

10 Suggested specialist nurses' formulary

Notes on prescribing

Most of the drugs listed here are 'basic' and may well be included in your local formularies, policies or PGDs (Patient Group Directions), but it may be wise to cross-check. Many of these drugs can be prescribed by nurses with an extended nurse prescribing qualification, but this formulary aims to cover the range of medication commonly required to treat minor illness and is not a mirror of the extended nurse prescribers' formulary.

Drugs marked 'OTC' are available over the counter, and often cost less than a prescription charge. The price depends on the pack size, brand and pharmacy.

Prescriptions must be signed by a qualified prescriber; but if the nurse who has no such qualification can complete the details of the prescription and slip it under the prescriber's door for signature, the interruption will be minimal. Entries marked NPEF or OTC are in the Nurse Prescribers' Extended Formulary, although the indications for use under this formulary may be more limited than those covered by *The Minor Illness Manual*.

The FP10 prescription form in England has a box at the top where the number of days' treatment may be entered. This avoids the need to calculate quantities but is awkward to use. It cannot be used for variable dose drugs, creams, lotions, etc. Remember that the box is an instruction to the pharmacist as to how much to dispense, not a direction to the patient, so it will not appear on the dispensed medication instructions unless repeated in the main body of the prescription. On the whole, it is usually simpler and clearer to specify an amount to be dispensed and leave the top box blank.

The following formulary gives brief notes on the clinical use of medications and justification for recommending such medication. The *BNF* and its appendices, or the drug data sheet (formally known as the Supplementary Protection Certificate or SPC), provide more information. As a final check before giving a prescription, the acronym *PASS* can be used to check if the patient is *Pregnant*, *Allergic*, on *Something else*, or has a *System failure*. When considering if a patient is pregnant, bear in mind that those hoping to become pregnant but who have not yet missed a period, and mothers who are breastfeeding also need special caution when prescribing. Always check for interaction with any other current medication.

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Some drugs are contraindicated, or should be given at lower dosage, to patients with kidney, liver or heart failure. If in doubt, consult a doctor.

Above all, make sure the prescription specifies the drug you intended. Most prescriptions in primary care are now computer printed. The difference between drugs with similarly spelt names can be as little as the gap between two adjacent keys on a keyboard. One of the most dangerous examples is prescribing penicillamine when penicillin was intended. Such an inadvertent swap from an antibiotic to an immunosuppressant could be fatal.

Previous antibiotic treatment

If a patient presents with a condition requiring antibiotic treatment, but has finished a course of the 'first-choice' antibiotic within the last 7 days, then either the infection is viral or the organism is resistant to the antibiotic. In these circumstances a different antibiotic may be necessary, as follows:

- for otitis media or sinusitis – change to co-amoxiclav
- for chest infections – add erythromycin or change to doxycycline (see notes on mycoplasma infection, page 23)
- for uncomplicated UTIs in non-pregnant women – change to either nitrofurantoin m/r or trimethoprim, whichever one was not used last time (unless sensitivities are available from the laboratory)
- for throat infections – take throat swab and await result before prescribing a different antibiotic, as in most cases the infection will be viral

Antibiotics and oral contraceptives

Broad-spectrum antibiotics (amoxicillin, co-amoxiclav, cefalexin and doxycycline) may slightly reduce the effectiveness of the COC and contraceptive patch. Advise patients to use a condom or refrain from intercourse while taking the antibiotic and for 1 week afterwards, and if there are fewer than seven pills in their packet advise them not to have a pill-free week.

Narrow-spectrum antibiotics such as penicillin V, flucloxacillin and trimethoprim do not have this effect, nor do nitrofurantoin, erythromycin or clarithromycin.

The progestogen-only pill, injection and implant are not affected by any of the antibiotics in this formulary.

Half-life ($t_{1/2}$)

The speed at which a drug is eliminated from the body is often proportional to the concentration of drug in the blood. When the drug is present in high concentration shortly after a dose, the elimination is more rapid than when it is present only in low concentration some time later. Drugs that follow this rule are said to have first-order kinetics, and they have a constant half-life. When this is so, the plasma half-life is given in this formulary. This is the time taken for the plasma concentration of the drug to reduce by one half of its starting level. It is useful to know the $t_{1/2}$ even if it is only an approximation, to help understand how long the action of a drug will last and when a further dose may be needed. When there is a known range of $t_{1/2}$ for different individuals, this is given in brackets after the mean.

Allergies

Many reported allergies are really just coincidences, for example, the appearance of a viral rash just after starting a course of antibiotic. However, any report of swelling of the tongue or face, or difficulty in breathing, must be taken seriously.

If the patient has a true allergy to one type of penicillin, *all* drugs of this class should be avoided. This does not apply if the patient experiences non-allergic side-effects, such as diarrhoea with co-amoxiclav; penicillin V will probably not produce this side-effect.

Ten percent of those allergic to penicillin will also be allergic to cephalosporins such as cefalexin.

▼ Black triangle symbol

This symbol means that there is limited experience of the use of this product and the Committee on Safety of Medicine (CSM) requests that all suspected adverse reactions should be reported. Use the yellow forms in

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the *BNF*. They can now be signed and submitted by any health professional, not just doctors.

Less suitable for prescribing symbol

This symbol means that the Joint Formulary Committee of the *BNF* considers a drug to be 'less suitable for prescribing'. Several are in fairly common use in managing minor illnesses despite this. If you feel tempted to use a drug not in our formulary, it is worth checking to see if the *BNF* lists the drug with this symbol. If it does, then usually either there is an unacceptable balance between efficacy and side-effects, or the drug is ineffective.

Pack size

The number of tablets, capsules or items, or the volume of liquids is given in the formulary for the usual original pack dispensed. This is not to be taken as a recommendation of how much to prescribe, which depends on the patient's needs, but when possible it is more convenient for a manufactured pack to be dispensed whole, together with the patient information leaflet.

Formulary

Listed by *BNF* classification.

Gastrointestinal system

Magnesium trisilicate [1.1]
Gaviscon Advance® [1.1.2]
Ranitidine [1.3.1]
Loperamide [1.4.2]
Ispaghula husk [1.6.1]
Glycerol suppositories [1.6.2]
Senna [1.6.2]
Anusol® [1.7.1]
Xyloproct® [1.7.2]

Cardiovascular system

Tranexamic acid [2.11]

Respiratory system

Salbutamol CFC-free and Salamol Easi-Breathe® inhaler [3.1.1]

AeroChamber Plus® [3.1.5]

Peak flow meter [3.1.5]

Beclometasone inhaler and Beclazone Easi-Breathe® [3.2]

Fexofenadine [3.4.1]

Loratadine [3.4.1]

Chlorphenamine [3.4.1]

Menthol and eucalyptus [3.8]

Pholcodine [3.9.1]

Simple linctus [3.9.2]

Nervous system

Temazepam [4.1.1]

Prochlorperazine [4.6]

Domperidone [4.6]

Aspirin [4.7.1]

Paracetamol [4.7.1]

Paradote® [4.7.1]

Codeine phosphate [4.7.2]

Infections

Phenoxyethylpenicillin [5.1.1]

Flucloxacillin [5.1.1.2]

Amoxicillin [5.1.1.3]

Co-amoxiclav [5.1.1.3]

Cefalexin [5.1.2]

Doxycycline [5.1.3]

Erythromycin [5.1.5]

Clarithromycin [5.1.5]

Trimethoprim [5.1.8]

Metronidazole [5.1.11]

Nitrofurantoin m/r [5.1.13]

Fluconazole [5.2]

Nystatin [5.2]

Mebendazole [5.5.1]

Piperazine [5.5.1]

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Endocrine system

Norethisterone [6.4.1.2]

Obstetrics and gynaecology

Clotrimazole [7.2.2]

Levonorgestrel [7.3.1]

Nutrition and blood

Ferrous sulphate [9.1.1]

Dioralyte® [9.2.1.2]

Musculoskeletal system

Ibuprofen [10.1.1]

Ibuprofen (topical) [10.3.2]

Algesal® [10.3.2]

Eye

Chloramphenicol [11.3.1]

Sodium cromoglicate [11.4.2]

Hypromellose [11.8.1]

Ear, nose and oropharynx

EarCalm® [12.1.1]

Otosporin® [12.1.1]

Otomize® [12.1.1]

Beclometasone aqueous spray [12.2.1]

Saline nose drops [12.2.2]

Warm moist air inhalation [12.2.2]

Chlorhexidine oral spray [12.3.4]

Skin

Emulsifying ointment [13.2.1]

Hydrous ointment [13.2.1]

Oilatum® [13.2.1.1]

Hydrocortisone [13.4]

Clobetasone butyrate [13.4]

Betamethasone valerate [13.4]

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Clotrimazole/hydrocortisone [13.4]

Salicylic acid [13.7]

Sodium fusidate [13.10.1]

Clotrimazole [13.10.2]

Terbinafine [13.10.2]

Aciclovir [13.10.3]

Malathion [13.10.4]

Permethrin [13.10.4]

Gastrointestinal system

[1.1] Magnesium trisilicate (OTC)

Class:	antacid
Liquid:	magnesium trisilicate, light magnesium carbonate, sodium bicarbonate, peppermint flavour
Dose:	10 ml suspension three times daily in water
Pack:	500 ml
$t_{1/2}$:	not applicable
Side-effects:	may cause diarrhoea occasionally
Interactions:	may reduce the absorption of other drugs, for example, iron, nitrofurantoin, ciprofloxacin, fexofenadine, digoxin, phenytoin
Cautions:	as the mixture contains sodium (equivalent to about 3 level teaspoonfuls of salt in a 500 ml bottle), it should be used with caution when there is heart failure, hypertension, renal or hepatic failure
Selection:	antacids provide rapid, short-term relief from dyspepsia. Plain alkali can cause rebound acid secretion, but magnesium trisilicate forms a barrier to protect the gastric mucosa. Liquid preparations are more effective than tablets

[1.1.2] Gaviscon Advance® (OTC)

Class:	compound alginate antacid
Liquid:	sodium alginate 500 mg, potassium bicarbonate 100 mg per 5 ml
Dose:	adults and children over 12 years: 5–10 ml after meals and at bedtime
Pack:	500 ml
$t_{1/2}$:	not applicable
Side-effects:	very rarely patients sensitive to the ingredients may develop allergic manifestations such as urticaria or bronchospasm
Interactions:	as the raft is formed by the alginate and bicarbonate reacting with gastric acid to produce a froth of carbon dioxide bubbles, other medication that reduces gastric acid secretion may make a less effective raft
Cautions:	the salts of sodium, potassium and calcium (an excipient in Gaviscon Advance) might exacerbate some severe diseases, such as cardiac failure, hyperkalaemia, calcium-containing renal stones
Selection:	whereas magnesium trisilicate primarily reduces acidity and forms a barrier to protect the gastric mucosa, compound alginate agents such as Gaviscon form a raft to reduce the chance that acid can reflux up into the oesophagus, which helps to control the symptoms of mild to moderate heartburn. The Advance version has a lower sodium content than plain Gaviscon, and is no more expensive. It can be used in pregnancy

References

- Lindow SW, Regnèll P, Sykes J and Little S (2003) An open-label, multicentre study to assess the safety and efficacy of a novel reflux suppressant Gaviscon Advance in the treatment of heartburn during pregnancy. *Int J Clin Pract* **57**: 175–9.
- Chatfield S (1999) A comparison of the efficacy of the alginate preparation, Gaviscon Advance, with placebo in the treatment of gastro-oesophageal reflux disease. *Curr Med Res Opin* **15**: 152–9.

[1.3.1] Ranitidine (lower dose tablets available OTC, NPEF)

Class:	histamine (H ₂) receptor antagonist
Tablets:	150 mg
Dose:	adults: 150 mg twice daily or 300 mg at night
Pack:	60
<i>t</i> _{1/2} :	2 h
Side-effects:	ranitidine is usually well tolerated, but very rarely is associated with changes in liver or kidney function, pancreatitis, reduction in white cell or platelet counts, bradycardia, headache, allergic phenomena such as rash, joint aches or vasculitis
Interactions:	none
Cautions:	the possibility of malignancy should be excluded before starting treatment with acid suppressants because they may mask symptoms of a gastric carcinoma. Use half the normal dose in severe renal impairment. Do not prescribe for people with a history of acute porphyria
Selection:	H ₂ receptor antagonists provide longer-term relief from dyspeptic symptoms than antacids, and are useful for those who have already tried OTC antacids. Ranitidine rarely causes side-effects.

Reference

- Netzer P, Brabetz-Hofliger A, Brundler R *et al.* (1998) Comparison of the effect of the antacid Rennie versus low-dose H₂-receptor antagonists (ranitidine, famotidine) on intragastric acidity. *Aliment Pharmacol Ther* **12**: 337–42.

[1.4.2] Loperamide (OTC)

Class:	antimotility opioid
Capsules:	2 mg
Dose:	adults: two capsules initially, followed by one after each loose stool for up to a maximum of 5 days; usual dose 3–4 capsules a day, maximum of 8 capsules a day
Pack:	30
$t_{1/2}$:	11 (9–14) h
Side-effects:	abdominal cramps, bloating, nausea, vomiting and rarely paralytic ileus, dizziness, drowsiness, skin reactions
Interactions:	oral desmopressin
Cautions:	not suitable for children (although licensed from age 4), or anyone with undiagnosed abdominal pain
Selection:	loperamide provides rapid relief from diarrhoea – within 4 h for 40% of people with traveller's diarrhoea. There is a low risk of opioid abuse

References

- Wingate D, Phillips SF, Lewis SJ, Malagelada JR, Speelman P, Steffen R and Tytgat GN (2001) Guidelines for adults on self-medication for the treatment of acute diarrhoea. *Aliment Pharmacol Ther* **15**: 773–82.
- Steffen R, Heusser R, Tschopp A and Du Pont HL (1988) Efficacy and side-effects of six agents in the self-treatment of traveller's diarrhoea. *Travel Med Int* **6**: 153–7.

[1.6.1] Ispaghula husk (OTC)

Class:	bulk-forming laxative
Granules:	effervescent or non-effervescent, sugar- and gluten-free ispaghula husk, 3.5 g/sachet (plain, lemon or orange flavours available in effervescent form)
Powder:	sugar- and gluten-free ispaghula husk, 3.4 g/sachet (orange or lemon/lime flavour)
Dose:	adults: 1 sachet or 10 ml in water twice daily preferably after or with meals children 6–12 years: 1/2 to 1 sachet or 5 ml twice daily preferably after or with meals
Pack:	30 sachets, 150 g (orange-flavoured effervescent granules), 200 g (non-effervescent plain granules)
$t_{1/2}$:	not applicable
Side-effects:	flatulence, abdominal distension, gastrointestinal obstruction or impaction, very rarely allergic reactions
Interactions:	none
Cautions:	adequate liquid intake is essential to reduce the risk of intestinal obstruction. <i>In vitro</i> , the husk can absorb up to 40 times its own weight of water. Do not prescribe for patients with difficulty swallowing, intestinal obstruction or atony, or faecal impaction
Selection:	the best form of medicine for constipation is to increase the natural fibre in the diet. When this is not achievable, bulk-forming laxatives are an alternative. Ispaghula husk is also useful for controlling diarrhoea in diverticular disease and when there is too much fluid in an ileostomy or colostomy. At first, this seems paradoxical, but it is just making use of the liquid-absorbing property of the husk

[1.6.2] Glycerol suppositories (OTC)

Class:	mildly irritant laxative
Suppositories:	gelatine 140 mg/g, glycerol 700 mg/g, purified water 160 mg/g
Dose:	adults 4 g, children 2 g, infants 1 g; insert one suppository, blunt end first, into the rectum when required
Pack:	12
$t_{1/2}$:	not applicable
Side-effects:	rectal discomfort
Interactions:	none
Selection:	glycerol is a simple, safe laxative suitable for short-term relief of distal constipation

Reference

- Abd-el-Maeboud KH, el-Naggar T, el-Hawi EM *et al.* (1991) Rectal suppository: commonsense and mode of insertion. *Lancet* **338**: 798–800.

[1.6.2] Senna (OTC)

Class:	stimulant laxative
Tablets:	7.5 mg
Liquid:	7.5 mg/5 ml
Dose:	start with the lowest dose in the range, then increase if necessary: adults: 15–30 mg at night children 6–12 years: 7.5–15 mg in the morning 2–6 years: 3.75–7.5 mg in the morning
Pack:	20 tablets, or 100 ml
$t_{1/2}$:	not applicable
Side-effects:	abdominal cramp
Interactions:	none
Cautions:	do not prescribe to patients with intestinal obstruction. Prolonged use can cause an atonic, non-functioning colon and hypokalaemia. Long-term use has this risk, but is sometimes justified. Young children with chronic constipation should be referred to a doctor
Selection:	stimulant laxative may be necessary to relieve generalised constipation where diet or a bulk-forming laxative has failed and glycerol would not help evacuate the colon. The action of senna takes about 8–12 h

[1.7.1] Anusol® (OTC)

Class:	soothing haemorrhoidal preparation
Ointment:	bismuth subgallate 2.25%, bismuth oxide 0.88%, balsam peru 1.88%, zinc oxide 10.75%
Suppositories:	similar proportions as above in a 2.8 g suppository
Dose:	one suppository or application of ointment night and morning and after defaecation
Pack:	12 or 24 suppositories, 1 × 25 g of ointment
$t_{1/2}$:	not applicable
Side-effects:	rarely discomfort on application or local dermatitis
Interactions:	none
Cautions:	avoid prescribing to patients who are sensitive to lanolin as this is one of the excipients
Selection:	Anusol exerts its effects locally without systemic absorption. Although no formal trial in pregnancy has been done, it has been used during pregnancy for many years and is considered safe. The ointment is used for external haemorrhoids and may provide better protection and lubrication of the anal surface than a cream. Suppositories are used for internal haemorrhoids

[1.7.2] Xyloproct®

Class:	soothing haemorrhoidal preparation with corticosteroid and local anaesthetic
Ointment:	aluminium acetate 3.5%, hydrocortisone acetate 0.275%, lidocaine 5%, zinc oxide 18%
Dose:	apply several times daily
Pack:	20 g
$t_{1/2}$:	not applicable
Side-effects:	stinging on application, local dermatitis, very rarely systemic effects from absorption of the components, with confusion in children or hypersensitivity reactions
Cautions:	pregnancy, anal infections such as <i>Herpes simplex</i> or candida. Avoid prolonged use which could theoretically result in local skin atrophy from the hydrocortisone. It would be very unusual to prescribe this for a child
Selection:	the idea is that the corticosteroid controls itching and the lidocaine controls the pain. The aluminium acetate is a soothing component. An applicator is supplied so that the ointment can be applied within the rectum if required. The usual indication is painful or irritant haemorrhoids, but the preparation is also useful for symptomatic relief from an anal fissure or troublesome pruritus ani

Cardiovascular system

[2.11] Tranexamic acid

Class:	Antifibrinolytic (inhibits the natural destruction of fibrin in clots)
Tablets:	500 mg
Dose:	adults: 2 tablets three times a day
Pack:	60
$t_{1/2}$:	2 h after intravenous (IV) injection (the duration of action of tablets will depend on the rate of absorption)
Side-effects:	nausea, vomiting, diarrhoea (these often resolve if the dose is reduced), disturbance of colour vision (discontinue), rarely thrombotic events (discontinue)
Interactions:	counteracts fibrinolytic drugs, such as streptokinase
Cautions:	do not prescribe to anyone with a history of thromboembolic disease. Lower doses are required in renal impairment. There is no evidence of harm during pregnancy or breast-feeding, but the manufacturer advises caution
Selection:	this is one of the few non-hormonal treatments for menorrhagia. Tranexamic acid causes a greater reduction of heavy menstrual bleeding and no increase in side-effects when compared with placebo or other medical therapies (NSAIDS, oral progestogens and etamsylate). It is probably underused because of misplaced fears about causing thrombosis. Long-term studies in Sweden have shown that the rate of thrombosis in women treated with tranexamic acid is comparable with the spontaneous background frequency

Reference

- Lethaby A, Farquhar C and Cooke I (2000) Antifibrinolytics for heavy menstrual bleeding (Cochrane Review). *The Cochrane Library, Issue 4, 2000*. Update Software, Oxford.

Respiratory system

[3.1.1] Salbutamol CFC-free and Salamol Easi-Breathe[®] inhaler (NPEF)

Class:	β_2 adrenoceptor agonist (mimics the action of adrenaline at the β_2 receptors in the lungs)
Inhaler:	100 μ g per dose
Nebuliser solution:	2.5 mg/2.5 ml, 5 mg/2.5 ml
Dose:	inhaler: adult 2 doses, child 1–2 doses nebuliser: adult 5 mg, child 2.5 mg These doses can be repeated up to four times in a day if required, but follow the BTS asthma guidelines for appropriate treatment of persistent symptoms
Pack:	1 inhaler or 20 ampoules of nebuliser solution
$t_{1/2}$:	5 (4–6) h
Side-effects:	fine tremor (particularly hands), nervous tension, headache, tachycardia, hypokalaemia, disturbance of sleep and behaviour in children, allergic reactions including paradoxical bronchospasm with exacerbation of wheezing shortly after receiving a dose of salbutamol (discontinue and substitute ipratropium bromide)
Interactions:	high doses of salbutamol can cause dangerous hypokalaemia, particularly in combination with corticosteroids, diuretics, theophylline or hypoxia. Patients needing salbutamol should not be taking a beta-blocker (which has the opposite action), especially a non-selective one such as propranolol. Salbutamol possibly reduces plasma concentration of digoxin
Cautions:	patients finding that salbutamol is not relieving their symptoms should seek medical advice and be treated according to the BTS guidelines. Increasing frequency of use of salbutamol suggests

continued opposite

deteriorating asthma in need of anti-inflammatory treatment with inhaled or oral corticosteroids. Caution is needed when prescribing for patients with hyperthyroidism, ischaemic heart disease, arrhythmias, hypertension, or any predisposing factors to hypokalaemia

Selection: Short-acting β_2 adrenoceptor agonists are the first step in the management of asthma. Nebulisers offer no advantage over spacer devices for delivery, but some patients, who are either young children or frightened adults, find the nebuliser easier. Ideally use a spacer device. If you have to use a nebuliser, it should be driven by pressurised oxygen. Easi-Breathe is the inhaler device most liked by patients, but is several times the cost of the standard inhaler when it contains salbutamol, however the steroid versions are the same price. If the patient uses a regular inhaled steroid, prescribe the same type of inhaler for their salbutamol

References

- Cates CJ, Bara A, Crilly JA and Rowe BH (2003) Holding chambers versus nebulisers for beta-agonist treatment of acute asthma (Cochrane Review). *The Cochrane Library, Issue 2, 2003*. Update Software, Oxford.
- Lenney J, Innes JA and Crompton GK (2000) Inappropriate inhaler use: assessment of use and patient preference of seven inhalation devices. *Resp Med* **94**: 496–500.

[3.1.5] AeroChamber Plus® (OTC)

- Class:** medium-sized spacer device
- Device:** standard adult (blue), with mask (blue), child device with mask (yellow), infant device with mask (orange)
- Cautions:** advise that the device should be washed no more often than once a month and is best left to dry in the air because wiping with a cloth creates a static electric charge on the plastic which can affect drug delivery. Replace the device every year
- Selection:** spacer devices reduce the need for co-ordination when using metered dose inhalers and slow the speed of the aerosol spray, improving the deposition of the drug in the lungs, with less being sprayed directly onto the back of the throat. However, a study in the elderly concluded that breath-activated and dry powder inhalers were more likely to be used correctly than metered-dose inhalers with large volume spacers. AeroChamber Plus works with a wide variety of inhalers and is available in a range to suit children. The *BNF* says that larger devices with one-way valves work better, but a systematic review of inhaler devices shows no difference in efficacy. In our experience, any theoretical advantage of large volume spacers may be outweighed by problems with compliance. The noise of the valve moving in the large spacers disturbs some younger users, and adults find them cumbersome to use anywhere away from home

References

- Jones V, Fernandez C and Diggory P (1999) A comparison of large volume spacer, breath-activated and dry powder inhalers in older people. *Age Ageing* **28**: 481–4.
- MeReC (1995) Inhaler devices: an update. *MeReC Bulletin* **6**: 1–4.
- Centre for Reviews and Dissemination. Inhaler devices for the management of asthma and COPD. Centre for Reviews and Dissemination, York, **12**.

[3.1.5] Peak flow meter (OTC)

Class:	disease-monitoring device
Device:	standard range for adults and children, low range for adults who can only manage peak flows less than 400 l/minute or children
Cautions:	children under 5 years of age cannot reliably use a peak flow meter, and older ones cannot be expected to keep an accurate record of their readings
Selection:	all peak flow meters available on an NHS prescription now conform to a European standard (EN 13826), so it does not matter which one you choose. (Part of the standard is that the meter should measure flows up to 800 l/min, technically all paediatric meters fail to conform, but the point is academic.) Standard ranges of peak flow have changed to match the new meters. Details can be found at www.peakflow.com . A small digital device (Piko-1) is now available at a slightly higher cost. An asthma management plan, whereby the patient knows what to do if their condition starts to deteriorate, is what matters, rather than whether it is based on symptoms or peak flow readings

References

- Powell H and Gibson PG (2002) Options for self-management education for adults with asthma (Cochrane Review). *The Cochrane Library, Issue 3, 2002*. Update Software, Oxford.
- Kamps AW, Roorda RJ and Brand PL (2001) Peak flow diaries in childhood asthma are unreliable. *Thorax* **56**: 180–2.

[3.2] Beclometasone inhaler and Beclazone Easi-Breathe®

Class:	inhaled adrenocortical steroid
Inhaler:	50, 100 and (in the standard inhaler only) 200 µg per dose
Dose:	see text on acute asthma (page 24), 100–800 µg/day
Pack:	200-dose inhaler
$t_{1/2}$:	30 minutes. What matters clinically is that the time to maximum effect of the first dose is 2–8 h by whatever route the adrenocortical steroid is administered. Maximum effect of repeated doses of inhaled beclometasone may not be achieved for 3 to 7 days
Side-effects:	may precipitate oral thrush (in which case use a spacer and rinse mouth after use); rarely: paradoxical bronchospasm, glaucoma, cataracts
Interactions:	none
Cautions:	tuberculosis (quiescent disease may be reactivated), high doses may induce adrenal suppression (patients on doses over 800 µg/day should be issued with a steroid card), children's height monitored and adults considered for monitoring of bone mineral density
Selection:	at equipotent doses, the type of adrenocortical steroid makes no difference to its effectiveness. This is the reason why national guidelines recommend prescribing the cheapest. The delivery system should suit the patient and there is virtually no difference in cost between the standard and the Easi-Breathe steroid inhalers

Reference

- Iwasaki E and Baba M (1993) [Pharmacokinetics and pharmacodynamics of hydrocortisone in asthmatic children]. [Japanese] *Arerugi – Japanese Journal of Allergology* **42**: 1555–62.

[3.4.1] Fexofenadine (NPEF)

Class:	histamine (H ₁) receptor blocker
Tablets:	120 mg
Dose:	adults and children over 12 years: 120 mg once a day children 6–11 years: 30 mg twice a day
Pack:	30 (120 mg tablets); 60 (30 mg tablets)
$t_{1/2}$:	14 (11–15) h
Side-effects:	incidence of sedation is low but it is still worth warning drivers to be alert to the slight possibility of drowsiness or dizziness
Interactions:	erythromycin and ketoconazole increase plasma levels of fexofenadine by 2 to 3 times, but no adverse effects of this are reported. Antacids containing aluminium or magnesium hydroxide (not trisilicate) are known to reduce absorption of fexofenadine (use an alternative antacid or leave 2 h between the antacid and the fexofenadine doses). Theoretical antagonism of betahistine
Cautions:	pregnancy, breast-feeding, porphyria
Selection:	fexofenadine is the active metabolite of terfenadine, but free of its potential to induce arrhythmias. So if the patient says that terfenadine used to control their hay fever well, try fexofenadine. All non-sedating antihistamines have a low risk of causing drowsiness, but fexofenadine and loratadine have a lower incidence of sedation than cetirizine or acrivastine

Reference

- Mann RD, Pearce GL, Dunn N, Shakir S and Ferner RE (2000) Sedation with 'non-sedating' antihistamines: four prescription-event monitoring studies in general practice. *BMJ* **320**: 1184–7.

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[3.4.1] Loratadine (OTC)

Class:	histamine (H ₁) receptor blocker
Tablets:	10 mg
Liquid:	5 mg/5 ml
Dose:	adults and children over 6 years: 10 mg daily children 2–5 years: 5 mg daily
Pack:	30 tablets; 100 ml liquid
<i>t</i> _{1/2} :	15 h
Side-effects:	incidence of sedation is low but it is still worth warning drivers to be alert to the slight possibility of drowsiness or dizziness
Interactions:	cimetidine, erythromycin, ketoconazole and possibly fluconazole, fluoxetine, amprenavir and quinidine, may increase plasma levels of loratadine or the interacting drug, and could cause adverse effects from either. Theoretical antagonism of betahistine
Cautions:	pregnancy, breast-feeding

[3.4.1] Chlorphenamine (OTC)

Class:	histamine (H ₁) receptor blocker
Tablets:	4 mg
Liquid:	2 mg/5 ml
Dose:	although the doses below are quoted in the <i>BNF</i> , the long half-life of chlorphenamine means that a single dose can suffice in most individuals adults: 4 mg every 4–6 h, maximum 24 mg daily children 1–2 years: 1 mg twice a day 2–5 years: 1 mg every 4–6 h, maximum 6 mg daily 6–12 years: 2 mg every 4–6 h, maximum 12 mg daily
Pack:	any number of tablets (usually about 20); 150 ml liquid
$t_{1/2}$:	18 (11–33) h, with considerable variability between individuals
Side-effects:	drowsiness may affect performance of skilled tasks, e.g. driving; headache, psychomotor impairment, dry mouth, blurred vision, urinary retention and gastrointestinal disturbances; occasionally allergic reactions such as rashes or photosensitivity; rarely paradoxical stimulation. Children and elderly people are particularly susceptible to side-effects
Interactions:	sedatives (including alcohol), monoamine oxidase inhibitors (MAOIs) and tricyclic antidepressants, quinidine
Cautions:	prostatic hypertrophy, urinary retention, glaucoma, hepatic or renal disease, epilepsy. Allow enough time for the effects to wear off before the patient returns to any activity that could be dangerous under sedation

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Selection: chlorphenamine is useful when sedation is helpful, such as disruption of sleep caused by skin irritation or cough. The sedative effect is not mediated by blocking histamine, but by other actions of the drug

References

- Yasuda SU, Zannikos P, Young AE *et al.* (2002) The roles of CYP2D6 and stereoselectivity in the clinical pharmacokinetics of chlorpheniramine. *Br J Clin Pharmacol* **53**(5): 519–25.
- Simons KJ, Martin TJ, Watson WT and Simons FE (1990) Pharmacokinetics and pharmacodynamics of terfenadine and chlorpheniramine in the elderly. *J Allergy Clin Immunol* **85**: 540–7.

[3.8] Menthol and eucalyptus (OTC)

Class: aromatic inhalation

Liquid: race- or levo- menthol 2 g, eucalyptus oil 10 ml, light magnesium carbonate 7 g, water to 100 ml

Dose: add one teaspoonful to a pint of hot water and inhale vapour

Pack: 100 ml

Side-effects: only scalds from spilling the water

Interactions: none

Cautions: use hot, not boiling, water, may induce apnoea in infants less than 3 months

Selection: the ingredients encourage the inhalation of water vapour, which can be soothing in bronchitis or sinusitis, and may also have a useful placebo action. Inhaler devices are available for about £7 which may reduce the risk of scalding

[3.9.1] Pholcodine (OTC)

Class:	cough suppressant
Linctus:	5 mg/5 ml or 10 mg/5 ml (sugar-free available)
Dose:	adults: 5–10 mg, three to four times daily
Pack:	100 ml
$t_{1/2}$:	50 (32–54) h
Side-effects:	may dry the bronchial mucosa and thicken sputum; constipation; in large doses respiratory depression
Interactions:	sedatives (including alcohol), mexiletine, MAOIs, antidepressants
Cautions:	asthma, hepatic and renal impairment, history of drug abuse
Selection:	before prescribing, ask yourself if it is appropriate to try to reduce the coughing. Adults may be distressed by a dry, unproductive cough. Pholcodine, as the name suggests, is an opioid. Part of the anti-tussive effect is by sedation of the central nervous system part of the cough reflex. In children, coughing is usually helpful, but if necessary a sedative antihistamine is more effective at providing some rest at night than pholcodine. Note the long half-life means that doses could be less frequent than usually recommended

References

- Chen ZR, Bochner F and Somogyi A (1988) Pharmacokinetics of pholcodine in healthy volunteers: single and chronic dosing studies. *Br J Clin Pharmacol* **26**: 445–53.
- Findlay JW (1988) Pholcodine. [Review] *J Clin Pharma Ther* **13**: 5–17.

[3.9.2] Simple linctus (OTC)

Class:	demulcent cough linctus
Linctus:	adults: citric acid monohydrate 2.5% in a suitable vehicle with anise flavour; children: citric acid monohydrate 0.625% in a suitable vehicle with anise flavour
Dose:	adults: 5 ml of adult linctus four times daily children 6–12 years: 10 ml of paediatric linctus four times daily 2–5 years: 5 ml of paediatric linctus four times daily
Pack:	100 ml
$t_{1/2}$:	not applicable
Side-effects:	none
Interactions:	none
Cautions:	none
Selection:	a demulcent is a substance that coats mucous membranes to allay irritation. Simple linctus contains soothing substances that may help patients to tolerate a dry irritating cough without any risk of side-effects. Note this is quite different from expectorants, which aim to promote the coughing up of sputum. There is no evidence of effectiveness of any OTC cough linctus. Quite often patients attend because of a persisting cough for which they are taking an expectorant-type of cough medicine inappropriately; all that is required is to stop the expectorant

References

- Schroeder K and Fahey T (2002) Should we advise parents to administer over the counter cough medicines for acute cough? Systematic review of randomised controlled trials. *Arch Dis Child* **86**: 170–5.
- Schroeder K and Fahey T (2002) Systematic review of randomised controlled trials of over the counter cough medicines for acute cough in adults. *BMJ* **324**: 329–31.

Nervous system

[4.1.1] Temazepam

Class:	benzodiazepine hypnotic
Tablets:	10 mg
Dose:	one at night
Pack:	28, but limit prescriptions to 7 tablets
$t_{1/2}$:	men: 8 (7–15) h, women: 17 h, overall range: 7–38 h
Side-effects:	drowsiness and lightheadedness the next day; confusion, paradoxical agitation and ataxia (especially in the elderly); addiction from long-term use
Interactions:	enhanced sedation with other sedatives including alcohol, opiates, tricyclic antidepressants, antihistamines, antipsychotics, disulfiram, lofexidine, baclofen, tizanidine, cimetidine
Cautions:	potentially addictive, may cause daytime drowsiness the following day and affect driving, enhances the effect of alcohol. Do not use in those with chronic chest disease, liver or renal disease, or in pregnancy or breastfeeding
Selection:	hypnotics are occasionally very useful for short-term relief of insomnia – usually related to psychological stress, but are not suitable for long-term use because of the risk of addiction and the fact that there is often a better, non-pharmacological, solution to the problem. Temazepam has the advantage of being one of the shorter acting hypnotics and is therefore less likely to cause drowsiness the next day, although it is not free of this risk, particularly in women. Be careful to warn patients that it may impair their driving ability the next morning. Age does not seem to affect the duration of action of the drug, but the elderly are more susceptible to side-effects. Tolerance does not appear to be a problem

continued overleaf

References

- Divoll M, Greenblatt DJ, Harmatz JS and Shader RI (1981) Effect of age and gender on disposition of temazepam. *J Pharm Sci* **70**: 1104–7.
- van Steveninck AL, Wallnofer AE, Schoemaker RC *et al.* (1997) A study of the effects of long-term use on individual sensitivity to temazepam and lorazepam in a clinical population. *Br J Clin Pharmacol* **44**: 267–75.

[4.6] Prochlorperazine (buccal tablets OTC to people over 18 years, limited amount)

Class:	phenothiazide type anti-emetic
Tablets:	5 mg
Buccal tablets:	3 mg
Liquid:	5 mg/5 ml
Suppositories:	5, 25 mg
Dose:	adults only tablets/liquid labyrinthitis: 5 mg three times daily initially acute nausea/vomiting: 20 mg initially, 10 mg after 2 h prevention of nausea/vomiting: 5–10 mg three times daily buccal tablets: 1 or 2 tablets twice a day, place high between upper lip and gum and leave to dissolve (buccal 3 mg twice daily is equivalent to an oral dose of 5 mg three times daily) suppositories: 25 mg inserted into rectum followed by oral dose after 6 h as above <i>or</i> for migraine, 5 mg suppository three times a day
Pack:	no specific pack size of tablets (usually about 20); 100 ml liquid; 10 suppositories; 50 buccal tablets
$t_{1/2}$:	8 (6–10) h
Side-effects:	for a full list see the <i>BNF</i> under chlorpromazine, but in practice the only common one is drowsiness, and very occasionally severe dystonic reactions (see below)

continued opposite

- Interactions:** enhanced sedation with other sedatives including alcohol, desferrioxamine, dopaminergic drugs in Parkinson's disease (e.g. levodopa), lithium
- Cautions:** may cause severe dystonic reactions (abnormal face and body movements). This is rare, but more common in teenagers and young adults (acute 'oculogyric' reactions), the elderly (delayed Parkinsonian-type reactions), and the risk may be exacerbated by a concurrent viral illness. It is therefore wise to avoid prescribing prochlorperazine for these groups
- Selection:** prochlorperazine is useful when sedation is helpful in addition to an anti-emetic action. Often the distress of feeling nauseous is a major part of the problem and a degree of sedation is welcome. As the end of the drug name implies, this belongs to the phenothiazine group of drugs, other members of which are used as antipsychotics. Thus it is no surprise that prochlorperazine is liable to give rise to central nervous system side-effects, and this is what limits its use

References

- Isah AO, Rawlins MD and Bateman DN (1991) Clinical pharmacology of prochlorperazine in healthy young males. *Br J Clin Pharmacol* **32**: 677–84.
- Schumock GT and Martinez E (1991) Acute oculogyric crisis after administration of prochlorperazine. *South Med J* **84**: 407–8.
- Hessel PG, Lloyd-Jones JG, Muir NC, Parr GD and Sugden K (1989) A comparison of the availability of prochlorperazine following i.m., buccal and oral administration. *Int J Pharmaceutics* **52**: 159–64.

[4.6] Domperidone (OTC, limited amount, promoted for dyspepsia rather than nausea, NPEF)

Class:	dopamine (D ₂) receptor blocker
Tablets:	10 mg
Liquid:	5 mg/5 ml
Suppositories:	30 mg
Dose:	adults only: oral: 10–20 mg every 4–8 h rectal: 60 mg twice daily
Pack:	30 tablets; 200 ml liquid; 10 suppositories
$t_{1/2}$:	7 h
Side-effects:	raised prolactin concentrations (possible breast tissue enlargement and leakage of milk from the nipples); occasionally reduced libido and, very rarely acute dystonic reactions
Interactions:	antagonised by opioid analgesics, increased absorption of paracetamol
Cautions:	avoid in liver disease and pregnancy, reduce dose in renal impairment
Selection:	because domperidone does not cross the blood–brain barrier, the acute dystonic reactions seen with metoclopramide and prochlorperazine are much less likely to occur. It blocks peripheral D ₂ receptors, including those in the chemoreceptor trigger zone. It is a logical choice to minimise drug-induced nausea (e.g. associated with post-coital contraception) when sedation is not required and minimising the risk of side-effects is paramount

Reference

- Barone JA (1999) Domperidone: a peripherally acting dopamine₂-receptor antagonist. [Review] *Ann Pharmacother* **33**: 429–40.

[4.7.1] Aspirin (OTC)

Class:	antiplatelet agent
Tablets:	75 mg, 300 mg (dispersible also available)
Dose:	adults, ideally taken with or after food anti-thrombotic use 75–300 mg daily (usually 75 mg daily for long-term use, and 300 mg as the first dose for acute chest pain)
Pack:	28
$t_{1/2}$:	2–3 h, but the effect of 300 mg lasts up to 3 days
Side-effects:	high incidence of gastrointestinal irritation with slight asymptomatic blood loss, increased bleeding time, bronchospasm and skin reactions in hypersensitive patients
Interactions:	important interaction with warfarin, avoid co-prescribing with NSAIDs or methotrexate, increased risk of bleeding with selective serotonin reuptake inhibitor (SSRI), antidepressants, clopidogrel or adrenocorticosteroids
Cautions:	<i>not for use by children under 16 years</i> ; caution in those with allergy, peptic ulcer, gout, pregnancy, breastfeeding, asthma (a small proportion of asthmatic patients find that aspirin worsens their symptoms; occasionally this can be severe)
Selection:	aspirin disables an enzyme essential to the action of platelets sticking together. As platelets have no cell nucleus, they never recover this ability, but 10% of the platelet population is replaced daily. A single dose of 300 mg inhibits all platelets, 75 mg inhibits about 30% and can be used to maintain antiplatelet action. Platelet function is restored to near normal 24 h after stopping aspirin by the 10% of newly formed platelets, so missing a dose or two can cause the protection against strokes and heart attacks to be lost

Reference

- Furukawa K and Hitoshi O (2004) Inhibition of platelet aggregation with aspirin falls quickly at 1 day after discontinuation and vanished after 3 days. *J Thorac Cardiovasc Surg* **127**: 1814–15.

[4.7.1] Paracetamol (OTC)

Class:	non-opioid analgesic
Tablets:	500 mg
Soluble tablets:	500 mg Paediatric soluble tablets: 120 mg
Liquid:	250 mg/5 ml, 120 mg/5 ml
Suppositories:	60, 125, 250, 500 mg
Dose:	all up to four times a day, by mouth or by rectum adults: 500–1000 mg children 6–12 years: 250–500 mg 1–5 years: 120–250 mg 3 months–1 year: 60–120 mg
Pack:	no specific pack size of tablets (usually about 28); 100 ml liquid; 10 suppositories
$t_{1/2}$:	2 (1–3) h
Side-effects:	overdose is the only serious problem
Interactions:	prolonged regular use possibly enhances warfarin, colestyramine reduces absorption of paracetamol, whereas metoclopramide, domperidone and sodium bicarbonate can accelerate it
Cautions:	overdosage with paracetamol is particularly dan- gerous as it may cause hepatic damage which is sometimes not apparent for 4 to 6 days. Legislation to limit the pack sizes available over the counter has reduced the number of deaths and large over- doses, so prescribing a limited supply for acute self- limiting conditions may help achieve the same aim. Pre-existing liver disease or taking enzyme- inducing drugs (including alcohol) makes the potential for toxic effects greater. Although para- cetamol is often given to babies under 3 months of age to prevent or treat post-immunisation pyrexia, it is questionable whether this is necessary. Neonates absorb and eliminate paracetamol differently from older children and adults, but toxic effects from paracetamol are most unlikely

continued opposite

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Selection: paracetamol is virtually free of side-effects when taken in the normal dose range

References

- Arana A, Morton NS and Hansen TG (2001) Treatment with paracetamol in infants. [Review] *Acta Anaesthesiol Scand* **45**: 20–9.
- Isbister GK, Bucens IK and Whyte IM (2001) Paracetamol overdose in a preterm neonate. *Arch Dis Child Fetal Neonatal Ed* **85**: F70–F72.
- Hawton K, Simkin S, Deeks J *et al.* (2004) UK legislation on analgesic packs: before and after study of long term effect on poisonings *BMJ* **329**: 1076–9.

[4.7.1] Paradote® (OTC)

Class: non-opioid analgesic

Tablets: 500 mg paracetamol, 100 mg methionine

Dose: adults: 500–1000 mg up to four times a day

Pack: 24

$t_{1/2}$: 2 (1–3) h (paracetamol)

Side-effects: most unlikely

Interactions: as for paracetamol, plus levodopa and MAOI-type antidepressants

Cautions: liver or renal disease, pregnancy or lactation

Selection: paracetamol is involved in 20% of all deaths from overdose and poisoning in England and Wales, and is the only drug taken in an average of 175 cases of fatal overdose per year. If you have *any* concern about prescribing paracetamol to a person at risk, consider discussing with them the option of Paradote, which contains the antidote methionine

Reference

- Zakyeya A and Majeed A (2000) Paracetamol related deaths in England and Wales, 1993–97. *Health Statistics Quarterly, London* **7**: 5–9.

[4.7.2] Codeine phosphate

Class:	opioid analgesic
Tablets:	30 mg
Dose:	adults: 30 mg when required up to 4-hourly
Pack:	no specific pack size of tablets (usually about 20)
$t_{1/2}$:	3 h
Side-effects:	constipation, nausea, dependence, may cause drowsiness, respiratory depression, hypotension, difficulty with micturition and a variety of rare side-effects listed in the <i>BNF</i> under morphine
Interactions:	sedatives (including alcohol), MAOI-type anti-depressants, cimetidine, reduced action of domperidone and metoclopramide on the gut
Cautions:	avoid in significant respiratory, renal or liver (including biliary) disease, or after a head injury, or in the third trimester of pregnancy; may exacerbate urinary obstructive symptoms, or confusion in elderly or debilitated. To take this drug abroad, patients may require a letter from their doctor stating that it is a necessary medication
Selection:	codeine is effective at improving the analgesia provided by paracetamol, but only if it is taken in an adequate dose. The best dose to balance effectiveness against side-effects is 30 mg. Fixed combination tablets contain paracetamol/codeine in ratios of 500/8 mg or 500/30 mg, which makes it impossible to achieve the best dose of each analgesic. In prescribing codeine separately, you can give the patient the freedom to match the analgesic they take to the degree of pain: paracetamol alone for mild pain, codeine alone for more moderate, or both for more severe pain. Minimising the need to take the codeine with every dose minimises the side-effects. Dihydrocodeine offers no advantages over codeine. The codeine group of analgesics can increase biliary spasm, so are not suitable to relieve biliary colic. NSAIDs (such as ibuprofen) are preferable for inflammatory conditions, or dental pain

continued opposite

References

- Moore A, Collins S, Carroll D and McQuay H (1997) Paracetamol with and without codeine in acute pain: a quantitative systematic review. [Review] *Pain* **70**: 193–201.
- Mehlisch D, Frakes L, Cavaliere MB and Gelman M (1984) Double-blind parallel comparison of single oral doses of ketoprofen, codeine, and placebo in patients with moderate to severe dental pain. *J Clin Pharmacol* **24**: 486–92.

Infections

[5.1.1] Phenoxyethylpenicillin (Penicillin V)

Class:	narrow-spectrum, bactericidal antibiotic
Tablets:	250 mg
Liquid:	125 mg/5 ml, 250 mg/5 ml
Dose:	all four times a day, an hour before food or on an empty stomach adults: 500 mg, increased to 1000 mg in severe infections children 6–12 years: 250 mg 1–5 years: 125 mg up to 1 year: 62.5 mg
Pack:	28; 100 ml; but the usual prescription for streptococcal tonsillitis in adults is 80 tablets
$t_{1/2}$:	45 (30–60) minutes
Side-effects:	hypersensitivity reactions including urticaria, fever, joint pains, rashes, angio-oedema, and in severe cases anaphylaxis; interstitial nephritis; antibiotic-associated diarrhoea, reduction in platelet, white or red blood cell counts, increased risk of bleeding, rarely convulsions
Interactions:	phenoxyethylpenicillin is not a broad-spectrum antibiotic and therefore does not affect the combined oral contraceptive or warfarin
Cautions:	penicillin allergy, lower doses may be needed in renal impairment

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Selection: phenoxymethylpenicillin is useful for treating streptococcal tonsillitis, but the absorption is too variable for the antibiotic to be reliably used for serious infections or those needing fast onset of action. Note the adult dose recommended by authorities in the UK starts at 500 mg four times daily. Otherwise the variable absorption can result in subtherapeutic blood level, leading to treatment failure and the risk of developing resistant bacteria. Prescribing a 10-day course may reduce the chance of recurrence of the infection

References

- Scottish Intercollegiate Guidelines Network (SIGN) www.sign.ac.uk/guidelines/fulltext/34/section5.html (accessed 13 June 2005).
- British Medical Association and Royal Pharmaceutical Society of Great Britain (2004) *British National Formulary*. British Medical Association and Royal Pharmaceutical Society of Great Britain, London, **48**: 270.

[5.1.1.2] Flucloxacillin (NPEF)

Class:	β -lactamase-resistant narrow-spectrum bactericidal antibacterial
Capsules:	250, 500 mg
Oral solution:	125 mg/5 ml, 250 mg/5 ml
Dose:	all four times a day, an hour before food or on an empty stomach, doses may be doubled in severe infection adults and children over 10 years: 250 mg children 2–10 years: 125 mg up to 2 years: 62.5 mg
Pack:	no specific number of capsules per pack, liquid 100 ml, but usual prescription is for 28 capsules, or 140 ml of liquid
$t_{1/2}$:	1 h
Side-effects:	see phenoxymethylpenicillin above; rarely hepatitis, cholestatic jaundice which can develop several weeks after the course (the risk is greater for courses longer than two weeks and for older patients)
Interactions:	flucloxacillin is a narrow-spectrum antibiotic and therefore does not affect the combined oral contraceptive or warfarin
Cautions:	penicillin allergy, porphyria, children may not like the taste – co-amoxiclav is then an alternative, though broader spectrum
Selection:	this is the standard treatment against staphylococcal infections

References

- Miros M, Kerlin P, Walker N and Harris O (1990) Flucloxacillin induced delayed cholestatic hepatitis. *Aust N Z J Med* **20**: 251–3.
- Matsui D, Barron A and Rieder MJ (1996) Assessment of the palatability of antistaphylococcal antibiotics in pediatric volunteers. *Ann Pharmacother* **30**: 586–8.

[5.1.1.3] Amoxicillin (NPEF)

Class:	broad-spectrum, bactericidal antibacterial
Capsules:	250, 500 mg
Liquid:	125 mg/1.25 ml, 125 mg/5 ml, 250 mg/5 ml
Dose:	for general infections: dose three times a day, may be doubled in severe infection adults and children over 10 years: 250 mg children up to 10 years: 125 mg or for dental abscess in adults: 3 g repeated after 8 h
Pack:	21; 100 ml; 20 ml of paediatric liquid 125 mg/1.25 ml
$t_{1/2}$:	1 h
Side-effects:	nausea, diarrhoea, rashes, allergic reactions; also see phenoxymethylpenicillin above
Interactions:	warfarin effect may be altered, slight reduction in efficacy of combined oral contraceptive pill
Cautions:	allergy, glandular fever (may cause rash), reduce dose in renal impairment
Selection:	amoxicillin is a broad-spectrum antibacterial suitable for treating a wide variety of infections. It is better absorbed than ampicillin and not affected by food. The paediatric liquid (125 mg/1.25 ml) is available in peach, strawberry and lemon flavours; the standard liquid is banana flavoured. The choice may help concordance but we have found no research into this, which is surprising given the 29% non-concordance reported for amoxicillin liquids taken by children. The cost of the paediatric liquid (125 mg/1.25 ml) is three times more than the standard liquid form

References

- Hoppe JE and Wahrenberger C (1999) Compliance of pediatric patients with treatment involving antibiotic suspensions: A pilot study. *Clin Ther* **21**: 1193–201.
- Adam D (1994) Advances in the treatment with amoxicillin in childhood. *Sozialpädiatrie und Kinderärztliche Praxis* **16**: 463–6.

[5.1.1.3] Co-amoxiclav

Class:	β -lactamase-resistant broad-spectrum bactericidal antibacterial; a combination of amoxicillin and clavulanic acid
Tablets:	250/125 mg (= 375 mg) or 500/125 mg (= 625 mg)
Liquid:	400/57 mg in 5 ml
Dose:	adults: 375 mg three times a day, increased to 625 mg in severe infections children using 400/57 mg suspension: (be careful to specify the strength of the suspension as there are several types) 7–12 years: 5 ml twice a day 2–6 years: 2.5 ml twice a day 2 months–2 years: 0.15 ml <i>per kg</i> twice a day
Pack:	21; 35, 70 ml
$t_{1/2}$:	1 h (amoxicillin)
Side-effects:	nausea, diarrhoea, rashes, hepatitis, cholestatic jaundice: 1 in 6000 risk of liver damage (greater risk in men over 65 years of age, and with courses lasting over 2 weeks, but rare in children); also see phenoxymethylpenicillin above
Interactions:	warfarin effect may be altered, slight reduction in efficacy of combined oral contraceptive pill
Cautions:	penicillin allergy, liver or renal impairment
Selection:	clavulanic acid is itself a β -lactam and can distract β -lactamase away from penicillins by acting as a suicide inhibitor, swamping the enzyme with false targets. Co-amoxiclav is useful when the broad spectrum of amoxicillin is required, but β -lactamase-producing organisms, such as <i>Staph. aureus</i> , <i>H. influenzae</i> , <i>M. catarrhalis</i> , <i>E. coli</i> or <i>Bacteroides</i> , may be involved. It is the first choice for infected animal and human bites. If there is no likelihood of penicillin-resistant infection, use plain amoxicillin instead because it is safer and much cheaper

References

- Medicines and Healthcare Products Regulatory Agency/Committee on Safety of Medicines (1997) *Curr Probl Pharmacovigilance* **23**: 5–8.
- Garcia Rodriguez LA, Stricker BH and Zimmerman HJ (1996) Risk of acute liver injury associated with the combination of amoxicillin and clavulanic acid. *Arch Intern Med* **156**: 1327–33.

[5.1.2] Cefalexin

Class:	cephalosporin β -lactamase-resistant broad-spectrum bactericidal antibacterial
Tablets or capsules:	250, 500 mg
Liquid:	125 mg/5 ml, 250 mg/5 ml
Dose:	adults: 250 mg four times a day, <i>or</i> 500 mg two to three times a day children 6–12 years: 250 mg three times a day 1–5 years: 125 mg three times a day under 1 year: 125 mg twice a day
Pack:	28 (250 mg); 21 (500 mg); 100 ml
$t_{1/2}$:	1 h
Side-effects:	rare, but there may be allergy in people allergic to penicillin (10% cross-over) including rashes, fever and joint pains; diarrhoea and, rarely, antibiotic-associated colitis, especially with high doses; or, with courses longer than 2 weeks, reduced white cells or platelets, liver or kidney damage which should recover once the drug is stopped
Interactions:	warfarin effect may be altered, slight reduction in efficacy of combined oral contraceptive pill
Cautions:	penicillin sensitivity, renal impairment, porphyria. The efficacy of this antibiotic can be impaired by storage at high room temperatures
Selection:	cephalosporins are similar to β -lactamase-resistant penicillins in their action and their clinical use. Cefalexin is useful in treating urinary tract infections in pregnancy where the sensitivity of the infecting organism is not yet known and trimethoprim is not licensed for use

Reference

- Crichton B (2004) Keep in a cool place: exposure of medicines to high temperatures in general practice during a British heatwave. *J R Soc Med* **97**: 328–9.

[5.1.3] Doxycycline (NPEF)

Class:	tetracycline broad-spectrum bacteriostatic anti-bacterial
Capsules or dispersible tablets:	100 mg
Dose:	adults: 200 mg on first day, then 100 mg daily; capsules should be swallowed whole with plenty of fluid during meals, while sitting or standing, and at least 1 h before retiring to bed
Pack:	8
$t_{1/2}$:	16 (12–24) h (probably decreased by alcohol)
Side-effects:	photosensitivity (minimise exposure to strong sunlight or sunlamps), nausea, vomiting, dysphagia and oesophageal irritation (hence the instruction about how to take the medication); diarrhoea and rarely antibiotic-associated colitis; very rarely headache and visual disturbances which may indicate 'benign' intracranial hypertension, also rarely reported cases of hypoglycaemia in non-diabetic people
Interactions:	antacids (also quinapril which contains magnesium carbonate), iron, zinc, oral bismuth chelate (Pepto-Bismol® or De-Nol®), warfarin, antiepileptics, barbiturates, alcohol, rifampicin, slight reduction in efficacy of combined oral contraceptive pill; avoid prescribing with ciclosporin or retinoids; avoid prescribing this bacteriostatic drug with a bactericidal antibiotic such as a penicillin, because the two mechanisms of action interfere with each other
Cautions:	avoid prescribing in pregnancy , breastfeeding, hepatic impairment, systemic lupus erythematosus (SLE), porphyria. Not for children under 12 years of age
Selection:	doxycycline is well absorbed from the gut and not affected by food, or calcium-rich food which does affect other tetracyclines. It is eliminated via the bile and the faeces as well as in the urine, so there is no need to adjust the dose in mild or moderate renal impairment

References

- Digre KB (2003) Not so benign intracranial hypertension. *BMJ* **326**: 613–14.
- Lochhead J and Elston JS (2003) Doxycycline induced intracranial hypertension. *BMJ* **326**: 641–2.
- Al-Mofarreh MA and Al Mofleh IA (2003) Esophageal ulceration complicating doxycycline therapy. *World J Gastroenterol* **9**: 609–11.

[5.1.5] Erythromycin (NPEF)

Class:	macrolide bacteriostatic antibiotic
Enteric-coated tablets:	250, 500 mg
Liquid:	125 mg/5 ml, 250 mg/5 ml
Dose:	all four times a day, may be doubled for severe infections adults and children 8 years or older: 250 mg (enteric-coated tablets) children (liquid) 2–8 years: 250 mg up to 2 years: 125 mg
Pack:	no specific number of tablets per pack but usual prescription is for 20–28; 100 ml or 140 ml
$t_{1/2}$:	2 h
Side-effects:	nausea or vomiting (20% of patients), abdominal discomfort, diarrhoea (mainly after large doses), antibiotic-associated colitis; allergic reactions; reversible hearing loss also reported after large doses; if given for more than 14 days may occasionally cause cholestatic jaundice
Interactions:	artemether/lumefantrine, atorvastatin, bromocriptine, buspirone, cabergoline, carbamazepine , cilostazol, cimetidine , clozapine, ciclosporin, digoxin, disopyramide, eletriptan, ergotamine, lercanidipine, loratadine, mizolastine , methysergide, pimozide , reboxetine, rifabutin, sertindole, sildenafil, simvastatin , sirolimus, tacrolimus, tadalafil, terfenadine , theophylline , tolterodine, valproate, vardenafil, warfarin , zopiclone. There is no loss of protection against pregnancy from oral contraceptives
Cautions:	hepatic and severe renal impairment; avoid in porphyria

continued opposite

Selection:

erythromycin binds to ribosomes within bacteria and interferes with protein synthesis. As Gram-positive organisms (e.g. streptococci, staphylococci) absorb the drug more readily, they are more susceptible to its action than Gram-negative ones. The spectrum of activity is similar to penicillin with additional activity against chlamydia and unusual organisms such as mycoplasma and legionella, so it is often used as a substitute when the patient is allergic to penicillin. The only liquid form available is erythromycin ethyl succinate, whereas the generic tablets are erythromycin base in an enteric coating to protect the drug against destruction by gastric acid. Doses for children are set to take into account this difference. There are a number of preparations for adults without any evidence of one being superior to another, but there is a wide range in the prices. Generic enteric-coated tablets are the cheapest

References

- Anonymous (1995) Giving erythromycin by mouth. *Drug Ther Bull* **33**: 77–9.
- Yakatan GJ, Rasmussen CE, Feis PJ and Wallen S (1985) Bioinequivalence of erythromycin ethylsuccinate and enteric-coated erythromycin pellets following multiple oral doses. *J Clin Pharmacol* **25**: 36–42.

[5.1.5] Clarithromycin

Class:	macrolide bacteriostatic antibacterial
Tablets:	250, 500 mg
Liquid:	125 mg/5 ml, 250 mg/5 ml
Granules:	250 mg/sachet
Dose:	all twice a day adults: 250–500 mg children: see Table 10.1
Pack:	14 tablets or sachets; 70 ml, 100 ml of 125 mg/5 ml; 70 ml of 250 mg/5 ml
$t_{1/2}$:	3 h after 250 mg; 5 h after 500 mg; but the active metabolite is eliminated slightly slower
Side-effects:	may cause similar side-effects to erythromycin but nausea or vomiting only affect 5% of patients; also dyspepsia, headache, smell and taste disturbances, oral inflammation or discolouration, joint or muscle aches, pancreatitis or hepatitis, various psychological disturbances, renal failure, reduction in white blood cells or platelets
Interactions:	artemether/lumefantrine, atorvastatin, bromocriptine, cabergoline, carbamazepine , cimetidine , clozapine, ciclosporin, digoxin, disopyramide, eletriptan, ergotamine, itraconazole, methysergide, mizolastine , omeprazole, phenytoin, pimozide , reboksetine, repaglinide, rifabutin, sertindole, simvastatin , sirolimus, tacrolimus, tadalafil, terfenadine , theophylline , tolterodine, warfarin , zopiclone. There is no loss of protection against pregnancy from oral contraceptives
Cautions:	hepatic and renal impairment; pregnancy and breast-feeding; avoid in porphyria
Selection:	this macrolide is an alternative to erythromycin, especially when the patient has experienced nausea with erythromycin. It has a similar spectrum of antimicrobial activity

Reference

- Periti P, Mazzei T, Mini E and Novelli A (1993) Adverse effects of macrolide antibacterials. [Review] *Drug Saf* **9**: 346–64.

Table 10.1 Children's doses of clarithromycin, all twice daily

Weight (kg)	Age (years)	Dose (mg)	Volume of 125 mg/5 ml	Volume of 250 mg/5 ml
30–40	10–12	250	10	5
20–29	7–9	187.5	7.5	–
12–19	3–6	125	5	–
8–11	1–2	62.5	2.5	–
under 8	under 1	7.5 mg/kg	0.3 ml/kg	–

[5.1.8] Trimethoprim (NPEF)

Class:	enzyme-inhibiting bacteriostatic antibacterial
Tablets:	100 mg, 200 mg
Liquid:	50 mg/5 ml
Dose:	all twice a day adults: 200mg children 6–12 years: 100 mg 6 months–5 years: 50 mg 6 weeks–5 months: 25 mg
Pack:	no specific pack size of tablets (usually 6); 100 ml liquid
$t_{1/2}$:	10 h
Side-effects:	blood and generalised skin disorders, especially in the elderly or with long-term treatment; gastrointestinal disturbances including nausea and vomiting, allergic reactions, raised blood potassium
Interactions:	antimalarial drugs containing pyrimethamine (Fansidar® and Maloprim®), azathioprine, ciclosporin, mercaptopurine, methotrexate, phenytoin, warfarin. Does not affect the combined oral contraceptive pill
Cautions:	breast-feeding, renal impairment, avoid in pregnancy, porphyria, blood disorders
Selection:	trimethoprim inhibits an enzyme (dihydrofolate reductase) which is essential for the metabolism of folic acid. It capitalises on the marked sensitivity of

continued overleaf

the bacterial enzyme relative to the human one. Thus although the antibiotic is not licensed for use in pregnancy and should not be used, many women have taken it before knowing they were pregnant and had no ill-effects. It is a first-line choice for the treatment of uncomplicated urinary infections, but inadequate for more serious ones, such as pyelonephritis. Approximately 10–20% of bacteria responsible for UTI in general practice are resistant to trimethoprim (source via Prodigy). A 3-day course for any age group provides appropriate duration of treatment and patient acceptability, although there is still some controversy that it may have a slightly higher failure rate than a 5-day course

References

- Lutters M and Vogt N (2002) Antibiotic duration for treating uncomplicated, symptomatic lower urinary tract infections in elderly women (Cochrane Review). *The Cochrane Library, Issue 3, 2002*. Update Software, Oxford.
- Michael M, Hodson EM, Craig JC, Martin S and Moyer VA (2003) Short versus standard duration oral antibiotic therapy for acute urinary tract infection in children (Cochrane Review). *The Cochrane Library, Issue 1, 2003*. Update Software, Oxford.
- Goettsch WG, Janknegt R and Hering RMC (2004) Increased treatment failure after 3-days' courses of nitrofurantoin and trimethoprim for urinary tract infections in women: a population-based retrospective cohort study using the PHARMO database. *Br J Clin Pharmacol* **58**: 184–9.

[5.1.11] Metronidazole (NPEF)

Class:	Azole bacteriostatic anti-anaerobic
Tablets:	200, 400 mg
Dose:	200 mg three times a day for seven days for dental infections, 400mg twice a day for seven days <i>or</i> 2 g as a single dose for bacterial vaginosis (different dosage regimens are used for other infections)
Pack:	no specific pack size of tablets (usually 20)
$t_{1/2}$:	8 h
Side-effects:	nausea (metallic taste in mouth), vomiting and gastrointestinal disturbances, rashes; rarely drowsiness, headache, dizziness, ataxia, hepatitis, blood disorders, aching, darkening of urine
Interactions:	alcohol (interaction may cause facial flushing, throbbing headache, palpitations, nausea and vomiting), warfarin , cimetidine, phenytoin, lithium
Cautions:	alcoholism, liver disease
Selection:	metronidazole is the first-line antibiotic used in the UK against anaerobic infections. In the context of treating minor illness, dental infections are quite commonly presented to health professionals other than dentists, and most acute cases of toothache involve infection which can be appropriately treated with amoxicillin and/or metronidazole

Reference

- Palmer NA, Peeling R, Ireland RS and Martin MV (2000) A study of therapeutic antibiotic prescribing in National Health Service general dental practice in England. *Br Dent J* **188**(10): 554–8.

[5.1.13] Nitrofurantoin m/r (NPEF)

Class:	multiple action bactericidal antibacterial
Modified release capsules:	100 mg
Dose:	100 mg twice a day
Pack:	14
$t_{1/2}$:	20 min–1 h, but use of the modified-release version prolongs the action considerably
Side-effects:	urine may be coloured yellow or brown, anorexia, nausea and vomiting (modified release version less so), diarrhoea, acute and chronic pulmonary reactions, peripheral neuropathy; also reported rash, pruritus, hepatitis, pancreatitis, arthralgia, blood disorders and transient alopecia
Interactions:	magnesium trisilicate, probenecid, sulfinpyrazone
Cautions:	avoid in renal failure, late pregnancy, breast-feeding, glucose-6-phosphate dehydrogenase (G6PD) deficiency or porphyria; caution in anaemia, diabetes mellitus, electrolyte imbalance, vitamin B and folate deficiency, hepatic impairment, pulmonary disease, susceptibility to peripheral neuropathy
Selection:	approximately 10% of bacteria responsible for UTI in general practice are resistant to nitrofurantoin (source via Prodigy). The antibacterial action of nitrofurantoin is unusual. Nitrofurantoin is converted to an active metabolite that interferes with many essential components of bacterial chemistry. Perhaps this multiple action accounts for the stable level of bacterial resistance, which has not increased appreciably since the antibacterial was first launched in 1953. As it is concentrated in the urine it is highly effective against lower urinary tract infections, but the plasma levels are not sufficient to treat invasive infections such as pyelonephritis. There is less evidence for the use of short 3-day courses for treating uncomplicated lower urinary tract infection with nitrofurantoin than with amoxicillin or trimethoprim, so prescribe a 7-day course. It can be used in pregnancy but not at term because of a risk of neonatal haemolysis

continued opposite

References

- Goettsch WG, Janknegt R and Hering RMC (2004) Increased treatment failure after 3-days' courses of nitrofurantoin and trimethoprim for urinary tract infections in women: a population-based retrospective cohort study using the PHARMO database. *Br J Clin Pharmacol* **58**: 184–9.
- Spencer RC, Moseley DJ and Greensmith MJ (1994) Nitrofurantoin modified release versus trimethoprim or co-trimoxazole in the treatment of uncomplicated urinary tract infection in general practice. *J Antimicrob Chemother* **33** (Suppl A): 121–9.

[5.2] Fluconazole (OTC)

Class:	triazole antifungal
Capsules:	150 mg
Dose:	(vaginal candidiasis) 150 mg single dose
Pack:	1
$t_{1/2}$:	30 h
Side-effects:	occasionally nausea, abdominal discomfort, diarrhoea, flatulence; rarely headache, hepatic disorders, skin reactions, seizures, reduced white cells or platelets, allergic reactions
Interactions:	avoid with eletroptan, pimozone, sertindole, sirolimus, tacrolimus, terfenadine. There are many interactions between triazole antifungal and other drugs, but most, with the exception of those just listed, may be irrelevant to the use of a single dose of the antifungal
Cautions:	avoid in pregnancy and breast-feeding
Selection:	fluconazole is available OTC to people aged 16–60 years for the treatment of vaginal thrush and associated candidal balanitis as a single dose pack of 150 mg. Some women find it more acceptable than using a pessary, but it is no more effective and costs a few pounds more

Reference

- Watson MC, Grimshaw JM, Bond CM, Mollison J and Ludbrook A (2003) Oral versus intra-vaginal imidazole and triazole anti-fungal treatment of uncomplicated vulvo-vaginal candidiasis (thrush) (Cochrane Review). *The Cochrane Library, Issue 1, 2003*. Update Software, Oxford.

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[5.2] Nystatin (NPEF)

Class:	polyene antifungal
Liquid:	100 000 units/ml
Dose:	children and infants: 1 ml four times a day
Pack:	30 ml with pipette
$t_{1/2}$:	not absorbed
Side-effects:	oral irritation
Interactions:	none
Cautions:	although it is used, it is not licensed for use in infants aged under 1 month
Selection:	nystatin is not absorbed from the gut, so it is most unlikely to cause any systemic side-effects. It was named after being discovered in <i>New York State</i> , derived from soil fungi <i>actinomyces</i> . Despite its safety, it is still a prescription-only medicine

[5.5.1] Mebendazole (OTC)

Class:	antihelmintic
Tablets (chewable):	100 mg
Liquid:	100 mg/5 ml
Dose:	for threadworms adults and children aged 2 years and older: 100 mg single dose (if re-infection occurs, a second dose may be needed after 2–3 weeks)
Pack:	6 tablets; 30 ml
$t_{1/2}$:	1 h
Side-effects:	rarely abdominal pain, diarrhoea, headache, dizziness, allergic reactions
Interactions:	cimetidine
Cautions:	avoid in pregnancy (toxicity in rats), no information about safety in breast-feeding
Selection:	this is the first-line treatment for treating threadworm infestations in anyone aged 2 years or over. It is not suitable for use in pregnancy because toxicity has been demonstrated in animal studies. As there is no suitable alternative treatment during early pregnancy, pregnant women may have to put up with threadworms until after the first trimester, but thereafter piperazine can be used

References

- Dawson M, Braithwaite PA, Roberts MS and Watson TR (1985) The pharmacokinetics and bioavailability of a tracer dose of [3H]-mebendazole in man. *Br J Clin Pharmacol* **19**: 79–86.
- www.prodigy.nhs.uk/guidance.asp?gt=threadworm (accessed 13 June 2005)

[5.5.1] Piperazine (OTC)

Class:	antihelmintic
Oral powder:	for mixing into milk or water: piperazine phosphate 4 g, sennosides 15.3 mg per sachet
Dose:	for threadworms two doses are given, two weeks apart adults: 1 sachet at bedtime children aged 2 years or older: use mebendazole 1 year–1 year 11 months: 5ml of sachet contents in the morning 3 months–1 year: 2.5 ml of sachet contents in the morning
Pack:	2 sachets
$t_{1/2}$:	wide variation between individuals, but usually fully eliminated within 24 h
Side-effects:	nausea, vomiting, colic, diarrhoea, allergic reactions, seizures
Interactions:	none
Cautions:	avoid in liver impairment, first trimester of pregnancy (manufacturer's advice), severe renal impairment, or epilepsy; if breast-feeding, express and discard breast milk for 8 h after the dose
Selection:	this is the alternative treatment for threadworm infestations when mebendazole cannot be used

Reference

- Leach FN (1990) Management of threadworm infestation during pregnancy. [Review] *Arch Dis Child* **65**: 399–400.

Endocrine system

[6.4.1.2] Norethisterone (NPEF)

Class:	progestogen
Tablets:	5 mg
Dose:	to delay menstruation: 5 mg three times a day, starting 3 days before expected menstrual period
Pack:	30
$t_{1/2}$:	8 (5–12) h
Side-effects:	fluid retention, weight gain, nausea, change in libido, breast discomfort, headache, dizziness, insomnia, drowsiness, depression, skin reactions including exacerbation of acne, jaundice, allergic reactions
Interactions:	ciclosporin, warfarin, antidiabetic drugs; drugs that accelerate the metabolism of progestogens and reduce the effectiveness of progestogen-only contraceptives could reduce the effectiveness of norethisterone used to delay a period
Cautions:	pregnancy, breast-feeding, arterial disease, susceptibility to thromboembolism, epilepsy, uncontrolled hypertension, cardiac failure, renal or liver impairment, migraine, depression, diabetes
Selection:	norethisterone is useful to delay an inconvenient period. Side-effects are quite common but usually mild, with breast tenderness and fluid retention. Bleeding occurs two to three days after stopping the norethisterone. Women taking a standard combined oral contraceptive pill do not need norethisterone for this purpose; they can simply continue without having a 7-day gap between packs. Norethisterone is a synthetic progestogen related to testosterone. Be aware that there has been some publicity that such progestogens may cause an increased risk of breast cancer, but there is no good evidence for this claim

Reference

- Kuhl H (2000) Scientific comment: norethisterone acetate (NETA) – A risky compound? *Geburtshilfe und Frauenheilkunde* **60**: 393–406.

Obstetrics and gynaecology

[7.2.2] Clotrimazole (OTC)

Class:	imidazole antifungal
External cream:	2%
Pessaries:	500 mg
Vaginal cream:	10%
Dose:	for vaginal thrush: one 500 mg pessary or 5 g of 10% vaginal cream inserted at night
Pack:	20 g external cream; 1 pessary with applicator; combination pack with 1 pessary and 10 g external cream; vaginal cream 5g with applicator
$t_{1/2}$:	not applicable (external)
Side-effects:	possible destructive effect on latex condoms and diaphragms (use alternative contraception for at least 5 days after dose), local irritation; rarely allergic reactions
Interactions:	none
Cautions:	some women develop an allergy to the excipients, which may produce symptoms similar to the original infection
Selection:	The usual treatment for vaginal thrush is a single dose of a 500 mg pessary inserted at night. Some women may prefer to use the 10% vaginal cream. External infection can be treated with 2% cream, but this is not sufficient if there is concurrent vaginal infection. Clotrimazole can be used in pregnancy

Reference

- Watson MC, Grimshaw JM, Bond CM, Mollison J and Ludbrook A (2003) Oral versus intra-vaginal imidazole and triazole anti-fungal treatment of uncomplicated vulvovaginal candidiasis (thrush) (Cochrane Review). *The Cochrane Library, Issue 1, 2003*. Update Software, Oxford.

[7.3.1] Levonorgestrel (OTC to women aged 16 years or over, NPEF)

Class:	post-coital contraceptive
Tablets:	750 µg
Dose:	1.5 mg (2 tablets) as soon as possible after unprotected sexual intercourse: best within 12 h, ideally not later than 72 h, but some effect up to 120 h (unlicensed use)
Pack:	2 tablets
$t_{1/2}$:	10 (9–14.5) h
Side-effects:	nausea (affecting 14–23% of patients), lower abdominal pain (18%), fatigue (17%), headache (17%), dizziness (11%), breast tenderness (11%), vomiting (6%). Glucose tolerance may worsen. The timing of menstrual bleeding may be temporarily disturbed, although most women have their next period on time. If it is more than 1 week overdue, a pregnancy test is needed. A barrier method will need to be used until the next period. Also advise the patient to report any lower abdominal pains, which might indicate an ectopic pregnancy
Interactions:	drugs that induce liver enzymes reduce the effectiveness of the contraception. The drugs suspected of doing this are: carbamazepine, griseofulvin, phenytoin, primidone, rifabutin, rifampicin, ritonavir, St John's Wort. If levonorgestrel is still considered the best option, the dose may need to be increased to 2.25mg (3 tablets). There is also an interaction with ciclosporin which could lead to toxic effects
Cautions:	check that there was no earlier unprotected intercourse during the same cycle that would be outside the time limit. Although hormonal post-coital contraception may work up to 120 h after intercourse, the effectiveness decreases with time, so the alternative of an intra-uterine device may be a better option. Also check that a period is not overdue which may be because the woman is already pregnant. If vomiting

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occurs within 3 h of taking the dose, repeat with domperidone. Severe malabsorption, such as in severe Crohn's disease, could affect the absorption of the drug. Avoid in pregnancy, porphyria or severe liver disease

Selection: levonorgestrel has now superseded other hormonal methods of oral post-coital contraception

References

- Anonymous (1998) Randomised controlled trial of levonorgestrel versus the Yuzpe regimen of combined oral contraceptives for emergency contraception. Task Force on Postovulatory Methods of Fertility Regulation. *Lancet* **352**: 428–33.
- Webb A, Shochet T, Bigrigg A *et al.* (2004) Effect of hormonal emergency contraception on bleeding patterns. *Contraception* **69**: 133–5.
- Sheffer-Mimouni G, Puzner D, Maslovitch S, Lessing JB and Gamzu R (2003) Ectopic pregnancies following emergency levonorgestrel contraception. *Contraception* **67**: 267–9.

Nutrition and blood

[9.1.1] Ferrous sulphate (OTC)

Class:	iron
Tablets:	200 mg
Dose:	adults only: usual dose 200 mg three times a day
Pack:	no specific number of tablets but usual supply is 84
$t_{1/2}$:	not applicable as iron is used and stored within the body rather than eliminated
Side-effects:	<i>reduce dose if side-effects occur</i> – nausea, epigastric pain, constipation (particularly in the elderly) or diarrhoea
Interactions:	reduced absorption of iron with magnesium trisilicate, tetracyclines, and zinc, trientine. Iron reduces absorption of tetracyclines (e.g. doxycycline), quinolone antibiotics including ciprofloxacin, levothyroxine (take iron and levothyroxine at least 2 h apart), L-dopa, entacapone, biphosphonates, penicillamine and zinc
Cautions:	dangerous to children in overdose
Selection:	this is only used for treating iron deficiency, which usually manifests as microcytic anaemia. A low haemoglobin level frequently occurs in pregnancy, due to dilution. If the mean cell volume is normal, iron deficiency is unlikely. Side-effects are related to the dose of iron rather than the formulation. Some other more expensive forms may seem to give rise to fewer side-effects, but this may well be because less iron is available for absorption. Taking the iron with food reduces both the absorption and the chance of side-effects. There is no point in advocating a diet rich in vitamin C to help improve the absorption, because this only works by converting ferric iron in food to the more readily absorbed ferrous form. As ferrous sulphate is already in this form, adding vitamin C gives no advantage

Reference

- Mahomed K (1997) Iron and folate supplementation in pregnancy (Cochrane Review). *The Cochrane Library, Issue 4, 1997*. Update Software, Oxford.

[9.2.1.2] Dioralyte® (OTC)

Class:	oral rehydration
Sachets:	blackcurrant, citrus or plain; mix one sachet with 200 ml drinking water, use within 1 h or keep in fridge for up to 24 h
Dose:	according to fluid loss, but usually adults: 200–400 ml after every loose motion children 2–12 years: 200 ml after every loose motion infants up to 2 years: 1–1.5 times usual feed volume
Pack:	6 or 20
$t_{1/2}$:	not applicable
Side-effects:	potentially electrolyte imbalance could arise if the solution was incorrectly diluted
Interactions:	none
Cautions:	none
Selection:	having experienced the distribution of a recipe by a health authority for a home-made oral rehydration fluid mixture only to see it rapidly withdrawn when it was discovered that the quantity of salt was incorrect, using manufactured sachets containing the correct amount seems a safer option. If professionals can get the mixture wrong, then so can parents. For those who are normally healthy in affluent countries with plentiful drinking water, oral rehydration with electrolyte–water mixtures is rarely necessary; what matters is maintaining adequate fluid intake and restarting feeding as soon as possible. Note that rehydration fluids used in Britain have less salt and more glucose than the World Health Organization formulation

References

- Mecrow IK and Miller V (1993) An open triple crossover study comparing water absorption from potable water, Lucozade, and Dioralyte using the stable isotope ^{18}O . *J Pediatr Gastroenterol Nutr* **16**: 316–20.
- Hahn S, Kim Y and Garner P (2001) Reduced osmolarity oral rehydration solution for treating dehydration due to diarrhoea in children: systematic review. *BMJ* **323**: 81–5.
- Ho TF, Yip WCL, Duggan C and Vashishtha VM (2001) Letters about oral rehydration solutions. *BMJ* **323**: 1068.

Musculoskeletal system

[10.1.1] Ibuprofen (OTC)

Class:	non-steroidal anti-inflammatory drug
Tablets:	200, 400, 600 mg
Liquid:	100 mg/5 ml (see next entry for topical gel)
Dose:	all three or four times a day adults: 400–600 mg children 8–12 years: 200 mg (10 ml) 3–7 years: 100 mg (5 ml) 1–2 years: 50 mg (2.5 ml) <i>equivalent to 20 mg per kg body weight per day,</i> <i>not recommended for children weighing under 7 kg</i>
Pack:	84 tablets (but only prescribe the amount required); 100 or 150 ml liquid
$t_{1/2}$:	2 h
Side-effects:	gastrointestinal discomfort – also nausea, diarrhoea, and occasionally bleeding and ulceration, hypersensitivity reactions – notably with bronchospasm, rashes and angio-oedema. Other rare side-effects include fluid retention, headache, dizziness, vertigo, changes in mood, hearing disturbances such as tinnitus, photosensitivity, haematuria, blood disorders, renal failure, alveolitis, hepatic damage, pancreatitis, eye changes and aseptic meningitis
Interactions:	ibuprofen co-administered with aspirin can not only increase the risk of gastrointestinal haemorrhage but may also counteract the protective effect of aspirin against thrombosis. Other interactions with: ciclosporin, lithium, methotrexate, penicillamine, pentoxifylline, phenytoin, quinolones (such as ciprofloxacin), SSRI antidepressants (such as fluoxetine), sulphonylureas (such as gliclazide), tacrolimus, warfarin

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Cautions:

- gastrointestinal disease – especially a history of peptic ulcer
- asthma: about 5% of adults find that *aspirin* causes or exacerbates wheezing. There is a concern that the same effect may occur with ibuprofen and a few case reports of such, but no broad epidemiological evidence. Furthermore, children have fewer problems with asthma when febrile illnesses are treated with ibuprofen instead of paracetamol. The exacerbation of asthma caused by ibuprofen in individuals who are not specifically allergic to it, may turn out to be as much a myth as the misconception that ibuprofen was ineffective in women
- allergy to aspirin or other NSAID
- elderly, pregnancy, heart, kidney or liver disease
- systemic lupus erythematosus

Selection:

of the group of standard NSAIDs, ibuprofen poses the least risk of gastrointestinal bleeding. Toxicity to the gut is mainly from the systemic effect of ibuprofen, not a local effect, so it makes little difference whether it is taken after food or not

References

- Body R and Potier K (2004) Non-steroidal anti-inflammatory drugs and exacerbations of asthma in children. *Emerg Med J* **21**: 713.
- Khazaeinia T and Jamali F (2000) Evaluation of gastrointestinal toxicity of ibuprofen using surrogate markers in rats: effect of formulation and route of administration. *Clin Exp Rheumatol* **18**: 187–92.
- MacDonald TM and Wei L (2003) Effect of ibuprofen on cardioprotective effect of aspirin. *Lancet* **361**: 57.
- Anonymous (2004) Mythbuster: ibuprofen and women. *Bandolier* **120**: 4.

[10.3.2] Ibuprofen (topical) (OTC)

Class:	non-steroidal anti-inflammatory drug
Gel:	10%
Dose:	apply three times daily
Pack:	30, 100 g
$t_{1/2}$:	although the plasma half-life is 2 h, levels in the blood are very low with topical formulations. Ibuprofen can be detected at therapeutically effective concentration in soft tissue under the area of application for at least 15 h afterwards
Side-effects:	rarely, allergic reactions including asthma and rashes; dyspepsia, exacerbation of renal impairment
Interactions:	most unlikely with topical form
Cautions:	as for oral ibuprofen, but much less likely to pose a significant risk
Selection:	higher concentrations of ibuprofen are found in soft tissue in the area of application using a topical formulation than with an oral form, but there is hardly any penetration into large joints. Therefore the percutaneous route is ideal for soft tissue inflammatory conditions but not suitable for relieving arthritic pains. Gel formulations provide better absorption than emulsions

References

- Dominkus M, Nicolakis M, Kotz R *et al.* (1996) Comparison of tissue and plasma levels of ibuprofen after oral and topical administration. *Arzneimittel-Forschung* **46**: 1138–43.
- Trefel P and Gabard B (1993) Ibuprofen epidermal levels after topical application in vitro: effect of formulation, application time, dose variation and occlusion. *Br J Dermatol* **129**: 286–91.
- Vaile JH and Davis P (1998) Topical NSAIDs for musculoskeletal conditions. A review of the literature. [Review] *Drugs* **56**: 783–99.

[10.3.2] Algesal® (OTC)

Class:	counter-irritant
Cream:	diethylamine salicylate 10%
Dose:	adults and children 6 years or over: massage in three times a day, wash hands afterwards
Pack:	50 g
$t_{1/2}$:	not applicable
Side-effects:	local irritation
Interactions:	none
Cautions:	none
Selection:	counter-irritants relieve pain by causing sensation from the skin to block the entry of pain stimuli into the spinal cord via the same nerve. They are simple to use because even if the pain is referred, the best place to apply the cream is where the pain is felt. There is little evidence to choose between the wide variety of preparations available, and Algesal is inexpensive

Reference

- Mason L, Moore RA, Edwards JE *et al.* (2004) Systematic review of efficacy of topical rubefacients containing salicylates for the treatment of acute and chronic pain [see comment]. [Review] *BMJ* **328**: 995.

Eye

[11.3.1] Chloramphenicol (OTC drops for adults and children 2 years and over, NPEF)

Class:	topical, primarily bacteriostatic, antibiotic
Drops:	0.5%
Ointment:	1%
Dose:	drops: apply hourly at first, reduce to 4-hourly as symptoms improve; ointment: apply four times a day, or at night if used in conjunction with drops
Pack:	10 ml drops or 4 g ointment
$t_{1/2}$:	5 h – but not relevant to topical use because so little is absorbed
Side-effects:	transient stinging
Interactions:	none
Cautions:	past or close family history of blood disorder
Selection:	chloramphenicol has a broad spectrum of activity, but its systemic use is limited by rare but serious toxicity. Topical use is free from this hazard. The risk of serious blood disorders among people who have used topical chloramphenicol is no higher than the background rate, but the reassurance gained from this does not necessarily apply to patients who have a past or close family history of such disorders, who could be more susceptible. The patient information leaflet warns of this

Reference

- Laporte JR, Vidal X, Ballarin E and Ibanez L (1998) Possible association between ocular chloramphenicol and aplastic anaemia – the absolute risk is very low. *Br J Clin Pharmacol* **46**: 181–4.

[11.4.2] Sodium cromoglicate eye drops (OTC)

Class:	preventative anti-inflammatory
Eye drops:	2%
Dose:	adults and children: 1 drop four times a day
Pack:	13.5 ml
$t_{1/2}$:	not applicable to local effect
Side-effects:	transient stinging
Interactions:	none
Cautions:	discard 1 month after opening
Selection:	the mechanism of action of sodium cromoglicate is not as straightforward as simply inhibiting the release of histamine from stores in mast cells. Doubts were cast on this theory many years ago when a study showed beneficial effects on acute asthma, when the drug ought to have none. Nevertheless, the maximum benefit from using this drug is only likely to be gained if it is used regularly throughout the allergic season

References

- Sadeghi-Hashjin G, Nijkamp FP, Henricks PA and Folkerts G (2002) Sodium cromoglycate and doxantrazole are oxygen radical scavengers. *Eur Resp J* **20**: 867–72.
- Anderson SD, Du Toit JJ, Rodwell LT and Jenkins CR (1994) Acute effect of sodium cromoglycate on airway narrowing induced by 4.5 percent saline aerosol: Outcome before and during treatment with aerosol corticosteroids in patients with asthma. *Chest* **105**: 673–80.

[11.8.1] Hypromellose (OTC)

Class:	tear replacement
Eye drops:	0.3%
Dose:	use as needed, usually 2 drops three times a day
Pack:	10 ml
$t_{1/2}$:	not applicable
Side-effects:	none
Interactions:	none
Cautions:	discard 1 month after opening
Selection:	hypromellose is the standard solution used to replace deficient tears. Such medication does help the condition but fails to restore the correct composition of the conjunctival mucus. If the patient does not obtain adequate relief with this preparation it is often worth trying an alternative listed in this section of the <i>BNF</i>

Reference

- Versura P, Maltarello MC, Stecher F, Caramazza R and Laschi R (1989) Dry eye before and after therapy with hydroxypropyl methylcellulose. Ultrastructural and cytochemical study in 20 patients. *Ophthalmologica* **198**: 152–62.

Ear, nose and oropharynx

[12.1.1] EarCalm® (OTC)

Class:	antibacterial and antifungal topical solution
Spray:	acetic acid 2%
Dose:	adults and children 12 years or over: 1 spray into affected ear(s) three times a day for up to 1 week
Pack:	5 ml
$t_{1/2}$:	not applicable
Side-effects:	transient stinging
Interactions:	none
Cautions:	manufacturer advises treatment for children under 12 years only on medical advice
Selection:	Prodigy describes this treatment for otitis externa as 'a "best guess" treatment for use while awaiting the results of swabs'. As this preparation is available OTC, many people successfully treat themselves for this condition on the advice of their pharmacist, without any need for swabs to be taken. The advantage of simple acetic acid is that it is an antiseptic with a wide range of mild activity against both bacteria and fungi, but without the risk of either sensitisation to an antibiotic, or fungal superinfection caused by topical steroids. The disadvantage of this preparation is that it is not as effective as a corticosteroid plus either acetic acid or antibacterial. There is no steroid/acetic acid preparation marketed in the UK without an antibiotic, so that option is currently unavailable. For more inflamed cases of otitis externa, a topical steroid/antibacterial combination and/or oral antibiotic is recommended

References

- Rowlands S, Devalia H, Smith C, Hubbard R and Dean A (2001) Otitis externa in UK general practice: a survey using the UK General Practice Research Database. *Br J Gen Pract* **51**: 533–8.
- van Balen FA, Smit WM, Zuithoff NP and Verheij TJ (2003) Clinical efficacy of three common treatments in acute otitis externa in primary care: randomised controlled trial. *BMJ* **327**: 1201–5.

[12.1.1] Otosporin®

- Class:** bactericidal antibiotics and corticosteroid topical solution
- Ear drops:** hydrocortisone 1%, neomycin 3400 units/ml, polymyxin B 10 000 units/ml
- Dose:** 3 drops into the ear three times a day
- Pack:** 5, 10 ml
- $t_{1/2}$:** not applicable
- Side-effects:** occasional sensitivity reactions, with an increased risk in patients with chronic otitis externa or venous disease such as varicose eczema or ulceration. The drops may sting on application
- Interactions:** none
- Cautions:** if previous perforation, consult doctor. Avoid prolonged use: usually one week is sufficient. If the condition fails to respond or gets worse, take a swab to identify infections not affected by the antibiotics in Otosporin, such as fungal, but also stop the Otosporin in case the patient has developed a sensitivity to it. Advise the patient not to wash the ear canal using soap or shampoo, as this could inactivate the antibiotics as well as exacerbating the underlying eczema
- Selection:** the two antibiotics in this preparation are active against a wide range of bacteria, including *Pseudomonas*. Swabs from infected cases of otitis externa in primary care frequently grow this organism. The fact that patients present more often in the summer months with *Pseudomonas* infection after swimming in pools, suggests that this micro-organism is more than a bystander

References

- Hajjartabar M (2004) Poor-quality water in swimming pools associated with a substantial risk of otitis externa due to *Pseudomonas aeruginosa*. *Water Sci Technol* **50**: 63–7.
- also see references above for EarCalm®

[12.1.1] Otomize® (NPEF)

Class:	mixed antibacterials and corticosteroid topical solution
Spray:	dexamethasone 0.1%, neomycin 3250 units/ml, glacial acetic acid 2%
Dose:	1 metered spray drops into the ear three times a day
Pack:	5 ml
$t_{1/2}$:	not applicable
Side-effects:	occasional sensitivity reactions, with an increased risk in patients with chronic otitis externa or eczema. The drops may sting on application
Interactions:	none
Cautions:	if previous perforation, consult doctor. Avoid prolonged use: usually one week is sufficient. If the condition fails to respond or gets worse, take a swab to identify infections not affected by the antibacterials in Otomize, such as fungal, but also stop the Otomize in case the patient has developed a sensitivity to it. Advise the patient not to wash the ear canal using soap or shampoo, as this could inactivate the antibacterials as well as exacerbating the underlying eczema
Selection:	this is a compromise between EarCalm, which depends on acetic acid for its antibacterial action, and Otosporin, which we recommend for infections occurring after swimming. The spray delivery system provides a more accurate dose than self-administered drops, may be more effective and is often preferred by patients

References

- Lancaster J, Mathews J, Williams RS, Thussey C and Kent SE (2003) Comparison of compliance between topical aural medications. *Clin Otolaryngol* **28**: 331–4.
- Connolly AA, Picozzi GL and Browning GG (1997) Randomized trial of neomycin/dexamethasone spray vs drop preparation for the treatment of active chronic mucosal otitis media. *Clin Otolaryngol* **22**: 529–31.
- also see references above for EarCalm®

[12.2.1] Beclometasone aqueous nasal spray (OTC)

Class:	corticosteroid
Nasal spray:	beclometasone 50 µg per spray
Dose:	adults and children over 6 years: initially two sprays to each nostril twice daily; when symptoms are controlled reduce to one spray twice daily
Pack:	200-spray unit
$t_{1/2}$:	irrelevant to the local action, but for the small amount absorbed 0.5 h for beclometasone and 2.7 h for its active metabolite
Side-effects:	dry nose or throat, epistaxis, altered smell or taste; rarely ulceration of the nasal septum, bronchospasm, headache, raised intra-ocular pressure or glaucoma, growth retardation in children, allergic reactions
Interactions:	none
Cautions:	untreated nasal infection, recent nasal surgery, pulmonary tuberculosis, in children on long-term treatment monitor height annually
Selection:	with no evidence to suggest superiority of any particular topical steroid for hay fever, the selection is made on the basis of cost. Beclometasone does give benefit on the first day of use, but this increases over the next few days, so ideally patients should start treatment one week before their hay fever season starts. Systemic side-effects are extremely rare because the dose of corticosteroid is so low, nasal absorption is less than 1% and swallowed beclometasone is rapidly cleared

References

- Graft D, Aaronson D, Chervinsky P *et al.* (1996) A placebo- and active-controlled randomized trial of prophylactic treatment of seasonal allergic rhinitis with mometasone furoate aqueous nasal spray. *J Allerg Clin Immunol* **98**: 724–31.
- Selner JC, Weber RW, Richmond GW, Stricker WE and Norton JD (1995) Onset of action of aqueous beclomethasone dipropionate nasal spray in seasonal allergic rhinitis. *Clin Ther* **17**: 1099–109.

[12.2.2] Saline nose drops (OTC)

Class:	topical nasal decongestant
Drops:	sodium chloride 0.9%
Dose:	apply to nostrils before feeds
Pack:	10 ml
$t_{1/2}$:	not applicable
Side-effects:	none
Interactions:	none
Cautions:	none
Selection:	helps to liquefy nasal mucous secretions

Reference

- www.patient.co.uk/showdoc/23069191/ (accessed 13 June 2005)

[12.2.2] Warm moist air inhalation (OTC)

Class:	topical nasal decongestant
Liquid:	very hot water
Dose:	inhale three or four times a day with a towel over the head
Pack:	not applicable
$t_{1/2}$:	not applicable
Side-effects:	only the risk of scalds from the hot water
Interactions:	none
Cautions:	none
Selection:	helps to liquefy nasal mucous secretions. Adding aromatic oils may make the experience more soothing

Reference

- www.patient.co.uk/showdoc/23068821/ (accessed 13 June 2005)

[12.3.4] Chlorhexidine oral spray (OTC)

Class:	antiseptic
Spray:	chlorhexidine gluconate 0.2%
Dose:	up to 12 actuations applied to ulcer(s) twice daily
Pack:	60 ml
$t_{1/2}$:	not applicable
Side-effects:	chlorhexidine has been associated with bitter taste, brown staining of teeth and tongue, and nausea, but these effects are less likely with the limited amount required to cover an oral ulcer with the spray compared with a mouthwash
Interactions:	none
Cautions:	none
Selection:	superficial infection may play a part in the symptoms caused by aphthous ulcers. Chlorhexidine is a general antiseptic with limited evidence of effectiveness in reducing the severity, duration and incidence of oral ulceration

References

- Aphthous ulcers: chlorhexidine and similar agents (2004) *Clinical Evidence* BMJ Publishing Group, London. www.clinicalevidence.com/ceweb/conditions/orh/1303/1303_12.jsp (accessed 13 June 2005)
- Addy M, Carpenter R and Roberts WR (1976) Management of recurrent aphthous ulceration. A trial of chlorhexidine gluconate gel. *Br Dent J* **141**: 118–20.

Skin

[13.2.1] Emulsifying ointment; hydrous ointment; Oilatum® bath additive (OTC)

Class:	emollients
Dose:	apply in the direction of hair growth as frequently as necessary, or add 1 to 3 capfuls to bath
Pack:	100, 500 g ointments; 250, 500 ml bath additive
$t_{1/2}$:	not applicable
Side-effects:	rarely sensitisation to an excipient in an emollient (consult the listed excipients in the <i>BNF</i> or table in <i>MIMS</i> to help in choosing an alternative); can make the surface of a bath slippery
Interactions:	none
Cautions:	none
Selection:	emollients hydrate the skin and are useful in all dry or scaling disorders. The choice is mainly a matter of patient preference. Emulsifying ointment can also be used instead of soap

Reference

- Berth-Jones J and Graham-Brown RAC (1992) How useful are soap substitutes? *J Dermatol Treat* 3: 9–11.

**[13.4] Hydrocortisone cream or ointment – *mild* (OTC);
Clobetasone butyrate cream or ointment – *moderately
potent* (NPEF); betamethasone valerate cream or
ointment – *potent* (NPEF)**

Class:	topical corticosteroids
Cream or ointment:	hydrocortisone 0.5% or 1%; clobetasone butyrate 0.05%; betamethasone valerate 0.025%, 0.1%
Pack:	hydrocortisone 15, 30 g; clobetasone 30, 100 g; betamethasone 0.025% 100 g; betamethasone 0.1% 30, 100 g
$t_{1/2}$:	not applicable
Side-effects:	worsening of infection including acne, thinning and potential permanent disfiguring marks of skin with potency greater than hydrocortisone, increased hair growth, perioral dermatitis (papular rash around the mouth in young women), depigmentation; large doses may be absorbed into the body and cause similar side-effects to oral steroids; rarely sensitisation to an excipient (consult the listed excipients in the <i>BNF</i> or table in <i>MIMS</i> to help in choosing an alternative)
Interactions:	none
Cautions:	skin infection including acne, do not use clobetasone or betamethasone on the face, children are more susceptible to side-effects, psoriasis (may rebound or relapse on stopping betamethasone), avoid confusing plain hydrocortisone with hydrocortisone butyrate, or clobetasone with clobetasol, because either switch would inadvertently increase the potency
Selection:	topical corticosteroids are helpful in treating dry skin conditions. The general rule is to use none if an emollient will suffice, otherwise to use the mildest effective potency. Some of the therapeutic effect of these preparations is due to the emollient vehicle

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rather than just the steroid component. Sensitisation to one of the excipients can occur and lead to diagnostic confusion when a dermatitis persists or worsens despite treatment

References

- National Prescribing Centre (1999) Using topical corticosteroids in general practice. *MeReC Bull* **10**: 21–4.
- Anonymous (2003) Topical steroids for atopic dermatitis in primary care. *Drug Ther Bull* **41**: 5–8.
- Parneix-Spake A, Goustas P and Green R (2001) Eumovate (clobetasone butyrate) 0.05% cream with its moisturizing emollient base has better healing properties than hydrocortisone 1% cream: a study in nickel-induced contact dermatitis. *J Dermatol Treat* **12**: 191–7.
- Charman CR, Morris AD and Williams HC (2000) Topical corticosteroid phobia in patients with atopic eczema. *Br J Dermatol* **142**: 931–6.

[13.4] Clotrimazole/hydrocortisone cream (OTC)

Class:	topical antifungal and corticosteroid
Cream or ointment:	clotrimazole 1% and hydrocortisone 1%
Dose:	apply twice daily
Pack:	30 g
$t_{1/2}$:	not applicable
Side-effects:	see hydrocortisone
Interactions:	none
Cautions:	see hydrocortisone
Selection:	for simple fungal skin infections, use plain clotrimazole topically (see section 13.10.2). If pruritus is troublesome, or the fungal infection is in an eczematous area, the combination of an antifungal agent with a corticosteroid can be helpful. Both clotrimazole and miconazole are the same type of imidazole antifungal agents, so if a fungal infection does not respond to one it will not respond to the other. Terbinafine cream is then a suitable alternative

Reference

- Crawford F, Hart R, Bell-Syer S *et al.* (1999) Topical treatments for fungal infections of the skin and nails of the foot (Cochrane Review). *The Cochrane Library, Issue 3, 1999*. Update Software, Oxford.

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[13.7] Salicylic acid (OTC)

Class:	topical treatment for warts various formulations available from 11% to 26%; currently the least expensive is Salactol®
Dose:	apply daily
Pack:	10 ml
$t_{1/2}$:	not applicable
Side-effects:	local irritation, sensitisation
Interactions:	none
Cautions:	flammable
Selection:	The limited evidence that is available on the topical treatment of warts suggests salicylic acid is the best

Reference

- Gibbs S, Harvey I, Sterling JC and Stark R (2003) Local treatments for cutaneous warts (Cochrane Review). *The Cochrane Library, Issue 3, 2003*. Update Software, Oxford.

[13.10.1] Sodium fusidate ointment (NPEF)

Class:	anti-staphylococcal topical antibiotic
Ointment:	2%
Dose:	apply three to four times a day
Pack:	15, 30 g
$t_{1/2}$:	not applicable to local effect
Side-effects:	rarely local hypersensitivity reactions
Interactions:	none
Cautions:	avoid contact with eyes
Selection:	this narrow-spectrum antibiotic is very effective against staphylococcal infections. The Cochrane Review of treatment for impetigo concluded that this topical agent is better than oral antibiotics for people with limited disease, and possibly even for those with more extensive disease. We know of no comparative study between fusidic acid cream and sodium fusidate ointment, but it seems more appropriate to use the salt than the acid on areas of skin that are likely to be inflamed and sore. The ointment can also be used to treat angular cheilitis (inflammation of the corners of the lips, which become cracked and sore)

Reference

- Koning S, Verhagen AP, van Suijlekom-Smit LWA *et al.* (2003) Interventions for impetigo (Cochrane Review). *The Cochrane Library, Issue 2, 2003*. Update Software, Oxford.

[13.10.2] Clotrimazole cream (OTC)

Class:	topical antifungal
Cream:	clotrimazole 1%
Dose:	apply twice daily
Pack:	20, 50 g
$t_{1/2}$:	not applicable
Side-effects:	rarely local irritation
Interactions:	may cause damage to latex contraceptives
Cautions:	none
Selection:	for simple fungal skin infections, use plain clotrimazole topically. If pruritis is troublesome, or the fungal infection is in an eczematous area, the combination of an antifungal agent with a corticosteroid can be helpful (see section 13.4). Both clotrimazole and miconazole are the same type of imidazole antifungal agents, so if a fungal infection does not respond to one it will not respond to the other. Terbinafine cream is then a suitable alternative

Reference

- Crawford F, Hart R, Bell-Syer S *et al.* (1999) Topical treatments for fungal infections of the skin and nails of the foot (Cochrane Review). *The Cochrane Library, Issue 3, 1999*. Update Software, Oxford.

[13.10.2] Terbinafine cream (OTC)

Class:	allylamine topical antifungal
Cream:	1%
Dose:	apply one to two times a day, for 1 week for fungal infections of the feet, 2 weeks if elsewhere
Pack:	15, 30 g
$t_{1/2}$:	not applicable to local effect
Side-effects:	redness, itching or stinging occasionally occur at the site of application; however, treatment rarely has to be discontinued for this reason. This must be distinguished from allergic reactions which are rare but require discontinuation
Interactions:	none
Cautions:	avoid contact with eyes
Selection:	this broad-spectrum antifungal agent is a useful alternative to clotrimazole because cross-resistance is unusual. Terbinafine can be applied less often and for a shorter course, but is more expensive. The Cochrane Review concluded: 'The most cost-effective strategy is first to treat with azoles or undecenoic acid and to use allylamines only if that fails'

Reference

- Crawford F, Hart R, Bell-Syer S *et al.* (1999) Topical treatments for fungal infections of the skin and nails of the foot (Cochrane Review). *The Cochrane Library, Issue 3, 1999*. Update Software, Oxford.

[13.10.3] Aciclovir cream (OTC)

Class:	topical antiviral
Cream:	aciclovir 5%
Dose:	apply every 4 h (five times a day) for 5 days at the first sign of an attack, continuing for a further 5 days if the lesions have not completely healed
Pack:	2 g
$t_{1/2}$:	not applicable to local effect
Side-effects:	transient stinging or burning; occasionally erythema or drying of the skin, sensitivity to excipients
Interactions:	none (interactions listed in the <i>BNF</i> apply to tablets and infusions, not the cream)
Cautions:	avoid contact with eyes and mucous membranes, limited data in pregnancy and breast-feeding – but not known to be harmful
Selection:	aciclovir interferes with viral DNA synthesis. It is used topically to treat cold sores. Standard advice is that the cream needs to be applied as soon as the first symptom appears, and although this gives the best chance of speedy resolution, the cream is still effective if it is applied later. Prophylaxis with topical agents is not effective

References

- Spruance SL and Kriesel JD (2002) Treatment of herpes simplex labialis. [Review] *Herpes* **9**: 64–9.
- Spruance SL, Nett R, Marbury T *et al.* (2002) Acyclovir cream for treatment of herpes simplex labialis: results of two randomized, double-blind, vehicle-controlled, multicenter clinical trials. *Antimicrob Agents Chemother* **46**: 2238–43.

[13.10.4] Malathion (OTC)

Class:	organophosphorus parasiticial
Liquid:	aqueous malathion 0.5%
Dose:	adults and children over 6 months head lice: apply liberally to dry hair and scalp, allow to dry naturally, shampoo in the usual way after 12 h, or the next day if preferred, comb the hair, ideally with a fine-toothed metal comb; can be repeated after 7 days (unlicensed use) scabies: apply over the whole skin surface, do not wash hands after treatment (if any part is washed then reapply malathion to the area afterwards), wash off after 24 h, can be repeated after 7 days (unlicensed use)
Pack:	50, 200 ml (prescribe sufficient to treat the household in case of scabies: children 50 ml, adults 100 ml each)
$t_{1/2}$:	not applicable
Side-effects:	rarely skin irritation
Interactions:	none
Cautions:	avoid contact with eyes, broken or infected skin. Avoid repeated doses at intervals less than one week or for more than three consecutive weeks
Selection:	this is one option to try to tackle the perennial problem of head lice. Scabies is also common. Advise the patient that the irritation from scabies usually lasts for one week after treatment, sometimes up to four weeks, and that it does not represent treatment failure. Malathion is one of the least toxic organophosphorus insecticides because it is rapidly inactivated by an enzyme in human plasma

Reference

- Dodd CS (2001) Interventions for treating headlice (Cochrane Review). *The Cochrane Library, Issue 2, 2001*. Update Software, Oxford.

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[13.10.4] Permethrin (OTC)

Class:	membrane-destabilising parasitocidal
Cream:	permethrin 5%
Dose:	adults and children over 2 months; scabies: apply over the whole skin surface, do not wash hands after treatment (if any part is washed then reapply permethrin to the area afterwards), wash off after 8–12 h, can be repeated after 7 days
Pack:	30 g (prescribe sufficient to treat the household: children and smaller adults, 30 g larger adults may require two 30 g tubes, the maximum dose for any individual)
$t_{1/2}$:	not applicable
Side-effects:	itching, redness, stinging; rarely rashes, oedema. Permethrin appears to be more toxic to humans than malathion. There are reports of five cases of convulsions and six deaths associated with the topical use of permethrin worldwide, in comparison with two cases of convulsions and no death associated with malathion
Interactions:	none
Cautions:	avoid contact with eyes, broken or infected skin. Ensure you prescribe the 5% strength, not the 1% creme rinse preparation which is intended for head lice but marked as 'less suitable for prescribing' in the <i>BNF</i> . Children between 2 months and 2 years should be treated under medical supervision
Selection:	this is an alternative, effective treatment for scabies, but because of the reports of very rare but serious toxicity, malathion would be our first choice. Prodigy recommends permethrin despite the increased risks compared with malathion. Although permethrin would also kill head lice there is no suitable formulation for this use. Only about 0.5% of the applied permethrin is absorbed and that is rapidly metabolised

References

- Walker GJA and Johnstone PW (2000) Interventions for treating scabies (Cochrane Review). *The Cochrane Library, Issue 3, 2000*. Update Software, Oxford.
- WHO (1998) Reported adverse reactions to ectoparasiticides, incl. scabicides, insecticides and repellants. Abstracted from: WHO Collaborating Centre for International Drug Monitoring, Uppsala, Sweden.