Chapter 1

Respiratory Problems

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Colds and flu

The common cold comprises a mixture of viral upper respiratory tract infections (URTIs). Although colds are nearly always self-limiting, some people go to their general practitioner (GP) for treatment, and increasingly there is concern about overprescribing of antibiotics when this happens as these do not improve outcome. Self-management or getting advice and support from a pharmacist are usually much better options. Many people choose to buy over-the-counter (OTC) medicines for symptomatic relief and this is to be encouraged. However, some of the ingredients of OTC cold remedies may interact with prescribed therapy, occasionally with serious consequences. Therefore, careful attention needs to be given to taking a medication history and selecting an appropriate product where indicated. Educating people on the self-limiting nature of symptoms is also important.

What you need to know

Age (approximate)
  Child, adult
Duration of symptoms
Runny/blocked nose
Summer cold
Sneezing/coughing
Generalised aches/headache
High temperature

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Sore throat
Earache
Facial pain/frontal headache
Flu
Asthma
Previous history
- Allergic rhinitis
- Bronchitis
- Heart disease
- Present medication

Significance of questions and answers

Age

Establishing who the patient is – child or adult – will influence the pharmacist's decision about the necessity of referral to the doctor and choice of treatment. Children are more susceptible to URTI than are adults and may get complications. Very young children and babies are also at increased risk of bronchiolitis, pneumonia and croup, and these conditions need to be considered. Older people, particularly if they are frail and have co-morbidities (e.g. diabetes), may be at risk of complications such as pneumonia.

Duration

Patients may describe a rapid onset of symptoms over hours or a gradual onset over a day or two; the former is said to be more commonly true of flu, the latter of the common cold. Such guidelines are general rather than definitive. The symptoms of the common cold usually last for 7–14 days. Some symptoms, such as a cough, may persist after the worst of the cold is over and coughing for 3 weeks is not unusual. This is often poorly recognised, so expectations of recovery may be unrealistic, and it is worth advising patients that this may happen.

Box 1.1 NICE Guideline: Respiratory tract infections (self-limiting)

The average total lengths of the illnesses are as follows:

- Acute otitis media: 4 days
- Acute sore throat/acute pharyngitis/acute tonsillitis: 1 week
- Common cold: $1\frac{1}{2}$ weeks
- Acute rhinosinusitis: $2\frac{1}{2}$ weeks
- Acute cough/acute bronchitis: 3 weeks

Source: NICE Clinical Guideline 69 (CG69) (July 2008).

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Symptoms

Runny/blocked nose

Most patients will experience a runny nose (rhinorrhoea). This is initially a clear watery fluid, which is then followed by the production of thicker and more tenacious, often coloured mucus. Nasal congestion occurs because of dilatation of blood vessels, leading to swelling of the lining surfaces of the nose and can cause discomfort. This swelling narrows the nasal passages that are further blocked by increased mucus production.

Summer colds

In summer colds, the main symptoms are nasal congestion, sneezing and irritant watery eyes; similar symptoms are commonly caused by allergic rhinitis (see Allergic rhinitis: Duration, later in this chapter).

Sneezing/coughing

Sneezing occurs because the nasal passages are irritated and congested. A cough may be present (see Cough: What you need to know, later in this chapter) either because the pharynx is irritated (producing a dry, tickly cough) or as a result of irritation of the bronchus caused by postnasal drip.

Aches and pains/headache

Headaches may be experienced because of inflammation and congestion of the nasal passages and sinuses. A fever may also cause headache. A persistent or worsening frontal headache (pain above or below the eyes) may be due to sinusitis (see below). People often report muscular and joint aches and this is more likely to occur with flu than with the common cold (see below).

High temperature

Those suffering from a cold often complain of feeling hot, but in general a high temperature (e.g. exceeding 38°C) will not be present. The presence of fever may be an indication that the patient has flu rather than a cold (see below).

Sore throat

The throat often feels dry and sore during a cold and may sometimes be the first sign that a cold is imminent. A sore throat can be a prominent feature in colds and flu, and it is often treated erroneously as a throat infection (see the separate section on sore throat later in this chapter).

Earache

Earache is a common complication of colds, especially in children. When nasal catarrh is present, the ear can feel blocked. This is due to blockage of the Eustachian tube, which is the tube connecting the middle ear to the back of the nasal cavity. Under normal circumstances, the middle ear is an air-containing compartment. However, if the Eustachian tube is blocked, the ear can no longer be cleared or air pressure equilibrated by swallowing and may feel uncomfortable and deaf. This situation often resolves spontaneously, but decongestants and inhalations can be helpful (see 'Management' below). Sometimes the situation worsens when the middle ear fills up with fluid and is under pressure. When this does occur, the ear becomes acutely painful and this is called acute otitis media (AOM). AOM is common in young children and usually the best treatment is pain relief. A secondary infection may follow, but even in the context of infection, the evidence for antibiotic use is conflicting with some trials showing benefit and others showing no benefit from taking antibiotics. Overall the evidence from clinical trials shows that without antibiotic treatment, symptoms will improve within 24 h in 60% of children and will settle spontaneously within 3 days in 80% of children. Antibiotics have also been shown to increase the risk of vomiting, diarrhoea and rash, and these risks can be greater than the potential for benefit. Antibiotics are most useful in children under 2 years of age with pain in both ears or with a painful ear with discharge from that ear (otorrhoea), so in these circumstances suggesting getting a fairly rapid doctor or nurse assessment is appropriate. Do not advise that antibiotics may be needed as this raises expectations that may not be met; it is better to say that examination is required.

In summary, a painful ear can initially be managed by the pharmacist. There is evidence that *paracetamol* and *ibuprofen* are effective treatments for AOM. However, if pain were to persist or be associated with an unwell child (e.g. high fever, very restless or listless, vomiting), then referral to the GP would be advisable.

Facial pain/frontal headache

Facial pain or frontal headache may signify sinusitis. The sinuses are air-containing spaces in the bony structures adjacent to the nose (maxillary sinuses) and above the eyes (frontal sinuses). During a cold, their lining surfaces become inflamed and swollen, producing catarrh. The secretions drain into the nasal cavity. If the drainage passage becomes blocked, fluid builds up in the sinus. This causes pain from pressure that is called acute sinusitis. It can become secondarily (bacterially) infected but this is rare. If this happens, more persistent pain arises in the sinus areas. The maxillary sinuses are most commonly involved. A recent systematic review indicated only a small benefit from antibiotics even in acute sinusitis that had lasted for longer than 7 days.

Antibiotics however may be recommended if the symptoms of sinusitis persist for more than 10 days or are severe with fever (>38°C), severe local pain,

discoloured or purulent nasal discharge or if a marked deterioration in sinusitis symptoms develops following a recent cold that had started to settle (so called 'double sickening'). These may be reasons to direct patients for further assessment. When these features are not present, treatment should be aimed at symptom relief. Options include *paracetamol* or *ibuprofen* to reduce pain; an intranasal decongestant (for a maximum of 1 week, in adults only) may help if nasal congestion is problematic. Oral decongestants, commonly found in combination products with an analgesic, are generally not recommended for sinusitis. A randomised controlled trial found that steam inhalations had little effect in sinusitis but that saline nasal irrigation improved symptoms, patients were more likely to feel they could manage the problem themselves and used less OTC medication. Pharmacists can recommend a short video showing patients how to use saline nasal irrigation that was used in the trial. Drinking adequate fluids and rest will generally help.

Flu

Differentiating between colds and flu may be needed to make a decision about whether referral is needed for patients in 'at-risk' groups who might need to be considered for antiviral treatment. Flu is generally considered to be likely if

- Temperature is 38 °C or higher (37.5 °C in the elderly).
- A minimum of one respiratory symptom – cough, sore throat, nasal congestion or rhinorrhoea – is present.
- A minimum of one constitutional symptom – headache, malaise, myalgia, sweats/chills, prostration – is present.

Infection with the influenza virus usually starts abruptly with sweats and chills, muscular aches and pains in the limbs, dry sore throat, cough and high temperature. Someone with flu may be bedbound and unable to go about usual activities, and this differentiates it from viruses causing cold. There is often a period of generalised weakness and malaise following the worst of the symptoms, and this may last a week or more. A dry cough may also persist for some time.

True influenza is relatively uncommon compared with the large number of flu-like infections that occur, but when it does occur, it can spread rapidly throughout a community (it is then said to be a 'flu epidemic'). Influenza is generally more unpleasant than a cold, although both usually settle with no need for referral.

Because of damage caused to the airways by the influenza virus, flu can be complicated by secondary lung infection (pneumonia or pneumonitis). Such complications are much more likely to occur in the very young, who have not yet developed resistance, the very old and frail, who may have impaired immunological responses, and those who have pre-existing heart disease or respiratory disease (asthma or chronic obstructive pulmonary disease [COPD]), where further damage is more critical. People with kidney disease, a weak

immune system or diabetes are also at greater risk of pneumonia. Warning that pneumonia complications are developing may be given by a severe or productive cough, persisting high fever, pleuritic-type chest pain (see Respiratory symptoms for direct referral, at the end of this chapter) or delirium. If this is suspected, people with such symptoms need urgent referral for further assessment.

Asthma

Asthmatic attacks can be triggered by respiratory viral infections. Most asthma sufferers learn to start or increase their usual medication to prevent such an occurrence. However, if these measures fail, referral is recommended.

Previous history

People with a history of COPD, also sometimes called chronic bronchitis or emphysema, may need referral. COPD should be considered in patients over the age of 35 who are or who have been long-term smokers and who have shortness of breath on exercise, persistent cough, regular sputum production and frequent winter 'bronchitis' or wheeze. Ideally all COPD patients should get an annual flu immunisation, although this will not protect against colds or all strains of flu virus. Such patients may be advised to see their doctor if they have a bad cold or flu-like infection, as it often causes an exacerbation of their COPD. The main signs to watch for are worsening cough, purulence of sputum and increasing shortness of breath. In this situation, the doctor is likely to increase the dose of inhaled anticholinergics and β_2-agonists and prescribe oral steroids and a course of antibiotics. Certain OTC medications are best avoided in those with heart disease, hypertension and diabetes (see section on Management: Decongestants, earlier in Colds and flu).

Present medication

The pharmacist must ascertain if any medicines are being taken by the patient. It is important to remember that interactions might occur with some of the constituents of commonly used OTC medicines.

If medication has already been tried for relief of cold symptoms with no improvement, and if the remedies tried were appropriate and used for a sufficient amount of time, referral for primary care assessment might occasionally be needed. In most cases of colds and flu, however, OTC treatment will be appropriate.

When to refer

Earache not settling with analgesic (see above)
In the very young

In the frail and old
In those with heart or lung disease, for example, COPD, kidney disease, diabetes, compromised immune system
With persisting fever and productive cough
With delirium
With pleuritic-type chest pain
Asthma

Colds and flu: Hygiene advice

When people seek help with symptoms of a cold or flu, it is also worth giving advice on how to prevent transmission of infection. Transmission of the common cold cannot be completely prevented, but basic good hygiene measures may help to prevent spread. These include washing hands frequently with soap and hot water when the person has symptoms of the common cold or comes into contact with someone who has symptoms, avoiding the sharing of towels, and, for children, discouraging the sharing of toys with an infected child.

Treatment timescale

Once the pharmacist has recommended treatment, patients should be advised to see their nurse or doctor in several weeks (see Box 1.1 earlier in Colds and flu) if the respiratory infection has not improved or earlier if there is a marked deterioration in symptoms. If they are unsure, they can check with the pharmacist first; sometimes all that is needed is further reassurance.

Management

The use of OTC medicines in the treatment of colds and flu is widespread, and such products are heavily advertised to the public. There is little doubt that appropriate symptomatic treatment can make the patient feel better; the placebo effect also plays an important part here. For some medicines used in the treatment of colds, particularly older medicines, there is little evidence available with which to judge effectiveness.

The pharmacist's role is to select appropriate treatment based on the patient's symptoms and available evidence, and taking into account the patient's preferences. Polypharmacy abounds in the area of cold treatments and patients should not be overtreated. The discussion of medicines that follows is based on individual constituents; the pharmacist can decide whether a combination of two or more drugs is needed.

The UK Commission on Human Medicines (CHM) made recommendations in 2009 about the safer use of cough and cold medicines for children under 12 years of age. As a result, the UK Medicines and Healthcare products and

Regulatory Agency (MHRA) advised that the following OTC cough and cold remedies should no longer be sold for children under 6 years:

- Antitussives: Dextromethorphan and pholcodine
- Expectorants: Guaifenesin and ipecacuanha
- Nasal decongestants: Ephedrine, oxymetazoline, phenylephrine, pseudoephedrine and xylometazoline
- Antihistamines: Brompheniramine, chlorphenamine, diphenhydramine, doxylamine, promethazine and triprolidine

Children aged between 6 and 12 years can still use these preparations, but with an advice to limit treatment to 5 days or less. The MHRA rationale was that for children aged over 6 years,

> *the risk from these ingredients is reduced because: they suffer from cough and cold less frequently and consequently require medicines less often; with increased age and size, they tolerate the medicines better; and they can say if the medicine is working.*

Simple cough remedies (such as those containing glycerine, honey or lemon) are still licensed for use in children. Alternatively, for children over the age of 1 year, a warm drink of honey and lemon could be given.

Remember that all aspirin-containing products are contraindicated in all children under the age of 16. This includes oral salicylate gels.

Decongestants

Sympathomimetics

Sympathomimetics (e.g. *pseudoephedrine*) can be effective in reducing the symptoms of nasal congestion. Nasal decongestants work by constricting the dilated blood vessels in the nasal mucosa. The nasal membranes are effectively shrunk, so drainage of mucus and circulation of air is improved, and the feeling of nasal stuffiness is relieved. These medicines can be given orally or applied topically. Tablets and syrups are available, as are nasal sprays and drops.

If nasal sprays/drops are to be recommended, the pharmacist should advise the patient not to use the product for longer than 7 days. Rebound congestion (rhinitis medicamentosa) can occur with topically applied, but not oral sympathomimetics. The decongestant effects of topical products containing *oxymetazoline* or *xylometazoline* are longer lasting (up to 6 h) than those of some other preparations such as *ephedrine*. The pharmacist can give useful advice about the correct way to administer nasal drops and sprays. The MHRA advises that these decongestants can be used in children between the ages of 6 and 12 years, but should not be used in children under the age of 6.

A combination topical product containing *xylometazoline* and *ipratropium* in a nasal spray is also available through pharmacy sales (P) for the symptomatic treatment of nasal congestion and rhinorrhoea (runny nose) in connection with common colds, in adults aged 18 years and above. Use should not exceed 7 days. *Ipratropium* is an anticholinergic drug that helps to reduce mucus secretion.

Problems

Ephedrine and pseudoephedrine, when taken orally, have the theoretical potential to keep patients awake because of their stimulating effects on the central nervous system (CNS). In general, *ephedrine* is more likely to produce this effect than *pseudoephedrine*. A systematic review found that the risk of insomnia with *pseudoephedrine* was small compared with placebo.

Sympathomimetics can cause stimulation of the heart and an increase in blood pressure and may affect diabetic control because they can increase blood glucose levels. They should be used with caution (as per current *British National Formulary* (*BNF*) warnings) in people with diabetes, those with heart disease or hypertension and those with hyperthyroidism. The hearts of hyperthyroid patients are more vulnerable to irregularity, so stimulation of the heart is particularly undesirable.

Sympathomimetics are most likely to cause these unwanted effects when taken by mouth and are unlikely to do so when used topically. Nasal drops and sprays containing sympathomimetics can therefore be recommended for those patients in whom the oral drugs are less suitable. Saline nasal drops, things like menthol inhalations, or sitting in a steamy room (e.g. in a bathroom with a running shower) would be other possible choices for patients in this group.

The interaction between sympathomimetics and monoamine oxidase inhibitors (MAOIs) is potentially extremely serious (although MAOIs are rarely prescribed these days); a hypertensive crisis can be induced and several deaths have occurred in such cases. This interaction can occur up to 2 weeks after a patient has stopped taking the MAOI, so the pharmacist must establish any recently discontinued medication. There is a possibility that topically applied sympathomimetics could induce such a reaction in a patient taking an MAOI. It is therefore advisable to avoid both oral and topical sympathomimetics in patients taking MAOIs.

Cautions

Diabetes
Heart disease
Hypertension
Hyperthyroidism

Interactions: Avoid in those taking

MAOIs (e.g. *phenelzine*)
Reversible inhibitors of monoamine oxidase A (e.g. *moclobemide*)

Beta-blockers
Tricyclic antidepressants (e.g. *amitriptyline*) – a theoretical interaction that appears not to be a problem in practice

Restrictions on sales of pseudoephedrine and ephedrine

In response to concerns about the possible extraction of *pseudoephedrine* and *ephedrine* from OTC products for use in the manufacture of methylamphetamine (crystal meth), restrictions were introduced in 2007. The medicines are available only in small pack sizes, with a limit of one pack per customer, and their sale has to be made by a pharmacist or by suitably trained pharmacy staff under the supervision of a pharmacist. When the MHRA reviewed these arrangements in 2015, they concluded that these measures had made an important contribution to managing the risk of misuse of pseudoephedrine and ephedrine in the United Kingdom.

Antihistamines (see also Allergic rhinitis (hay fever): Management, later in this chapter)

Antihistamines could theoretically reduce some of the symptoms of a cold: runny nose (rhinorrhoea) and sneezing. These effects are due to the anticholinergic action of antihistamines. The older drugs (e.g. *chlorphenamine* (*chlorpheniramine*), *promethazine*) have more pronounced anticholinergic actions than the non-sedating antihistamines (e.g. *loratadine, cetirizine, acrivastine*). Therefore the non-sedating antihistamines are less effective in reducing symptoms of a cold. Antihistamines are not so effective at reducing nasal congestion. Some (e.g. *diphenhydramine*) may also be included in cold remedies for their supposed antitussive action (see Cough: Management: Cough remedies – Other constituents, later in this chapter) or to help the patient to sleep (included in combination products intended to be taken at night). Evidence indicates that antihistamines alone are not of benefit in the common cold but that they may offer limited benefit for adults in combination with decongestants, analgesics and cough suppressants.

Interactions: The problem of using antihistamines, particularly the older types (e.g. *chlorphenamine*), is that they can cause drowsiness. Alcohol will increase this effect, as will drugs such as *benzodiazepines* or *phenothiazines* that have the ability to cause drowsiness or CNS depression. Antihistamines with known sedative effects should not be recommended for anyone who is driving, or in whom an impaired level of consciousness may be dangerous (e.g. operators of machinery at work).

Because of their anticholinergic activity, the older antihistamines may produce the same adverse effects as anticholinergic drugs (i.e. dry mouth, blurred vision, constipation and urinary retention). These effects are more likely if antihistamines are given concurrently with anticholinergics such as *hyoscine* or with drugs that have anticholinergic actions such as tricyclic antidepressants or bladder antispasmodics (e.g. *oxybutynin*). Anticholinergic adverse effects

are also more likely to be problematic if antihistamines are taken by people using some inhaled drugs containing anticholinergics used for COPD, such as *ipratropium* or *tiotropium*. In older and frail people, the combined effects of several drugs with anticholinergic properties can be particularly troublesome (often referred to as "anticholinergic load") and also aggravate confusion or memory problems.

Antihistamines should be avoided in patients with a history of angle-closure glaucoma (usually this will have presented acutely) or prostatic symptoms because of possible anticholinergic side effects. In patients with angle-closure glaucoma, they may cause increased intraocular pressure. Anticholinergic drugs can occasionally precipitate acute urinary retention in predisposed patients, for example, men with prostatic problems (lower urinary tract symptoms (LUTS)) where bladder outlet obstruction causes poor urinary flow.

While the probability of such serious adverse effects is low, the pharmacist should be aware of the potential for possible adverse effects from OTC medicines.

At high doses, antihistamines can produce stimulation rather than depression of the CNS. There have been occasional reports of fits being induced at very high doses of antihistamines, and it is for this reason that it has been argued that they should be avoided in epileptic patients. However, this appears to be a theoretical rather than a practical problem.

Interactions

- Alcohol
- Hypnotics
- Sedatives
- Betahistine
- Anticholinergics

Side effects

- Drowsiness (driving, occupational hazard)
- Constipation
- Blurred vision
- Urinary symptoms
- Confusion

Cautions

- Closed-angle glaucoma
- LUTS in men
- Epilepsy
- Liver disease

Zinc

Two systematic reviews have found limited evidence that *zinc gluconate* or *acetate lozenges* may reduce continuing symptoms at 7 days compared

with placebo. It is therefore generally not recommended that people take zinc supplements for colds.

Echinacea

A systematic review of trials indicated that some echinacea preparations may be better than placebo or no treatment for the prevention and treatment of colds. However, due to variations in preparations containing echinacea, there is insufficient evidence to recommend a specific product. Echinacea has been reported to cause allergic reactions and rash.

Vitamin C

A systematic review found that high-dose vitamin C (over 1 g/day) taken prophylactically could reduce the duration of colds by a slight amount (about 8%). Although it is relatively cheap and safe, general advice is that there is not much to be gained from taking extra vitamin C for colds.

Cough remedies

For discussion of products for the treatment of cough, see the section on cough later in this chapter.

Analgesics

For details of analgesics, their uses and side effects, see Chapter 4 Painful Conditions: Management.

Products for sore throats

For discussion of products for the treatment of sore throat, see the separate section later in this chapter.

Practical points

Inhalations

Breathing in warm moist air generated by steam (with or without the addition of aromatic oils) has traditionally been used to reduce nasal congestion and soothe the air passages. The BNF warns against using boiling water because of the risk of burns. Inhalants for use on handkerchiefs, bedclothes and pillowcases are available. These usually contain aromatic ingredients such as eucalyptus or menthol. There has been a move away from recommending steam inhalations for children because of the risk of scalding, and aromatic inhalants should not be used in those 3 months or younger.

Nasal sprays or drops?

Nasal sprays are preferable for adults and children over 6 years old because the small droplets in the spray mist reach a large surface area. Drops are more easily swallowed, which increases the possibility of systemic effects.

For children under 6 years old, drops are preferred because in young children the nostrils are not sufficiently wide to allow the effective use of sprays. Paediatric versions of nasal drops should be used where appropriate. Nasal saline drops or sprays may help to reduce nasal congestion in babies and young children.

Prevention of colds and flu

Pharmacists should encourage those in at-risk groups to have an annual flu vaccination. In the United Kingdom, the health service now provides vaccinations to all patients over 65 years and those below that age who have chronic respiratory disease (including asthma), chronic heart disease, chronic renal failure, chronic neurological disease, and diabetes mellitus or immunosuppression due to disease or treatment. Pregnant women and people living in long-stay residential care are also advised to have immunisation. Recommendations are updated every year so it is important to be aware of any changes to these 'campaigns'. Community pharmacists are in a good position to use their patient medication records (PMRs) to target patients each autumn and remind them to have their vaccination. Over half of community pharmacies in England are now commissioned by the health service to provide flu vaccinations.

It is useful to be aware that flu nasal spray vaccination is also now offered routinely on the NHS annually to children aged 2, 3 and 4 years plus children in school years 1, 2 and 3. Children aged 2–17 years at a particular risk of flu (such as those with diabetes) are also eligible.

Increasing attention is being paid to ways of reducing transmission of flu, and this also applies to colds. Routine handwashing with soap and water for at least 20 seconds reduces the transmission of cold and flu viruses. Hand sanitisers have become widely used because immediate access to soap and water may be difficult in many everyday settings. Transfer of the cold or flu virus usually occurs directly from person to person when an infected individual coughs or sneezes. Droplets of respiratory secretions come into contact with the mucous membranes of the mouth and nose of another person. People should use tissues to cover their mouth and nose when coughing or sneezing and should put used tissues in a bin as soon as possible.

Ethanol-based hand sanitisers are widely used in healthcare settings and can contribute to reducing transmission of colds and flu. The influenza virus is susceptible to alcohol in formulations of 60–95% ethanol. The rationale is that the virus in droplets can survive for 24–48 h on hard, non-porous surfaces; for 8–12 h on cloth, paper and tissue; and for 5 min on hands. Touching contaminated hands, surfaces and objects can therefore transfer the virus.

Avoiding the sharing of towels is also to be recommended, and for children, discouraging the sharing of toys with an infected child is sensible advice.

A nasal spray containing a viscous gel is marketed as a medical device with claims that it prevents progression of the first signs of a cold into a full-blown infection. It is used four times a day from the time symptoms are experienced. The theoretical basis for its action is that the gel is slightly acidic (whereas viruses are said to prefer an alkaline environment) and that its viscous nature traps the viruses. There are no published trials of effectiveness.

Flu pandemic

An influenza pandemic is an epidemic of an influenza virus that spreads on a worldwide scale and infects a large proportion of the world population. There were three flu pandemics in the last century, occurring in 1918, 1957 and 1968. There was also a worldwide pandemic in 2009 with a large number of cases in the United Kingdom. Concerns about potential pandemics have arisen because of the emerging strains of influenza from animals or birds (zoonoses). In 1997, an avian H5N1 strain of influenza emerged, which has a high mortality rate. Although the virus is highly virulent, it does not spread easily between humans. Nearly all, if not all, cases have been spread from contact between humans and infected birds. The concern is that the virus may mutate, making transmission between humans more likely. As there is no natural immunity to this virus, a pandemic could follow, and if the virulence remained unchanged, then it could be extremely deadly. It is not possible to predict how likely this scenario is.

The Department of Health has issued various publications detailing the evidence base for dealing with pandemic flu for the United Kingdom as a whole, specifically making recommendations on vaccination and use of antivirals, antibiotics and face masks. See https://www.gov.uk/guidance/pandemic-flu

Antivirals and seasonal flu

Three antiviral products are licensed for use in seasonal flu in the United Kingdom: oseltamivir, zanamivir and amantadine. The National Institute for Health and Care Excellence (NICE) supports the use of neuraminidase inhibitors for those who are in at-risk groups in seasonal flu outbreaks if treatment is started within 36 h (for zanamivir) or within 48 h (for oseltamivir). They can also be used to prevent transmission of flu (prophylaxis) under some circumstances. Advice to use these is triggered if the incidence of flu hits a specific threshold. The incidence is monitored by a national surveillance scheme. Amantadine is generally not recommended because of its lower efficacy, its adverse effects and because rapid resistance can develop to its use.

The effectiveness of antivirals during a pandemic cannot be known until used in such a situation and can only be guessed at based on experience in seasonal influenza and in those infected with animal strains of flu. It is believed that they

are likely to reduce the chance of developing complications and the chance of dying and shorten the time taken to recover from an infection. It is possible that using antivirals for the non-infected members of a household when another member has the infection could reduce the spread of the pandemic. There is uncertainty as to how much resistance to antivirals could be present in a pandemic virus.

Surgical face masks

Some people may wish to buy surgical face masks at the pharmacy. The Department of Health and WHO have looked at the evidence concerning the use of surgical face masks in a flu pandemic. Their recommendations are that the general public can use them but are not encouraged to do so. There is insufficient evidence to support their use. They are, however, recommended in healthcare settings, and they may be of value in infected households both for the symptomatic person and non-infected members and carers and for symptomatic people outside the home. There is concern that the masks may not be used safely, (i.e. they may be worn too long and get too wet and therefore become ineffective), be worn at times around the neck, not disposed of correctly, and there may be a failure to wash hands after touching the mask. There is also concern that symptomatic people wearing masks continue to meet with people outside the home when it would be best to be isolated at home.

Antibiotics

A serious complication of flu is the development of pneumonia, and this can be either directly due to the flu virus or due to a secondary bacterial infection. In the case of a viral pneumonia or 'pneumonitis', antibiotics are of little value although clinically it is difficult to tell the difference, and antibiotics are usually given in a hospital setting with a severe illness. Avian flu outbreaks have been mainly complicated by viral pneumonia.

Most uncomplicated influenza infections in the community do not require antibiotics. They may be considered in those at risk, such as people who have pre-existing COPD, compromised immunity, diabetes or heart or lung disease. In these situations, if there is no improvement within 48 h of starting antibiotics, then the person should be reviewed by the GP (or the out-of-hours service, e.g. at the weekend).

Typical flu chest symptoms include cough, retrosternal discomfort, wheeze and phlegm (symptoms of acute bronchitis) and by themselves do not require antibiotics in a person who is not at risk. However, if these symptoms worsen with a persistent or recrudescent (recurring) fever, pleuritic-type chest pain or breathlessness, then pneumonia might be developing. In this situation, review by a doctor or nurse would be essential and either treatment with antibiotics in the community or hospital admission could follow.

Colds and flu in practice

Case 1

Mrs Allen, a regular customer in her late 60s, asks what you can recommend for her husband. He has a very bad cold; the worst symptoms are his blocked nose and sore throat. Although his throat feels sore, she tells you there is only a slight reddening (she looked this morning). He has had the symptoms since last night and is not feverish. He does not have earache but has complained of a headache. When you ask her if he is taking any medicines, she says yes, quite a few for his heart. She cannot remember what they are called. You check the PMR and find that he is taking *aspirin* 75 mg daily, *ramipril* 5 mg daily, *bisoprolol* 10 mg daily and *atorvastatin* 20 mg daily. Mrs Allen asks you if it is worth her husband taking extra vitamin C as she has heard this is good for colds. She wondered if this might be better than taking yet more medicines.

The pharmacist's view

The patient's symptoms indicate a cold rather than flu. He is concerned most with his congested nose and sore throat. He is taking a number of medications, which indicate that oral sympathomimetics would be best avoided. You could recommend that he take regular simple painkillers for his sore throat and a topical decongestant or an inhalation to clear his blocked nose. The symptoms may take about 1 week before they start to clear. You offer these alternatives to Mrs Allen to see what she thinks her husband might prefer. You explain that taking vitamin C may slightly reduce the length and severity of colds, although this is not a large effect, but that it won't do much harm. You show her some vitamin C products and tell her their cost. You also ask if Mr Allen has had a flu jab as he is in an 'at-risk' group.

The doctor's view

The advice given by the pharmacist is sensible. A simple analgesic such as *paracetamol* could help both the headache and sore throat. The development of sinusitis at such an early stage in an infection would be unlikely, but it would be wise to enquire whether his colds are usually uncomplicated and to ascertain the site of his headache. Although a lot of people believe in the benefits of vitamin C, it probably makes little difference.

The patient's view

I came to the pharmacist because we didn't want to bother the doctor. The pharmacist asked me about which symptoms were causing Pete (my husband) the biggest problem and he gave me a choice of what to use. I wanted to know what he thought about vitamin C and he told me about how it might make

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the cold shorter. In the end though, I decided not to bother with it because it would have been quite expensive with the other medicines as well, especially as it was unlikely to help much. I thought I would give him some fresh orange juice instead. I decided to give him regular *paracetamol*, which I was advised is OK alongside his low-dose aspirin.

Case 2

A man comes into the pharmacy just after Christmas asking for some cough medicine for his wife. He says that the medicine needs to be sugar-free as his wife has diabetes. On listening to him further, he says she has had a dreadful cough that keeps her awake at night. Her problem came on 5 days ago when she woke in the morning, complaining of being very achy all over and then became shivery and developed a high temperature and cough by the evening. Since then her temperature has gone up and down and she has not been well enough to get out of bed for very long. She takes *glipizide* and *metformin* for her diabetes, and he has been checking her glucose readings, which have all been between 8 and 11 mmol/l – a little higher than usual. The only other treatment she is taking is *atorvastatin;* she is not on any antihypertensives. He tells you that she will be 70 next year.

The pharmacist's view

The history indicates flu. It would be best for this woman to be seen by a GP. She has been ill for 5 days and has been mostly bedbound during this time. There are several features that suggest she might be at a higher risk of complications from flu. I would suggest that her husband asks for someone at the surgery to come out to see her, as she does not sound well enough to go to the surgery. Sometimes people are reluctant to call the surgery as they feel they might be 'bothering' the doctor unnecessarily. The pharmacist's support is often helpful.

The doctor's view

The infection is likely to be flu. She is in the higher-risk group for developing complications (age and diabetes), so it would be reasonable to advise referral. Most cases of flu usually resolve within 7 days. The complications can include AOM, bacterial sinusitis, bacterial pneumonia and, less commonly, viral pneumonia and respiratory failure.

In this situation, a doctor or nurse would want to check her chest for signs of a secondary infection. A persisting or worsening fever would point to a complication developing. There would be little point in prescribing an antiviral, for example, *zanamivir,* as it is only effective if started within 2–3 days of symptom onset. One review has found it to be effective in reducing the duration of flu symptoms by about 1 day if started soon enough. It would also be advisable to

check whether or not her husband had had the flu vaccine. The incubation time for flu is 1–4 days, and adults are contagious from the day before symptoms start until 5 days after the onset of symptoms; however, the husband would almost certainly have caught the infection by now, if susceptible.

Cough

Coughing is a protective reflex action caused when the airway is being irritated or obstructed. Its purpose is to clear the airway so that breathing can continue normally. The majority of coughs presenting in the pharmacy will be caused by a viral respiratory tract infection. They will often be associated with other symptoms of a cold. The evidence to support the use of cough suppressants and expectorants is not strong, but some patients report finding them helpful.

What you need to know

Age (approximate)
- Baby, child, adult

Duration

Nature
- Dry or productive

Associated symptoms
- Cold, sore throat and fever
- Sputum production
- Chest pain
- Shortness of breath
- Wheeze

Previous history
- COPD (chronic bronchitis, emphysema, chronic obstructive airways disease)
- Asthma
- Diabetes
- Heart disease
- Gastro-oesophageal reflux (indigestion, dyspepsia)
- Smoking habit

Present medication

Significance of questions and answers

Age

Establishing who the patient is – child or adult – will influence the choice of treatment and whether referral is necessary.

Duration

Most coughs are self-limiting and will get better with or without treatment. Cough can often go on for 3 weeks or more after a bad cold but usually slowly subsides over this time (see Box 1.1 earlier in this chapter in Colds and flu: Significance of questions and answers). It is useful to explain this to people as the long duration of cough symptoms is often not realised. Acute bronchitis is the term often used to describe more severe cases arising from a viral infection leading to cough and phlegm production. Even in acute bronchitis, antibiotics are not needed in people who are otherwise well. In general, a cough of longer than 2-3 weeks' duration that has showed no improvement, or is getting worse, should be referred to the GP surgery for further investigation. This is particularly so if accompanied by feelings of tiredness, malaise or fever.

Patients are often concerned when a cough has lasted for, what seems to them, a long time. They may be worried that because the cough has not resolved, it may have a serious cause.

Nature of cough

Unproductive (dry, tickly or tight)

In an unproductive cough, no sputum is produced. These coughs are usually caused by viral infection that temporarily damages and irritates the airway and are self-limiting.

Productive (chesty or loose)

Sputum is normally produced by the body and it is an oversecretion that leads to coughing. Oversecretion may be caused by irritation of the airways due to infection, allergy, etc., or when the cilia are not working properly (e.g. in smokers). Non-coloured (clear or whitish) sputum is uninfected and known as mucoid. Green sputum is not uncommon in asthma and is thought to be due to eosinophils.

Coloured sputum is common and in most cases does not signify the need for antibiotic therapy. Clinical trials in relatively healthy people with acute bronchitis indicate that antibiotics do not help overall and the colour does not predict a better response to antibiotic treatment. It may be more useful as a sign in people who have other lung complications. In people with COPD, an exacerbation of their condition with more purulent sputum (e.g. a change in colour to green or yellow) may be a sign that antibiotics are indicated. Sometimes blood may be present in the sputum (haemoptysis), with a colour ranging from pink to deep red. Blood may be an indication of a relatively minor problem such as a burst capillary following a bout of violent coughing during an acute infection but may be a warning of more serious problems. Haemoptysis is an indication for referral.

As stated, antibacterials/antibiotics are not usually indicated for previously healthy people with acute bronchitis, even if their sputum is coloured. Most

cases of acute bronchitis are caused by viral infections, so antibacterials will not help. A Cochrane systematic review of antibacterials for acute bronchitis found no benefit or only slight benefit, at the most reducing the duration of illness by about half a day. Some people who have a tendency towards asthma develop wheeziness with a respiratory viral infection. They may benefit from inhalation treatment used in asthma, or possibly a short course of oral corticosteroids. Wheeziness as a symptom usually needs referral; however, people with asthma who get increased wheeziness with a cold often know how to self-manage by increasing their inhaler treatment and the use of 'rescue therapy'.

If a person has had repeated episodes of bronchitis over the years, they might have developed COPD (defined as a chronic cough, sputum, shortness of breath on exertion, wheeze, usually with a history of long-term smoking when other causes of chronic cough have been excluded). So careful questioning is important to determine this.

It is useful to be aware of those people where there may be a reason to consider antibiotics and refer accordingly. It is better to advise that further assessment is needed, rather than say an antibiotic is indicated, which may raise expectations inappropriately. A NICE guideline says that antibacterials should be considered if the person

- Is systemically very unwell
- Is at high risk of serious complications because of a pre-existing co-morbid condition such as heart, lung, kidney, liver or neuromuscular disease, or immunosuppression
- Is older than 65 years of age with two or more of the following, or older than 80 years with one or more of the following:
  - Hospital admission in the previous year
  - Type 1 or type 2 diabetes mellitus
  - Known congestive heart failure
  - Use of oral corticosteroids

As with asthma, there may be some patients who get frequent exacerbations of COPD who have been provided with 'rescue therapy'.

In heart failure and mitral stenosis, the sputum is sometimes described as pink and frothy or can be bright red. Confirming symptoms would be breathlessness (especially in bed during the night) and swollen ankles.

Tuberculosis

Until recently thought of as a disease of the past, the number of tuberculosis (TB) cases has been rising in the United Kingdom and there is increasing concern about resistant strains. Chronic cough with haemoptysis associated with chronic fever and night sweats is a classical symptom. TB is largely a disease of poverty and more likely to present in disadvantaged communities and in people who are malnourished. In the United Kingdom, most cases of respiratory TB are seen in ethnic minority groups, especially Indians and

Africans and in immigrants from other countries with high rates of TB. Human immunodeficiency virus (HIV) infection is a significant risk factor for the development of respiratory TB.

Prolonged cough and lung cancer

Current advice is that if a cough lasts more than 3 weeks, the patient should be assessed by a clinician to consider the possibility of other lung diseases, particularly cancer. This is particularly important in people who are smokers.

Croup (acute laryngotracheitis)

Croup usually occurs in infants. The cough has a harsh barking quality. It develops 1 day or so after the onset of cold-like symptoms. It is often associated with difficulty in breathing and an inspiratory stridor (noise in throat on breathing in). Referral, particularly if the child has breathing problems, or is distressed so that it affects eating, drinking, or play, is usually necessary.

Whooping cough (pertussis)

Despite immunisation programmes, whooping cough is still seen in the United Kingdom. Whooping cough starts with catarrhal symptoms. The characteristic whoop is not present in the early stages of infection. The whoop is the sound produced when breathing in after a paroxysm of coughing. The bouts of coughing prevent normal breathing and the whoop represents the desperate attempt to get a breath. If suspected, referral is necessary.

Associated symptoms

Cold, sore throat and catarrh may be associated with a cough. Often there may be an elevated temperature and generalised muscular aches present. This would be in keeping with a viral infection and be self-limiting. Chest pain, shortness of breath and wheezing are all indications for referral (see Respiratory symptoms for direct referral, at the end of this chapter).

Postnasal drip

Postnasal drip is a common cause of coughing and may be due to sinusitis (see Colds and flu: Symptoms: Facial pain/Frontal headache, earlier in this chapter).

Previous history

Certain cough remedies are best avoided in people with diabetes and anyone with heart disease or hypertension (see Cough: Management: Cough remedies – Other constituents, later in this section).

COPD ('chronic bronchitis' or emphysema)

Questioning may reveal a history of COPD, which is being treated by the doctor with antibiotics. In this situation, further symptom relief may be possible with an appropriate cough medicine.

Asthma

A recurrent night-time cough can indicate asthma, especially in children, and should be referred. Asthma may sometimes present as a chronic cough without wheezing, usually worse first thing in the morning. A family history of eczema, hay fever and asthma is worth asking about. Patients with such a family history appear to be more prone to extended episodes of coughing following a simple respiratory tract infection.

Cardiovascular

Coughing can be a symptom of heart failure (see Respiratory symptoms for direct referral: Cardiac causes, at the end of this chapter). If there is a history of heart disease, especially with a persisting cough, then referral is advisable.

Gastro-oesophageal

Gastro-oesophageal reflux can cause coughing. Sometimes such reflux is asymptomatic apart from coughing. Some patients are aware of acid coming up into their throat at night when they are in bed. It may also be suggested by cough that is worse during or after eating, with talking and with bending.

Smoking habit

Smoking will exacerbate a cough and can cause coughing since it is irritating to the lungs. One in three long-term smokers develops a chronic cough. The cough is usually worse in the mornings. If coughing is recurrent and persistent, the pharmacist is in a good position to offer health education advice about the benefits of stopping smoking, suggesting nicotine replacement therapy when appropriate. However, on stopping, the cough may initially become worse as the cleaning action of the cilia is re-established during the first few days, and it is worth mentioning this. Smokers may assume their cough is harmless, and it is always important to ask about any change in the nature of the cough that might suggest a serious cause, particularly as they are at high risk of COPD and lung cancer (see also 'Smoking cessation' in the chapter on 'Prevention of heart disease').

Present medication

It is always essential to establish which medicines are currently being taken. This includes those prescribed by a doctor and any bought OTC, borrowed from a friend or neighbour or rediscovered in the family medicine chest. It is important to remember the possibility of interactions with cough medicine. This may also be an issue with some herbal remedies.

It is also useful to know which cough medicines have been tried already. The pharmacist may decide that an inappropriate preparation has been taken, for example, a cough suppressant for a productive cough. If one or more remedies have been tried for an appropriate length of time without success, then referral may be advisable.

Angiotensin-converting enzyme inhibitors

Chronic coughing may occur in patients, particularly women, taking angiotensin-converting enzyme (ACE) inhibitors such as *enalapril, captopril, lisinopril* and *ramipril*. Patients may develop the cough within days of starting treatment or after a period of a few weeks or even months. The exact incidence of the reaction is not known and estimates vary from 2 to 10% of patients taking ACE inhibitors. ACE inhibitors control the breakdown of bradykinin and other kinins in the lungs, which can trigger a cough. Typically, the cough is irritating, non-productive and persistent. Any ACE inhibitor may induce coughing and there seems to be little advantage to be gained in changing from one to another. The cough may resolve or may persist; in some patients, the cough is so troublesome and distressing that ACE inhibitor therapy may have to be discontinued. Any patients in whom medication is suspected as the cause of a cough, should be referred to the prescriber. Angiotensin-2 receptor antagonists, which have similar properties to ACE inhibitors and which do not affect bradykinin, can be used as an alternative preparation if cough is a problem.

When to refer

Cough lasting 2–3 weeks or more and not improving
Cough associated with significant fever, malaise or feeling unwell
Distressing cough in frail, older people
Concern about co-morbidity such as diabetes or heart disease
Sputum (purulent sputum in COPD, rusty or bloodstained)
Chest pain
Shortness of breath
Wheezing
Whooping cough or croup
Recurrent nocturnal cough
Suspected adverse drug reaction
Failed medication

After a series of questions, the pharmacist should be in a position to decide whether treatment or referral is the best option.

Treatment timescale

Depending on the length of time the patient has had the cough and once the pharmacist has recommended an appropriate treatment, patients should see

their doctor 2–3 weeks after the cough started if it has not improved or sooner if it is getting worse.

Management

Pharmacists are well aware of the debate about the clinical efficacy of the cough remedies available OTC. A systematic review concluded that 'there is no good evidence for or against the effectiveness of OTC medicines in acute cough'. However, many people who visit the pharmacy for advice do so because they want some relief from their symptoms, and, while the clinical effectiveness of cough remedies is debatable, they can have a useful placebo effect.

The choice of treatment depends on the type of cough. Suppressants (e.g. *pholcodine*) are used to treat unproductive coughs, while expectorants such as *guaifenesin* (*guaiphenesin*) are used in the treatment of productive coughs. The pharmacist should check that the preparation contains an appropriate dose, since some products contain sub-therapeutic amounts. Demulcents like *simple linctus* that soothe the throat are particularly useful in children and pregnant women as they contain no active ingredients.

The *BNF* gives the following guidance:

Suppressants. When there is no identifiable cause, cough suppressants may be useful, for example, if sleep is disturbed. They may cause sputum retention and this may be harmful in patients with chronic bronchitis and bronchiectasis.

Demulcent cough preparations contain soothing substances such as syrup or glycerol and some patients believe that such preparations relieve a dry irritating cough. Preparations such as simple linctus have the advantage of being harmless and inexpensive; paediatric simple linctus is particularly useful in children.

Expectorants are claimed to promote expulsion of bronchial secretions, but there is no evidence that any drug can specifically facilitate expectoration.

Compound preparations are on sale to the public for the treatment of cough and colds but should not be used in children under 6 years old; the rationale for some is dubious. Care should be taken to give the correct dose and to not use more than one preparation at a time.

There is no logic in using expectorants (which promote coughing) and suppressants (which reduce coughing) together as they have opposing effects. Therefore, products that contain both are not therapeutically sound. The UK CHM made recommendations in 2009 about safer use of cough and cold medicines for children aged under 12 years (see Colds and flu: Management, earlier in this chapter).

Cough suppressants

Controlled trials have not confirmed any significant effect of cough suppressants over placebo on symptom reduction.

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Codeine/pholcodine

Pholcodine has several advantages over *codeine* in that it produces fewer side effects (even at OTC doses, *codeine* can cause constipation and, at high doses, respiratory depression) and *pholcodine* is less liable to be misused. Both *pholcodine* and *codeine* can induce drowsiness, although in practice this does not appear to be a problem. Nevertheless, it is sensible to give an appropriate warning. *Codeine* is well known as a drug, which is misused, and many pharmacists choose not to recommend it. Sales often have to be refused because of knowledge or likelihood of misuse. The MHRA/CHM advises that codeine-containing cough suppressants should not be used for children under 18 years old. *Pholcodine* can be given at a dose of 5 mg to children over 6 years old (5 mg of *pholcodine* is contained in 5 ml of *Pholcodine Linctus BP*). Adults may take doses of up to 15 mg three or four times daily. The drug has a long half-life and may be more appropriately given as a twice-daily dose.

Dextromethorphan

Dextromethorphan is less potent than *pholcodine* and *codeine*. It is generally non-sedating and has few side effects. Occasionally, drowsiness has been reported but, as for *pholcodine,* this does not seem to be a problem in practice. *Dextromethorphan* can be given to children of age 6 years and over. *Dextromethorphan* was generally thought to have a low potential for misuse. However, there have been rare reports of mania following misuse and consumption of very large quantities, and pharmacists should be aware of this possibility if regular purchases are made.

Demulcents

Preparations such as *glycerine, lemon* and *honey* or *simple linctus* are popular remedies and are useful for their soothing effect. They do not contain any active ingredient and are considered to be safe in children and pregnant women. They are now the treatment recommended for children under 6 years old.

Expectorants

Two mechanisms have been proposed for expectorants. They may act directly by stimulating bronchial mucus secretion, leading to increased liquefying of sputum, making it easier to cough up. Alternatively, they may act indirectly via irritation of the gastrointestinal tract, which has a subsequent action on the respiratory system, resulting in increased mucus secretion. This latter theory has less convincing evidence than the former to support it.

Guaifenesin (guaiphenesin)

Guaifenesin is commonly found in cough remedies. In adults, the dose required to produce expectoration is 100–200 mg, so in order to have a theoretical chance of effectiveness, any product recommended should contain a sufficiently

high dose. Some OTC preparations contain sub-therapeutic doses. In the United States, *guaifenesin* is the only FDA-approved expectorant.

Cough remedies: Other constituents

Antihistamines

Examples used in OTC products include *diphenhydramine* and *promethazine*. Theoretically, these reduce the frequency of coughing and have a drying effect on secretions, but in practice they also induce drowsiness. Combinations of antihistamines with expectorants are illogical and best avoided. A combination of an antihistamine and a cough suppressant may be useful in that antihistamines can help to dry up secretions through their anticholinergic side effects, and the combination can be given as a night-time dose if the cough is disturbing sleep. This is one of the rare occasions when a side effect may prove useful. The non-sedating antihistamines are less effective in symptomatic treatment of coughs and colds.

Interactions: Traditional antihistamines should not be used by patients who are taking *phenothiazines* and tricyclic antidepressants because of additive anticholinergic and sedative effects. Increased sedation will also occur with any drug that has a CNS depressant effect. Alcohol should be avoided because this will also lead to increased drowsiness. See Colds and flu: Management: Antihistamines, earlier in this chapter for more details of interactions, side effects and contraindications of antihistamines.

Sympathomimetics

Pseudoephedrine is used in cough and cold remedies (see also Colds and flu: Management: Decongestants, earlier in this chapter for information on restrictions on sales) for its bronchodilator and decongestant actions. It has a stimulant effect that may theoretically lead to a sleepless night if taken close to bedtime. It may be useful if the patient has a blocked nose as well as a cough, and an expectorant/decongestant combination can be useful in productive coughs. Sympathomimetics can cause raised blood pressure, stimulation of the heart and alterations in diabetic control. Oral sympathomimetics should be used with caution, or avoided, in patients with the following:

- Diabetes
- Coronary heart disease (e.g. angina)
- Hypertension
- Hyperthyroidism

Interactions: Avoid in those taking

- MAOIs (e.g. *phenelzine*)
- Reversible inhibitors of monoamine oxidase A (e.g. *moclobemide*)

- Beta-blockers
- Tricyclic antidepressants (e.g. *amitriptyline*) – a theoretical interaction that appears not to be a problem in practice

Theophylline

Theophylline is sometimes included in cough remedies for its bronchodilator effect. OTC medicines containing *theophylline* should not be taken at the same time as prescribed *theophylline* since toxic blood levels and side effects may occur. The action of *theophylline* can be potentiated by some drugs, for example, *cimetidine* and *erythromycin*.

Levels of *theophylline* in the blood are reduced by smoking and drugs such as *carbamazepine, phenytoin* and *rifampicin* that induce liver enzymes, so the metabolism of *theophylline* is increased and lower serum levels result.

Side effects include gastrointestinal irritation, nausea, palpitations, insomnia and headaches. The adult dose is typically 120 mg, three or four times daily. It is not recommended in children.

Practical points

Diabetes

In short-term acute conditions, the amount of sugar in cough medicines is relatively unimportant. Diabetic control is often upset during infections and the additional sugar is not considered to be a major problem. Nevertheless, many diabetic patients may prefer a sugar-free product, as will many other customers who wish to reduce sugar intake for themselves and their children, and many such products are now available. As part of their contribution to improving dental health, pharmacists can ensure that they stock and display a range of sugar-free medicines.

Steam inhalations

These can be useful, although a systematic review found insufficient evidence to judge whether there might be a benefit. The steam helps to liquefy lung secretions and patients find the warm moist air comforting. While there is no evidence that the addition of medications to water produces a better clinical effect than steam alone, some may prefer to add a preparation such as *menthol* and *eucalyptus* or a proprietary inhalant. One teaspoonful of inhalant should be added to a pint of hot (not boiling) water and the steam inhaled. Apart from the risk of scalding, boiling water volatilises the constituents too quickly. A cloth or towel can be put over the head to trap the steam. A change in advice is not to use this method in young children because of the risk of scalding; sitting in the bathroom with a running hot shower is a safer option.

Fluid intake

Maintaining a good fluid intake helps to hydrate the lungs, and hot drinks can have a soothing effect. For children a warm drink of honey and lemon can also be soothing. General advice to patients with coughs and colds should be to increase fluid intake.

Coughs in practice

Case 1

Mrs Patel, a woman in her early 20s, asks what you can recommend for her son's cough. On questioning, you find out that her son, Dillip, aged 4 years, has had a cough on and off for a few weeks. He gets it at night and it is disturbing his sleep, although he does not seem to be troubled during the day. She took Dillip to the doctor about 3 weeks ago, and the doctor explained that antibiotics were not needed and that the cough would get better by itself. The cough is not productive and she has given Dillip some *simple linctus* before he goes to bed, but the cough is no better. Dillip is not taking any other medicines. He has no pain on breathing or shortness of breath. He had a cold recently.

The pharmacist's view

This is a 4-year-old child who has a night-time cough of several weeks' duration. The doctor's advice was appropriate at the time Dillip saw him. However, referral back to the GP surgery would now be advisable because the cough is only present during the night. A recurrent cough in a child at night can be a symptom of asthma, even if wheezing is not present. It is possible that the cough is occurring as a result of bronchial irritation following his recent viral URTI. Such a cough is more likely to occur in those who have asthma or a family history of atopy (a predisposition to sensitivity to certain common allergens such as house dust mite, animal dander and pollen). Nevertheless, the cough has been present for several weeks without improvement and further medical advice is needed.

The doctor's view

Asthma is an obvious possibility. It would be interesting to know if anyone else in the family suffers from asthma, hay fever or eczema and whether Dillip has ever had hay fever or eczema. Any of these features would make the diagnosis more likely. Mild asthma often presents in this way in children without the more recognisable symptoms of shortness of breath and wheezing.

An alternative diagnosis could still include a viral respiratory tract infection. Most coughs are more troublesome and certainly more obvious during the night. This can falsely give the impression that the cough is only nocturnal. It should also be remembered that both diagnoses could be correct, as a viral infection often initiates an asthmatic reaction. Also, in young children with

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episodic breathlessness, wheeze and cough, a likely alternative diagnosis to asthma is viral-induced wheeze. Because the diagnosis is uncertain and inhaled oral steroids may be appropriate, referral to the surgery is advisable.

The parent's view

I was hoping the pharmacist could recommend something but she seemed to think Dillip should see the doctor. She didn't really explain why though.

Case 2

A man aged about 25 years asks if you can recommend something for his cough. He sounds as if he has a bad cold and looks a bit pale. You find out that he has had the cough for a few days, with a blocked nose and a sore throat. He has no pain on breathing or shortness of breath. The cough was chesty to begin with, but he tells you it is now tickly and irritating. He has not tried any medicines and is not taking any medicines from the doctor.

The pharmacist's view

This patient has the symptoms of the common cold and none of the danger signs associated with a cough that would make referral necessary. He is not taking any medicines, so the choice of possible treatments is wide. You could recommend something to treat his congested nose as well as his cough, for example, a cough suppressant and a sympathomimetic. *Simple linctus* and a systemic or topical decongestant would also be a possible option. If a topical decongestant were to be recommended, he should be warned to use it for no longer than 1 week to avoid the possibility of rebound congestion.

The doctor's view

The action suggested by the pharmacist is very reasonable. It may be worthwhile explaining that he is suffering from a viral infection that is self-limiting and should be better within a few days. If he is a smoker then it would be an ideal time to encourage him to stop.

Sore throat

Most people with a sore throat do not consult a doctor – only about 5% do so and many will consult their pharmacist. Most sore throats that present in the pharmacy will be caused by viral infection (90%), with only 1 in 10 being due to bacterial infection. Even where there is bacterial infection, antibiotics make little difference on outcome, so treatment with antibiotics is unnecessary in most cases. Clinically it is difficult to differentiate between the two. The majority of infections are self-limiting. Sore throats are often associated with other symptoms of a cold, and determining whether cold symptoms,

particularly a cough, are present is a useful way to triage cases (it makes a throat infection less likely). It is also important to realise that in the United Kingdom (as in many other countries), sore throats are one of the main reasons for prescribing antibiotics. In many cases these prescriptions are unnecessary. Overuse of antibiotics contributes to antibiotic resistance, which is an increasing public health concern and can also cause side effects such as diarrhoea, nausea and vomiting.

Once the pharmacist has excluded more serious conditions, an appropriate OTC medicine can be recommended.

What you need to know

Age (approximate)
- Baby, child, adult

Duration
Severity
Associated symptoms
- Cold, congested nose and cough
- Difficulty in swallowing
- Hoarseness
- Fever

Previous history
- Smoking habit

Present medication

Significance of questions and answers

Age

Establishing who the patient is will influence the choice of treatment and whether referral is necessary. Streptococcal (bacterial) throat infections are more likely in children of school age.

Duration

Most sore throats are self-limiting and will be better within 7 days. If it has been present for longer, then the patient should be referred to the GP surgery for further advice.

Severity

If the sore throat is described as being extremely painful, especially in the absence of cold, cough and catarrhal symptoms, then referral should be recommended when there is no improvement within 24–48 h.

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Associated symptoms

Cold, catarrh and cough may be associated with a sore throat. There may also be a fever and general aches and pains. These are in keeping with a minor self-limiting viral infection.

Both hoarseness of longer than 3 weeks' duration and difficulty in swallowing (dysphagia) are indications for referral. The latter is sometimes seen with tonsillitis.

Previous history

Recurrent bouts of infection such as tonsillitis in the past would mean that referral is best.

Smoking habit

Smoking will exacerbate a sore throat, and if the patient smokes, then it can be a good time to offer advice and information about quitting. Surveys indicate that two-thirds of people who smoke want to stop (see also 'Smoking cessation' in the chapter on 'Prevention of heart disease').

Present medication

The pharmacist should establish whether any medication has been tried already to treat the symptoms. If appropriate use of medicines has been tried without improvement for several days, then referral to the GP surgery may be indicated.

Current prescriptions are important and the pharmacist should question the patient carefully about them. Steroid inhalers (e.g. *beclometasone* or *budesonide*) can cause hoarseness and candidal infections of the throat and mouth. Generally, they tend to do this at high doses. Such infections can be prevented by rinsing the mouth with water after using the inhaler. It is also worthwhile checking the patient's inhaler technique. Poor technique with metred-dose inhalers can lead to large amounts of the inhaled drug being deposited at the back of the throat. If you suspect this is the problem, discuss with the GP whether a device that will help coordination, such as a spacer, or perhaps a different inhaler might be needed.

Any patient taking *carbimazole* and presenting with a sore throat should be referred immediately. A rare side effect of *carbimazole* is agranulocytosis (suppression of white cell production in the bone marrow). The same principle applies to any drug that can cause agranulocytosis, including methotrexate and azathioprine, which are commonly used as disease modifying drugs for long-term conditions. A sore throat in such patients can be the first sign of a life-threatening infection.

Symptoms for direct referral

Hoarseness

Hoarseness is caused when there is inflammation of the vocal cords in the larynx (laryngitis). Laryngitis is typically caused by a self-limiting viral infection. It is usually associated with a sore throat and a hoarse, diminished voice. Antibiotics are of no value and symptomatic advice (see 'Management' below), which includes resting the voice, should be given. The infection usually settles within a few days and referral is not necessary.

When this infection occurs in babies, infants or small children, it can cause croup (acute laryngotracheitis), and severe cases may present with difficulty in breathing and stridor (see Cough: Nature of cough: Croup). In this situation, referral is essential.

When hoarseness persists for more than 3 weeks, especially when it is not associated with an acute infection, referral to the GP surgery is necessary. There are many causes of persistent hoarseness, some of which are serious. For example, laryngeal cancer can present in this way and hoarseness may be the only early symptom. A doctor will normally refer the patient to an ear, nose and throat (ENT) specialist for accurate diagnosis.

Dysphagia

Difficulty in swallowing can occur in severe throat infection. Sometimes it is caused by pain, making swallowing very uncomfortable. It can also happen when an abscess develops in the region of the tonsils (quinsy) as a complication of tonsillitis. This will usually result in a hospital admission where an operation to drain the abscess may be necessary and high-dose parenteral antibiotics may be given.

Glandular fever (GF) (infectious mononucleosis) is one viral cause of sore throat that often produces marked discomfort and may cause dysphagia. If it is suspected, referral is necessary for an accurate diagnosis.

Most bad sore throats will cause discomfort on swallowing, but not true difficulty and do not necessarily need referral unless there are other reasons for concern. Dysphagia, when not associated with a sore throat, always needs referral (see Chapter 2 Heartburn: Significance of questions and answers: Symptoms: Dysphagia).

Appearance of throat

Tonsils often have white patches on them in healthy people. These are part of the lymphatic immune system and are sometimes called tonsillar crypts. It is commonly thought that the presence of white spots, exudates or pus on the tonsils is an indication for referral or a means of differentiating between viral and bacterial infection, but this is not so. Unfortunately, the appearance can be the same in both types of infection and sometimes the throat can appear almost

normal without exudates in a streptococcal (bacterial) infection. With a sore throat, the tonsils may swell and become red and pus may appear as white spots on the tonsils. Symptoms typically get worse over 2–3 days and then gradually go, usually within a week. Often described as tonsillitis, this does not normally require treatment. If an exudate is present, this may increase the likelihood of a bacterial infection but as an isolated finding has poor diagnostic value.

Thrush

An exception not to be forgotten is candidal (thrush) infection that produces white plaques. However, these are rarely confined to the throat alone and are most commonly seen in babies or the very elderly. It is an unusual infection in young adults and may be associated with more serious disorders that interfere with the body's immune system, for example, leukaemia, HIV and acquired immune deficiency syndrome (AIDS) or with immunosuppressive therapy (e.g. oral corticosteroids or inhaled corticosteroids). The plaques may be seen in the throat and on the gums and tongue. When they are scraped off, the surface is raw and inflamed. Referral is advised if thrush is suspected and the throat is sore and painful. See Chapter 8 Childhood Conditions: Oral thrush.

Glandular fever (infectious mononucleosis)

GF, also known as infectious mononucleosis, is a viral throat infection caused by the Epstein–Barr virus. It is well known because of its tendency to leave its victims debilitated for some months afterwards and its association with the controversial condition myalgic encephalomyelitis. It is characterised by a sore throat that grumbles on with swollen lymph glands and often also causes general malaise, fatigue, muscle aches, chills, sweats, loss of appetite and headache. The most common age group for this illness to occur is between 15 years and 25 years of age. It is sometimes known as the 'kissing disease'. A severe sore throat may follow 1 or 2 weeks of general malaise. The throat may become very inflamed with creamy exudates present. There may be difficulty in swallowing because of the painful throat. Glands (lymph nodes) in the neck and axillae (armpits) may be enlarged and tender. The diagnosis can be confirmed with a blood test, although this may not become positive until the second week of the illness. If the test is negative and there is a strong suspicion of GF, it should be repeated after a further week. Antibiotics are of no value; in fact if *ampicillin* or *amoxicillin* is given during the infection, a measles-type rash is likely to develop in 80% of those with GF. Treatment is aimed at symptomatic relief.

When to refer

Sore throat lasting 1 week or more
Recurrent bouts of infection
Hoarseness of more than 3 weeks' duration
Difficulty in swallowing (dysphagia)

Failed medication
High temperature – >38°C

Use of clinical scoring systems

In 2008 when NICE produced their clinical guideline on respiratory tract infections, they suggested that one way to determine if somebody had a throat infection that warranted an antibiotic was to assess patients using four CENTOR criteria:

- Presence of tonsillar exudate
- Presence of tender neck glands
- History of fever
- Absence of cough – the latter suggests absence of cold symptoms

Research shows that having three or four of these has some predictive value for those people most likely to have some benefit from antibiotic treatment. A recent refinement of this system, increasingly used by GPs, is the FeverPAIN score (fever in last 24 h, severely inflamed tonsils, pus on tonsils, attends within 3 days and no cough or cold symptoms). This is now advocated by NICE. This is based on research that has shown that the people who have a score of four or five are the ones most likely to benefit from antibiotic treatment. This research also showed that this was just as useful as doing near-patient testing for the presence of streptococcal infection (the bacteria most commonly associated with throat infection) using rapid antigen testing. CENTOR or FeverPAIN may be useful systems to consider when deciding who may benefit from referral to the GP surgery.

Treatment timescale

Patients should see their doctor after 1 week if the sore throat has not improved.

Management

Most sore throats are self-limiting in nature, with 90% of patients feeling better or improving within 1 week of the onset of symptoms. The pharmacist can offer a selection of treatments aimed at providing some relief from discomfort and pain until the infection subsides. Oral analgesics are first-line treatment. A systematic review found that simple analgesics (*paracetamol*, *aspirin* and *ibuprofen*) are very effective at reducing the pain from sore throat. Lozenges and pastilles have a soothing effect. There is some evidence that *benzydamine spray* is effective in relieving sore throat pain.

Oral analgesics

Paracetamol, aspirin and *ibuprofen* have been shown in clinical trials to provide rapid and effective relief of pain in sore throat. A systematic review showed no

benefit of adding other analgesic constituents. The patient can be advised to take the analgesic regularly to sustain pain relief. (For a discussion of doses, side effects, cautions and contraindications for simple analgesics, see Chapter 4 Painful Conditions: Management.) *Flurbiprofen lozenges* are licensed for sore throat in adults and children aged 12 years and over. They contain 8.75 mg of *flurbiprofen*, and one lozenge is sucked or dissolved in the mouth every 3–6 h as required, to a maximum of five lozenges. *Flurbiprofen lozenges* can be used for up to 3 days at a time.

Mouthwashes and sprays

Anti-inflammatory (e.g. benzydamine)

Benzydamine is an anti-inflammatory agent that is absorbed through the skin and mucosa and has been shown to be effective in reducing pain and inflammation in conditions of the mouth and throat. Side effects have occasionally been reported and include numbness and stinging of the mouth and throat. *Benzydamine spray* can be used in children of 6 years and over, whereas the mouthwash may only be recommended for children over 12 years of age.

Local anaesthetic (e.g. *benzocaine)*

Benzocaine and *lidocaine* are available in throat sprays.

Lozenges and pastilles

Lozenges and pastilles can be divided into three categories.

Antiseptic (e.g. *cetylpyridinium*)
Antifungal (e.g. *dequalinium*)
Local anaesthetic (e.g. *benzocaine*)

Lozenges and pastilles are commonly used OTC treatments for sore throats, and where viral infection is the cause, the main use of antibacterial and antifungal preparations is to soothe and moisten the throat. Lozenges containing *cetylpyridinium chloride* have been shown to have antibacterial action.

Local anaesthetic lozenges will numb the tongue and throat and can help to ease soreness and pain. *Benzocaine* can cause sensitisation and such reactions have sometimes been reported.

Caution: Iodised throat lozenges should be avoided in pregnancy because they have the potential to affect the thyroid gland of the foetus.

Practical points

Diabetes

Mouthwashes and gargles are suitable and can be recommended. Sugar-free pastilles are available, but the sugar content of such products is not considered important in short-term use.

Mouthwashes and gargles

Patients should be reminded that mouthwashes and gargles should not be swallowed. The potential toxicity of OTC products of this type is low, and it is unlikely that problems would result from swallowing small amounts. However, there is a small risk of systemic toxicity from swallowing products containing *iodine*. Manufacturers' recommendations about whether to use the mouthwash diluted or undiluted should be checked and appropriate advice should be given to the patient.

'Test and treat' in community pharmacies

Following a feasibility service evaluation of screening and treatment of group A streptococcal pharyngitis in community pharmacies, a 'test and treat' service has been commissioned in a larger number. Patients meeting three or all four of the CENTOR criteria are offered a throat swab test and those in whom the test was positive are offered antibiotic treatment. In the feasibility study, 40% of patients were offered a throat swab and 25% of these had a positive result (~10% of the patients that initially presented). One-third of patients presented at the weekend and two-thirds on weekdays. At the time of writing, the scheme is still in early stages and remains the subject of some controversy.

Sore throats in practice

Case 1

A woman asks your advice about her son's very sore throat. He is 15 years old and is at home in bed. She says he has a temperature and that she can see creamy white matter at the back of his throat. He seems lethargic and has not been eating very well because his throat has been so painful. The sore throat started about 5 days ago and he has been in bed since yesterday. The glands on his neck are swollen.

The pharmacist's view

It would be best for this woman's son to be seen by the doctor or nurse. The symptoms appear to be severe and he is ill enough to be in bed. GF is common in this age group and this is a possibility. In the meantime, you might consider recommending some *paracetamol* in soluble or syrup form to make it easier to swallow. The analgesic and antipyretic effects would both be useful in this case.

The doctor's view

The pharmacist is sensible in recommending referral. The description suggests a severe tonsillitis, which will be caused by either a bacterial or viral infection. If it turns out to be viral, then GF is a strong possibility. The doctor or nurse should

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check out the ideas, concerns and expectations of the mother and son and then explain the likely causes and treatment. Often it is not possible to rule out a bacterial (streptococcal) infection at this stage and it may be advisable to prescribe oral *penicillin*, or if the patient is allergic to *penicillin*, *clarithromycin* (as elixir if necessary, to aid swallowing). Amoxicillin should not be used because of the risk of rash. Depending on the availability of laboratory services, the doctor may consider taking a throat swab, which would identify a bacterial infection. If the infection has gone on for over a week, then a blood test can identify infectious mononucleosis (GF). Although there is no specific treatment for GF, it is helpful for the patient to know what is going on and when to expect full recovery. If swallowing does not improve, particularly if fluids prove difficult, some patients need admission for intravenous fluids.

Case 2

A teenage girl comes into your shop with her mother. The girl has a sore throat, which started yesterday. There is slight reddening of the throat. Her mother tells you she had a slight temperature during the night. She also has a blocked nose and a tickly cough and has been feeling generally achy. She has no difficulty in swallowing and is not taking any medicines, either prescribed or OTC.

The pharmacist's view

It sounds as though this girl has a minor respiratory tract infection. The symptoms described should improve within a few days. In the meantime, it would be reasonable to recommend a systemic analgesic such as paracetamol, perhaps in combination with a decongestant.

The doctor's view

The pharmacist's assessment sounds correct. Because she has a blocked nose and tickly cough, a viral infection is most likely. Many patients attend the GP surgery with similar symptoms understandably hoping for a quick cure with antibiotics that have no place in such infections.

Case 3

A middle-aged woman comes to ask your advice about her husband's bad throat. He has had a hoarse gruff voice for about 1 month and has tried various lozenges and pastilles without success. He has been a heavy smoker (at least a pack a day) for over 20 years and works as a bus driver.

The pharmacist's view

This woman should be advised that her husband should see his doctor. The symptoms that have been described are not those of a minor throat infection.

On the basis of the long duration of the problem and of the unsuccessful use of several OTC treatments, it would be best for this man to attend the GP surgery for further investigation.

The doctor's view

A persistent alteration in voice, with hoarseness, is an indication for referral to an ENT specialist. This man should have his vocal cords examined, which requires skills and special equipment that most family doctors do not have. It is possible he may have a cancer on his vocal cords (larynx), especially as he is a smoker.

Allergic rhinitis (hay fever)

Seasonal allergic rhinitis (hay fever) affects up to 20% of people in the United Kingdom, at one time or another, and millions of patients rely on OTC medicines for treatment. The symptoms of allergic rhinitis occur after an inflammatory response involving the release of histamine, which is initiated by allergens being deposited on the nasal and respiratory tract mucosa. The allergy may also affect the eyes. Allergens responsible for seasonal allergic rhinitis include grass pollens, tree pollens and fungal mould spores. Allergic rhinitis on exposure to cats or dogs is also relatively common and sometimes horses, rabbits and rodents (such as pet guinea pigs, hamsters and rats) may trigger symptoms. Perennial allergic rhinitis occurs when symptoms are present all year round and is commonly caused by the house dust mite, animal dander and feathers. Some patients may suffer from a form of perennial rhinitis that becomes worse in the summer months (possibly aggravated by tree or grass pollen allergy).

What you need to know

Age (approximate)
- Baby, child, adult

Duration

Symptoms
- Rhinorrhoea (runny nose)
- Nasal congestion
- Nasal itching
- Watery eyes
- Irritated eyes
- Discharge from the eyes
- Sneezing

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Previous history
Associated conditions
  Eczema
  Asthma
Medication

Significance of questions and answers

Age

Symptoms of allergic rhinitis may start at any age, although it is more common in children and young adults. There is frequently a family history of atopy in allergic rhinitis sufferers (the typical atopy triad is asthma, hay fever and eczema). Thus, children of allergic rhinitis sufferers are more likely to have the condition. The condition often improves or resolves as the child gets older. Adults are more likely to have perennial allergic rhinitis. The age of the patient must be taken into account if any medication is to be recommended. Young adults who may be taking examinations should avoid treatments that may cause drowsiness.

Duration

Sufferers will often present with seasonal rhinitis as soon as the pollen count becomes high. Symptoms may start in April when tree pollens appear and the hay fever season may start 1 month earlier in the south than in the north of England. Hay fever peaks between the months of May and July, when grass pollen levels are highest and spells of good weather commonly cause patients to seek the pharmacist's advice. The weather forecast gives information on pollen levels. Anyone presenting with a summer cold, perhaps of several weeks' duration, may be suffering from hay fever. Fungal spores are also a cause and are present slightly later, often until September.

People can suffer from what they think are mild cold symptoms for a long period, without knowing they have perennial rhinitis.

Allergic rhinitis can be classified as

Intermittent: Occurs less than 4 days/week or for less than 4 weeks
Persistent: Occurs more than 4 days/week and for more than 4 weeks
Mild: All of the following – normal sleep, normal daily activities, sport, leisure, normal work and school; symptoms not troublesome
Moderate: One or more of the following – abnormal sleep; impairment of daily activities, sport, leisure, problems caused at work or school and troublesome symptoms

Symptoms

Rhinorrhoea

A runny nose is a commonly experienced symptom of allergic rhinitis. The discharge is often thin, clear and watery, but can change to a thicker, coloured, purulent one. This suggests a secondary infection, although the treatment for allergic rhinitis is not altered. There is usually no need for antibiotic treatment.

Nasal congestion

The inflammatory response caused by the allergen produces vasodilation of the nasal blood vessels and so results in nasal congestion. Severe congestion may result in headache and occasionally earache. Secondary infection such as otitis media and sinusitis can occur but is rare.

Nasal itching

Nasal itching commonly occurs. Irritation is sometimes experienced on the roof of the mouth.

Eye symptoms

The eyes may be itchy and also watery; it is thought these symptoms are a result of tear duct congestion and also a direct effect of pollen grains being caught in the eye, setting off a local inflammatory response. Irritation of the nose by pollen probably contributes to eye symptoms too. People who suffer severe symptoms of allergic rhinitis may also be hypersensitive to bright light (photophobic) and find that wearing dark glasses is helpful.

Sneezing

In hay fever, the allergic response usually starts with symptoms of sneezing, then rhinorrhoea, progressing to nasal congestion. Classically, symptoms of hay fever are more severe in the morning and in the evening. This is because pollen rises during the day after being released in the morning and then settles at night. Patients may also describe a worsening of the condition on windy days as pollen is scattered, and a reduction in symptoms when it rains, or after rain, as the pollen clears. Conversely, in those allergic to fungal mould spores, the symptoms become worse in damp weather.

Previous history

There is commonly a history of hay fever going back over several years. However, it can occur at any age, so the absence of any previous history does not necessarily indicate that allergic rhinitis is not the problem. The incidence of

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hay fever has risen during the last few decades. Pollution, particularly in urban areas, is thought to be at least partly responsible for the trend.

Perennial rhinitis can usually be distinguished from seasonal rhinitis by questioning about the timing and the occurrence of symptoms. People who have had hay fever before will often consult the pharmacist when symptoms are exacerbated in the summer months.

Danger symptoms/associated conditions

When associated symptoms such as tightness of the chest, wheezing, shortness of breath or coughing are present, immediate referral is advised. These symptoms may herald the onset of an asthma attack.

Wheezing

Difficulty with breathing, possibly with a cough, suggests either asthma or aggravation of asthma by pollen allergy. Some sufferers experience asthma symptoms only during the hay fever season (seasonal asthma). These episodes can be quite severe and require referral. People with seasonal asthma often do not have appropriate medication at hand as their attacks occur so infrequently, which puts them at greater risk.

Earache and facial pain

As with colds and flu (see Colds and flu: Symptoms, earlier in this chapter), allergic rhinitis can be complicated by increased fluid pressure in the middle ear or in the sinuses as mucosal swelling causes blockage of drainage of fluid caused by allergic inflammation. Secondary bacterial infection in the middle ear (otitis media) or the sinuses (sinusitis) can occur but is rare. These conditions can cause persisting severe pain.

Purulent conjunctivitis

Irritated watery eyes are a common accompaniment to allergic rhinitis. Occasionally, but rarely, allergic conjunctivitis is complicated by a secondary infection. When this occurs, the eyes become more painful (gritty sensation) and redder, and the discharge changes from being clear and watery to coloured and sticky (purulent). If this is suspected a referral may be needed.

Medication

The pharmacist must establish whether any prescription or OTC medicines are being taken by the patient. Potential interactions between prescribed medication and antihistamines can therefore be identified.

It would be useful to know if any medicines have been tried already to treat the symptoms, especially where there is a previous history of allergic rhinitis.

Some patients know that certain antihistamines cause them to become drowsy. However, the pharmacist should be also aware of the potentiation of drowsiness by some antihistamines combined with other medicines. This can lead to increased danger in certain occupations and driving.

Failed medication

If symptoms are not adequately controlled with OTC preparations, an appointment with the doctor or nurse may be worthwhile. Such an appointment is useful to explore the patient's beliefs and preconceptions about hay fever and its management. It is also an opportunity to suggest ideas and give advice on preparing for the next season.

When to refer

Diagnosis unclear
Wheezing and shortness of breath
Tightness of chest
Painful ear
Painful sinuses
Purulent conjunctivitis
Severe symptoms only partially relieved by OTC preparations
Failed medication

Treatment timescale

Improvement in symptoms should occur within a few days. If no improvement is noted after 7 days, the patient might be referred to the doctor for other therapy.

Management

Management is based on whether symptoms are intermittent or persistent and mild or moderate. Options include antihistamines, nasal corticosteroids and *sodium cromoglicate* (*sodium cromoglycate*) in formulations for the nose and eyes. Antihistamines and corticosteroid nasal sprays are generally equally effective in the treatment of allergic rhinitis. Antihistamines usually work within a day, but corticosteroid sprays may take several days to build up an effect. The choice of treatment should be rational and based on the patient's symptoms and previous history where relevant.

Many cases of hay fever can be managed with OTC treatment, and it is reasonable for the pharmacist to recommend treatment. Patients with symptoms that do not respond to OTC products can be referred to the GP surgery

at a later stage. Pharmacists also have an important role in ensuring that patients know how to use any prescribed medicines correctly (e.g. corticosteroid nasal sprays, which must be used continuously for the patient to benefit).

Antihistamines

Many pharmacists would consider these drugs to be the first-line treatment for mild-to-moderate and intermittent symptoms of allergic rhinitis. They are effective in reducing sneezing and rhinorrhoea, less so in reducing nasal congestion. Non-sedating antihistamines available OTC include *acrivastine, cetirizine* and *loratadine*. All are effective in reducing the troublesome symptoms of hay fever and have the advantage of causing less sedation than some of the older antihistamines.

Cetirizine and *loratadine* are taken once daily, while *acrivastine* is taken three times daily. For sale OTC, *loratadine* can be recommended for children over 2 years, *cetirizine* over 6 years and *acrivastine* over 12 years.

While drowsiness is an unlikely side effect of any of the three drugs, patients might be well advised to try the treatment for a day before driving or operating machinery as drowsiness is still sometimes seen in some people.

Acrivastine, cetirizine and *loratadine* may also be used for allergic skin disorders such as urticaria.

Older antihistamines such as *promethazine* and *diphenhydramine* have a greater tendency to produce sedative effects. Indeed, both drugs are available in the United Kingdom among OTC products promoted for the management of temporary sleep disorders (see Chapter 9 Insomnia). The shorter half-life of *diphenhydramine* (5–8 h compared with 8–12 h of *promethazine*) should mean less likelihood of a morning hangover/drowsiness effect.

Other older antihistamines are relatively less sedative, such as *chlorphenamine* (*chlorpheniramine*), but sedation can still be problematic. Patients may develop tolerance to their sedation effects. Anticholinergic activity is very much lower among the newer drugs compared with the older drugs.

Interactions: The potential sedative effects of older antihistamines are increased by alcohol, hypnotics, sedatives and anxiolytics. The alcohol content of some OTC medicines should be remembered.

The plasma concentration of non-sedating antihistamines may be increased by *ritonavir;* plasma concentration of *loratadine* may be increased by *amprenavir* and *cimetidine*. There is a theoretical possibility that antihistamines can antagonise the effects of *betahistine*.

Side effects: The major side effect of the older antihistamines is their potential to cause drowsiness. Their anticholinergic activity may result in a dry mouth, blurred vision, constipation and urinary retention. These effects will be increased if the patient is already taking another drug with anticholinergic effects (e.g. tricyclic antidepressants, most commonly *amitriptyline*, and neuroleptics such as *prochlorperazine, metoclopramide* or *haloperidol*).

At very high doses, antihistamines have CNS excitatory effects rather than depressive effects. Such effects seem to be more likely to occur in children. At toxic levels, there have been reports of fits being induced. As a result, it has been suggested that antihistamines should be used with care in epileptic patients. However, this appears to be a largely theoretical risk.

Antihistamines are best avoided by patients with narrow-(closed-) angle glaucoma, since the anticholinergic effects produced can cause an increase in intraocular pressure. They should be used with caution in patients with liver disease or prostatic hypertrophy.

Decongestants

Oral or topical decongestants may be used short term to reduce nasal congestion alone or in combination with an antihistamine. They can be useful in patients starting to use a preventer such as a nasal corticosteroid (e.g. *beclometasone*) or *sodium cromoglicate* where congestion can prevent the drug from reaching the nasal mucosa. Topical decongestants can cause rebound congestion, especially with prolonged use. They should not be used for more than 1 week. Oral decongestants are occasionally included such as *pseudoephedrine*. Their use, interactions and adverse effects are considered in the section on 'Colds and flu' (see Colds and flu: Management: Decongestants, earlier in this chapter).

Eye drops containing an antihistamine and sympathomimetic combination are available and may be of value in troublesome eye symptoms, particularly when symptoms are intermittent. The sympathomimetic acts as a vasoconstrictor, reducing irritation and redness. Some patients find that the vasoconstrictor causes painful stinging when first applied. Eye drops that contain a vasoconstrictor should not be used in patients who have glaucoma or who wear soft contact lenses.

Steroid nasal sprays

Beclometasone nasal spray (aqueous pump rather than aerosol version), *fluticasone metered nasal spray* and *mometasone nasal spray* can be used for the treatment of hay fever and are available OTC for this indication.

A corticosteroid nasal spray is the treatment of choice for moderate-to-severe nasal symptoms that are continuous. The steroid acts to reduce inflammation that has occurred as a result of the allergen's action. Regular use is essential for full benefit to be obtained and treatment should be continued throughout the hay fever season. If symptoms of hay fever are already present, the patient needs to know that it is likely to take several days before the full treatment effect is reached.

Dryness and irritation of the nose and throat as well as nosebleeds have occasionally been reported; otherwise side effects are rare. *Beclometasone, fluticasone* and *mometasone nasal sprays* can be provided to patients over 18 years of age for up to 3 months. They should not be recommended for pregnant women or for anyone with glaucoma.

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Patients are sometimes alarmed by the term 'steroid', associating it with potent oral steroids and possible side effects. Therefore, the pharmacist needs to take account of these concerns in explanations about the drug and how it works.

Sodium cromoglicate

Sodium cromoglicate is available OTC as nasal drops or sprays and as eye drops. *Cromoglicate* can be effective as a prophylactic if used correctly. It should be started at least 1 week before the hay fever season is likely to begin and then used continuously. There seem to be no significant side effects, although nasal irritation may occasionally occur.

Cromoglicate eye drops are usually highly effective for the treatment of eye symptoms that are not controlled by antihistamines and work very quickly (within an hour). However, *cromoglicate* should be used continuously to obtain full benefit. The eye drops should be used four times a day. The eye drops contain the preservative *benzalkonium chloride,* which occasionally is associated with allergy, and also should not be used by wearers of soft contact lenses as benzalkonium can be deposited in these lenses.

Topical antihistamines

Nasal treatments

Azelastine is a nasal spray used in allergic rhinitis. The *BNF* suggests that treatment should begin 2–3 weeks before the start of the hay fever season. Its place in treatment is for mild and intermittent symptoms in adults and children over 5 years. Advise the patient to keep the head upright during use to prevent the liquid trickling into the throat and causing an unpleasant taste.

Barrier nasal sprays

Thixotropic gel nasal sprays are available, the theory being that a barrier is formed that prevents allergens reaching the nasal mucosa. Licensed as a medical device, there are only two small published studies and no definitive evidence of effect or lack of effect.

Further advice

1. Car windows and air vents should be kept closed while driving. Otherwise a high pollen concentration inside the car can result. Some car air conditioning units will filter out pollen.
2. When house dust mite is identified as a problem, regular cleaning of the house to maintain dust levels at a minimum can help. Special vacuum cleaners are now on sale that are claimed to be particularly effective.

Hay fever in practice

Case 1

A young man presents in late May. He asks what you can recommend for hay fever. On questioning, he tells you that he has not had hay fever before, but some of his friends have got it and he thinks he has the same thing. His eyes have been itching a little and are slightly watery, and he has been sneezing for over a week. His nose has been runny and now feels quite blocked. He will not be driving. He is a student at the local sixth-form college and has exams coming up next week. He is not taking any medicines.

The pharmacist's view

This young man is experiencing the classic symptoms of hay fever for the first time. The nasal symptoms are causing the most discomfort; he has had rhinorrhoea and now has congestion, so it would be reasonable to recommend a corticosteroid nasal spray, provided he is aged 18 years or over. If he is under 18 years, an oral or topical antihistamine could be recommended, bearing in mind that he is sitting exams soon and so any preparation that might cause drowsiness is best avoided. His eyes are slightly irritated, but the symptoms are not very troublesome. You know that he is not taking any other medicines, so you could recommend *acrivastine, loratadine* or *cetirizine* but advise him to try it for a few days in advance, if intending to use it at exam time. If the symptoms are not better in a week, he should see the doctor or nurse.

The doctor's view

As suggested, a corticosteroid nasal spray is likely to be more effective for his symptoms. If he cannot use the OTC product because he is under 18 years, *acrivastine, loratadine* or *cetirizine* would be worth a try. Even though they are generally non-sedating, they can cause drowsiness in some patients and as recommended by the pharmacist, the student should be advised not to take his first dose just before the exam. If his symptoms do not settle, then referral is appropriate. He may benefit from *sodium cromoglicate eye drops* if his eye symptoms are not fully controlled by the antihistamine. It is often worthwhile trying an older antihistamine as an alternative because some people are unaffected by the sedative properties, but this should only be done if at a time when he is not driving or operating machinery.

Case 2

A woman in her early thirties wants some advice. She tells you that she has hay fever and a blocked nose and is finding it difficult to breathe. You find out that she has had the symptoms for a few days; they have gradually got worse.

She gets hay fever every summer, and it is usually controlled by *chlorphenamine* tablets that she buys every year and that she is taking at the moment. As a child, she suffered quite badly from eczema and is still troubled by it occasionally. She tells you that she has been a little wheezy for the past day or so, but she does not have a cough, and has not coughed up any sputum. She is not taking any other medicines.

The pharmacist's view

This woman has a previous history of hay fever, which has, until now, been dealt adequately with *chlorphenamine* tablets. Her symptoms have worsened over a period of a few days and she is now wheezing. It seems unlikely that she has a chest infection, which could have been a possible cause of the symptoms. She should be referred to the GP surgery quickly since her symptoms suggest a more serious condition such as asthma.

The doctor's view

This woman should be referred to her doctor's surgery to be seen urgently as she has shortness of breath. She almost certainly has seasonal asthma. In addition to the hay fever treatment recommended by her pharmacist, it is likely that she would benefit from a corticosteroid inhaler such as *beclometasone*. She would be prescribed a beta-2-agonist, such as a *salbutamol inhaler,* as well to use for shortness of breath and wheeze. This consultation may be a complex one to manage in the usual 10 min available in view of the time required for information-giving, explanation about the nature of the problem, the rationale for the treatments and the technique of using inhalers. Many nurses in primary care specialise in asthma so seeing the nurse initially might be a good option.

Respiratory symptoms for direct referral

Chest pain

Respiratory causes

A localised knifelike pain aggravated by breathing or coughing is characteristic of pleurisy. It is usually caused by a respiratory infection and may be associated with an underlying pneumonia. Less commonly, it may be caused by a pulmonary embolus (a blood clot that has lodged in a pulmonary artery after separating from a clot elsewhere in the circulation), and there may be a history of a swollen leg or immobility.

A pain similar to that experienced with pleurisy may arise from straining the muscles between the ribs following coughing. It may also occur with cracked or fractured ribs following injury or violent coughing. Another less common

cause of pain is due to a pneumothorax where a small leak develops in the lung causing its collapse.

The area beneath the upper front part of the chest may be very uncomfortable in the early stages of acute viral infections that cause inflammation of the trachea (tracheitis). Viral flu-like infections can be associated with non-specific muscular pain (myalgia).

Non-respiratory causes

Heartburn

Heartburn occurs when the acid contents of the stomach leak backwards into the oesophagus (gullet). The pain is described as a burning sensation, which spreads upwards towards the throat. Occasionally, it can be so severe as to mimic cardiac pain.

Cardiac pain

Cardiac pain typically presents as a tight, gripping, vicelike, dull pain that is felt centrally across the front of the chest. The pain may seem to move down one or both arms. Sometimes the pain spreads to the neck. When angina is present, the pain is brought on by exercise and relieved by rest. When a coronary event such as a heart attack (myocardial infarction) occurs, the pain is similar but more severe and prolonged. It may come on at rest. Usually, but not always, the patient feels very unwell with sweating, nausea and vomiting, and there may be shortness of breath.

Anxiety

Anxiety is a commonly seen cause of chest pain in general practice. The pain probably arises as a result of hyperventilation. Diagnosis can be difficult as the hyperventilation may not be obvious.

Shortness of breath

Shortness of breath may be a symptom of a cardiac or respiratory disorder. Differential diagnosis can be difficult. It is usually a sign of a serious condition, although it can be due to anxiety.

Respiratory causes

Asthma

Occasionally, asthma may develop in later life, but it is most commonly seen in young children or young adults. The breathlessness is typically associated with a wheeze that gets worse with exercise or can be precipitated by exercise,

although in mild cases the only symptom may be a recurrent nocturnal cough. Most people with asthma have normal breathing between attacks. The attacks are often precipitated by viral infections such as colds. Some are worse in the hay fever season, while others are aggravated by animal fur or dust. The breathlessness is often worse at night.

COPD (chronic bronchitis or emphysema)

COPD (chronic bronchitis or emphysema) is usually caused by years of cigarette smoking and gives rise to shortness of breath, especially on exertion, with a productive cough. The damage causing breathlessness is irreversible. When it is very severe the patient may be breathless at rest. The breathing often worsens when an infective episode develops. At such times there is also an increase in sputum production and the sputum may be coloured or purulent (like pus). If there is a sudden deterioration in symptoms, or an infective exacerbation is suspected, referral is appropriate.

Cardiac causes

Heart failure

Heart failure may develop gradually or present acutely as an emergency (usually in the middle of the night). The former (congestive cardiac failure) may cause breathlessness on exertion. It is often associated with ankle swelling (oedema) and is most common in the elderly. The more sudden type is called acute left ventricular failure. The victim is woken by severe shortness of breath and has to sit upright. There is often a cough present with clear frothy sputum (sometimes bloodstained). In such cases, the patient is very unwell and distressed.

Other causes

Hyperventilation syndrome

Hyperventilation syndrome occurs when the rate of breathing is too high for the bodily requirements. Paradoxically, the subjective experience is that of breathlessness. The sufferer complains of difficulty in taking in a deep breath. The experience is frightening but usually harmless. It may be associated with other symptoms such as tingling in the hands and feet, numbness around the mouth, dizziness and various muscular aches. In many cases it is caused by anxiety.

Wheezing

Wheezing is a high pitched whistling sound that occurs during breathing, often described as ‘musical’. Wheezing sounds may be heard in the throat region in respiratory tract infections because of mucus in the large airways and are

of little consequence. They are to be differentiated from wheezing emanating from the lungs where smaller airways contract and inflammation causes more narrowing and impaired airflow. In this latter situation, there is usually some difficulty in breathing.

Viral-induced wheeze in children

Wheezing often occurs in infants with viral respiratory infections and may go on for several weeks. This is called viral-induced wheeze (in the past it was often called wheezy bronchitis). The infection is usually self-limiting, but the condition requires accurate diagnosis to exclude asthma. It may also be confused with croup (laryngotracheitis) or bronchiolitis. It often occurs again when there is a further viral respiratory infection; the main distinctions from asthma are that symptoms settle completely between episodes, there is no wheeze on exercise and wheeze is not triggered by other things such as allergy to pets. Some children who have a history of recurrent viral-induced wheeze develop asthma in the future but most will stop wheezing as they get older.

Asthma

Wheezing is a common feature of asthma and accompanies the shortness of breath. However, in very mild asthma it is not obvious and may present with just a cough. At the other extreme, an asthma attack can be so severe that so little air moves in and out of the lungs, there is no audible wheeze.

Cardiac

Wheezing may be a symptom associated with shortness of breath in heart failure.

Sputum

Sputum may be described as thick or thin and clear or coloured. It is a substance coughed up from the lungs and is not to be confused with saliva or nasal secretions. It may have a green tinge in people with asthma, but this does not signify infection.

COPD

Clear, thick sputum may be coughed up in COPD or by regular cigarette smokers. It may have a mucoid (jelly-like) nature and may be described as white, grey or clear with black particles. People with COPD are prone to recurrent infective exacerbations during which sputum production increases and turns yellow or green, or purulent (pus-like).

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Pneumonia

Coloured mucoid (jelly-like) sputum may be present in other lung infections such as pneumonia. Rust-coloured sputum is a characteristic of pneumococcal (lobar) pneumonia. Usually it is associated with severely ill people who have a high fever and sweats.

Cardiac

Clear, thin (serous) sputum may be a feature of heart failure (left ventricular failure). The sputum forms as a result of pulmonary oedema, which characteristically awakens the patient in the night with shortness of breath. In such cases it may have a red-tinge or be blood stained.

Haemoptysis

The presence of blood in sputum is always alarming. Small traces of blood can result from a broken capillary caused by coughing and is harmless. The most common cause is respiratory tract infection, which is usually self-limiting, but it can be a symptom of serious disease such as lung cancer or pulmonary TB and should always be referred for further investigation. Occasionally, blood is coughed up after a nosebleed and is of no consequence. Haemoptysis is rare in children and often only presents where bleeding is substantial, as children tend to swallow rather than expectorate their sputum.