Clinical Topics

Asthma triggers

A wide range of factors can trigger asthma, and triggers differ between individuals.

Table

Types of asthma triggers

Category	Examples
Respiratory tract infections	Influenza Pneumococcal disease Pertussis Rhinovirus RSV
Allergens	Animals Cockroaches House dust mite Moulds Pollens Occupational allergens
Airborne irritants	Cigarette smoke Smoke (including bushfires, vegetation reduction fires, indoor wood fires) Cold/dry air Fuel stoves Gas heaters Home renovation materials Household aerosols Moulds (airborne endotoxins) Occupational irritants Outdoor industrial and traffic pollution Perfumes/scents/incense
Medicines	Aspirin and NSAIDs (in patients with aspirin-exacerbated respiratory disease) Beta-blockers Echinacea
Dietary	Food chemicals/additives (if person is intolerant) Thermal effects (e.g. cold drinks)
Physiological and psychological states	Exercise Laughter Extreme emotions Pregnancy

Most of the evidence that certain exposures and physiological factors can trigger asthma comes from cross-sectional population studies and cohort studies. Because there is insufficient evidence to confirm without doubt whether some factors can or cannot act as triggers for an individual, triggers and avoidance strategies must be discussed with each patient.

Triggers can include:

- exercise
- respiratory infections

- allergens (e.g. grass pollen, pets, house dust mite, moulds)
- airborne irritants
- medicines.

Key points

Help patients identify individual asthma triggers.

Smoking and vaping, and exposure to other people's smoking and vaping, should always be avoided.

Airborne allergens (in sensitised individuals) and indoor and outdoor irritants can trigger asthma symptoms and exacerbations.

Aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs) can trigger asthma symptoms in individuals with aspirin-exacerbated respiratory disease.

Beta-blockers can cause bronchoconstriction.

Exercise

See Exercise and asthma

Respiratory infections

Viral infections, mainly with human rhinovirus, are the most common triggers for asthma exacerbations. Viruses are present in an estimated 80% of asthma exacerbations in children and 50–75% of exacerbations in adults.[Jackson 2010, Puranik 2017]

Other viruses reported to trigger asthma exacerbations include respiratory syncytial virus, parainfluenza, and influenza. [Puranik 2017]

Allergens

See Allergy and asthma

See Thunderstorm asthma

See Work-related asthma

See Specific allergen immunotherapy for adults and adolescents

See Specific allergen immunotherapy for children 6–11 years

Grass pollens

Allergy to airborne pollen grains from certain grasses, weeds and trees is common in people with asthma in Australia. For sensitised patients, exposure to pollen may worsen asthma symptoms during the pollen season. The highest pollen counts occur on calm, hot, sunny days in spring or early summer, or during the dry season in tropical regions.

Allergies are usually caused by wind-pollinated species such as imported grasses, weeds and trees, whose pollen can travel many kilometres from its source. Worsening of asthma symptoms is rarely due to the pollen of insect-pollinated garden flowers or Australian native plants (with the exception of cypress Pine).

Furred pets

Contact with pets (e.g. cats, dogs and horses) can trigger asthma, mainly due to sensitisation to allergens in sebum or saliva. Exposure can trigger flare-ups or worsen symptoms in sensitised individuals. Cat allergens easily spread on clothing and are found in places where cats have never been.

Dust mite

Exposure to house dust mite (mainly *Dermatophagoides pteronyssinus*) is a major asthma trigger in Australia. These microscopic mites live indoors, feed on skin scales, and thrive in temperate and humid climates, such as coastal Australia.

Moulds

Exposure to moulds can worsen asthma symptoms in sensitised individuals. Airborne mould particles can also act as irritants.[Hope 2007] Sensitisation to Alternaria has been associated with an increased risk of hospitalisation in children

with asthma.[Rao 2011]

Epidemiological studies suggest that exposure to damp, mouldy buildings can worsen symptoms in adults and children with asthma.[Rao 2011, Mendell 2011]

Airborne irritants

Smoking

See Smoking and vaping

Outdoor pollutants

Observational studies suggest that exposure to outdoor pollutants (ozone, nitrogen dioxide, sulfur dioxide, or particulate matter), including those due to traffic, trigger asthma symptoms and exacerbations in children and adults, including severe exacerbations requiring hospital admission.[Tiotiu 2020] Exposure to ozone, nitrogen dioxide, sulfur dioxide, or particulate matter is associated with reduction in lung function.[Tiotiu 2020] Effects on asthma depend on dose and duration of exposure.[Tiotiu 2020]

Airborne particulate matter due to land fires is associated with an increase in asthma hospitalisations and emergency department visits in adults.[Borchers 2019] Children are at increased risk of the harmful effects of exposure to bushfire smoke, compared with adults, due to smaller airways, higher metabolic rate and ongoing development.[McDonald 2023] During bushfire smoke exposure, children younger than 4 years may have a higher risk of severe asthma exacerbations and other respiratory symptoms than older children.[McDonald 2023]

No avoidance measures for individual patients are strongly supported by clinical trial evidence. Strategies that have sometimes been suggested include driving with windows closed and air conditioner in recycle mode, subscribing to air quality alerts, and staying inside during or using close-fitting N95 facemasks when air pollution levels are high.[Tiotiu 2020]

Indoor pollutants

Emissions from gas appliances, wood heating and smoking have harmful effects on lung health.

An Australian longitudinal cohort study reported that adults living in houses with gas cooking, the combination of wood heating and exposure to indoor smoking, or the combination of wood heating and gas cooking, developed greater lung function decline and greater bronchodilator responsiveness over ten years, compared with people in households using reverse-cycle air conditioning, electric cooking and no smoking.[Dai 2021]

Woodfire smoke has been shown to reduce lung function and increase airway inflammation in children aged 6–13 years with asthma.[Allen 2008]

Indoor exposure to nitrogen dioxide (e.g. due to gas stoves or heaters in homes or schools) increases the risk of asthma symptoms in preschool aged children[Hansel 2008, Kattan 2007] and primary-school-aged children.[Kattan 2007, Gillespie-Bennett 2011, Marks 2010] and may reduce lung function.[Gillespie-Bennett 2011] Indoor nitrogen dioxide concentrations from use of gas stoves has been reported to correlate positively with nighttime inhaler use in children aged

5–12 years with asthma.[Paulin 2017] Even relatively low exposure to indoor nitrogen dioxide has been shown to be associated with respiratory symptoms among children with asthma.[Belanger 2006]

Preventing exposure (e.g. replacing heaters with non-polluting heaters) improves symptoms of asthma and wheeze in primary school-aged children.[Pilotto 2004, Howden-Chapman 2008, Free 2010, Marks 2010] Exhaust fan use and opening windows frequently may reduce the adverse effects of household air pollution produced by combustion heating and cooking on current asthma in adults and children.[Dai 2021]

Airborne mould particles may also act as irritants as well as allergens.[Hope 2007]

Workplace exposures

See Work-related asthma

Medicines that can trigger asthma symptoms

Aspirin and NSAIDs

Aspirin-exacerbated respiratory disease is a distinct condition resulting in adult-onset asthma.[Rajan 2015] People with aspirin-exacerbated respiratory disease have a combination of nasal polyposis, aspirin sensitivity, and eosinophilic sinusitis. It is an adverse reaction, not an allergy to aspirin.[ASCIA 2024]

It is present in approximately 7% of people with asthma and approximately 15% of people with severe asthma.[Rajan 2015] It typically progresses from nasal congestion and anosmia to chronic rhinosinusitis with nasal polyps, then asthma and hypersensitivity to aspirin and NSAIDs.[Szczeklik 2000]

Within minutes to hours of ingesting aspirin or NSAIDs, people with aspirin-exacerbated respiratory disease can develop dyspnoea and other reactions that can include angioedema and anaphylactoid shock.[Szczeklik 2000]

A presumptive diagnosis of aspirin-exacerbated respiratory disease is based on a history of reactions to aspirin or nonselective NSAIDs, with a higher degree of certainty in patients with chronic rhinosinusitis and nasal polyps.[Kennedy 2016] Aspirin challenge, performed in a specialist clinic with cardiopulmonary resuscitation capabilities, provides a definitive diagnosis.[GINA 2025]

Management of aspirin-exacerbated respiratory disease involves avoidance of aspirin and NSAIDs, ICS treatment, and aspirin desensitisation treatment.[GINA 2025]

ASCIA advises that people who are highly aspirin-sensitive may need to avoid other salicylates, including those in complementary and alternative medicines such as willow tree bark extract, and in topical medicines.[ASCIA 2024]

Beta-blockers

First-generation non-selective beta-blockers have been reported to cause severe bronchospasm, including fatal reactions, both with oral and ocular administration.[Bennett 2021]

Cardioselective beta-blockers such as metoprolol, bisoprolol and atenolol can also result in severe bronchospasm. [Australian PI] However, observational data suggest that the rate of asthma deaths attributable to cardioselective beta1-blockers is negligible.[Bennett 2021]

A history bronchospasm or severe asthma are listed in TGA-approved product information as contraindications to the use of beta-blockers; advice differs between molecules.[Australian PI]

Patients who require beta-blocker eyedrops should close their eyes after instilling the drop and apply pressure to the lacrimal puncta for 1–2 minutes, to minimise systemic absorption by reducing passage through nasolacrimal duct into the nasopharynx.[Steiner 2008]

Complementary and alternative medicines

Allergic reactions to complementary medicines (e.g. echinacea) can include acute bronchoconstriction.[ASCIA 2024]

Dietary triggers

Foods are rarely a trigger for asthma.

Sulphite additives (widely used as preservative and antioxidants in the food and pharmaceutical industries) have been associated with acute asthma. [Vally 2009] An estimated 3–10% of people with asthma are sensitised to sulfites.[Vally 2009]

Asthma symptoms provoked by drinking cold liquids are commonly reported anecdotally. Asthma symptoms and a reduction in FEV_1 after drinking icy water have been observed in children with asthma.[Wilson 1985] Increased bronchial hyperresponsiveness has been observed approximately 90 minutes after ingestion of ice.[Wilson 1985]

Physiological states

Some patients report asthma flare-ups and asthma symptoms in response to stress and extreme emotions.[Busse 2012, Theoharides 2012] Adolescents with asthma may experience breathlessness in response to stress (without changes in lung function or other asthma symptoms).[Rietveld 1999]

Laughing is a common trigger for wheeze in infants. In children, the presence of respiratory symptoms that are triggered by laughter increases the probability of symptoms being due to asthma.

Asthma may worsen during the premenstrual phase in up to 40% of women, possibly due to a reduced response to corticosteroids and bronchodilators.[Boulet 2009] However, this rarely causes severe flare-ups.[Boulet 2009] Perimenstrual worsening asthma may be relatively common among women with severe or poorly controlled asthma, and may share risk factors with aspirin-exacerbated respiratory disease.[Rao 2013]

Approximately 40% of pregnant women with asthma experience worsening asthma symptoms, and at least 20% have an exacerbation that requires medical intervention.[Murphy 2023]

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