoms of asthma. It is deemed to be secondary prevention (by detecting adverse effects early rather than total prevention) and is not as effective as the primary prevention measures outlined above. Health surveillance, where used, has to be used in conjunction with these other control measures.

Health surveillance can take the form of a pre-employment medical assessment, an annual respiratory questionnaire and/or lung function tests, depending on the situation.

Pre-Employment Medical

A pre-employment health questionnaire should be completed by all those going to work with respiratory sensitisers. Unless it is likely that any exposure will be slight, the pre-employment medical should also include spirometry or lung function test (LFT) and probably a medical examination. A previous history of asthma, significant allergy or an obstructive pattern on LFT may increase that individual's risk of getting more severe asthma.

There may be limitations in employing a person who currently suffers from or is at high risk of developing asthma in a high risk environment, e.g. asthmatic going to work in a flour mill. At all times there must be a balance between the risk an individual might face if working there and the rights of that individual not to be discriminated against because of a disability, in this case asthma. Nevertheless, there will be times when the risk of allowing a particular person to work with a sensitiser will be unacceptable.

The basis of this decision will be the risk assessment. The dose of potential

exposure to the chemical is a very important part of this risk assessment. Usually it is advised to get the opinion of a specialist occupational physician or respiratory physician before allowing a known asthmatic or someone identified as having an asthmatic tendency to work with significant quantities of a respiratory sensitiser.

Routine Health Surveillance

Again the decision whether to carry out health surveillance is based on the risk assessment. When the risk assessment suggests there is the potential for an employee to develop asthma because of workplace exposure, then usually health surveillance is required. This should be carried out by a competent health professional three months and twelve months after job commencement and annually thereafter. The respiratory questionnaire should be completed again and results compared with pre-employment ones. Ideally, abnormal results should be interpreted by a doctor qualified and experienced in occupational medicine or respiratory medicine.

If health surveillance indicates that an employee has become sensitised, the employer should remove the employee from work with the sensitiser and advise him or her to consult a doctor. This outcome would also indicate that the existing control measures are inadequate and the risk assessment should be reviewed and any necessary changes made.

Abnormalities detected during routine health surveillance will require referral from nurse to doctor to specialist. A diagnosis of occupational asthma can only be made after a suitable history and supplementary objective tests are undertaken. These include both immunological tests and physical examination for evidence of symptoms. The doctor may have to

decide on fitness to work and whether the employee should continue working or be removed from the work environment.

How is occupational asthma evaluated?

The evaluation of a potential case of occupational asthma is usually best done by a specialist occupational physician or a specialist respiratory physician with an interest in occupational asthma or ideally both. It is beyond the scope of this document to describe evaluation in detail. Once asthma is confirmed the next step is determination of its potential relationship to work. A history of symptoms being related to work is suggestive but not conclusive. Many asthmatics may experience symptoms at work due to an irritant effect (work-aggravated asthma).

Potential sensitisers in the workplace should be identified. It is not enough for sensitisers just to be present, there also should be potential for exposure. Exposure assessments will involve examining work practices but also objective measurements in air, which are compared with the OELs. While control of sensitisers below OELs makes sensitisation less likely, it does not completely eliminate the risk.

Contacts/References

See the HSA's website (www.hsa.ie) for copies of:

- **Guidelines on Occupational Asthma.**
- **2007 Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001.**