Work-related asthma

An update for primary care health professionals

National Asthma Council AUSTRALIA

Key points

- Work-related asthma is a common and under-recognised preventable occupational lung disease.
- Failure to prevent further exposure to a sensitiser or irritant in a patient with established occupational asthma could lead to rapid, irreversible deterioration in lung function.
- Diagnostic investigations for work-related asthma are complex and specialised. Referral to a respiratory physician is recommended as soon as work-related asthma is suspected.

Exposure to airborne contaminants or adverse conditions at work is an important and preventable cause of asthma and asthma symptoms in adults. About 1 in 4 adults with asthma have asthma that was either caused by their work or is worsened by work conditions.

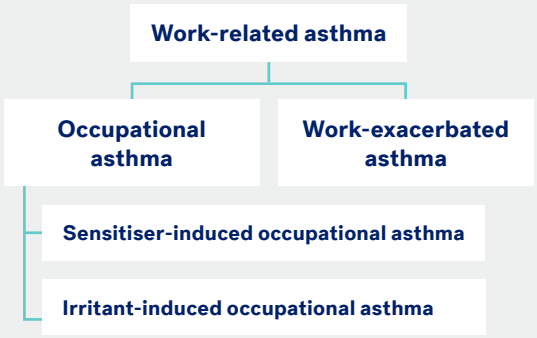
A 2020 joint position statement[1] by National Asthma Council Australia and the Thoracic Society of Australia and New Zealand warns that work-related asthma is under-recognised and under-reported in Australia.

Definitions

Work-exacerbated asthma: asthma that is worsened by workplace conditions (e.g. exposure to cold air, exertion, irritants or allergens) – includes pre-existing asthma or new-onset non-occupational asthma

Occupational asthma: new-onset asthma, or recurrence of previous asthma, caused by airborne substances (sensitisers or irritants) in the workplace

Work-related asthma: the general term covering both occupational asthma and work-exacerbated asthma (Figure 1)



(Figure 1)

Work-exacerbated asthma

About 1 in 5 adults with asthma experiences worsening of asthma at work, ranging from increased frequency of symptoms and need for reliever medication to acute flare-ups requiring emergency care. Workplace triggers can include respiratory irritants (dusts, fumes, sprays, gas, aerosols, liquids), aeroallergens (dust mite, pollens, animal dander), very hot or very cold air, physical exertion, or emotional stress.

Occupational asthma

Occupational asthma can be either sensitiser-induced or irritant-induced.

Sensitiser-induced occupational asthma accounts for about 90% of occupational asthma. Sensitisers include:

- high-molecular weight allergens (e.g. plant allergens, animal allergens, fungi and enzymes) that induce immunoglobin E (IgE)-mediated allergic reactions – asthma is often preceded by symptoms of allergic rhinitis
- low-molecular weight sensitisers (e.g. chemicals, dusts or fumes), which mostly cause asthma via cellular immune-mediated pathways.

More than 300 workplace agents have been reported to cause sensitiser-induced occupational asthma. Web-based tools can help identify these.*

*The **Australian Asthma Handbook** provides a list of common sensitising agents and occupations associated with exposure.*

The probability of developing occupational asthma is influenced by the concentration of the sensitising agent in the air, as well as the duration of exposure. Individual risk factors include atopy and smoking.

Asthma may develop at any time from within days of initial exposure to the sensitiser to many years later. Ongoing exposure to the causal agent can lead to rapid decline in lung function, which may be irreversible.

Irritant-induced occupational asthma is caused mainly by damage to bronchial epithelium after exposure to respiratory irritants (e.g. acids, formaldehyde, diesel exhaust, sulphur dioxide, ammonia, chlorine, chlorofluorocarbons).

It can either cause sudden-onset asthma within a few hours of a single high-level exposure to an irritant, or develop over time with repeated lower-level exposures.

Prevention

Work-related asthma is generally preventable. Employers are responsible for maintaining safe workplaces for all their employees. Health professionals should consider how work could influence a patient's asthma – this is particularly important for young people with asthma or atopy who are considering a high-risk occupation.

When a new diagnosis of occupational asthma is confirmed, the clinician can consider (with appropriate patient consent) contacting the workplace to inform the employer and advise protection for other workers. Occupational physicians can advise employers on elimination or reduction of asthma-inducing agents and symptom triggers in the workplace (e.g. substitution with less hazardous agents, appropriate ventilation, and use of respiratory protective equipment) and on health surveillance programs.

Practice points

DIAGNOSIS

Consider the possibility of work-related asthma in all working-age patients with asthma, particularly if asthma develops during adult life or has been difficult to control.

Take a detailed symptom history including onset and timing of symptoms. Symptoms of work-related asthma typically improve during times away from work, such as weekends and holidays, and worsen at work. Over time or as asthma becomes more severe, this fluctuation in symptoms may no longer be obvious. Occupational asthma screening questionnaires are available.[2]

Get a detailed description of work and the workplace environment, including strategies to prevent exposure to air pollution at work (e.g. respiratory protection or ventilation). The worker should ask their employer for a safety data sheet (documentation of hazardous chemicals in the workplace).

Investigations should start as soon as work-related asthma is suspected, while the person is still doing the same job. Early referral to a respiratory physician or clinic with experience in work-related asthma is recommended because diagnostic investigations for work-related asthma are complex and specialised.

Accurate confirmation of work-related asthma is essential: because changes in the person's workplace or

* www.occupationalasthma.com; www.aoecdata.org

occupation may be necessary, to support workers compensation claims where relevant, and because other workers may also be at risk.

DIAGNOSTIC INVESTIGATIONS FOR WORK-RELATED ASTHMA

Objective testing is needed to:

1. **Confirm the diagnosis of asthma** *by documenting symptoms and variable expiratory airflow obstruction (spirometry before and after bronchodilator, bronchial provocation testing if spirometry does not confirm variable expiratory airflow obstruction)*
2. **Demonstrate that asthma symptoms are linked to exposure at work** *(e.g. air quality monitoring, comparison of bronchial hyperreactivity at work and after 1–2 weeks away from work, frequent peak expiratory flow rate monitoring)*
3. **Identify the causal agent** *(e.g. skin prick tests and serum allergen-specific IgE levels for suspected sensitisers).*

MANAGEMENT

Treat asthma according to the recommendations in the Australian Asthma Handbook (asthmahandbook.org.au). For people who smoke, advise and support them to quit.

For patients with sensitiser-induced occupational asthma, long-term worsening of asthma may not be preventable if the person continues to be exposed to the causal agent. Complete avoidance is recommended. Some people may need to leave their job, so accurate diagnosis and identification of the sensitising agent(s) are crucial. Close monitoring of asthma is needed, even after exposure stops.

People with irritant-induced occupational asthma should be able to control their asthma symptoms while continuing their job, unless repetitive exposure to respiratory irritants cannot be avoided. Periodic monitoring of asthma is needed.

People with work-exacerbated asthma should be able to control symptoms while continuing their job, if triggers are identified and eliminated or reduced.

References

1. Hoy R, Burdon J, Chen L et al. Thoracic Society of Australia and New Zealand and National Asthma Council work-related asthma position paper. Respirology 2020; ePub 5 October DOI: 10.1111/resp.13951: (Available from: https://pubmed.ncbi.nlm.nih.gov/33020986).
2. Pralong JA, Moullec G, Suarthana E et al. Screening for occupational asthma by using a self-administered questionnaire in a clinical setting. J Occup Environ Med 2013; 55: 527-31. (Available from: https://pubmed.ncbi.nlm.nih.gov/23618886/).

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