

Cough medicines: do they make a difference?

Over-the-counter cough medicines, although widely used, are not particularly effective at reducing the severity or duration of acute cough associated with a viral upper respiratory tract infection. Most cough preparations contain medicines that are not recommended for children aged under six years. As there are limited effective treatment options available, the management of acute viral cough can be challenging.

KEY PRACTICE POINTS:

- There is little to no evidence that cough medicines (e.g. expectorants, mucolytics) have any clinically significant benefit on reducing cough in children
 - Most cough preparations contain medicines that are not recommended for use in children aged under six years
- In adults, there is little to no evidence that antitussives or expectorants are effective for cough; bromhexine (a mucolytic) may reduce cough frequency
- There is currently insufficient evidence to determine whether analgesic, antihistamine and decongestant combination products have any effect on cough
- Complementary and alternative treatments are often sought, particularly for children where specific medicines are not recommended or are contraindicated. For example, ivy leaf extract, honey (if aged over one year) or aromatic rubs. These products are generally safe to use and there is some evidence that they may reduce cough duration or severity.
- General supportive care strategies can be recommended to people with acute cough, such as rest and adequate fluid intake. Environmental factors such as a warm, dry, smoke- and e-cigarette (vape)-free home, warm clothing, adequate nutrition and good hygiene are also important.

This article focuses on over-the-counter cough medicines and alternative treatments/remedies for acute cough associated with a viral upper respiratory tract infection. For information on the management of other symptoms associated with respiratory tract infections, see: [bpac.org.nz/2018/cold-season.aspx](https://www.bpac.org.nz/2018/cold-season.aspx) and [bpac.org.nz/2019/rti.aspx](https://www.bpac.org.nz/2019/rti.aspx).

Further resources related to cough include:

- Cough in children [bpac.org.nz/bpj/2010/july/cough.aspx](https://www.bpac.org.nz/bpj/2010/july/cough.aspx)
- Preventing and managing bronchiectasis in high-risk paediatric populations [bpac.org.nz/2020/bronchiectasis.aspx](https://www.bpac.org.nz/2020/bronchiectasis.aspx)
- Bronchiolitis: when to reassure and monitor, and when to refer [bpac.org.nz/2017/bronchiolitis.aspx](https://www.bpac.org.nz/2017/bronchiolitis.aspx)
- Is it asthma? Assessing and managing wheeze in pre-school children [bpac.org.nz/2020/wheeze.aspx](https://www.bpac.org.nz/2020/wheeze.aspx)

Treating an acute viral cough

Adults reportedly experience an average of two to four upper respiratory tract infections each year; up to eight can occur in children.^{1,2} These infections can be caused by more than 200 different viruses, the most common being rhinovirus.² Most upper respiratory tract infections are self-limiting, with symptoms usually resolving within seven to ten days.^{1,2}

Cough is the most common symptom associated with an upper respiratory tract infection and may persist for longer than other symptoms, e.g. nasal congestion.^{3,4} Most cases of acute cough resolve within three weeks (see: "Classifying cough").⁵ Despite cough being a protective reflex, it can have a negative impact on daily life, including work or school attendance and sleep.^{3,6} Many people use over-the-counter (OTC) cough or cold medicines to relieve acute cough and other associated symptoms, e.g. rhinorrhoea, nasal congestion.^{2,6} A small number of products are funded on prescription (e.g. inhaled corticosteroids or bronchodilators), although their use and effectiveness for acute cough is limited.

Pharmacists and other staff working in community pharmacies are often tasked with guiding people who present with cough on appropriate management strategies.⁵ However, as there are a myriad of OTC, including pharmacist-only, products available, with differing claims and extent of effectiveness, knowing which product(s) to recommend can sometimes be difficult.

Cough preparations

There are three main classes of OTC cough medicines: expectorants, antitussives and mucolytics.^{2,6} They may be formulated in syrups, lozenges, tablets or capsules. These medicines can also be included in combination products with antihistamines, decongestants or analgesics.^{5,6} The actions of OTC cough (and cold) preparations differ, depending on the active ingredient(s) (Table 1). Choice of treatment usually depends on which symptoms predominate, e.g. if a patient has a wet cough, a mucolytic or expectorant may be recommended.^{2,5} However, patient-specific factors must also be considered, e.g. contraindications, medicine interactions, relevant co-morbidities such as asthma or COPD.^{2,5}

Cough preparations now codeine-free

Cough (and cold) preparations in New Zealand no longer contain codeine. The intended purpose of codeine in these products may have been to provide analgesia for sore throat and general aches and pains, or to act as a cough suppressant. Codeine tablets, with or without paracetamol, can be prescribed short-term for adults with dry cough, although this practice is uncommon, and the potential risks and adverse effects should be considered.¹⁰ Codeine must be avoided in children aged under 12 years and in people who are breastfeeding.¹⁰


 For further information on the reclassification of codeine, see: [bpac.org.nz/2020/codeine.aspx](https://www.bpac.org.nz/2020/codeine.aspx) and for a community pharmacy perspective, see: [bpac.org.nz/2020/codeine-rx.aspx](https://www.bpac.org.nz/2020/codeine-rx.aspx)

Table 1. Mechanism of action of common active ingredients in cough (and cold) preparations.^{2,5-8}

Active ingredient	Mechanism of action
Expectorants , e.g. guaifenesin	Stimulate secretion of mucus in the respiratory tract and reduce adhesion to facilitate clearance
Antitussives , e.g. dextromethorphan*, pholcodine (see: "Pholcodine-containing products to be withdrawn")	Suppress the cough reflex which decreases the urge to cough
Mucolytics , e.g. bromhexine	Decrease mucus viscosity to make it easier to expel
Sedating antihistamines , e.g. chlorpheniramine, brompheniramine	Decrease histamine release which can reduce congestion and secretion production. Also has sedating and anticholinergic effects. May reduce post-nasal drip. ⁹
Nasal decongestants , e.g. phenylephrine, pseudoephedrine [†]	Aim to reduce the volume of fluid reaching the nose and reduce nasal swelling through vasoconstriction. May reduce post-nasal drip. ⁹

* There are currently no cough (or cold) products containing dextromethorphan supplied in New Zealand (some older stock may remain), see: "OTC dry cough management"

† Cold and flu products containing pseudoephedrine are now available for purchase in some pharmacies on the recommendation of a pharmacist. In April, 2024, Medsafe approved 11 cold and flu medicines containing pseudoephedrine, and since 20th May, 2024, some of these medicines have been available for purchase in pharmacies who wish to stock them. Pseudoephedrine has been reclassified from a Class B to Class C controlled drug and is now a restricted medicine; products containing pseudoephedrine can be sold in a pharmacy by a registered pharmacist without a prescription.

⚠ Cough (and cold) preparations containing the following medicines **should not** be used in children **aged under six years**.¹⁰

- The antihistamines brompheniramine, chlorpheniramine, diphenhydramine, doxylamine, promethazine and triprolidine
- The antitussives dextromethorphan or pholcodine (see: “Pholcodine-containing products to be withdrawn”)
- The expectorants guaifenesin or ipecacuanha
- The mucolytic bromhexine
- The decongestants phenylephrine or pseudoephedrine

N.B. Many of these medicines are not currently available in cough and cold preparations in New Zealand; however, be aware that some patients may purchase these products from international websites or while overseas.

👤 If cough preparations are used for children aged over six years, advise parents to follow dose instructions carefully, do not give more than one medicine at a time and do not use for longer than five days.

So do cough medicines work? The short answer is no

Cough medicines are used widely, but the evidence base for almost all of these products is limited (Table 2).^{5,20} The efficacy of some preparations has been shown in adults, but studies conducted in children have largely been unsuccessful in demonstrating benefit.⁷ Some international panels recommend against the use of OTC cough (and cold) medicines for both children and adults based on currently available evidence.¹⁵ The demulcent properties of syrup in cough products, which soothe the throat, has been suggested as the most beneficial component, rather than the active medicine(s).^{1,3}

👤 Cough can be unpleasant for many people, affecting multiple aspects of daily life and overall wellbeing.^{6,20} Therefore many people will wish to trial OTC cough preparations (or other remedies including traditional Rongoā Māori, Ayurvedic or Chinese herbal medicines), despite the limited evidence of efficacy. People should be supported to do so if the product could theoretically provide some benefit, and is unlikely to cause harm. People can also be reassured that things they already have at home may also be effective, e.g. honey.

Table 2. An overview of the evidence for over-the-counter (OTC) preparations commonly used for cough.

Treatment	Source of evidence	What is the evidence?
Oral OTC cough preparations (including antitussives, expectorants, mucolytics, antihistamine-decongestant combinations, other combinations and antihistamines)	Systematic review of 29 trials ⁷	In children, antitussives, antitussive and bronchodilator combinations, antihistamines and antihistamine and decongestant combinations were no more effective than placebo in reducing acute cough. ⁷ One study found mucolytics to be slightly more effective than placebo. ⁷ In adults, some studies found that antitussives and expectorants were more effective than placebo, although evidence is mixed. ⁷ One study found that the mucolytic bromhexine (tablets) reduced cough frequency. ⁷ Most other studies showed OTC cough preparations, e.g. antihistamine and decongestant combinations, to be no more effective than placebo. ⁷
Analgesic, antihistamine and decongestant combination products	Systematic review of 30 trials ²¹	There is currently insufficient evidence to determine whether combination analgesic, antihistamine and decongestant products have any effect on cough. ²¹ Some studies in adults have shown benefit, however, the treatment in these trials included an antitussive, therefore it cannot be determined which specific medicine was effective. ²¹
Nasal decongestants	Systematic review of 15 trials ²²	There is no evidence that nasal decongestants reduce cough associated with the common cold ²²

Classifying cough

Cough is a protective reflex that is typically classified according to its duration and characteristics:^{5,11}

- **Acute** – present for less than three weeks (or two weeks in children)
- **Subacute** – present for three to eight weeks (or two to four weeks in children)
- **Chronic** – present for longer than eight weeks (or four weeks in children)

Acute cough is most likely to be caused by a viral upper respiratory tract infection, but it can also be triggered by irritants such as chemicals or fragrance, smoke or allergens.^{3,5} In some cases, the cause of acute cough is more serious, e.g. pneumonia, foreign body aspiration.^{5,11} Subacute cough may be post-viral or an exacerbation of an existing condition, e.g. asthma, COPD.^{5,11} A chronic cough is usually due to an underlying condition such as asthma, COPD, gastro-oesophageal reflux disease, or medicine use, e.g. angiotensin-converting enzyme inhibitor, beta blocker.^{5,11} Consider the possibility of bronchiectasis in children with chronic cough, see: bpac.org.nz/2020/bronchiectasis.aspx for further information.

⚠ People who present to a pharmacy and report a persistent (e.g. > 3 weeks) or worsening cough, or cough with concerning characteristics, should be advised to consult with their general practitioner.^{2,5}

Is the cough “wet” or “dry”?

In addition to classifying cough as either acute, subacute or chronic, determining whether it is dry and irritating (non-productive) or wet and rattly (productive) is also important, as this can help to guide diagnosis of the underlying cause and inform treatment decisions.^{2,5}

👉 Best Practice Tip. The term productive cough can have limited value for young children as they tend to swallow sputum rather than cough it up, which can result in vomiting. Instead, it may be useful to ask if a child has vomited.

👁 For information on the assessment and management of cough in children, see: bpac.org.nz/bpj/2010/july/cough.aspx

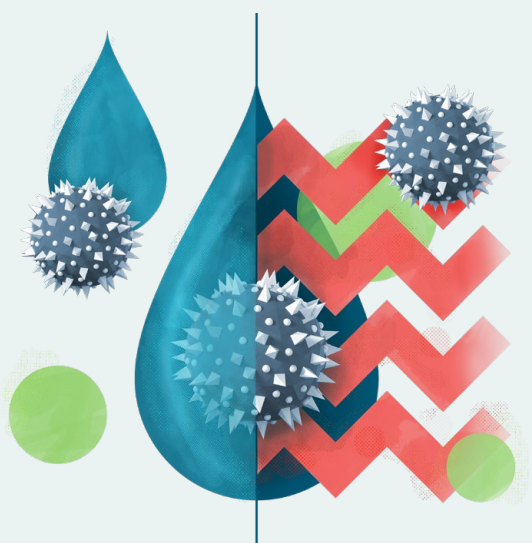
OTC wet cough management

Medicines that promote cough, e.g. expectorants such as guaifenesin and mucolytics such as bromhexine, can be used for the symptomatic treatment of wet cough associated with an upper respiratory tract infection, however, evidence that they are effective is mixed (see: “*So do cough medicines work?*”).^{5,7,8} Expectorants and mucolytics are often present together in cough/cold products.² Medicines that decrease the urge to cough are usually avoided in people with wet cough.

OTC dry cough management


Medicines that suppress the cough reflex, i.e. antitussives, can be used short-term for dry cough associated with an upper respiratory tract infection in adults.^{5,8} However, there are limited options as pholcodine, one of the commonly used antitussive medicines in OTC products, will be no longer available in New Zealand from early 2024 (see: “*Pholcodine-containing products to be withdrawn*”).¹² Products containing dextromethorphan are also unavailable as they are no longer being supplied to the New Zealand market (some older stock may remain). The approval status for many dextromethorphan-containing products has now lapsed; dextromethorphan was up-scheduled to a pharmacist-only or prescription medicine in 2019.


Besides antitussives (for which the effect on cough is minimal), there are currently no other medicines that show effect for dry cough. However, there are complementary and alternative treatments available that have demonstrated some benefit in either reducing cough frequency or severity, e.g. honey, glycerol syrups, aromatic rubs, ivy leaf extract and zinc (see: “*Other treatments for cough*”).^{4,13–15}



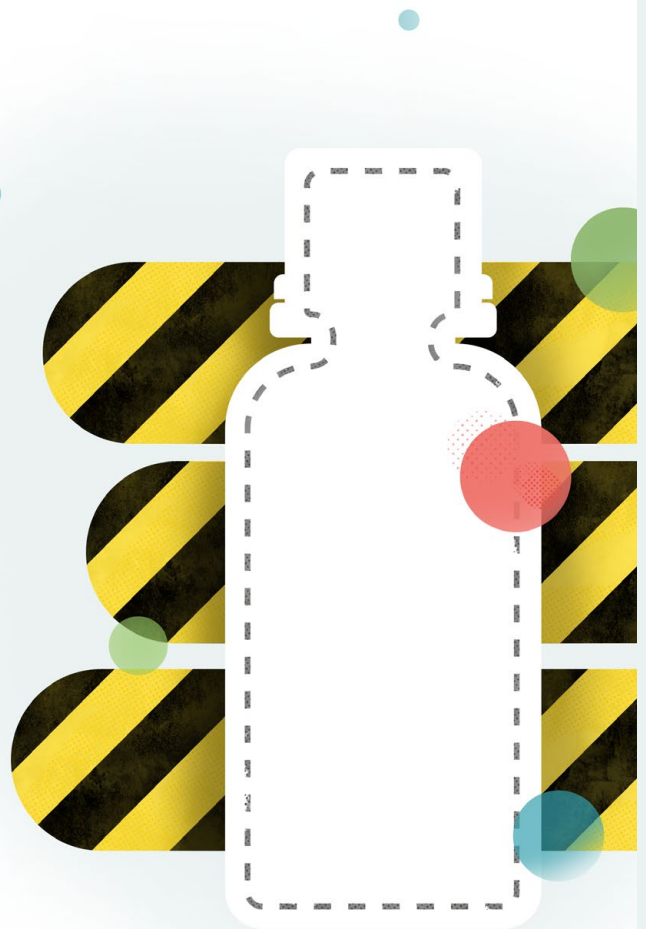
Pholcodine-containing products to be withdrawn

Pholcodine-containing products were reclassified in December, 2022, from pharmacy-only to pharmacist-only (restricted) medicines, due to potential safety concerns around the use of pholcodine in the absence of pharmacist guidance.¹⁶ Throughout 2023, Medsafe has been reviewing whether pholcodine-containing products should continue to be available in New Zealand as there is increasing evidence that the risks of these products may outweigh the benefits (related to anaphylaxis – see below).¹⁷ This evidence has prompted some international regulators, e.g. in Australia and Europe, to withdraw supply of these medicines.¹⁷ In September, 2023, Medsafe announced that consent to distribute pholcodine-containing products will be revoked on **12th January, 2024**, due to safety concerns following recommendation from the Medicines Adverse Reactions Committee.¹²

 A full list of affected products is available from: www.medsafe.govt.nz/safety/Alerts/PholcodineConsentRevoked.asp

 **The safety concern.** Increasing evidence has become available in recent years supporting an association between neuromuscular blocking agent-related anaphylaxis during surgery and pholcodine exposure.¹⁸ ¹⁹ Results from a 2022 case-control study have shown that people who had taken pholcodine in the preceding 12 months were four times more likely to experience an anaphylactic event during surgery compared to those not exposed.¹⁸

Neuromuscular blocking agent-related anaphylaxis is very rare and conventional understanding suggests there must be some sensitisation that occurs.¹⁸ However, many people who have experienced this adverse effect do not have prior exposure to neuromuscular blocking agents.¹⁸ It has since been hypothesised that cross-sensitisation occurs from chemicals with similar molecular structures, e.g. medicines, cosmetics.¹⁸ Pholcodine might act as a sensitiser that increases the risk of neuromuscular blocking agent-related anaphylaxis.



Potential adverse effects

Antitussives such as dextromethorphan and pholcodine can be associated with adverse effects, including nausea, vomiting, constipation, dizziness, drowsiness and ataxia.^{5, 20} Pholcodine use has been associated with an increased risk of anaphylaxis during surgery involving neuromuscular blocking agents (see: “Pholcodine-containing products to be withdrawn”).^{18, 19} In rare cases, serotonin syndrome can occur in people taking high doses of dextromethorphan, or with concomitant use of other medicines known to cause serotonin syndrome, e.g. selective serotonin reuptake inhibitors.^{2, 20}

Mucolytics such as bromhexine, and **expectorants** such as guaifenesin, are generally safe but minor adverse effects are possible, e.g. nausea, vomiting, diarrhoea, dizziness, sedation, rash.^{5, 6}


Sedating antihistamines, e.g. chlorpheniramine, can cause sedation, drowsiness, dizziness, dry mouth and headache.^{5, 21}

Decongestants, e.g. phenylephrine, pseudoephedrine, can cause insomnia, drowsiness, headache and dizziness.²²

Other treatments for cough

With the limited efficacy of cough medicines, particularly in children, alternative treatments or remedies are often sought. General supportive care strategies can be recommended such as rest, adequate fluid intake and keeping warm (see: “Support a healthy home environment and good hygiene practices”).^{2, 5} Other complementary and alternative treatments may also be discussed such as honey or ivy leaf extract (see sections below for details).

Analgesics such as paracetamol or ibuprofen have no significant effect on cough, but may be given as required for general aches and pains, fever and headache associated with the common cold.^{23, 24} There is currently no evidence that echinacea, vitamin C supplements, garlic capsules, probiotics or steam inhalation has any effect on cough severity or duration.^{25–29}

 For information on managing other symptoms associated with the common cold, see: [bpac.org.nz/2018/cold-season.aspx](https://www.bpac.org.nz/2018/cold-season.aspx)

Inhalation products

There is little to no evidence to support the use of **inhaled beta2-agonists**, e.g. salbutamol, in adults and children with acute cough and no airflow obstruction.³⁰ If there is evidence of airflow obstruction, beta2-agonists may reduce cough.³⁰

Inhaled corticosteroids, e.g. fluticasone propionate, are sometimes prescribed for subacute or chronic post-viral cough,

however, there is currently insufficient evidence to support this practice.^{31, 32}

Aromatic compounds such as menthol and eucalyptus oil can be added to warm water to create a vapour which is inhaled to relieve nasal congestion and ease breathing.¹⁴ There is also evidence that these compounds may have antitussive effects and reduce cough frequency.¹⁴ Remind parents or caregivers that aromatic oils and inhalation solutions should be stored out of reach of children due to significant toxicity.

Saline

A Cochrane review evaluating saline nasal irrigation for symptomatic relief of acute upper respiratory tract infections found some evidence of benefit, however, evidence was low quality due to small sample sizes and a high risk of bias.³³ Saline irrigation may reduce cough associated with upper airway cough syndrome (post-nasal drip).³³

Commercial products are available (sodium chloride 0.9%) and are usually well tolerated. Alternatively, a home-made saltwater solution can be used: mix ¼ teaspoon salt with two cups of cooled, boiled water and administer using a small spray bottle, nasal dropper or syringe.

Honey

Honey is often suggested as a treatment for cough (particularly dry cough), largely due to its demulcent properties which act to soothe the throat and mucous membranes.^{5, 8} A 2021 systematic review and meta-analysis, including 14 randomised controlled trials* investigating the clinical efficacy of honey for upper respiratory tract symptoms, found that consumption of honey or honey-containing preparations improved respiratory symptoms, with the strongest evidence for reducing the frequency and severity of cough.¹³ The authors of a more recent systematic review concluded that in children with acute cough, honey may be more effective than cough medicines at relieving cough and improving sleep, although evidence was low quality.³⁴

Honey can be given directly from a teaspoon or added to a drink such as warm water with lemon. Lollipops and lozenges are also available. Honey is only suitable for children aged 12 months and older due to the rare association with infant botulism in those aged under one year.²³

* The majority of studies were of children

Throat lozenges

Throat lozenges marketed for easing cough and sore throat generally contain a combination of anti-inflammatory, antiseptic and local anaesthetic agents or other ingredients such as honey, glycerol, eucalyptus oil or menthol.^{2, 6} These may temporarily soothe a sore throat and relieve a dry irritative

cough,^{1,6} however, there is no evidence that throat lozenges reduce the duration or severity of cough.

Glycerol

Glycerol is a component found in some cough syrups that is used as a solvent or thickening agent.^{5, 35} However, the properties of glycerol are thought to contribute to treatment efficacy as well, e.g. lubricant, demulcent, sweetener and humectant.^{5,35} Glycerol or other demulcent syrups form a layer over the sensory receptors in the throat, which can be useful for the symptomatic relief of dry cough in both adults and children.^{5,35}

Aromatic rubs

Aromatic rubs, e.g. camphor + eucalyptus oil + menthol, can be applied directly to the skin, bedding or clothing or applied to a tissue and placed in a pyjama pocket or pillow case, and may reduce cough frequency and improve sleep.¹⁴ Check individual products for age recommendations as some aromatic rubs are not recommended for use in children aged under two years.²³ Care must be taken to avoid ingestion due to the toxic nature of these products.²⁰

Ivy leaf extract

“Bronchial syrups” containing ivy leaf extract (*Hedera helix*) are classified as dietary supplements in New Zealand and because of this there are no age restrictions for use. A 2021 systematic review of the efficacy and tolerability of ivy leaf for the treatment of acute upper respiratory tract infections concluded that ivy leaf preparations are safe and well tolerated by adults and children, and that there is some effect on reducing cough severity and frequency.⁴ However, it is uncertain whether this effect is clinically significant.⁴

Zinc

There is some evidence that zinc lozenges may reduce the duration of cough in adults if administered within 24 hours of symptom onset.¹⁵ However, evidence is currently insufficient to recommend zinc for the prevention or treatment of cough.¹⁵ Zinc lozenges are usually well tolerated but can have an unpleasant taste.¹⁵

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Support a healthy home environment and good hygiene practices

The importance of a healthy home environment, including warm clothing and good nutrition to reduce the risk of respiratory illnesses can be discussed with people seeking cough and cold treatments, particularly parents who have children with cough and cold. Appropriate hygiene practices, e.g. hand washing, covering the mouth and nose with a tissue when coughing or sneezing, mask wearing when symptomatic, should also be encouraged to help prevent transmission to others in the household.²³

A smoke- and e-cigarette (vape)-free home should be supported as exposure to second-hand smoke, particularly in children, increases the risk of health conditions such as asthma, chest infections, e.g. bronchiolitis, and ear infections.³⁶

A cold, damp house increases the risk of respiratory tract infections and asthma.³⁶ Heat pumps, wood pellet burners and flued gas appliances are preferable to multi-fuel or coal burners, electric heaters and un-flued gas heaters, which are associated with the release of moisture, nitrogen dioxide and emissions into the internal environment.³⁶ Insulating and improving heating in New Zealand houses has been shown to reduce cough and cold and the number of days off school and work.³⁶

 The Energy Efficiency and Conservation Authority (EECA) provides grants to assist people in insulating their homes and installing clean and efficient heating. For further information, including eligibility criteria, see: www.eeca.govt.nz/co-funding/insulation-and-heater-grants/warmer-kiwi-homes-programme/



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