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Extended Care Paramedic Clinical Procedures and Guidelines

Comprehensive edition, December 2021

Extended Care Paramedic Clinical Procedures and Guidelines

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Introduction

These are the Extended Care Paramedic Clinical Procedures and Guidelines (ECP CPGs), incorporating standing orders for use by personnel within the New Zealand ambulance sector.

These ECP CPGs are for the use of St John personnel with current authority to practice at Extended Care Paramedic (ECP) level when providing clinical care to patients on behalf of St John. These CPGs have been developed by the Extended Care Paramedic Clinical Working Group and are issued to individual clinical personnel by Dr Craig Ellis, the Deputy Medical Director for St John.

These ECP CPGs will be reviewed on an ongoing basis, with updates being formally issued as required. They remain the intellectual property of the Extended Care Paramedic Clinical Working Group and may be recalled or updated at any time. Any persons other than St John personnel using these ECP CPGs do so at their own risk. Neither St John nor the Extended Care Paramedic Clinical Working Group will be responsible for any loss, damage or injury suffered by any person as a result of, or arising out of, the use of these ECP CPGs by persons other than authorised St John personnel.

Extended Care Paramedic Clinical Working Group

Dr Craig Ellis (Chair), Deputy Clinical Director, St John

Hannah MacLeod, National Ambulance Education Manager, St John

Fraser Watson, Clinical Support Officer - ECP Clinical Lead, St John

Dr Kunjay Patel, General Practitioner, Hawkes Bay District Health Board

Dr Dave O'Byrne, Deputy Medical Director, Wellington Free Ambulance

Murray Foreman, Pharmacist, St John

Comments and enquiries

Personnel should send an email to **clinical.excellence@stjohn.org.nz**. Others wishing to make formal comments or enquiries should contact Dr Craig Ellis at **craig.ellis@stjohn.org.nz**.

Dr Craig Ellis
Deputy Clinical Director

Dr Ian Civil
Chair of the Clinical Governance Committee

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1.1 ECP delegated scope of practice

Introduction

- The ECP delegated scope of practice encompasses all skills and medicines described for the Paramedic delegated scope of practice in the EAS CPGs, and the additional skills outlined in the table within this section.
- Personnel who do not have an ECP authority to practice but hold an urgent community care (UCC) endorsement, must use the ECP CPGs to guide practice, and may only perform skills that are ticked in the 'UCC' column within the table.

Skill	UCC	ECP
Absorbed diphtheria and tetanus (ADT) booster vaccine IM		✔
Adrenaline/lignocaine 1% IN		✔
Amlodipine PO		✔
Amoxicillin PO		✔
Amoxicillin/clavulanic acid PO	✔	✔
Aspirin PO (headache)		✔
Azithromycin PO		✔
Benzathine penicillin IM		✔
Bisacodyl suppository PR		✔
Ceftriaxone IV (severe cellulitis)	✔	✔
Chloramphenicol 1% ointment		✔
Codeine PO		✔
Doxycycline PO		✔
Droperidol IV or IM (end of life care)		✔
Erythromycin PO	✔	✔
Flucloxacillin PO	✔	✔
Gentamicin IV (post urinary catheter placement)	✔	✔
Hydrocortisone cream 1%		✔
Hyoscine butylbromide IV and SC		✔
Incision and drainage of abscesses		✔
Kenacomb™ ear drops		✔
Ibuprofen PO		✔
Levonorgestrel PO		✔
Levomepromazine IV and SC		✔
Lignocaine/adrenaline field block	✔	✔
Lignocaine dental block		✔

Skill	UCC	ECP
Lignocaine 2%/ chlorhexidine 0.05% gel	✔	✔
Lignocaine 4%/fluorescein 0.25% eye drops		✔
Lignocaine 5%/phenylephrine 0.5% spray IN	✔	✔
Loperamide PO	✔	✔
Loratadine PO (rash with prominent itch)	✔	✔
Manual disimpaction of faeces	✔	✔
Metoprolol PO		✔
Metronidazole PO		✔
Miconazole 2%/hydrocortisone 1% topical		✔
Microlax enema PR	✔	✔
Midazolam IV, SC, and IM (end of life care) and IN (COPD)		✔
Nasal packing for epistaxis (Rapid Rhino™)	✔	✔
Nitrofurantoin PO	✔	✔
Ondansetron PO	✔	✔
Oral rehydration formula PO	✔	✔
Ophthalmoscopy		✔
Otoscopy	✔	✔
Oxycodone PO		✔
Paracetamol IV		✔
Parecoxib IV and IM		✔
Peak expiratory flow rate measurement	✔	✔
PEG management		✔
Phosphate enema (Fleet enema) PR		✔
Prednisone PO	✔	✔
Prednisolone PO	✔	✔
Prochlorperazine PO and IM		✔
Rectal prolapse reduction		✔
Roxithromycin PO	✔	✔
Salbutamol MDI	✔	✔
Sennoside B PO		✔
Trimethoprim/sulfamethoxazole PO	✔	✔
Ultraproct ointment PR		✔
Urinary catheter placement (in adults)	✔	✔
Wound closure with glue	✔	✔
Wound closure with staples	✔	✔
Wound closure with sutures	✔	✔

1.2 General principles

Using the ECP CPGs in conjunction with the EAS CPGs

- These ECP CPGs are an addendum to the Emergency Ambulance Sector Clinical Procedures and Guidelines (EAS CPGs).
- These ECP CPGs are intended to guide assessment, management and referral of patients suitable for treatment in the community.
- Where a clinical presentation features in both the EAS CPGs and the ECP CPGs, the relevant ECP CPG will describe:
  - The cohort of patients the clinical presentation the CPG applies to, and
  - How the ECP CPG supersedes guidance described within the EAS CPGs, and
  - How the EAS CPGs and ECP CPGs should be used in conjunction with one another.
- The transport/referral tables in the ECP CPGs supersede the flag tables in the EAS CPGs for the same clinical presentation. For example, the transient loss of consciousness transport/referral table in the ECP CPGs supersedes the syncope flag table in the EAS CPGs.
- Clinical judgement is required to ensure that where a condition features in both the ECP CPGs and EAS CPGs (for example, acute undiagnosed abdominal pain or acute non-traumatic chest pain), using the transport/referral tables in the ECP CPGs to supersede the EAS CPGs is done in a way that benefits the patient without adding undue clinical risk.
- Community management of patients is usually best achieved by referring the patient back to primary care (usually their own GP) – this is sometimes referred to as 'closing the loop'.
- Local pathways should also be used whenever possible.

Calling the Clinical Desk

- The Clinical Desk is the primary avenue for ECPs seeking clinical advice.
- Personnel should adhere to the principles outlined in the EAS CPGs when seeking advice via the Clinical Desk.
- Formalised alternative avenues have been introduced in some areas where ECPs are able to obtain clinical advice from personnel other than via the Clinical Desk (for example, the on call GP for that area). These avenues should be used whenever feasible.
- Experience in primary care will vary between personnel on the Clinical Desk. Where feasible, advice should be sought via the Clinical Desk and if a resolution cannot be found (for example, discussion with another on-duty ECP), escalation to the on call doctor will occur.

1.3 Crew resource management in ECP practice

- Crew resource management (CRM) as described in the EAS CPGs is focused on optimising the performance of a team, and often in an emergent situation (for example, a resuscitation). The environment in which ECPs operate requires an adaptation of CRM principles because:
  - ECPs are more likely to be working alone, and
  - ECPs are likely to be working in an environment where time is less constrained, and
  - Key stakeholders are often not physically present at the scene.
- Ways in which the principles of CRM can be applied to, and adapted for, the ECP environment are outlined using the same paragraph headings as the relevant section in the EAS CPGs:
  - **Call for help.** Consider early in the assessment process if the patient is best managed using the ECP or EAS model of care.
  - **Establish a team leader.** Make an early decision about whether advice will be sought from another health provider and followed (for example, a hospice team or a lead maternity carer), or whether the assessment and management process will be determined solely by the ECP.
  - **Communicate effectively.**
    a) Thorough and effective communication between ECP, patient, the patient's family/caregivers, and relevant health professionals is of utmost importance.
    b) Ensure the patient and their family/caregiver clearly understand the outcome of assessment and the transport/referral plan.
    c) Ensure the patient's primary care provider (usually their own GP) has been informed of any transport/referral plan, especially if the plan relies on further action from the primary care provider.
    d) Ensure that any investigations with results pending have clearly communicated plans for follow up.
  - **Utilise resources appropriately.**
    a) Accessing a limited service or supplying a course of medication requires good stewardship.
    b) Care must be taken to ensure that limited resources are being used appropriately and that medications are not being supplied if they unnecessarily raise the risk of antibiotic resistance or drug dependence.
  - **Step back and reassess.**
    a) Because ECP practice is often complex, pausing to step back and reassess any management and treatment/referral decisions before they are finalised is important.
    b) Take time to ask questions such as 'have I obtained all the information I need to make safe and appropriate decisions for diagnosis, treatment and referral?' and 'is this the best thing to do for the patient?'.

1.4 Clinical assessment

Introduction

- This section outlines the approach ECPs should take to clinical assessment and broadly follows the medical model framework.
- In addition to the minimum requirements for patient assessment described in the EAS CPGs, ECPs are required to conduct more in-depth patient assessment where clinically indicated, providing the patient consents and suitable equipment and/or facilities are available.
- Individual sections within these ECP CPGs describe further assessment required for specific patient presentations.
- Point of care testing (POCT) is described in the 'point of care testing' section within these ECP CPGs.

History

- Take a history using the 'four frames' approach, which is comprised of four parts. These are the presenting complaint, past medical history, social and family history, and ideas, concerns and expectations.
- Presenting complaint:
  - Ask the patient what their main complaint is, and why they have called for an ambulance today.
  - Establish whether the complaint is appropriate for ECP management.
  - Establish the history of their presenting complaint, and the nature of the problem.
  - Establish which body systems may be involved and conduct a review of the relevant systems as required (including red flags relevant to the complaint).
- Past medical history:
  - Ask the patient about any existing medical conditions, or recent operations/procedures. While patients rarely intentionally withhold health problems from ambulance personnel, sometimes the use of explicit closed questions is required.
  - Ask the patient what medications they are prescribed, and whether they are taking any health supplements or herbal remedies. Be sure to ascertain if the patient is lacking concordance with prescribed medication.
  - Ask the patient about any allergies and clarify whether this is a true allergy or a recognised adverse effect from the medication.
- Social and family history:
  - When asking about family medical history, confine this to first-degree relatives, as beyond this group family tendencies and specific genetic links become more tenuous. While potentially useful, do not spend significant time defining family medical history.
  - Establish how well supported the patient is. This could include friends and

family or specific home help and district nurse services.
  - Establish whether the house is suitable for the patient and their medical conditions. Note whether there is food in the house and some degree of environmental control.
  - Establish the impact of the patient's medical conditions on their ability to undertake activities of daily living (for example, eating, cooking, cleaning, bathing and toileting.)
  - Ask the patient if they smoke and if so, how many. Use this information to calculate 'pack years', which is the number of packs per day multiplied by the number of years the patient has smoked for.
  - Ask the patient if they drink alcohol, and if so, how much. A standard drink is:
    a) 330 ml of standard strength beer, or
    b) 100 ml of wine, or
    c) 30 ml of spirit.
  - The recommended weekly maximum intake is 10 standard drinks for females and 15 standard drinks for males.
- Ideas, concerns, and expectations:
  - This is an opportunity to ensure personnel have a good understanding of the patient's main concerns and what their expectations are. Focusing on this aspect improves diagnosis and reduces the incidence of adverse incidents and complaints.
  - Ask the patient whether they have any further information to share. On occasions, patients will have more information to share, but for a variety of reasons have not. Explicitly asking the patient is often useful.
  - Ask the patient whether they have any questions. Approximately 30-40% of the population have low or very low health literacy and so personnel must not assume the patient has understood everything that has been said, even if at a relatively simple level.
  - Ask the patient specifically what they want to happen. Understanding the patient's expectations of the outcome of the individual clinical interaction is important.

Principles of examination

- To understand 'normal' within the context of clinical examination, it is important to have a wide base knowledge of 'normal' as a frame of reference.
- It is important to tailor the examination to the presenting complaint and clinical judgement is required:
  - Not every patient requires a head to toe, multi-system examination, nor is there adequate time to allow for this.
  - The examination must be appropriate to the patient complaint and detailed enough to form a diagnosis and safely manage the patient.
  - Not every component of a systems assessment may be necessary.

- All patients must undergo a general examination. Most aspects of a general examination can be conducted during the initial introduction and while an initial set of vital signs is being obtained. This can include observations of the patient's cognition and general appearance (for example, perfusion status, patient weight, and the presence of any gross abnormalities).
- Specific consent must be obtained, and a chaperone present (where possible) when performing an assessment of an intimate or sensitive nature.
- Assessment of body system(s) should be conducted in a way which is relevant to the patient's complaint. Personnel should avoid performing unnecessary assessments that will provide minimal useful information to the overall patient assessment.

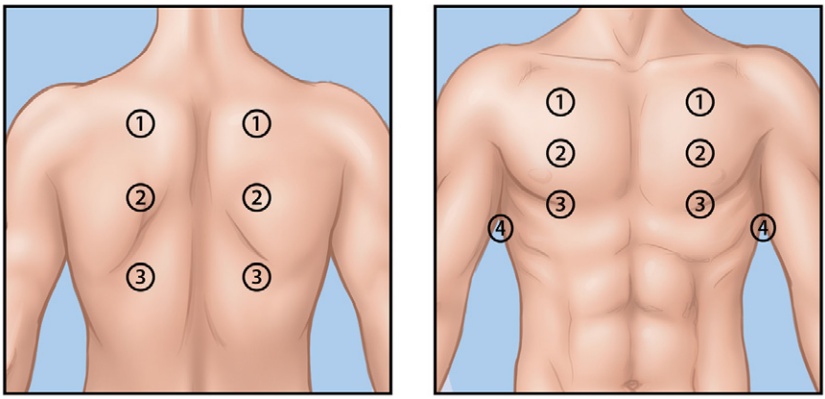
Cardiovascular system assessment

- Assess perfusion status and level of cardiovascular compromise.
- Feel for a radial pulse and note the rate, strength and regularity.
- Visually inspect the patient, focusing on:
  - Evidence of thoracic surgery.
  - Scars, bruising or wounds.
  - The presence of jugular vein distension.
  - The presence of peripheral oedema.
  - Signs of bleeding, external and internal.
- Palpate the chest if chest pain or discomfort is present and feel for any abnormalities and/or a change in pain during palpation.
- Auscultate heart sounds:
  - Locate the apex beat.
  - Note whether heart sounds are clear and if there are additional heart sounds.
  - There is no requirement to diagnose specific murmurs but it is important to document the presence of additional heart sounds.
- Acquire a 12 lead ECG.

Respiratory system assessment

- Visually inspect the chest, focusing on:
  - Work of breathing.
  - Effectiveness of breathing.
  - Chest wall expansion and movement.
  - Evidence of thoracic surgery.
  - Scars, bruising or wounds.
- Palpate the chest, focusing on:
  - Chest wall expansion and movement.
  - Abnormalities such as tenderness, crepitus, or subcutaneous air.

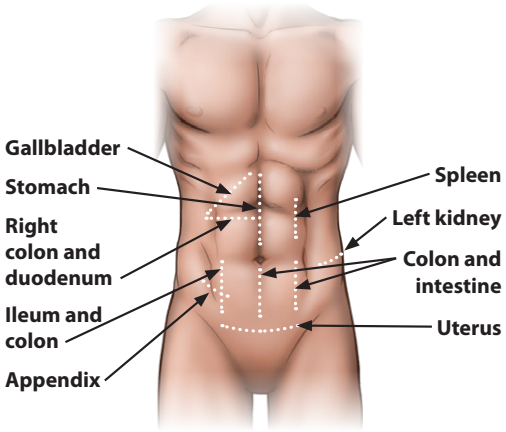
- Percuss the chest, focusing on whether the percussion note is resonant (normal), dull, or hyperresonant.
- Auscultate the chest:
  - It is possible to auscultate the chest in multiple sites and the number of sites chosen requires clinical judgement that balances the time taken to auscultate, with the value of clinical information obtained. The recommended number of sites is six anterior, two lateral, and six posterior (see the recommended sites for chest percussion and auscultation diagram).
  - Listen for equality of air entry and the presence of abnormal lung sounds.
- Obtain a peak expiratory flow rate (PEFR) if indicated.
- Obtain a sputum sample for microbiology if indicated.



Recommended sites for chest percussion and auscultation

Abdominal assessment

- Visually inspect the abdomen, focusing on:
  - Evidence of abdominal surgery (see the common abdominal surgical scars diagram).
  - The presence and likely cause of swelling (could be due to fat, fluid, foetus, faeces or flatus).
  - Localised protrusion.
  - Bruising, erythema or rashes.
- Auscultate the abdomen. Document the presence or absence of bowel sounds, but do not specify whether they are normal or abnormal as this is very subjective.



Common abdominal surgical scars

- Palpate the abdomen:
  - Palpate the abdominal segments in a logical manner (including the flanks), aiming to palpate the painful regions last.
  - It is unusual to feel individual organs during abdominal palpation. It should feel uniformly soft.
  - In a thin patient, hard masses may be palpated in the left lower quadrant and this is usually faecal matter in the sigmoid colon but should still be documented. Pulsation of the aorta may also be found in a thin person above the umbilicus.
  - Guarding is relatively subjective and seldom useful.
  - Do not test for rebound tenderness.
  - Localised rigidity is a sign of localised pathology, and generalised rigidity is a sign of generalised pathology.
- Percuss the abdomen:
  - Percussion notes can be very difficult to hear, particularly if in a noisy environment.
  - Percussion of the abdomen in the presence of peritoneal irritation will be very painful. This is a useful test but should only be performed once in each quadrant if there is pain or tenderness.
- Consider performing the hop test for children if appendicitis is suspected.
- Consider the need for urinalysis and/or a pregnancy test.
- Assess renal function using volume of urine production and urinalysis. Identify any known renal impairment using the following list:
  - Normal renal function (eGFR > 90) is stage 1 chronic kidney disease (CKD).
  - Mildly decreased renal function (eGFR 60-90) is stage 2 CKD.
  - Mild to moderately decreased renal function (eGFR 45-59) is stage 3a CKD.
  - Moderate to severely decreased renal function (eGFR 30-44) is stage 3b CKD.

  - Severely decreased renal function (eGFR 15-29) is stage 4 CKD.
  - Renal failure (eGFR <15) is stage 5 CKD.
- A rectal examination may be appropriate depending on the presenting complaint but requires explicit permission and the presence of an independent chaperone where feasible.
- All patients with upper abdominal (epigastric) pain must have a 12 lead ECG, noting that a normal ECG does not rule out myocardial ischaemia.

Neurological assessment

- Determine the level of consciousness using the GCS.
- Perform a limited cranial nerve assessment including:
  - Assess pupil size, reactivity, and movement.
  - Symmetry of facial and tongue movement.
  - Power of facial movements.
  - Sensation across the distribution of the trigeminal nerve (nerve roots V1, V2, and V3).
  - Presence of gag and swallow reflexes.
  - Ability to shrug shoulders and rotate the head from left to right.
- Examine the peripheral nervous system for symmetry between upper and lower limbs (from left to right) of:
  - Power.
  - Tone.
  - Light touch.
  - Pain.
  - Proprioception.
  - Tendon reflexes.
- Assess coordination using the finger nose test and heel shin test.
- Assess balance using Romberg's test. Observe the patient for any tremors, abnormal movements, or flexion/extension.
- Ask the patient to mobilise and assess their stability and gait.

Musculoskeletal assessment

- Expose and assess the affected joint or limb:
  - Inspect for asymmetry, scars, swelling, redness, or obvious deformity.
  - Palpate and note any tenderness, evidence of effusions, and skin temperature.
  - Assess limb baselines where feasible.
  - Assess for range of movement, pain on movement, and joint stability. Assess both active (the patient moves the joint) and passive (the ECP moves the joint) movement of the joint.
- Note the exact location of the pain, for example, whether it is the joint itself or the area around the joint that is painful.

- Perform a neurovascular assessment. In particular:
  - Identify any deep vasculature involvement (arterial, arteriolar or venous).
  - Identify any distal vascular compromise (new ischaemia).
  - Distinguish between superficial and regional sensation loss.
  - Identify any loss of motor function.
- Assess the patient's mobility and use of the affected joint or limb. For example, consider whether they are walking normally, picking things up with ease and able to seat themselves in a chair.
- Consider the wider picture, for example, whether the patient uses a walking aid, wheelchair, or has chronic mobility issues.
- Medical imaging (x-ray and ultrasound):
  - Use the relevant section in the EAS CPGs referring to limb injuries to guide referral for an x-ray for minor musculoskeletal trauma. If presentations are not featured within the EAS CPGs:
    a) Discuss the patient with a medical or nurse practitioner to arrange referral for an x-ray or ultrasound (for example, for chest x-ray), or
    b) Follow a local pathway (for example, a deep vein thrombosis or a practitioner-initiated x-ray pathway).
  - Specific guidance on interpreting x-ray or ultrasound images is not contained within these CPGs.
  - All requested imaging must have a clearly documented plan for follow up of the result by the requestor.

Eye assessment

- Assess visual acuity using a Snellen chart.
- Consider the eye in layers (eyelids, the surface of the eye, the anterior chamber, the pupil and lens, the vitreous humour and the retina), and examine from anterior to posterior, considering each in turn.
- Inspect the eyelids (inverting if indicated) for evidence of infection, conjunctivitis or foreign bodies.
- Inspect the sclera and cornea for haemorrhage, haziness, or foreign bodies.
- Stain the surface of the eye with fluorescein and examine under blue or black light for leaking aqueous humour, ulceration or abrasions.
- Inspect the anterior chamber of the eye for floaters, sediment or blood.
- Check for pupillary reaction and the consensual light reflex.
- Inspect the retina for obvious abnormalities using an ophthalmoscope (if available).
- Obtain a swab if indicated.

Ear, nose and throat assessment

Ear

- Perform a gross assessment of hearing:
  - Distract the tragus of the ear.
  - Approximately 60 centimetres from the ear being tested, whisper a two-syllable word and ask the patient what it is. Repeat this twice more with other two-syllable words.
  - Repeat the same test in the other ear.
  - If the patient can repeat the word correctly two out of three times, this is considered normal.
  - The Weber or Rinne's test is not recommended as personnel will not usually have access to a tuning fork.
- Inspect the ears for deformities, piercings or signs of infection.
- Inspect and palpate behind the pinnae for tenderness, swelling or skin changes.
- It is not possible to perform a complete assessment of the ear without an otoscope.
- If an otoscope is available:
  - Pull the pinna upwards and backwards, opening the external auditory canal.
  - Position the otoscope in the external auditory meatus.
  - Slowly advance the otoscope under direct vision. It may be uncomfortable for the patient but should not be painful.
  - Inspect for wax, swelling, erythema, discharge or foreign bodies.
  - Examine the tympanic membrane. Divide it into four quadrants and inspect each in turn, assessing:
    a) Colour. Pearly grey or pink and translucent is normal.
    b) Bulging of the membrane. Inspect for a fluid level.
    c) Perforation of the membrane. Note the location and size.
    d) Light reflex. Absence of a light reflex suggests increased inner ear pressure.
    e) Cholesteatoma. This is a mass growing from the 'attic' of the middle ear and may appear as a rough, uneven, white growth over the superior aspect of the tympanic membrane.
  - Examine both tympanic membranes to determine what is 'normal' for the patient.

Nose

- Inspect the nose for evidence of skin lesions.
- Palpate the nose for tenderness or deformity.
- Examine each nostril using the light source from an otoscope or pocket torch, elevating the tip of the nose to improve visualisation.
- Examine for any focal bleeding spots, especially at the anterior apex of the nostril (Little's area).
- Inspect the nasal septum for deviation or swelling (septal haematoma in trauma).
- It is important to compare one nostril with the other to establish what is normal for each patient.

Throat

- Assess for pain associated with mouth opening or difficulty opening the mouth.
- Ask the patient to open their mouth and say 'ahh'.
- Inspect the structures that can be visualised, including the tonsils and oropharynx. Use a tongue depressor to enable this if required.
- Obtain a throat swab if indicated.
- Inspect the gum margins for general condition and any areas of tenderness or swelling.
- Examine the teeth for tenderness if indicated.

Wound assessment

- Assess the patient to include:
  - The mechanism of injury.
  - The time elapsed since the wound was sustained.
  - The onset, duration, location and characteristics of pain and sensory changes related to the wound.
  - Any treatment provided so far (for example, cleaning, and foreign body removal).
  - The degree of tissue destruction.
  - The degree of wound contamination.
  - The presence of any foreign bodies.
- Assess for evidence of damage to any underlying structures:
  - Perform a neurovascular assessment, in particular:
    a) Identify any deep vasculature involvement (arterial, arteriolar or venous).
    b) Identify any distal vascular compromise (new ischaemia).
    c) Distinguish between superficial and regional sensation loss.
    d) Identify any loss of motor function.

  - Muscle and tendon structures. This includes visible deficits (for example, in muscle or tendon fascia), range of motion, motor strength and stability.
  - Bone and joint structures.
- Assess the suitability of the wound for closure.
- Obtain a swab for microbiology if indicated.

Lymphatic system assessment

- Assess the patient for signs of:
  - Swollen lymph nodes (lymphadenopathy).
  - Impaired lymph drainage (for example unilateral limb oedema).
  - Inflamed lymph vessels (lymphangitis, also known as "tracking").

Development of a provisional diagnosis

- Development of a provisional diagnosis takes into consideration all the information obtained from the patient history, clinical examination and other investigations/point of care testing.
- Look for a single unifying diagnosis, as one diagnosis is more likely than two or more coexisting diagnoses.
- Prior to establishing the provisional diagnosis and commencing treatment, pause and consider whether there is an alternative diagnosis that requires further investigation.

Intimate partner violence

- All personnel have an essential role in identifying vulnerable persons and responding to suspected and actual abuse, neglect and vulnerability of children, young persons and adults.
- Due to the focus on primary care and more extensive clinical assessment, ECPs have a unique opportunity to identify vulnerable patients in the community.
- All personnel must follow the general principles outlined in organisational policy for identification and reporting of vulnerable persons. ECPs should conduct additional screening where possible, to include intimate partner violence (IPV).
- When screening for IPV, ECPs should adhere to the principles outlined in the following bullet points.
- **Where:**
  - The enquiry should take place in private.
  - No friends, relatives or children older than two years should be present.
  - Use a trained professional interpreter if translation is required and do not rely on children or other relatives.
  - Use written communication if the person is deaf and a sign language interpreter is not available.

- **Who**:
  - Patients requesting emergency contraception.
  - Patients with signs or symptoms of sexually transmitted infections.
  - Patients with signs or symptoms of intimate partner violence including:
    a) Injuries to the head, neck, face, chest, abdomen or genitals.
    b) Bilateral injury distribution, or multiple injury sites.
    c) Abrasions, bruises, contusions, burns, bites and fractures (particularly nose, orbit and wrist fractures).
    d) Sexual assault.
    e) Multiple injuries in different stages of healing.
    f) Delays between sustaining the injury and presenting for treatment.
    g) Tufts of hair pulled out.
    h) Strangulation or choking injuries.
- **When**:
  - Once rapport has been established.
  - While there is still time left in the consultation to respond to any issues identified.
- **How**:
  - Use simple direct questions in a non-judgmental manner.
  - Set up the enquiry carefully. Options for introducing the topic include asking about IPV as part of the wider psychosocial assessment or framing statements to explain the relevance of the query to the current health consultation. For example:
    a) "Because we know partner violence affects a lot of women's health, we are asking all our female patients about it".
    b) "Because violence affects people's health, I routinely ask all my patients about any violence they may have experienced".
    c) "Many of the women I see as patients are dealing with abuse in their homes, and it can have serious effects on their health, so I ask about it routinely".
    d) "We know that family violence is common and affects women's and children's health, so we are asking routinely about violence in the home".
  - Direct questions about specific behaviours are more likely to result in disclosures of violence and enable you to respond appropriately to the problem. Questions include:
    a) "Within the past year, did anyone scare you or threaten you, or someone you care about? (If so, who did this to you?)".
    b) "Within the past year, did anyone ever try to control you, or make you feel bad about yourself?".
    c) "Within the past year have you been hit, pushed or shoved, slapped, kicked, choked or otherwise physically hurt? (If so, who did this to you?)".

d) "Within the past year has anyone forced you to have sex, or do anything sexual, in a way you did not want to? (If so, who did this to you? When was the last time this happened?)".

- Questions may need to be asked in slightly different ways to enable clear communication, for example using the person's words if possible.

- **Confidentiality:** Avoid making a statement about the limited nature of confidentiality immediately before enquiring about IPV.
- **Other principles:**
  - Listen and express empathy.
  - Be prepared to listen to the experiences of violence and abuse if the person wants to describe these.
  - Do not express shock, horror or disbelief.
  - Let them know:
    a) You believe them.
    b) You are glad they told you.
    c) You are sorry it happened.
    d) It is not their fault.
    e) You will help.

Exclusion or identification of malignancy

- A key function of primary care is the early identification of malignancy, and every patient interaction within primary care is an opportunity for early identification.
- Early identification of malignancy potentially enables curative treatment instead of life prolonging or palliative care.
- Malignancy must always be considered as part of patient assessment and if personnel have concerns, non-urgent follow up within primary care (preferably the patient's own GP) is appropriate.
- Malignancy should be expressly considered in the presence of:
  - Sudden unexplained weight loss.
  - Generalised lymphadenopathy with no associated infective explanation.
  - Unexplained neck mass lasting greater than four weeks.
  - New onset hoarseness lasting greater than four weeks.
  - Breast or axillary masses.
  - Painless abdominal masses.
  - Rectal bleeding.
  - Haematuria.
  - Vaginal bleeding in a postmenopausal woman.
  - New or rapidly changing skin lesion.
  - Facial or intra-oral ulcer lasting greater than four weeks.

1.5 Point of care testing (POCT)

Introduction

- Point of care testing (POCT) refers to any clinical investigations performed that do not need to be sent away for analysis or reporting.
- Common point of care tests in ECP practice include:
  - Blood glucose level test.
  - Urine pregnancy tests.
  - Urinalysis.
  - Peak expiratory flow rate.
  - ECG.
- POCT is an adjunct to patient assessment and should not replace sound clinical judgement.
- Specific use of POCT is described within the relevant section(s).
- For each test, personnel must have an understanding of the test sensitivity and specificity, and the pre-test probability that the patient has the disease being tested for.
- For every investigation that is undertaken, personnel must consider the following:
  - Is this test appropriate for the patient?
  - Does the result of the test make sense?

Advantages of POCT

- Speed. The results of the test can be obtained on scene, and do not require analysis at another location.
- Portability. The test or testing device is compact and/or does not require complicated infrastructure to support it, enabling it to be both 'brought to the patient' and easily transferred to the following patient.
- Availability. Largely due to the portability of the test or testing device, POCT has substantially enhanced availability, and therefore can be used in a wider variety of clinical settings and made available to wider patient populations.
- Expanded capability. By obtaining more information about the patient through POCT, the ability for ECPs to make a wider range of management and referral decisions for patients in the community is expanded.

Disadvantages of POCT

- Quality control. Maintaining the chain of quality control for POCT devices can be challenging.
- Validity. While most testing devices translate well to the out-of-hospital environment, it is important to be aware of how a POC test performs in various clinical environments.

- Association with medical records. Most laboratory-performed test results are filed directly (or with minimal reliance on human input) into the patient's medical record. POCT can require a more labour-intensive approach to ensure the POCT results are linked with the patient's medical record.
- Cost. In some cases, the cost of each test by a POCT device compared to the cost of the same test within a laboratory is significant. This cost can be prohibitive and is a trade-off between the cost of the device and the cost saving of keeping a patient out of hospital when feasible and safe to do so.

POCT validity and quality control

- A test is only useful and valid if its reliability can be demonstrated against a known standard. Quality control is the process by which the accuracy of the result from a POC test is confirmed.
- Each manufactured test has specific internal quality controls built into the testing device.
- To maintain quality assurance in the POC tests being performed, personnel must:
  - Ensure they have been appropriately trained in using the POCT device, and
  - Avoid rushing to perform the test (each step is important to ensure accuracy), and
  - Comply with any quality control steps required.
- Quality control steps that may be required include:
  - Daily machine checks.
  - Logging results.
  - Ensuring test strips are not expired.
  - Ensuring the testing cartridges have been stored properly.
  - Checking testing devices have up-to-date software and are maintained.

iStat machines

- iStat machines are becoming increasingly common devices for undertaking blood tests including:
  - Basic electrolytes.
  - Renal function.
  - Liver function.
  - Venous or arterial blood gases.
  - Troponins.
- These are not currently widely available in the New Zealand out-of-hospital environment.
- If iStat machines are available, they may only be used by personnel who have been trained and authorised to do so.

1.6 Analgesia

This section is for patients with acute pain and a low risk of serious illness or injury.

General principles

- While the approach to analgesia in ECP practice is similar to EAS practice, there are some key differences:
  - A focus on community management of low acuity, low risk presentations.
  - Provision of packages of care providing analgesia for up to several days.
  - An extended range of oral analgesic options.
  - An extended range of local anaesthetic options.
  - The ability to manage some presentations of severe pain in the community.
- As a result, the medicine sections within these ECP CPGs are subtly different from that of the EAS medicine sections. Personnel must be aware of the additional risks and precautions in administering more than a single dose of any given medicine.
- In general, personnel should follow the principle of administering the lowest effective dose to achieve the longest possible duration of analgesia.
- Presentations involving severe undiagnosed pain should usually be referred to an ED, with reference to the relevant EAS CPGs.
- Patients must be given a clear recommendation to be transported to an ED by ambulance if they are administered any of the following:
  - Ketamine via any route.
  - More than two doses of parenteral opiate.

Stepwise progression of analgesia

- Use a multi-modal and stepwise progression of analgesia administration in response to the severity of the patient's pain.
- Refer to the analgesia steps table to guide treatment.

Analgesia steps table

Step	< 2 years	2-12 years	13–65 years	> 65 years
1	Paracetamol or ibuprofen	Paracetamol or ibuprofen	Paracetamol and/or ibuprofen	Paracetamol
2	Check concordance and consider alternating paracetamol and ibuprofen doses	Paracetamol and ibuprofen	Add a weak opioid. Consider high dose ibuprofen	Consider adding either an NSAID or a weak opioid
3	Consult or refer	Consult or refer	Consider replacing the weak opioid with oxycodone CR. Consider adding a single parenteral dose of paracetamol or NSAID to manage more severe pain in the acute phase	Consult or refer

Analgesia in the elderly

- The elderly are commonly prescribed multiple medications (polypharmacy) and are therefore vulnerable to medication interactions and side effects.
- The selection of analgesia at step two of the analgesia steps table should be guided by balancing the risk of adverse effects (for example, acute kidney injury, constipation, and gastrointestinal bleeding) against tolerability issues (for example, nausea, vomiting, dizziness and sedation). Refer to the step two analgesia options in the elderly table for guidance.
- The elderly are particularly vulnerable to acute kidney injury from NSAIDs due to factors including:
  - Age-related decreased renal function.
  - Renal disease.
  - Polypharmacy.
  - Nephrotoxic medication use such as:
    a) Angiotensin converting enzyme inhibitors.
    b) Angiotensin receptor blockers.
    c) Diuretics.

Step 2 analgesia options in the elderly table

Risks	Codeine	NSAID
Constipation	High	No
Respiratory depression	Medium	No
Acute kidney injury	No	High
Gastrointestinal bleeding	No	High
Cardiovascular adverse event	No	Medium
Serotonin syndrome	No	No
Sedation	Medium	No
Confusion	Medium	No
Orthostatic hypotension	No	No
Seizure	No	No
Nausea and vomiting	Low	Low
Dizziness	Low	Low

Non-steroidal anti-inflammatory (NSAID) treatment

- The risk profile of NSAIDs and COX-2 inhibitors is dependent on the:
  - Age of the patient, and
  - Past medical history, and
  - Degree of polypharmacy, and
  - Severity of pain.
- These risks include:
  - Gastrointestinal adverse effects (for example, bleeding).
  - Adverse cardiovascular effects relating to platelet aggregation. Patients with previous myocardial infarction are at increased risk of an adverse cardiovascular event during the first seven days of NSAID treatment.
  - Acute kidney injury.
- Avoid NSAIDs in:
  - Diverticulitis (due to the risk of perforation).
  - Gastro-oesophageal reflux disease (GORD) and dyspepsia.
  - Renal impairment (known, suspected, or at risk of impairment).
- Children, especially those who are dehydrated or have a higher body mass index, are at risk of NSAID-provoked acute kidney injury in the first seven days of NSAID treatment, even at recommended doses.
- Avoid administering NSAIDs to children with chickenpox (Varicella zoster) infection due to the risk of invasive group A streptococcal complications and severe skin and soft tissue infections.

- High dose ibuprofen up to maximum of 2400 mg/day is safe and effective in adult patients with a low risk of adverse effects from NSAIDs. Consider high dose ibuprofen in situations such as gout, renal colic and arthritis.

Opioids and laxatives

- The risk of constipation when administering opioids should be reduced where possible, particularly for elderly patients and patients already taking constipating drugs (see the 'constipation' section).
- This could mean either:
  - Encouraging appropriate use of the patient's prescribed laxatives.
  - Concurrently administering sennoside B if the patient does not have prescribed laxatives.

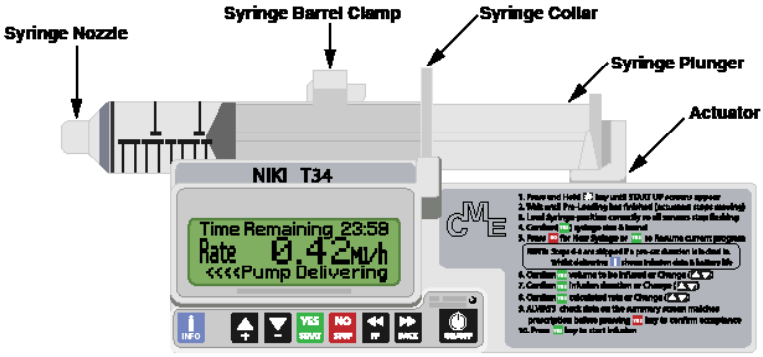
1.7 End of life care

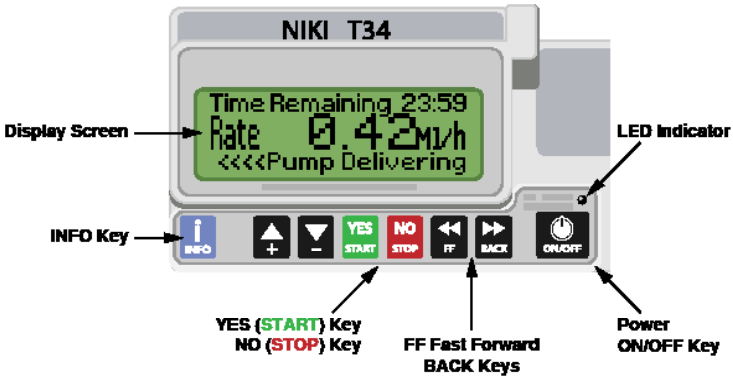
- This section is for patients receiving end of life care and should be used in conjunction with the relevant EAS CPG.
- Whenever possible, the primary care team and/or hospice who is responsible for managing the patient should be actively involved in all decisions relating to the patient's care. If this is not possible, ECPs should manage the patient using the principles outlined in this CPG.
- The aim of end of life care treatment is to relieve symptoms. Administration of multiple medications may in some circumstances hasten the patient's death. The risk of this must be balanced against the severity of the patient's symptoms, and discussed with the patient and/or their family if possible.

Syringe drivers

- Syringe drivers are the predominant tool for drug administration during the immediate end of life period, to manage pain and other symptoms such as agitation, respiratory distress, excess secretions or seizures.
- While ECPs will not usually be required to set up a syringe driver, they may be required to reload or troubleshoot them.
- ECPs must determine the type of syringe driver being used, which may include:
  - The Niki T-34 or BD BodyGuard T syringe driver, which measures millilitres per hour.
  - The AD ambulatory syringe driver, which measures millilitres per hour.
- This CPG will provide specific instruction on the Niki T-34 or BD BodyGuard T syringe driver as it is the standard device used in New Zealand.
- The Niki T-34 or BD BodyGuard T delivers a volume of drug based on volume per hour. All drug calculations should be checked with a crew partner on scene, or personnel on the Clinical Desk.
- Controls and use include:
  - On/Off key. Used to turn the syringe driver on or off completely and must be held down for several seconds.
  - Start/Yes key. Used to start the syringe driver or silence the alarm when sounding.
  - Stop/No key. Used to stop the syringe driver.
  - FF and Back key. Used to move the actuator when loading the syringe.
  - LED indicator. This indicator flashes green when the driver is operating, or solid green if malfunctioning.
  - Syringe clamp. This clamps over the syringe to secure it in place.
  - Actuator. This holds the syringe and moves to deliver the dose.
  - Syringe nozzle. This is the connection between the syringe and the tubing.
  - Syringe plunger. This clips into the actuator.

- Up arrow. Used to increase the volume.
- Down arrow. Used to decrease the volume.
- Information key. Used to show battery status. Pressing this for several seconds will lock or unlock the device.





- Standard connection tubing with a syringe luer plug will connect to the syringe and subcutaneous needle.
- Changes should only be made to the syringe driver rate following consultation with the patient's palliative care team or the on call doctor via the Clinical Desk.
- The Niki T-34 or BD BodyGuard T may be in a locked case and/or have a locked keypad to prevent changes. Without access to the device key, programming changes will not be possible.
- If the syringe driver is alarming:
  - Check the message screen of the device to view the error message.
  - The alarm may be sounding due to kink(s) in the tubing, internal blockage of the tubing, or internal blockage of the needle.
  - Repeated obstructions should result in replacement of the tubing and subcutaneous needle.

- Placement of a subcutaneous line:
  - Use a new sterile 21 gauge butterfly or 22 gauge IV cannula.
  - The preferred sites are the upper anterior chest wall away from the axilla, or the upper abdomen.
  - Avoid the following sites:
    a) Lymphoedematous or ascitic areas.
    b) Areas with broken skin or signs of infection.
    c) Areas that have undergone recent irradiation.
    d) Areas with extensive scarring.
    e) Bony prominences, skin folds, or areas close to a joint.
    f) Areas with tumours.
    g) The anterior chest wall in patients with cachexia.

If symptom control is inadequate

- Problems related to the delivery rate of medications should ideally be managed by the clinical team who have set up the syringe driver.
- If it is not possible to adjust or arrange for the syringe driver to be adjusted, administration of additional medicines may be required.
- Administration of additional medicines is dependent on what has been prescribed to the patient, and how this interacts with the medicines in the ECP scope of practice.
- Consider commencing with IV dosing and then de-escalate to SC dosing when control of symptoms has been achieved.

Pain

- Administer an opiate for pain. Morphine is preferred over fentanyl due to the longer duration of action, however, fentanyl may be used if it is the only opiate available.
- The breakthrough dose of opiate required is dependent on the amount of opiate the patient is prescribed.
- Administer one sixth of the total dose of opiate the patient has received in the previous 24 hours. See the opioid breakthrough dose equivalence table.
- Consider administration of 1 g paracetamol IV, which can be useful for breakthrough pain, especially for patients who are on very high doses of opiates.
- Administer hyoscine butylbromide 20 mg SC for abdominal colic during end of life care. Repeat at four-hour intervals, and change to one-hour intervals if necessary, to a maximum of 300 mg per day.

Opioid breakthrough dose equivalence table

Opioid	Total daily dose	1/6th	IV equivalence ratio	Fentanyl equianalgesic dose IV	SC equivalence ratio	Fentanyl equianalgesic dose SC *
Morphine PO	60 mg	10 mg	300:1	**30 mcg**	200:1	**50 mcg**
	90 mg	15 mg	300:1	**50 mcg**	200:1	**75 mcg**
	120 mg	20 mg	300:1	**70 mcg**	200:1	**100 mcg**
Morphine IV SC	30 mg	5 mg	100:1	**50 mcg**	70:1	**70 mcg**
	60 mg	10 mg	100:1	**100 mcg**	70:1	**140 mcg**
	120 mg	20 mg	100:1	**200 mcg**	70:1	**280 mcg**
Oxycodone PO	40 mg	7 mg	200:1	**35 mcg**	150:1	**50 mcg**
	80 mg	13 mg	200:1	**65 mcg**	150:1	**90 mcg**
	100 mg	17 mg	200:1	**85 mcg**	150:1	**120 mcg**
Oxycodone IV SC	60 mg	10 mg	100:1	**100 mcg**	75:1	**135 mcg**
	90 mg	15 mg	100:1	**150 mcg**	75:1	**200 mcg**
	120 mg	20 mg	100:1	**200 mcg**	75:1	**270 mcg**
Fentanyl TD patch 25 mcg/h	600 mcg	100 mcg	4:3	**75 mcg**	1:1	**100 mcg**
Fentanyl TD patch 50 mcg/h	1200 mcg	200 mcg	4:3	**150 mcg**	1:1	**200 mcg**
Fentanyl SC	450 mcg	75 mcg	4:3	**55 mcg**	1:1	**75 mcg**
	600 mcg	100 mcg	4:3	**75 mcg**	1:1	**100 mcg**
	900 mcg	150 mcg	4:3	**115 mcg**	1:1	**150 mcg**

* The maximum SC fentanyl volume for a single injection is 2.5 ml. Divide any volumes above 2.5 ml into two, and administer as SC injections in two separate sites.

Nausea and/or vomiting

- Administer 0.625 mg droperidol IV or SC (up to a maximum of 5 mg over 30 minutes) to manage breakthrough nausea or vomiting.
- If nausea is not well controlled with droperidol consider adding another antiemetic providing the patient has not been administered levomepromazine or ondansetron already as part of their end of life care plan:
  - Administer 5-10 mg levomepromazine IV or SC, or
  - Administer 4-8 mg ondansetron IV.

Agitation

- Administer midazolam to manage breakthrough symptoms of agitation or dyspnoea:
  - 5 mg midazolam SC, or
  - 1-2 mg midazolam IV
  - Repeat dosing as required to gain control of symptoms.
- Administer 10-15 mg levomepromazine SC if midazolam does not rapidly manage agitation. Repeat the levomepromazine dose hourly until control is achieved.
- Administer 50 mcg of fentanyl SC if midazolam does not relieve the dyspnoea, and repeat as required.

Myoclonic jerks or seizures

- Administer midazolam to manage myoclonic jerks or seizures:
  - 5 mg midazolam SC, or
  - 1-2 mg midazolam IV
- Repeat dosing as required to gain control of symptoms.

Excess secretions

- Administer 20 mg hyoscine butylbromide SC or IM if secretions are causing distress and the patient is unconscious.
- Positioning and mouth cares are useful adjuncts to medications in managing secretions.
- Hyoscine butylbromide is more useful is managing oral secretions and is less likely to have any benefit in managing established lower respiratory tract secretions or fluid.

1.8 Treatment and referral decisions

- Read this section in conjunction with the EAS CPGs referring to treatment and referral decisions and making recommendations using the flag tables.
- Areas where these ECP CPGs differ from or supersede the EAS CPGs sections are detailed in the following paragraphs. In addition to the minimum requirements set out in the relevant section in the EAS CPGs, ECPs must decide:
  - Whether treatment in the community is appropriate for the patient's clinical and social circumstances.
  - Whether follow up is required, and in what timeframe.
  - If follow up is required, what type is most appropriate.
- Ensure appropriate safety netting whenever care of the patient is not immediately handed over (for example, to a primary care team or an EAS crew to transport to an ED). Safety netting may include some or all of the following measures:
  - Communicating clearly with the patient about what is not known. For example, if a test or result is equivocal, if a diagnosis is unclear, or a predicted outcome or timeframe is uncertain.
  - Communicating any plans for follow up.
  - Ensuring any referral has been successfully accepted.
  - Ensuring the patient understands advice provided, has been given complete documentation (for example, an ACS form and relevant patient information leaflets) and has an opportunity to ask questions.
- Arrange follow up (either by an ECP or personnel on the Clinical Desk) if the patient is unable to access their GP or suitable follow up cannot be easily arranged.
- If the patient has no features described in the relevant transport/referral table, they are usually suitable for self-care in the community without referral.
- Where a patient information leaflet is available, this must be provided to the patient, along with an explanation of the information within it.
- Use the private transport or romeo unit transport checklist to determine suitability for alternative transport.

Obligations of personnel

- There are no significant differences between the obligations of ECPs when making and conveying decisions to the patient and the obligations of personnel utilising the EAS CPGs.
- A shared decision making model is appropriate for competent patients, noting that ECP advice must still be conveyed as clear recommendations.

Deciding if the patient requires referral to a medical facility

- In addition to the minimum requirements described in the EAS CPGs, ECPs must provide patients detailed advice on the following:
  - The expected course of their illness or injury.
  - What follow up is required.
  - Instructions for medication administration.

Making recommendations using the transport/referral tables

- Use this section in conjunction with the relevant transport/referral tables to make transport and referral recommendations.
- Apply the principles described in the relevant section of the EAS CPGs referring to making recommendations using the flag tables.
- ECP transport/referral tables differ from EAS flag tables in subtle ways (for example, the thresholds for referral) and in fundamental ways (for example, specifying the mode of transport).
- Specific referral criteria are contained within each section as transport/referral tables. Where a condition features in both EAS CPGs and ECP CPG sections (for example, abdominal pain) the ECP transport/referral table supersedes the EAS flag table.
- General referral criteria include mental health problems and poor social situation. The definition of a mental health problem in this context is broad and intended to capture any patterns of thinking or behaviour that may impede concordance with an action plan or delay the decision to make timely requests for assistance in the event of deterioration.
- Poor social situation includes:
  - Substandard housing (for example cold, damp or mouldy/dusty homes).
  - Social factors, such as those who live alone or those who lack a caring and competent companion in the home.
  - Transport or communication factors that could impede calling for help in the event of deterioration or make attending follow up appointments less likely.

Documentation

- This section should be used in conjunction with the relevant EAS CPG.
- The electronic patient report form (ePRF) is the primary patient care record for those patients attended by an ECP.
- The free text fields should be used liberally to describe the patient history, examination, and amalgamation of the information to articulate a provisional diagnosis and clear management plan.

- Specifically, ECP documentation must include:
  - History of the presenting complaint.
  - Appropriate review of systems.
  - Past medical and surgical history.
  - Family and social history.
  - Prescribed medication and allergies.
  - At least one set of vital signs.
  - The key positive and negative findings on physical examination.
  - The results of any point of care testing that has been performed.
  - Any tests that have been sent away for analysis.
  - A summary of all the findings and amalgamation of all information obtained.
  - Provisional diagnosis.
  - Management plan.
  - Any follow up and referrals made.
- Taking photographs using the ePRF tablet:
  - Photographs add considerably to the electronic storage of the ePRF system and should only be taken if the information is important for the clinical care of the patient or for the ePRF record.
  - ECPs should follow the principles outlined in the EAS CPGs relating to taking photographs using the ePRF tablet.
  - ECPs may also elect to take photographs of wounds, burns and rashes because they:
    a) Are often a useful record of the patient's clinical condition, and
    b) Enable better continuity of care when the patient is referred to primary care (or other).

Pharmaceutical stewardship

- ECPs must administer medicines in line with the best practice principles of pharmaceutical stewardship.
- Antibiotic stewardship is primarily intended to minimise the development of antibiotic resistance. This ensures effective antibiotics are available when needed. Good antibiotic stewardship involves:
  - Avoiding antibiotic administration whenever possible (for example in viral infections, or when a bacterial infection has a self-limiting course and antibiotics are not shown to significantly shorten that course).
  - Administering the lowest dose for the shortest time.
  - Administering narrow-spectrum antibiotics (for example amoxicillin) in preference to broad spectrum antibiotics (for example amoxicillin/clavulanic acid) whenever possible.
  - Delaying administration of empirical antibiotics until bacterial culture results are available to guide antibiotic choices whenever possible.

- Opioid stewardship is intended to minimise the rate of opioid dependence, overdose and death in the population (including ambulance personnel) and involves the following components:
  - Avoiding administering an opioid whenever reasonable and safe to do so.
  - Administering the lowest dose for the shortest time.
  - Completing a robust patient assessment.
  - Identifying potential for misuse.

2.1 Asthma (mild to moderate)

- This section is for patients aged greater than or equal to two years with:
  - Mild to moderate asthma and:
    a) Are systemically well, and
    b) Are at low risk of life-threatening or fatal asthma, and
    c) Have an established diagnosis of asthma or very high likelihood of asthma.
  - A single feature of severe asthma that responds rapidly to treatment.
- Refer to the 'community-acquired pneumonia' section in these CPGs if there are features of infection.
- Refer to the relevant section in the EAS CPGs for those with any feature(s) of life-threatening asthma and/or those who have been administered adrenaline IM.

Assessment

- Take a history, including:
  - Asthma control.
  - Risk factors for severe or fatal asthma.
  - A social history.
- Perform a physical examination, including:
  - A focused respiratory system assessment, with reference to the asthma severity table.
  - A peak expiratory flow rate (PEFR). If the patient does not usually measure a PEFR, calculate the predicted PEFR based on the Mini-Wright nomogram if aged greater than or equal to 15 years.

Asthma severity table (not all clinical features need to be present)

Mild to moderate asthma	Severe asthma	Immediately life-threatening asthma
• Short of breath • Able to speak in sentences • Usually have a loud wheeze • No significant chest/neck indrawing • Normal SpO_2 • Normal LOC	• Very short of breath • Able to only speak a few words per breath • May only have a quiet wheeze • Significant chest/neck indrawing • Tripod positioning • SpO_2 usually > 90% • May be agitated	• Extremely short of breath • Unable to speak • May not have wheeze • Marked indrawing, unless exhausted • Rapidly falling SpO_2 • Severe agitation • Falling LOC or drowsy • Bradycardic

Management

- Administer six puffs of salbutamol (preferably via a metered-dose inhaler [MDI] and spacer). Repeat up to three times every 20 minutes as required.
- Provide prednisone PO, except for the most minor presentations:
  - 40 mg PO once daily for five days for an adult.
  - See the paediatric drug dose tables for a child, once daily for three days.
- Observe the patient for a minimum of 20 minutes following completion of the last bronchodilator administration.
- Provide a salbutamol MDI and spacer if required and one cannot be obtained by repeat prescription within four hours.
- Provide a specific recovery plan for the next 48 hours, to include:
  - Continue taking a short-acting beta agonist (SABA) at 2-4 hours as required.
  - If a SABA is required more frequently than every two hours, the patient should seek medical attention (for example, a GP or urgent care clinic that day).
  - An asthma patient information leaflet.

Referral

Asthma transport/referral table
The patient requires immediate referral to an ED by ambulance: • Features of life-threatening asthma at any stage. • Features of severe asthma that do not immediately respond to treatment. • Inadequate improvement after one hour of treatment. • Significantly abnormal vital signs (other than an isolated low PEFR).
The patient requires referral to an ED, however alternative transport may be appropriate: • Isolated PEFR < 70% of predicted PEFR following one hour of treatment. • Features of severe asthma that immediately respond to treatment. • Risk factors for severe or fatal asthma.
Consider urgent referral to primary care: • An adult with an asthma control test score of 0-15. • Aged 4-11 years with an asthma control test score of 0-12.
Consider non-urgent referral to primary care: • Administered prednisone. • Administered > 3 doses of salbutamol. • Administered salbutamol via a nebuliser and/or oxygen at any stage. • Not currently prescribed an inhaled steroid. • Presumed new diagnosis of asthma in a child. • > 2 asthma exacerbations within the last three months. • An adult with asthma control test score of 16-20. • Aged 4-11 years with an asthma control test score of 13-20.

Additional information

Asthma control history in patients aged greater than or equal to 12 years

- Use the asthma control test for patients aged greater than or equal to 12 years.
- Ask the questions outlined in the table and add up the scores of each question:
  - A score of 0-15 indicates very poorly controlled asthma.
  - A score of 16-20 indicates poorly controlled asthma.
  - A score of 21-25 indicates well controlled asthma.

The asthma control test for patients aged greater than or equal to 12 years

1. In the past **4 weeks**, how much of the time did your **asthma** keep you from getting as much done at work, school or at home?				
1 All of the time	2 Most of the time	3 Some of the time	4 A little of the time	5 None of the time
2.During the past **4 weeks**, how often have you had shortness of breath?				
1 More than once a day	2 Once a day	3 3 to 6 times a week	4 Once or twice a week	5 Not at all
3. During the past **4 weeks**, how often did your **asthma** symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?				
1 4 or more nights a week	2 2 or 3 nights a week	3 One a week	4 Once or twice	5 Not at all
4. During the past **4 weeks**, how often have you used your blue inhaler or reliever medication?				
1 3 or more times per day	2 1 or 2 times per day	3 2 or 3 times per week	4 Once a week or less	5 Not at all
5. How would you rate your asthma control during the past **4 weeks**?				
1 Not controlled at all	2 Poorly controlled	3 Somewhat controlled	4 Well controlled	5 Completely controlled

Asthma control history for patients aged 4-11 years

- Use the asthma control test for patients aged 4-11 years.
- Ask the child the first four questions. If the child needs help in reading or understanding the question, you may help but let the child select the response if feasible.
- Ask the child's parent or caregiver the remaining three questions.
- Add up the scores of each question:
  - A score of 0-12 indicates very poorly controlled asthma.
  - A score of 13-20 indicates poorly controlled asthma.
  - A score of 21-27 indicates well controlled asthma.

The asthma control test for patients aged 4-11 years

1. How is your asthma today?			
 0 Very bad	 1 Bad	 2 Good	 3 Very good
2.How much of a problem is your asthma when you run, exercise or play sports?			
 0 Very bad	 1 Bad	 2 Good	 3 Very good
3. Do you cough because of your asthma?			
 0 Very bad	 1 Bad	 2 Good	 3 Very good
4. Do you wake up during the night because of your asthma?			
 0 Very bad	 1 Bad	 2 Good	 3 Very good

Please complete the following questions on your own					
5. During the last **4 weeks**, how many days did your child have any daytime asthma symptoms?					
5 Not at all	4 1-3 days	3 4-10 days	2 11-18 days	1 19-24 days	0 Every day
6. During the last **4 weeks**, how many days did your child wheeze during the day because of asthma?					
5 Not at all	4 1-3 days	3 4-10 days	2 11-18 days	1 19-24 days	0 Every day
7. During the last **4 weeks**, how many days did your child wake up during the night because of asthma?					
5 Not at all	4 1-3 days	3 4-10 days	2 11-18 days	1 19-24 days	0 Every day

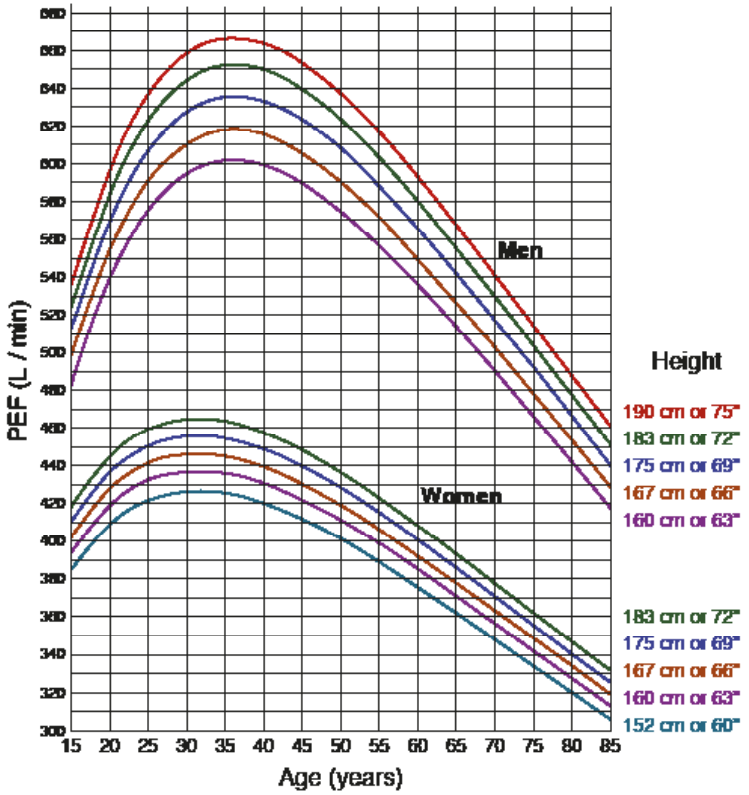
Risk factors for severe or fatal asthma

- There are a variety of factors that suggest an increased likelihood of treatment failure and poor outcome for patients with asthma.
- Clinical judgement is required to determine the relative weight of each of the factors, and patients with multiple risk factors should usually be given a clear recommendation to be referred to an ED.
- Risk factors for severe or fatal asthma include:
  - Previous ICU admission or intubation for asthma.
  - Precipitous or 'brittle' asthma (defined as time from onset to a severe state in less than four hours).
  - Very poorly controlled asthma.
  - Frequent presentations with asthma.
  - Poor concordance with medication. This can manifest as a lack of concordance with medication regimes (for example, not using inhaled corticosteroids regularly, or inappropriately using ICS alone as a short acting reliever) or failing to follow an asthma action plan (for example, delays in seeking help for deterioration).
  - Social factors, including smoking, low socioeconomic status, or lack of caregivers at home.

Wheeze in children

- Asthma is not usually diagnosed in young children unless there have been 2-3 episodes, however this section should be used for children presenting with symptoms of asthma.
- Do not diagnose the child as having asthma and instead refer to the presentation as a symptomatic wheeze.
- Wheeze associated with viral illness is common and often responds to bronchodilators.
- Cough is common but it is rarely the sole symptom and is not specific to asthma. A history of episodic symptoms makes asthma more likely, particularly wheeze in response to exercise, cold air or specific allergens. Additional factors supporting a diagnosis of asthma in a child include:
  - Family history of asthma.
  - Atopic disease in the child.
  - Decreased work of breathing in response to bronchodilator treatment.

Mini-Wright nomogram



Normal values for peak expiratory flow

2.2 Bronchiolitis

This section is for patients aged between two months and two years who are systemically well and have mild to moderate bronchiolitis.

Assessment

- Take a history and perform a physical examination, including:
  - A focused respiratory system assessment.
  - An assessment of the features contained within the bronchiolitis assessment tool and bronchiolitis transport/referral table.
- Consider a diagnosis of pneumonia if the patient has a fever greater than 39°C or persistent focal crackles.

Bronchiolitis assessment tool

Sign/symptom	Mild	Moderate	Severe
Wheeze	None or end-expiratory	Over entire expiratory phase	Inspiratory and expiratory
Feeding volume	Normal	Less than usual but more than half of normal feeds	Less than half of normal feeds
Feeding interruptions	None	Frequent	Gasping or coughing
Oxygen	No requirement	No requirement	Requires O_2 to maintain SpO_2 > 94%
Cyanosis	None	None	Central
Indrawing	None or mild	Intercostal +/- suprasternal	Severe
Nasal flaring	None	Intermittent	Obvious
Grunting	None	None	Any
Respiratory rate	< 60/minute	60-69/minute	≥ 70/minute
Behaviour	Normal	Some irritability	Irritable, lethargic, or exhausted
Hydration	Normal	Risk of dehydration	Evidence of dehydration

Management

- Treatment of bronchiolitis is supportive, and most children can be managed in the community with a focus on adequate hydration.
- Administer paracetamol PO if the patient has a temperature greater than 39°C and the fever is causing discomfort.
- Saline nasal drops may provide some comfort and aid in clearing the infant's nose of thickened mucous.
- Bronchodilators, antibiotics, adrenaline and steroids (by any route) have no role in the treatment of bronchiolitis.
- Suitability for community management depends primarily on the patient's ability to feed and maintain adequate hydration. There must also be no evidence of severe respiratory distress and no requirement for oxygen.

Referral

Bronchiolitis transport/referral table
The patient requires immediate referral to an ED by ambulance: • SpO_2 < 94% on room air. • Features of severe bronchiolitis. • Any episode of apnoea. • Lethargy or reduced alertness. • Age < 2 months (corrected for prematurity). • Moderately unwell and unclear diagnosis.
The patient requires referral to an ED, however alternative transport may be appropriate: • Dehydration. • Temperature > 38°C and aged < 12 weeks. • Temperature > 39°C and aged < 1 year. • Chronic respiratory, cardiac, or neuromuscular disease. • Immunocompromised (for example, on steroids or immunotherapy). • Repeat presentations in this illness, with deterioration. • Poor social situation.
Consider urgent referral to primary care: • Features of moderate bronchiolitis.
Consider non-urgent referral to primary care: • Presentation early in the course of illness. • Greater than two repeat presentations in this illness, without deterioration. • Minor illness and unclear diagnosis.

Additional information

General principles

- Bronchiolitis is a common viral lower respiratory tract infection which usually affects children aged less than one year.
- Bronchiolitis usually peaks on the second or third day, with gradual resolution over 7-10 days, although the cough may persist for weeks.
- Respiratory syncytial virus (RSV) is the virus responsible for most cases of bronchiolitis. Currently there is no immunisation available for RSV, however clinical trials are underway.
- Thick respiratory secretions are a feature of bronchiolitis and younger infants may have difficulty clearing these.
- Fever is present in around a third of cases and is usually less than 39°C.
- Diagnose bronchiolitis if the child has a coryzal prodrome lasting 1-3 days followed by:
  - Persistent cough, and
  - Tachypnoea and/or chest retractions, and
  - Widespread wheeze and/or crackles on auscultation.
- Associated clinical signs for bronchiolitis include:
  - Hyperinflation of the chest, and
  - Accessory muscle use, and
  - Impaired ability to feed.
- Children aged less than or equal to six weeks (or less than eight weeks corrected for prematurity) are at increased risk of apnoea.
- Infants aged less than six weeks may present with apnoea and no other clinical signs.
- Lethargic, exhausted children are likely to be hypoxic and are at risk of respiratory failure.
- Repeated presentations during the course of bronchiolitis due to parental concern but without deterioration or any indication for referral, remain suitable for community management. However, if there are greater than two repeat presentations in this cohort, it should trigger a non-urgent referral to primary care (preferably the patient's own GP).
- If there is significant parental concern or any deterioration in the child's presentation, this should trigger a referral to primary care or an ED.

Assessment

- Differential diagnoses for young children with a wheeze include:
  - Pneumonia.
  - Foreign body airway obstruction.
  - Congestive heart failure.
  - Congenital heart or lung malformations.
- Evidence of dehydration includes dry oral mucosa, decreased skin turgor or decreased urine output.
- Chest x-ray is not routinely indicated even in a secondary care setting.
- Blood tests and virological testing have no role in the assessment of bronchiolitis.

2.3 Chronic obstructive pulmonary disease (COPD)

- This section is for adult patients with:
  - Mild to moderate exacerbations of COPD, or
  - A provisional new diagnosis of COPD strongly supported by features and history, or
  - Severe end-stage COPD that is being managed conservatively.
- Refer to the relevant section in the EAS CPGs if the patient has severe COPD and use this section in conjunction with the relevant section in the EAS CPGs if sepsis is a feature of the patient's exacerbation.

Assessment

- Determine the patient's baseline functional status, using a COPD action plan (for example, a 'Blue Card') if available.
- Perform a physical examination, including:
  - A focused respiratory system assessment.
  - An assessment of the features contained within the COPD transport/referral table.
- Test the patient's sputum if an antibiotic has been administered and the exacerbation is unresponsive to the initial antibiotic choice.
- Assess the current impact of COPD on the patient's life, using the COPD assessment test (CAT).
- Determine the patient's social situation. Ask the patient and their family about their goals and expectations for management.
- Consider the need for antibiotic treatment.
- Consider alternative diagnoses of heart failure, pneumonia and lung cancer. If a new diagnosis of COPD is being considered, assess for:
  - Weight loss.
  - Effort intolerance.
  - Waking at night.
  - Ankle swelling.
  - Fatigue.
  - Occupational hazards.
  - Chest pain.
  - Haemoptysis.

Management

- Administer six puffs of salbutamol (preferably via a metered-dose inhaler [MDI] and spacer). Repeat up to three times every 20 minutes as required.
- Administer one dose of 500 mcg ipratropium nebulised if patient is not prescribed a long-acting muscarinic agonist (LAMA).
- If the patient has a LAMA, administer using a large volume spacer if possible.
- Administer 40 mg prednisone PO for five days, except for the most minor presentations.
- Administer antibiotics if the patient has increased sputum purulence, increased sputum volume, or increased breathlessness:
  - 500 mg amoxicillin PO three times daily for five days, or
  - 200 mg doxycycline PO on day one, then 100 mg PO once daily for day 2-5 if the patient has an allergy to penicillin, or
  - 500/125 mg amoxicillin/clavulanic acid PO three times daily for five days if atypical organisms are suspected or there is no improvement with first line therapy.
- Observe the patient for a minimum of 20 minutes following completion of the last bronchodilator administration.
- Administer 0.5 mg midazolam IN every ten minutes (up to a maximum of 5 mg) if the patient has agitation and severe end-stage COPD that is being managed conservatively.

Referral

- Use the COPD transport/referral table to guide referral unless the patient has severe end-stage COPD and/or a palliative care plan.
- Clinical judgement is required when making transport and referral decisions for patients with severe end-stage COPD and/or a palliative care plan. Where possible, follow the wishes of the patient regarding transport to a medical facility, taking into account the views of the family and the patient's healthcare providers.

COPD transport/referral table
The patient requires immediate referral to an ED by ambulance: • Features of severe COPD exacerbation. • Respiratory failure. • Significantly abnormal vital signs. • Inadequate improvement after one hour of treatment. • Community acquired pneumonia. • SpO_2 < 85%. • SpO_2 > 3 % lower than patient's baseline following treatment. • One or more features of moderate or high risk sepsis (except respiratory rate).
The patient requires referral to an ED, however alternative transport may be appropriate: • Diagnosis is unclear and exacerbation is moderate. • New onset dysrhythmia or myocardial ischaemia.
Consider urgent referral to primary care: • Not known to have COPD but features and history strongly support a provisional diagnosis of COPD. • Administered antibiotics. • A COPD assessment test score of > 21.
Consider non-urgent referral to primary care: • > 3 doses of bronchodilator administered. • Improves to usual respiratory state. • SpO_2 > 88% or within 3% of baseline on room air at rest. • Observed for a minimum of 20 minutes following completion of last bronchodilator. • Observed to mobilise at the patient's usual baseline level of function. • Able to see a doctor (preferably their own GP) within 48-72 hours. • Provided with a prednisone pack. • A COPD assessment test score of 10-20.

Additional information

General principles

- Exacerbations accelerate a decline in lung function, further impair quality of life, restrict daily activities and aggravate deconditioning. Therefore, an increased frequency of COPD exacerbations indicates more severe disease and a higher risk of mortality per year.
- New Zealand has one of the highest rates of admission to hospital in the OECD for exacerbations of COPD. Community management should be strongly considered.
- Manage the patient conservatively if their life expectancy is less than one year. ICU admission and invasive ventilation are usually inappropriate.
- Distinguish between lower-risk viral exacerbations of COPD and higher-risk bacterial exacerbations of COPD. Lower- risk viral exacerbations of COPD typically present with increased sputum production and relatively normal vital signs. Higher-risk bacterial exacerbations of COPD typically present as CAP superimposed on COPD. Mild to moderate viral exacerbations of COPD are usually suitable for community management. COPD and CAP must be referred to an ED except in the setting of severe end-stage COPD.
- Using an MDI is equally as effective as using a nebuliser for management of mild to moderate exacerbations of COPD.

Recognising COPD

- Consider a diagnosis of COPD in patients aged greater than 35 years who have:
  - A risk factor present (for example, smoking or occupational exposure).
  - Exertional breathlessness, and
  - Chronic cough, and
  - Regular sputum production, and
  - Frequent episodes of winter 'bronchitis' or wheeze.
- The diagnosis of COPD is confirmed by airflow obstruction by spirometry following bronchodilator administration. This can usually be performed in primary care.

COPD assessment test (CAT)

- Use the CAT to assess the impact of COPD on the patient's life.
- Ask the questions outlined in the table and add up the scores of each question:
  - A score of 0-9 indicates low impact.
  - A score of 10-20 indicates medium impact.
  - A score of 21-29 indicates high impact.
  - A score of 30 or higher indicates very high impact.

I never cough	0 1 2 3 4 5	I cough all the time
I have no phlegm (mucous) in my chest at all	0 1 2 3 4 5	My chest is completely full of phlegm (mucous)
My chest does not feel tight at all	0 1 2 3 4 5	My chest feels very tight
When I walk up a hill or one flight of stairs I am not breathless	0 1 2 3 4 5	When I walk up a hill or one flight of stairs I am very breathless
I am not limited doing any activities at home	0 1 2 3 4 5	I am very limited doing activities at home
I am confident leaving my home despite my lung condition	0 1 2 3 4 5	I am not at all confident leaving my home because of my lung condition
I sleep soundly	0 1 2 3 4 5	I don't sleep soundly because of my breathing
I have lots of energy	0 1 2 3 4 5	I have no energy at all

Differentiating COPD from asthma

- Differentiating asthma from COPD in older smokers can be difficult. If there are features of both asthma and COPD, consider asthma-COPD overlap syndrome (ACOS).
- Diagnosis of asthma or COPD is more likely when:
  - There are three or more features of either COPD or asthma, and
  - No features of the other condition, and
  - There is no alternative diagnosis.
- If a patient has a similar number of features for COPD and asthma, then a diagnosis of ACOS is more likely.
- ACOS is thought to account for up to 25% of obstructive airway disease and is associated with an increased severity of outcomes. However, ACOS does not currently have a clinical definition and lacks defining features. Have a low threshold for non-urgent referral to primary care if the presentation does not clearly fit COPD.

	Asthma	COPD	ACOS
Smoking	Maybe	Smoker or ex-smoker > 5 pack/years	Smoker or ex-smoker > 5 pack/years
Age of onset	Usually childhood respiratory symptoms and also hayfever, eczema	Usually aged > 35 years	Usually aged > 35 years but may have symptoms in childhood and early adulthood
Chronic productive cough	Uncommon	Common	Common
Breathlessness	Variable	Persistent and progressive	Usually persistent and progressive, but may have some variability
Night-time waking	Common	Uncommon	Variable
Day-to-day symptom variability	Common	Uncommon	Variable
Function between episodes	Usually normal	Always has some degree of breathlessness	Variable
Response to treatment	Responds to treatment	Slowly progressive despite treatment	Some response to treatment but often slowly progressive
Progression over time	Not progressive		

2.4 Community-acquired pneumonia (CAP)

- This section is for adults with mild to moderate CAP.
- Read this section in conjunction with the relevant EAS CPGs if sepsis is present.

Assessment

- Take a history, including:
  - The presence of risk factors for CAP.
  - Evidence of hospital-acquired pneumonia (recent hospital admission for two or more days in the last 90 days).
  - Evidence of aspiration pneumonia (chronic swallowing problems or resident of a hospital-level aged care facility).
  - Bronchiectasis.
  - Differential diagnoses.
- Perform a physical examination, including:
  - A focused respiratory system assessment.
  - An assessment of the features contained with the community-acquired pneumonia transport/referral table.
- Determine the severity of CAP using the CRB-65 score.

CRB-65		Score
Score one point each for	Acute confusion	**+ 1**
	Respiratory rate > 30/minute	**+ 1**
	Systolic blood pressure < 90 mmHg or diastolic blood pressure < 60 mmHg	**+ 1**
	Aged ≥ 65 years	**+ 1**
Result	0 = Mild 1 = Moderate ≥ 2 = Severe	

Management

Mild CAP

- Administer 500 mg amoxicillin PO three times daily for five days, or
- If the patient has an allergy to penicillin administer:
  - 300 mg roxithromycin PO once daily for five days, or
  - 200 mg doxycycline PO twice daily on day one, then 100 mg twice daily for days 2-5.
- If Legionella is suspected or other atypical organisms are present add:
  - 300 mg roxithromycin PO once daily for five days, or
  - 200 mg doxycycline PO twice daily on day one, then 100 mg twice daily for days 2-5.

Moderate CAP

- Administer 1000 mg amoxicillin PO three times daily for five days, or
- If the patient has an allergy to penicillin administer:
  - 300 mg roxithromycin PO once daily for five days, or
  - 200 mg doxycycline PO twice daily on day one, then 100 mg twice daily for days 2-5.

Mild community-acquired aspiration pneumonia

- Administer 500/125 mg amoxicillin/clavulanic acid PO three times daily for ten days, or
- If the patient has an allergy to penicillin administer:
  - 160/800 mg trimethoprim/sulfamethoxazole PO twice daily for ten days, and
  - 600 mg metronidazole PO twice daily for ten days.

Moderate community-acquired aspiration pneumonia

- Administer 1000/250 mg amoxicillin/clavulanic acid PO three times daily for ten days, or
- Seek clinical advice if the patient is allergic to penicillin.

If bronchiectasis is known or suspected

- Have an increased index of suspicion for CAP if the patient has bronchiectasis.

Referral

Community-acquired pneumonia transport/referral table
The patient requires immediate referral to an ED by ambulance: • Presumed hospital-acquired pneumonia. • Temperature > 40°C. • Severe community-acquired pneumonia (CRB-65 score ≥ 2). • SpO_2 < 92% with no history of lung disease. • SpO_2 > 3% lower than baseline for patients with a history of lung disease. • Unable to mobilise normally. • Pleuritic chest pain requiring more than simple oral analgesia. • Neutropenia. • Chemotherapy within the last four weeks. • COPD. • Aspiration pneumonitis. • Heart rate > 110/minute.
Consider urgent referral to primary care: • Moderate community-acquired pneumonia (CRB-65 score 1). • Suspected Legionella. • Suspected influenza. • Travel-acquired respiratory infection. • Mild to moderate aspiration pneumonia. • SpO_2 92-94% with no history of lung disease. • Vomiting and/or dehydration. • Immunocompromised (for example, on steroids or immunotherapy). • Diabetes. • Renal impairment. • Ischaemic heart disease. • Lack of improvement after three days on first line antibiotic.

Additional information

General principles

- Suspect CAP if the patient has:
  - Signs of sepsis, and
  - Two or more lower respiratory tract infection symptoms (for example, cough, purulent sputum, dyspnoea or pleuritic chest pain), and
  - New focal chest signs, and
  - No other explanation for the illness.
- Risk factors for CAP include:
  - Low socioeconomic status.
  - Poor nutrition.
  - Poor housing quality (for example, chronic exposure to damp, mould and overcrowding).
  - Exposure to tobacco smoke.
  - Māori and Pacific People have a higher incidence and mortality rate than other ethnic groups.
- Alternative diagnoses for CAP include:
  - Acute bronchitis with/without underlying pathology (for example, COPD).
  - Heart failure.
  - Pulmonary embolism.
  - Aspiration pneumonitis. This is a rapid and severe chemical lung injury and inflammatory response to larger volume aspiration of non-sterile acidic gastric contents.
  - Travel-acquired respiratory infection. These are more likely to be caused by drug-resistant organisms, especially if the travel was in India or Southeast Asia.
  - Pneumothorax.
  - Acute intra-abdominal pathologies (for example, pyelonephritis, cholecystitis and pancreatitis).
- Blood tests, sputum samples and chest x-rays are not usually required for mild to moderate CAP.
- CAP can be difficult to diagnose and in general, personnel tend to under-treat severe CAP (with high mortality risk) and over-treat mild CAP (with no mortality risk). The most important decision is whether to manage the patient in the community or refer them to hospital.
- Common causative organisms in CAP include *Streptococcus pneumoniae* and *Haemophilus influenzae*.

CRB-65

- The CRB-65 assessment tool is specific to CAP and supersedes the EAS CPG sepsis risk factors table.
- CRB-65 predicts 30-day mortality from CAP:
  - A score of 0 predicts low (0.5%) mortality and the patient is probably suitable for community management.
  - A score of 1-2 predicts intermediate (5.1%) mortality and the patient usually requires referral to hospital.
  - A score of 3-4 predicts high (18.9%) mortality and the patient requires urgent referral to an ED.
- The presence of multiple risk factors for sepsis should not be ignored, regardless of the CRB-65 score.
- A CRB-65 score derived from age > 65 years alone, in the absence of other signs of severe disease, should be treated as 'mild' CAP.
- Have a lowered threshold for treatment and referral for Māori and Pacific Peoples with CAP regardless of CRB-65 score.

Aspiration pneumonia

- Aspiration pneumonia is a lower respiratory tract infection commonly caused by micro-aspiration of non-sterile oropharyngeal and/or gastric contents.
- The aspiration event is usually not witnessed, and symptoms take days to weeks to evolve. Up to 15% of CAP may be due to aspiration pneumonia.
- The antibiotic choice for these patients must include coverage for anaerobes, in addition to streptococci.

Hospital-acquired pneumonia

- The threshold for referring a patient with hospital-acquired pneumonia to an ED should be considerably lower as it is likely that they will require intravenous antibiotics and microbiological identification of antibiotic-resistant organisms.

Bronchiectasis

- Bronchiectasis is permanent abnormal bronchial dilation, characterised by chronic airway inflammation and impaired mucous clearance. This leads to bacterial colonisation of normally sterile airways and a cycle of repeated infection, inflammation and progressive airway destruction.
- In New Zealand, bronchiectasis occurs in children and adults, and disproportionately affects Māori, Pacific People and those from lower socioeconomic communities. This is different to the presentation in other nations where the presentation is usually only associated with cystic fibrosis.
- In New Zealand, bronchiectasis is commonly caused by repeated and/or severe respiratory infections such as pneumonia (bacterial and viral), tuberculosis, adenovirus, measles and pertussis.

- Bronchiectasis may be misdiagnosed because its features overlap with asthma, COPD and common respiratory tract infections.
- Consider bronchiectasis as a provisional diagnosis in:
  - Patients aged greater than 45 years with chronic cough, daily sputum production, recurrent infections and no history of smoking.
  - Patients with COPD (or suspected COPD) who do not smoke or who have frequent and prolonged exacerbations.
  - Unexplained haemoptysis (usually blood-streaked sputum).
  - Māori and Pacific People with persistent cough and sputum. Children of these ethnicities have much higher incidence of bronchiectasis in comparison to children of New Zealand European ethnicity.

Legionella

- Legionella is responsible for many of the more severe cases of CAP, and New Zealand has the highest rate of CAP due to Legionella in the world.
- Legionella is much more common in the summer months but may occur year-round.
- Person to person transmission of Legionella has not been proven.
- Risk factors for Legionella include a history of recent gardening activities (for example, exposure to potting mix) and exposure to potentially contaminated and aerosolised water sources (for example, humidifiers, air conditioners or hot-water systems).
- The history is usually the most important component of the diagnosis of Legionella, however the presence of more atypical clinical findings can assist with diagnosis.
- Examples of atypical clinical findings include:
  - Excessive sweating.
  - Nausea and vomiting.
  - Abdominal pain.
  - Diarrhoea (more common with Legionella than other forms of CAP).

3.1 Chest pain

- This section is for adults who are systemically well and have non-traumatic chest pain that is not expected to be acute coronary syndrome or pulmonary embolism. For example, a:
  - Musculoskeletal system injury or disorder, or
  - Non-life-threatening gastrointestinal cause, or
  - Non-life-threatening respiratory system problem, or
  - Psychogenic problem.
- Refer to the relevant section in the EAS CPGs if the provisional diagnosis is cardiac chest pain.

Assessment

- Take a history and perform a physical examination, including:
  - An assessment of the presence of risk factors for acute coronary syndrome and pulmonary embolism using the described risk stratification tools:
    a) Use the Emergency Department Assessment of Chest Pain Score (EDACS) to stratify the risk of a major adverse cardiac event (MACE), if the patient's pain has resolved.
    b) Use the pulmonary embolism risk stratification table and flow chart to stratify the risk of pulmonary embolism, unless the patient is pregnant.
  - An assessment of features of thoracic and abdominal aortic dissection.
  - Consideration of the probability of acute coronary syndrome (using the acute coronary syndrome symptom table).
  - An assessment of features contained within the non-traumatic chest pain transport/referral table.
  - A focused cardiovascular system assessment, including a 12 lead ECG.

Referral

Non-traumatic chest pain transport/referral table

The patient requires immediate referral to an ED by ambulance:

- ACS, or moderate to high risk of ACS.
- Significantly abnormal vital signs.
- Ischaemia or infarction on 12 lead ECG.
- Systemically unwell.
- Suspected alternative, life-threatening diagnoses, including myocarditis, pericarditis, pneumothorax, oesophageal rupture, and aortic dissection.
- EDACS score ≥ 16.
- PE, or moderate to high risk of PE.
- Wells criteria score ≥ 2.
- rGeneva score ≥ 11.

The patient requires referral to an ED, however alternative transport may be appropriate:

- Referral for community troponin and/or D-dimer testing is indicated, but referral is not accepted by the GP or the patient cannot be seen within four hours.
- Pregnant.

The patient requires referral to primary care within four hours:

- PERC score ≥ 1 and rGeneva score of < 11.
- Referral for community troponin and/or D-dimer testing is indicated, referral is accepted by the GP, and the patient can be seen within four hours.

The patient may be suitable for care in the community without referral:

- Probable non-cardiac cause.
- Life-threatening problems excluded.
- ACS is not suspected.
- Normal vital signs.
- Normal 12 lead ECG.
- Wells score < 2 and PERC score is 0.

Community troponin and/or D-dimer testing

- There may be a small number of patients in whom community troponin testing may be appropriate.
- If there is low likelihood but some residual suspicion of acute coronary syndrome and all the following criteria are met, then consider referring to primary care for community troponin testing:
  - Symptoms resolved, and
  - EDACS < 16, and
  - Normal ECG, and
  - Patient presents less than 72 hours following onset, and
  - The GP accepts referral and can see patient in timely manner (less than four hours), and
  - There are no red flags present, and
  - There are no transport impediments to accessing a GP.
- Refer the patient to primary care (preferably their own GP) for D-dimer testing if PE cannot be ruled out but the risk is low (for example, a rGeneva score of less than 11).

Additional information

Assessment of risk factors for acute coronary syndrome

- Cardiac causes of non-traumatic chest pain account for less than 20% of chest pain complaints in primary care.
- Risk factors for acute coronary syndrome include:
  - Aged greater than 35 years.
  - Known coronary artery disease.
  - Current smoker.
  - First-degree family history with premature coronary artery disease (males aged less than 55 years, females aged less than 65 years).
  - Male sex.
  - Diabetes.
  - Hypertension.
  - Hyperlipidaemia.
  - High risk ethnic group. Indians and Fijian Indians are at very high risk. Māori and Pacific People are at increased risk.
- A lack of risk factors does not exclude acute coronary syndrome, and an age of less than 35 years does not exclude other causes of myocardial ischaemia.
- The autonomic nervous system transmission of pain, and autonomic neuropathy (particularly patients with diabetes) lessen the value of pain description in the diagnosis.
- Some risk factors and symptoms of acute coronary syndrome are also scored in EDACS. Only use the EDACS score if the risk of acute coronary syndrome is considered low.

Symptom	Suggests ACS	Less suggestive of ACS
Pain duration	> 15 minutes	< 30 seconds
Pain description	Heavy, burning, dull, crushing, ache	Other descriptions
Pain location	Predominantly in chest	Other locations
Pain radiation	Arm, shoulder, neck, jaw	Other locations
Correlation with breathing	None	Alters or worsens on inspiration
Palpation	Not reproducible on palpation	Reproducible on palpation

Emergency department assessment of chest pain score (EDACS)

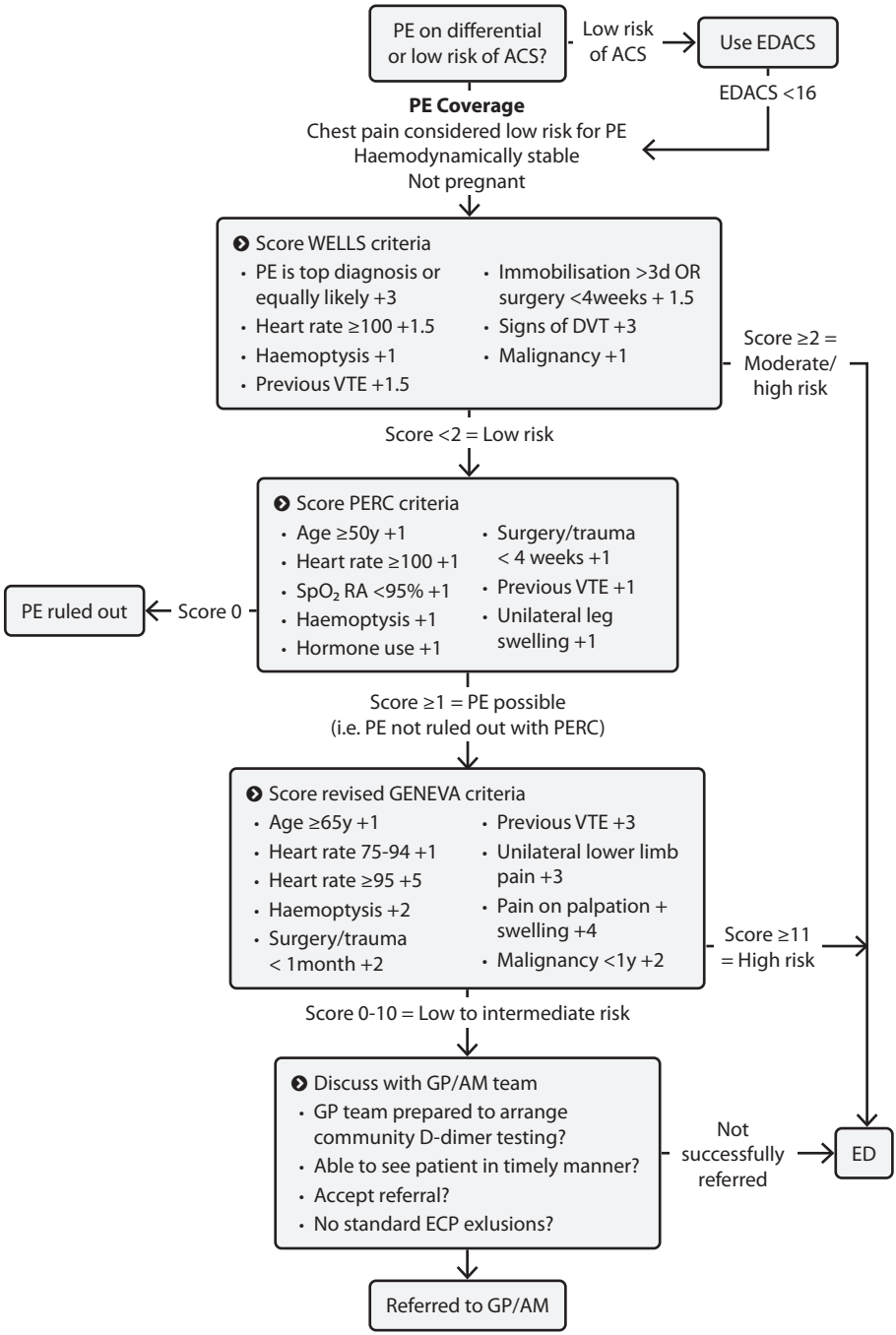
- In EDACS, known coronary artery disease refers to:
  - Previous myocardial infarction, or
  - Coronary artery bypass grafting (CABG), or
  - Percutaneous coronary intervention (PCI).
- In EDACS, risk factors refer to:
  - Family history of premature coronary artery disease.
  - Dyslipidaemia.
  - Diabetes.
  - Hypertension.
  - Current smoker.

Clinical characteristics		Score
Age (in years)	18-45	**+ 2**
	46-50	**+ 4**
	51-55	**+ 6**
	56-60	**+ 8**
	61-65	**+ 10**
	66-70	**+ 12**
	71-75	**+ 14**
	76-80	**+ 16**
	81-85	**+ 18**
	≥ 86	**+ 20**
Sex	Male	**+ 6**
Age 18-50 with	Known coronary artery disease (CAD) or ≥ 3 risk factors	**+ 4**
Symptoms and signs	Diaphoresis	**+ 3**
Pain	Radiates to arm or shoulder	**+ 5**
	Occurred/worse with inspiration	**- 4**
	Reproduced by palpation	**- 6**

Pulmonary embolism risk stratification table

	Wells Criteria		PERC Rule		Revised Geneva Score	
Purpose	Stratifies risk of PE		Rules out PE if score = 0 AND pre-test probability is low		Stratifies risk of PE	
Variable	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**
PE is primary diagnosis, or equally likely	Yes	**+3**				
Age			≥ 50y	**+1**	> 65y	**+1**
Heart rate	>100	**+1.5**	≥ 100	**+1**	75-94	**+3**
					≥ 95	**+5**
SpO_2 on room air			< 95%	**+1**		
Haemoptysis	Yes	**+1**	Yes	**+1**	Yes	**+2**
Hormone use			Yes	**+1**		
Surgery/trauma requiring hospitilisation < 4 weeks			Yes	**+1**		
Surgery under general anaesthetic < 1 month OR trauma involving lower limb fracture < 1 month					Yes	**+2**
Immobilisation > 3 days OR surgery < 4 weeks	Yes	**+1.5**				
Previous venous thromboembolism	Yes	**+1.5**	Yes	**+1**	Yes	**+3**
Unilateral leg swelling	Yes	**+3**	Yes	**+1**		
Unilateral lower limb pain (symptom)					Yes	**+3**
Pain on lower limb deep venous palpation and unilateral oedema					Yes	**+4**
Malignancy < 1 year	Yes	**+1**			Yes	**+2**
Result	Low: < 2 Moderate: 2-6 High: > 6		Rule out: 0 Possible: > 0		Low: < 4 Intermediate: 4-10 High risk: > 10	

Chest pain risk stratification flow chart



3.2 Atrial fibrillation

This section is for adults with new onset atrial fibrillation who are asymptomatic or have only mild symptoms with no myocardial ischaemia. Use the relevant section in the EAS CPGs for patients with atrial fibrillation and moderate to severe cardiovascular compromise.

Assessment

- Take a history, focusing on:
  - Possible triggers for atrial fibrillation.
  - Time of onset of atrial fibrillation.
  - Features contained within the atrial fibrillation transport/referral table.
  - Components of the CHA_2DS_2-VASc score.
- Perform a physical examination, focusing on:
  - A focused cardiovascular system assessment (including a 12 lead ECG).
  - The level of cardiovascular compromise (refer to the relevant section in the EAS CPGs).

CHA_2DS_2-VASc score

Risk		Score
Age (in years)	< 65 years	**0**
	65 - 74 years	**+ 1**
	≥ 75 years	**+ 2**
Congestive heart failure		**+ 1**
Hypertension		**+ 1**
Stroke, TIA or thromboembolism		**+ 2**
Vascular disease (MI, peripheral arterial disease or AAA)		**+ 1**
Diabetes		**+ 1**
Female		**+ 1**

Score

0 = low risk, no anticoagulation required

1 = low risk but needs referral to primary care within 48 hours for possible anticoagulation

≥ 2 = moderate to high risk - needs immediate referral to an ED

Management

- Administer 47.5 mg metoprolol CR PO once daily for five days if the patient is not being immediately referred to an ED and they are not already taking metoprolol.

Referral

Atrial fibrillation transport/referral table
The patient requires immediate referral to an ED by ambulance: • Heart rate > 150/minute. • Systolic blood pressure < 100 mmHg. • Chest pain. • Significant shortness of breath. • Clear onset within last 48 hours. • ST depression on the 12 lead ECG.
The patient requires immediate referral to an ED, but alternative transport may be appropriate: • CHA_2DS_2-VASc score ≥ 2.
The patient requires non-urgent referral to primary care: • CHA_2DS_2-VASc score of 1. • Metoprolol has been administered.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Advise the patient to see their GP if they have a moderate worsening of symptoms.
- Advise the patient to call 111 if their symptoms become severe.

Additional information

Triggers for atrial fibrillation

- Underlying heart disease, for example, cardiomyopathy and valvular disease.
- Myocardial infarction.
- Alcohol.
- Thyrotoxicosis.
- Respiratory conditions (for example, COPD, sleep apnoea, pulmonary embolism and pneumonia).
- Infection.

Suitability for community management

- Patients with atrial fibrillation are suitable for community management if they have:
  - Low risk of immediate compromise from atrial fibrillation, and
  - Low risk of complications of atrial fibrillation, and
  - Onset of symptoms is more than 48 hours ago or is unclear.
- Mild symptoms of atrial fibrillation such as palpitations are appropriate for community management, but any signs or symptoms of myocardial ischaemia (for example, rate-related ST segment changes or chest pain) should be managed in hospital.

Paroxysmal atrial fibrillation

- Patients with paroxysmal atrial fibrillation can be managed using this section if they otherwise meet the criteria for community management.

CHA_2DS_2-VASc score

- The primary complication of atrial fibrillation is arterial thromboembolism.
- The CHA_2DS_2-VASc score estimates the risk of arterial thromboembolism in the context of new onset atrial fibrillation.

Patients already taking metoprolol

- Seek clinical advice regarding dose changes if the patient is already prescribed metoprolol.

3.3 Hypertension

This section is for systemically well adults who have hypertension. Seek clinical advice if the patient is a child. Refer to the relevant section in the EAS CPGs if the patient is pregnant.

Assessment

- Take a history and perform a physical examination, including:
  - A focused cardiovascular system assessment (including a 12 lead ECG).
  - An assessment of evidence of end organ damage.
  - Auscultation of heart sounds, noting the presence of extra heart sounds or murmurs.
  - Measurement of the blood pressure at least twice in one sitting, 5-10 minutes apart. The patient should be seated with legs uncrossed, silent and rested.
- Perform urinalysis.

Management

- Do not attempt to reduce the patient's hypertension if they have unstable angina or severe aortic stenosis.
- Administer 5 mg amlodipine PO once daily for seven days if the patient has severe hypertension.
- Consult the patient's renal team prior to commencing amlodipine if the patient has known severe renal disease (eGFR <30).
- Withhold amlodipine and seek advice from the patient's primary healthcare provider if the patient has severe hypertension and is currently prescribed an antihypertensive medication.

Referral

Hypertension transport/referral table
The patient requires immediate referral to an ED by ambulance: • Features of end organ damage. • Presence of extra heart sounds or murmurs on auscultation.
Consider urgent referral to primary care: • Severe hypertension but contraindications and/or cautions for amlodipine are present.
The patient requires non-urgent referral to primary care: • Pre-existing diagnosis of hypertension. • New diagnosis of hypertension and administered amlodipine.

Advice

- Provide a hypertension patient information leaflet.
- Reinforce the lifestyle modification advice in the hypertension patient information leaflet:
  - Encourage exercise and healthy diet.
  - Reduce excessive alcohol consumption because this has a direct effect on blood pressure and wider health benefits.
  - Reduce excessive caffeine use.
  - Reduce added salt and raise awareness of the salt content of food.
  - Encourage smoking cessation options and provide referral if patient consents.

Additional information

Defining hypertension

- Hypertension is defined as:
  - Systolic BP greater than 140 mmHg and less than 179 mmHg, or
  - Diastolic BP greater than 90 mmHg and less than 119 mmHg.
- Severe hypertension is defined as:
  - Systolic BP greater than 180 mmHg, or
  - Diastolic BP greater than 120 mmHg.

Assessment

- Evidence of end organ damage includes:
  - Significant headache.
  - New onset of confusion.
  - Chest pain.
  - Shortness of breath or signs of acute cardiogenic pulmonary oedema.
  - Acute, new or worsened, lower limb or sacral oedema.
  - Proteinuria (more than trace protein on urinalysis).
- Abnormal heart sounds or extra heart sounds are suggestive of cardiomyopathy resulting from hypertension, or a more complicated underlying cause.
- Blood pressure should be measured more than once in a single sitting due to the anxiety some patients experience when having their blood pressure measured. Anxiety can cause:
  - Transiently elevated blood pressure, or
  - Cardiac rhythm changes with a single unexpected blood pressure measurement.
- A transiently elevated blood pressure is likely to settle when subsequently measured during the same sitting.

Diagnosing hypertension

- Do not rely on a single blood pressure measurement to diagnose hypertension.
- Blood pressure can vary significantly through the day and is transiently affected by:
  - Exercise.
  - Caffeine.
  - Acute illness.
  - Chronic poor health.
- A new diagnosis of hypertension usually requires elevated blood pressure measurements on more than one day.
- Elevated blood pressure measurements recorded at a single sitting should be interpreted with caution.
- Ambulatory blood pressure monitoring is the most accurate method to diagnose hypertension.

Types of hypertension

- There are two types of hypertension:
  - Essential hypertension, where no apparent cause is found.
  - Secondary hypertension, where another disease process is causing the hypertension (for example, heart valve disorders, renal disease and adrenal gland disorders).
- The patient should be managed as essential hypertension unless there is a clear alternative diagnosis causing the hypertension. Further investigation can be arranged within primary care if required.
- 'White coat' hypertension is an elevated blood pressure in a patient who is otherwise not hypertensive, due to the anxiety of having their blood pressure measured by a health practitioner:
  - A diagnosis of hypertension should be delayed if the patient is not severely hypertensive and is clearly anxious.
  - Arrange follow up in primary care (preferably the patient's own GP).

Treatment urgency

- There is usually no urgency to commence antihypertensive treatment.
- Mild to moderately elevated blood pressure causes damage over months to years.
- A delay of a few days in commencing antihypertensive treatment is not usually clinically significant.

4.1 Hyperglycaemia

- This section is for patients with clinically stable hyperglycaemia and:
  - Known diabetes, and
  - No signs of diabetic ketoacidosis (DKA), or hyperosmolar non-ketosis (HONK).
- Refer to the relevant section in the EAS CPGs if the patient has DKA or HONK.

Assessment

- Take a history and perform a physical examination, including an assessment of the features contained within the hyperglycaemia transport/referral table.
- Perform urinalysis.

Management

- There is currently no role for adjustment or administration of insulin in the community by ECPs.

Referral

Hyperglycaemia transport/referral table
The patient requires immediate referral to an ED by ambulance: • Diabetic ketoacidosis (DKA). • Hyperosmolar non-ketosis (HONK). • High risk of HONK or DKA. • BGL > 22 mmol/L and acutely unwell, particularly if unwell with infection. • Ketones > 1.5 mmol/L on urinalysis or capillary blood (finger-prick) test. • Clinically unstable. • Dehydrated or clinically significant risk of dehydration. • Requiring referral to primary care but unable to be seen within an appropriate timeframe.
The patient requires referral to primary care within two hours: • BGL 12-22 mmol/L and acutely unwell, particularly if unwell with infection. • BGL > 33 mmol/L but not acutely unwell.
The patient requires referral to primary care within 12 hours: • BGL 22-32 mmol/L but not acutely unwell.
The patient requires referral to primary care within 24 hours: • BGL 12-22 mmol/L but not acutely unwell.

Other referral considerations

- Referral to primary care may be to a community diabetes nurse or a GP (preferably the patient's own GP).
- Consult with the patient's GP to discuss suitability for management of the patient in the community if:
  - The patient has apparent steroid-induced hyperglycaemia, and
  - The BGL is greater than 22 mmol/L, and
  - The patient does not require immediate referral to an ED by ambulance.
- Have a low threshold for referral to an ED if the patient has poor concordance with diabetes medicines.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Increase unsweetened fluid intake until review.
- Do not exercise if the BGL is greater than 17 mmol/L.
- Test the BGL at a maximum of two hourly intervals until seen in primary care.
- Test the ketones at a maximum of two hourly intervals until seen in primary care, providing the patient is able.
- Seek immediate advice in primary care (preferably the patient's own GP) if:
  - The BGL increases to greater than 22 mmol/L (if the initial BGL was less than 22 mmol/L), or
  - The BGL increases to greater than 33 mmol/L (if the initial BGL was less than 33 mmol/L), or
  - Unable to stay hydrated, or
  - The patient becomes more unwell before being seen in primary care, or
  - Patient-tested ketones are greater than or equal to moderate on urinalysis or > 1.5 mmol/L on finger prick test.

Additional information

Diabetic ketoacidosis

- DKA develops in patients with type one diabetes who receive insufficient insulin, leading to clinically significant hyperglycaemia.
- Patients with DKA have:
  - Hyperglycaemia with a blood glucose concentration that is usually greater than 20 mmol/litre.
  - Hypovolaemia from a combination of osmotic diuresis secondary to hyperglycaemia, reduced oral intake and vomiting.
  - Acidosis from metabolism of fatty acids to ketones. The most common sign of this is tachypnoea. The patient's breath may have a fruity smell from ketones.
- The patient may have non-specific abdominal pain.
- Hyperventilation is a normal physiological response to metabolic acidosis and the patient should not be coached to lower their respiratory rate.

Hyperglycaemia without acidosis

- Patients with type two diabetes can develop clinically significant hyperglycaemia without acidosis, because there is sufficient insulin present to prevent cells shifting to predominantly metabolising fatty acids. This may be referred to as hyperosmolar non-ketosis (HONK), hyperosmolar hyperglycaemic non-ketotic state (HHNS) or hyperosmolar hyperglycaemic state (HHS).
- The patient may be very hypovolaemic from osmotic diuresis but will not usually have significant acidosis.
- The principles of out-of-hospital treatment are the same as for a patient with DKA.

Insulin

- There is currently no role for ECP alteration of a patient's prescribed insulin regime, unless there has been an explicit discussion with the patient's own GP, and appropriate follow up arranged.
- A GP may consider starting a hyperglycaemic patient on insulin if the patient:
  - Has previously diagnosed diabetes, and
  - Is otherwise well, and
  - Has no triggers for referral to an ED.

5.1 Undifferentiated abdominal pain

- This section is for patients aged greater than two years with undifferentiated abdominal pain and:
  - Have normal or near normal vital signs, and
  - Are systemically well, and
  - Are at low risk of serious pathology.
- Refer to the relevant section in these CPGs if a specific abdominal condition is likely.

Assessment

- Take a history and perform a physical examination, including:
  - A focused abdominal assessment (including the groin).
  - An assessment of the features contained within the abdominal pain transport/referral table.
- Consider referred testicular pain in males.
- Perform urinalysis.
- Perform a pregnancy test in females aged 12-60 years.

Referral

Undifferentiated abdominal pain transport/referral table
The patient requires immediate referral to an ED by ambulance: • Unclear diagnosis requiring intravenous or oral opiates to manage pain. • Ectopic pregnancy. • Bowel obstruction or perforation. • Myocardial ischaemia. • Pancreatitis. • Cholecystitis. • Frank haematuria. • Leaking or dissecting abdominal aortic aneurysm. • Evidence of peritonism.
The patient requires referral to an ED, however alternative transport may be appropriate: • Aged ≤ 2 years. • Systemically unwell. • Temperature ≥ 39°C. • Rigors. • Abnormal vital signs. • Significantly decreased urine output. • Persistent or recurrent vomiting. • Immunocompromised (for example, on steroids or immunotherapy). • Appendicitis. • Positive pregnancy test. • Requires referral to primary care but unable to be seen within an appropriate timeframe.
Consider non-urgent referral to primary care: • Aged ≤ 5 years. • Aged > 80 years. • Vomiting. • Temperature < 39°C, but all other vital signs normal. • Comorbidities (for example, diabetes or known abdominal aortic aneurysm). • Haematuria (macroscopic but not frank). • Suspicion of neoplasm without immediately life-threatening associated features. • Risk of acute kidney injury.

Consideration of management in the community

- Consider community management for patients where no specific provisional diagnosis is suggested provided all the following conditions are met:
  - Pain has resolved spontaneously, or with only simple oral analgesia, and
  - Pain was not persistently severe, and
  - There are no elements of concern within the patient history, and
  - The patient is systemically well, and
  - Vital signs are normal or near normal, and
  - No abnormalities found on examination, and
  - There are no significant comorbidities, and
  - The patient has good social support, and
  - Referral, follow up and safety netting are all straightforward.

Abdominal pain with a specific diagnosis not described in these CPGs

- Community management may be appropriate for patients with abdominal pain related to a known diagnosis (excluding chronic pain or complex pain syndromes) provided the following conditions are met:
  - The pain has resolved with simple oral analgesia or low dose fentanyl IV, and
  - The situation clearly fits within the management plan for the patient's problem if one exists, or
  - Community management is aligned with the goals and expectations for the problem if no management plan exists, and
  - The patient is systemically well, and
  - Vital signs are normal or near normal, and
  - The patient has good social support, and
  - Referral, follow up, and safety netting are all straightforward.

Additional information

General principles

- Abdominal pain is a symptom not a disease. There are many potential diagnoses related to the symptom of abdominal pain and the ability to form an out-of-hospital provisional diagnosis is limited.
- The cause of most abdominal pain remains unidentified because most pain self-resolves quickly.
- Many patients will require referral to a medical facility that has the capacity to complete investigations including blood tests, x-ray, CT scan and ultrasound.
- Have a low threshold for referral if the clinical presentation does not strongly suggest a provisional diagnosis of a minor or benign problem.
- Have a low threshold for seeking clinical advice if the problem is complex or the clinical risks are not readily reconcilable.

Decreased urine output

- Significantly decreased urine output is measured by:
  - Less than 200 ml output over 12 hours for an adult patient who is catheterised, or
  - Negligible urine output over six hours for an adult who is not catheterised, or a child.

Urinalysis interpretation

- Microscopic haematuria alone should not trigger referral to an ED.
- In the context of concern regarding renal function:
  - Negligible urine output over six hours or less than 200 ml urine output over 12 hours suggests acute kidney injury (AKI) or high risk of AKI.
- In the context of AKI:
  - Blood and protein on urinalysis suggest glomerular disease.
  - Protein but no blood on urinalysis suggests kidney tubular injury.
  - Lack of blood and protein on urinalysis suggests reduced renal blood flow or urinary tract obstruction.

5.2 Biliary colic

This section is for adults with biliary colic who are systemically well and known to have gallstone disease.

Assessment

- Take a history and perform a physical examination, including:
  - A focused abdominal assessment.
  - An assessment of the features contained within the biliary colic transport/referral table.
- Perform urinalysis.

Management

- Administer analgesia as required for pain.
- Administer an antiemetic as required for nausea and/or vomiting.
- Provide rehydration as required.

Referral

Biliary colic transport/referral table
The patient requires immediate referral to an ED by ambulance: • Pancreatitis. • Cholangitis. • Choledocholithiasis.
The patient requires referral to an ED, however alternative transport may be appropriate: • Jaundice. • Temperature > 38°C. • Rigors. • Significantly abnormal vital signs. • Presumed new diagnosis of gallstone disease. • Established gallstone disease and pain requiring more than two doses of fentanyl IV. • Cholecystitis. • Systemically unwell. • Requires referral to primary care but unable to be seen within 48 hours.
Consider non-urgent referral to primary care: • History of pancreatitis. • History of jaundice. • Established gallstone disease and pain managed with a single dose of fentanyl IV.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Avoid foods and drinks that trigger episodes until the patient has definitive surgical management.
- Provide a biliary colic patient information leaflet.
- Seek medical attention if:
  - Pain becomes worse despite oral analgesia.
  - Fever develops.
  - Rigors develop.
  - Jaundice develops.

Additional information

General principles

- Gallstone disease is a general term that describes the presence of one or more gallstones (cholelithiasis) in the gallbladder or other parts of the biliary tree, and the symptoms and complications they may cause.
- A gallstone is a solid deposit that forms within the gallbladder, and patients may have multiple gallstones present.
- Most people with gallstone disease are asymptomatic and will never know they have gallstones.
- Gallstone disease is common in Western countries, and risk factors for gallstones include:
  - Obesity.
  - Increasing age.
  - Female sex.
  - Hyperlipidaemia.
  - Weight cycling (intentionally losing then gaining weight repeatedly).
  - Diabetes mellitus.
  - Oral contraceptive use.
  - Hormone replacement therapy.
  - Smoking.
  - Crohn's disease.
  - Genetic (family history).
- Biliary colic is by far the most common complication of gallstone disease and can often be managed in the community.
- Biliary colic pain is caused by the gallbladder, cystic duct or common bile duct contracting around a gallstone.

- Life-threatening complications of gallstone disease include:
  - Acute cholecystitis (very common).
  - Acute pancreatitis.
  - Choledocholithiasis (gallstone occlusion of the common bile duct).
  - Cholangitis (bile duct inflammation).

Diagnosis

- A typical presentation of biliary colic is characterised by moderate to severe right hypochondriac or epigastric pain that lasts between 30 minutes and eight hours, and may:
  - Have a crescendo or colicky pattern.
  - Radiate round or through to the back.
  - Be provoked by eating fatty foods.
  - Be accompanied by nausea.
- Consider the following differential diagnoses before making a provisional diagnosis of suspected biliary colic. Up to 10% of patients who present with suspected biliary colic may have another underlying diagnosis such as:
  - Peptic ulcer disease.
  - Acute pancreatitis.
  - Acute hepatitis.
  - Appendicitis.
  - Irritable bowel syndrome.
  - Intra-abdominal neoplasia.
  - Myocardial ischaemia.
  - Pneumonia.
  - Kidney disease.
- Cholecystitis typically presents similarly to biliary colic but with:
  - Fever.
  - Steady and severe pain that may radiate to the right shoulder and back.
  - Vomiting.
  - Tenderness that is more severe in the right hypochondriac region.

5.3 Constipation

This section is for patients aged greater than 12 years who have a provisional diagnosis of acute constipation.

Assessment

- Take a history focusing on:
  - The duration of the episode.
  - Bowel habits, for example:
    a) Whether the patient is passing flatus.
    b) If there is a history of alternating bowel habits.
    c) Whether there are delays in response to the urge to defecate.
    d) Any bowel care administered so far.
    e) Stool consistency (using the Bristol Stool Chart).
  - Risk factors for cancer.
  - Bleeding.
  - Incontinence.
  - Medications known to contribute to constipation.
  - Surgical history, especially of abdominal surgery.
  - Laxative use and/or misuse.
- Perform a physical examination, including:
  - A focused abdominal assessment.
  - An assessment of the features contained within the constipation transport/ referral table.
  - Consider performing a digital rectal examination.
- Perform urinalysis if the patient is female.
- Determine the degree of constipation (see additional information).

Management

Use the constipation management table to determine the method of management for the patient's constipation.

Constipation management table

<table>
<tr><th></th><th>Mild</th><th>Moderate</th><th>Severe</th></tr>
<tr><td>Advice</td><td colspan="2">Provide advice as below</td><td>Reserve advice for PIL if discharged</td></tr>
<tr><td>Medications</td><td colspan="3">Stop recently commenced medicines thought to have precipitated the episode (for example, ondansetron or opiates) and replace with an alternative. Discuss with primary care team to ensure continuity and appropriateness of any medication changes whenever feasible</td></tr>
<tr><td>Laxatives</td><td colspan="2">• Encourage appropriate use of patient's prescribed laxatives, or
• Administer sennoside B, or
• Access suitable OTC laxative from community pharmacy</td><td>Top-down approach has been exhausted or is not appropriate</td></tr>
<tr><td>Suppository</td><td colspan="2">Consider bisacodyl suppository (depending on rectal exam findings)</td><td>Consider bisacodyl suppository in addition to enema</td></tr>
<tr><td>Enema</td><td>Not required</td><td>Consider sodium citrate (Microlax) enema</td><td>Phosphate (Fleet) enema</td></tr>
<tr><td>Manual disimpaction</td><td colspan="2">Not required</td><td>May be required</td></tr>
<tr><td>Result prior to non-transport</td><td colspan="2">No requirement to remain on scene until bowel motion passed</td><td>Remain on scene until bowel motion passed</td></tr>
<tr><td>Escalation</td><td>Manage as moderate constipation if initial management is unsuccessful</td><td>Manage as severe constipation if laxatives/enema fails</td><td>Refer to an ED or seek clinical advice if management is unsuccessful</td></tr>
</table>

Referral

Constipation transport/referral table
The patient requires immediate referral to an ED by ambulance: • Systemically unwell. • Sepsis. • Suspected bowel obstruction. • Moderate to severe rectal bleeding. • Abdominal tenderness or signs of peritonitis. • Failed community bowel care. • Requiring referral to primary care but unable to be seen within appropriate timeframe.
Consider non-urgent referral to primary care: • Cancer suspected. • Risk factors for bowel obstruction present. • Unclear patient history. • Spinal cord injury.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Maintain good fluid and fibre intake.
- Try to exercise regularly.
- Avoid constipating drugs.
- Respond promptly to the urge to pass a bowel motion.
- Avoid straining while passing stools.
- Avoid sitting on the toilet for long periods of time.

Additional information

General principles

- The typical presentation of constipation is difficulty passing stools with or without lower abdominal discomfort.
- Idiopathic constipation is difficult to define but may relate to infrequent passage of stools, difficulty in passing a stool, or the passage of hard stools. Most patients with idiopathic constipation are otherwise asymptomatic.
- A history of alternating bowel habits is inconsistent with constipation.
- Delays in responding to the urge to defecate can be due to learned habits, mobility impairment, or restricted access to a toilet.
- Bowel care can include laxatives, enemas, and any manual evacuation techniques the patient has needed to use.
- Risk factors for bowel obstruction include a history of previous obstruction and abdominal surgical scars. Bowel obstruction should be suspected if any of the following features are present:
  - No flatus passed in the last 24 hours.
  - Absent or high-pitched (tinkling) bowel sounds.
  - Overflow diarrhoea.
  - Cavitated or ballooned rectum on digital rectal examination.
  - Moderate to severe abdominal pain.
  - Abdominal distension.
  - Faecal vomiting or belching.
  - Moderate to severe vomiting.
- Have a high suspicion of cancer if the patient has:
  - Recent unplanned weight loss.
  - An abdominal mass (other than faeces in the rectum).
  - A rectal mass (hard, immobile, and not faecal).
  - Rectal bleeding (minor).
  - No obvious trigger, constipation lasting greater than 30 days and aged greater than 40 years.
- Constipating drugs include:
  - Opioids.
  - Tricyclics.
  - Anticholinergics.
  - Ondansetron.
  - Calcium channel blockers.
  - Aluminium-containing compounds for example, Mylanta.

The bristol stool chart

Example	Type	Description
	Type 1	Separate hard lumps, like nuts (hard to pass)
	Type 2	Sausage-shaped, but lumpy
	Type 3	Sausage-shaped, but with cracks on surface
	Type 4	Sausage or snake like, smooth and soft
	Type 5	Soft blobs with clear-cut edges (easy to pass)
	Type 6	Fluffy pieces with ragged edges, mushy
	Type 7	Watery, no solid pieces (entirely liquid)

Assessing the degree of constipation

- Clinical judgement is required if there are multiple features of varying severity.
- Failed phosphate enema, or failed manual disimpaction are not included in the severity assessment because they trigger the need for immediate referral to an ED.

	Mild	Moderate	Severe
Duration	1 - 2 days	3 - 4 days	> 4 days
Distress	Mild	Moderate	Severe
Rectal exam	Empty or some soft faeces	Full of soft/firm faeces	Full of firm/hard faeces
Laxatives	None or routine laxatives only	Increased laxatives	Top-down approach exhausted
Enema	None	None	Sodium citrate micro enema failed
Contribution of medications or comorbidities	None, or obvious and simple remedy (for example, stopping codeine).	Unclear, or some complexity involved (for example, opiate contributing, but not easily replaced with alternative)	Multiple or complex medication or comorbidities

Digital rectal examination

Prior to performing this procedure, ensure consent is gained, patient dignity is preserved, and a chaperone is present whenever possible.

Findings on rectal examination	Implications
Empty rectum that collapses on finger	Normal
Soft faeces present	Suitable for top-down approach (laxatives, fluid and fibre)
Full of soft faeces	Suitable for an enema
Empty and cavitated	Consider obstruction and impaction
Fixed and irregular hard mass	Consider tumour
Full of hard faeces	May be suitable for enema with/ without manual disimpaction

Types of laxatives

- Laxatives can be given orally as tablets or syrups, or rectally as suppositories or enemas.
- Oral laxatives are contraindicated in obstruction.
- Stimulant laxatives are the preferred option to manage constipation caused by reduced peristalsis (for example, opioid-induced constipation). Bulk-forming laxatives may make constipation due to reduced peristalsis paradoxically worse and should be avoided in this situation.
- Use the laxatives table when encouraging appropriate use of the patient's laxatives.

	Stimulant	Osmotic	Stool softening	Bulk forming
Oral examples	Sennoside-B	Lactulose	Docusate sodium	Psyllium
Rectal examples	Bisacodyl suppositories	Sodium citrate and sodium phosphate enemas	Glycerol suppositories	N/A
Mechanism	Increase intestinal motility	Increase the amount of water in the large bowel either by drawing fluid into the bowel or retaining fluid administered with the laxative	Non-ionic surfactant wetting agent	Increase faecal mass, stimulating peristalsis
Side effects	Abdominal cramps	Nausea, flatulence, cramps, electrolyte disturbances	Abdominal cramps	Flatulence, abdominal distension

Enemas

- A Microlax enema is a 5 ml micro-enema containing sodium citrate (an osmotic laxative), glycerol and sodium lauryl sulfoacetate (stool-softeners).
- A Fleet enema is a 118 ml sodium phosphate osmotic enema.
- Enema failure is usually as a result of failure to retain the enema contents in the rectum long enough for them to take effect (usually 10 - 15 minutes).
- Enemas may need to be repeated to clear hard impacted faeces:
  - Fleet enema may be repeated once only due to the risk of electrolyte disturbances.
  - Microlax enema may be repeated once only before escalating treatment.

Manual disimpaction

- Manual disimpaction can be an unpleasant and sometimes painful procedure, however for many patients (for example, those with spinal cord injury) it is a routine part of care.
- Preliminary manual disimpaction may be required to enable proper application of a fleet enema.

Constipation in palliative care

- Acute on chronic constipation is more likely in palliative care patients due to opioid use.
- Do not stop opioids in this situation, even if they are thought to be contributing to constipation.
- Liaise with palliative care services (for example, hospice palliative care coordinators or district nurses) to coordinate the management of constipation in these patients.

5.4 Diverticulitis

- This section is for patients who are systemically well and:
  - Have an established diagnosis of diverticulitis, or
  - Have a provisional diagnosis of diverticulitis and are aged greater than 40 years.

Assessment

- Take a history and perform a physical examination, including:
  - A focused abdominal assessment.
  - An assessment of the features contained within the diverticulitis transport/referral table.
  - Consider performing a digital rectal examination.
- Perform urinalysis.
- Perform a pregnancy test for females aged 12-60 years.

Management

- Administer simple analgesia but avoid NSAIDs and opioids if feasible.
- Administer antibiotics for seven days if infection is a feature:
  - 500/125 mg amoxicillin/clavulanic acid PO three times daily, or
  - If the patient has an allergy to penicillin:
    a) 160/800 mg trimethoprim/sulfamethoxazole PO twice daily, and
    b) 600 mg metronidazole PO twice daily.
- Encourage oral rehydration.

Referral

Diverticulitis transport/referral table
The patient requires immediate referral to an ED by ambulance: • Severe pain. • Evidence of peritonism. • Bowel obstruction. • Bowel perforation. • Moderate to severe rectal bleeding.
The patient requires referral to an ED, however alternative transport may be appropriate: • Aged ≤ 40 years. • Systemically unwell. • Temperature > 38°C. • Rigors. • Significantly abnormal vital signs. • Significant vomiting. • Moderate to severe dehydration. • Immunocompromised (for example, on steroids or immunotherapy). • Significant comorbidities. • Inadequate improvement after three days of treatment with antibiotics. • Requiring referral to primary care but unable to be seen within appropriate timeframe. • Positive pregnancy test.
Consider non-urgent referral to primary care: • Fistula (urinary or vaginal involvement). • Recurrent episodes. • Minor rectal bleeding. • Provisional diagnosis of diverticulitis.

Suitability for community management

- Most acute uncomplicated diverticulitis can be managed in the community with antibiotics and input from the patient's GP if required.
- Patients suitable for community management have the following features:
  - Will reliably request medical re-evaluation if condition worsens.
  - Concordance with outpatient treatment plan.
  - Mild to moderate pain.
  - Localised tenderness.
  - Low grade fever.
  - Tolerating oral intake.
  - No or minimal comorbidity.
  - A good support system available.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Avoid NSAIDs and opioids.
- Provide a diverticulitis patient information leaflet.
- Seek medical attention if:
  - Pain increases.
  - Fever develops.
  - Fluids cannot be tolerated.

Additional information

General principles

- A diverticulum is a sac-like herniation of the mucosa through the colonic wall, which occurs with high intraluminal pressure and focal areas of weakness in the bowel wall.
- Most diverticula occur in the sigmoid colon, however in about 15% of cases diverticula occur in the right colon (more common in those of Asian ethnicity).
- Diverticula are uncommon in those aged less than 40 years but become increasingly common with age.
- Approximately 25% of the population will experience diverticular disease, or symptomatic diverticulosis in their lifetime. This can include:
  - Diverticulitis (which may be acute or chronic).
  - Bleeding.
  - Inflammation.
  - Colitis.
- Uncomplicated diverticulitis does not extend to the peritoneum.
- The most common complications of diverticulitis are:
  - Diverticular abscess.
  - Fistulae.
  - Bowel obstruction.
  - Perforation and peritonitis.
- Risk factors for diverticulitis include:
  - Low fibre diet.
  - Increasing age.
  - Obesity.
  - Smoking.
  - Use of NSAIDs.

- Diverticular disease is the most common cause of colovesical fistulae which presents with urinary symptoms. Colovaginal fistula may present with purulent or faecal vaginal discharge.
- A typical presentation of diverticulitis is characterised by pain in the left iliac fossa and can be associated with:
  - Nausea and vomiting.
  - A history of previous similar episodes.
  - Fever.
  - Changes in bowel habits (diarrhoea is expected but constipation may occur).
  - Flatulence and/or bloating.
  - Rectal bleeding.
  - Passage of mucous in the stools.
  - Urinary or vaginal symptoms if a fistula is also present.
- NSAIDs and opioids should be avoided in patients with diverticulitis due to an increased risk of perforation.

Differential diagnosis for diverticulitis

- Consider the following alternative diagnoses before making a provisional diagnosis of suspected diverticulitis:
  - Irritable bowel syndrome or inflammatory bowel disease.
  - Gastroenteritis.
  - Colorectal cancer.
  - Gynaecological conditions, for example pelvic inflammatory disease, ovarian cyst or torsion and ectopic pregnancy.
  - Urinary or renal conditions, for example urinary tract infection, pyelonephritis, and urinary tract obstruction.
  - Other surgical emergencies, for example appendicitis, ischaemic colitis and bowel obstruction.

5.5 Gastroenteritis

This section is for patients aged greater than or equal to 12 years with a provisional diagnosis of gastroenteritis.

Assessment

- Take a history, focusing on:
  - Risks for dehydration.
  - Risks for acute kidney injury (AKI).
  - Risks for *Clostridium difficile* infection.
  - Bowel habits.
  - Urine output.
  - Possibility of close contacts as a transmission source.
  - Travel history.
  - Medication history (especially nephrotoxic medicines and laxatives).
  - Features contained within the adult gastroenteritis transport/referral table.
- View the patient's diarrhoea if possible.
- Perform urinalysis.
- Obtain both a sitting and standing blood pressure.
- Consider non-infectious causes of diarrhoea.
- Blood tests are not usually indicated for patients with gastroenteritis.
- Stool sampling in primary care is not required for first presentations of uncomplicated gastroenteritis.

Management

- Oral rehydration (with oral rehydration formula if required) is the preferred treatment for uncomplicated gastroenteritis.
- Administer 1 L 0.9% sodium chloride IV if there are clinical signs of dehydration.
- Administer 8 mg ondansetron PO if there is significant nausea and/or vomiting. Provide the patient with two additional doses of ondansetron if required.
- Administer 4 mg loperamide PO if diarrhoea is very severe (greater than six diarrhoea bowel motions per day), or if at risk of dehydration or acute kidney injury.
- Administer codeine PO if loperamide is indicated but not available.
- Provide up to six 2 mg loperamide capsules, with instructions to take one 2 mg loperamide capsule after each loose bowel motion.
- Advise the patient to stop taking nephrotoxic drugs until they are well.

Referral

Adult gastroenteritis transport/referral table
The patient requires immediate referral to an ED by ambulance: • Severe dehydration. • Suspected acute kidney injury. • Suspected *Clostridium difficile* diarrhoea. • Negligible urine output over six hours or urine output of less than 200 ml in the previous 12 hours (if catheterised). • Diarrhoea with frank blood. • Persistent diarrhoea for > 10 days. • Vomiting > 3 days or bile-stained vomit. • Temperature > 39°C. • Persistent isolated vomiting. • Moderate to severe abdominal pain, or peritonism. • Diabetes. • Immunocompromised (for example, on steroids or immunotherapy). • Requiring referral to primary care but unable to be seen within appropriate timeframe.
Consider referral to primary care within 24 hours: • Moderate dehydration. • Risk factors present for dehydration. • At risk of acute kidney injury. • At risk of *Clostridium difficile*. • Comorbidities (other than diabetes). • High ongoing fluid losses. • Recent overseas travel. • Recent antibiotic treatment or antibiotics thought to be contributing. • > 7 days of persistent diarrhoea. • History indicates suspected bowel cancer (for example, alternating bowel habits). • Minor rectal bleeding. • Ongoing vomiting. • Isolated vomiting that does not rapidly settle. • Aged > 85 years. • Pregnant. • Work as a food handler. • Minor abdominal pain or tenderness.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Maintain a healthy diet and oral rehydration:
  - Avoid sugary or carbonated drinks.
  - Resume a normal diet when able.
  - Consumption of solid food should be guided by appetite.
  - Eat small, light, bland meals.
- Perform good hygiene practices:
  - Wash hands thoroughly with soap and running water after toileting, changing nappies, and before preparing or eating food.
  - Do not share towels.
- Restrict activity. Do not go to work or other institutional settings for at least 48 hours after the last episode of diarrhoea or vomiting, especially if working in healthcare, caregiving or hospitality.
- Provide a gastroenteritis patient information leaflet.
- Seek medical attention in primary care (preferably the patient's own GP) if:
  - Symptoms do not improve in 72 hours.
  - Symptoms worsen.
  - There is frank blood in the stools.
  - There are signs of acute kidney injury.

Additional information

General principles

- Acute gastroenteritis is defined as diarrhoea of rapid onset, with/without vomiting, low-grade fever, and abdominal pain.
- Gastroenteritis may also be associated with cough, coryza and neurological symptoms.
- In New Zealand gastroenteritis is most commonly caused by viral agents, particularly rotavirus in children, and norovirus in all age groups.
- Diarrhoea associated with gastroenteritis usually lasts for up to a week and is usually only of concern if it persists for longer than ten days.
- Dehydration and acute kidney injury are the main concerns with prolonged diarrhoea, especially in patients with pre-existing renal impairment.
- Overseas travel, particularly to Southeast Asia or India, increases the risk of infection with drug resistant organisms.
- Campylobacter is the most common bacterial cause of gastroenteritis, followed by Salmonella and E. Coli. Protozoal infections such as Giardia are also possible.

- Consider *Clostridium difficile* infection, especially after antibiotic treatment or hospital admission within the last three months.

Acute kidney injury

- Patients at risk of acute kidney injury may have one or more of the following risk factors:
  - Increasing age (especially aged greater than 65 years).
  - Known kidney disease.
  - Dehydration.
  - Nephrotoxic medications.
  - Comorbidities (particularly diabetes, heart failure and hypertension).
- Nephrotoxic medications include the following:
  - Angiotensin converting enzyme (ACE) inhibitors.
  - Angiotensin receptor blockers.
  - Diuretics, for example furosemide and bendrofluazide.
  - NSAIDs, for example ibuprofen and diclofenac.
  - Metformin.
- Risk of nephrotoxicity is increased if the patient is taking a combination of diuretics, NSAIDs and ACE inhibitors.

Non-infectious causes of diarrhoea

- The differential diagnosis of acute gastroenteritis includes:
  - Irritable bowel syndrome.
  - Ulcerative colitis.
  - Food-sensitive enteropathy (for example, lactose intolerance).
  - Coeliac disease.
  - Medication effects (particularly laxative misuse).
  - Endocrinopathies (for example, diabetes or hyperthyroidism).

5.6 Gastroenteritis in children

This section is for patients aged less than 12 years with diarrhoea and vomiting.

Assessment

- Take a history and perform a physical examination, including:
  - A focused abdominal assessment.
  - An assessment of risk factors for dehydration.
  - Determining the degree of dehydration.
  - An assessment of features contained within the paediatric gastroenteritis transport/referral table.
- Perform urinalysis if feasible.
- Blood tests are not usually indicated for patients with gastroenteritis.

Paediatric dehydration assessment table

	None to mild	Moderate	Severe
Activity	Alert, restless	Irritable, lethargic	Drowsy, decreased GCS
Urine output	Normal	Decreased	Minimal or none
Extremity temperature	Warm	Warm	Cool
Skin colour	Normal	Normal	Pale, mottled
Eyes	Normal	Sunken	Sunken
Fontanelle	Normal	Sunken	Sunken
Oral mucosa	Moist	Dry	Dry
Tears	Normal	Absent	Absent
Heart rate	Normal	Mild tachycardia	Significant tachycardia
Respiratory rate	Normal	Tachypnoea	Significant tachypnoea
Ketosis	None	None	Signs of ketosis
Peripheral pulses	Normal	Normal	Poor
Capillary refill	Normal	Normal	Delayed
Skin turgor	Normal	Reduced	Reduced
Blood pressure	Normal	Normal	Reduced

Management

- Oral rehydration formula is the preferred treatment for all children with mild to moderate dehydration.
  - Administer 1 ml/kg of oral rehydration formula PO every five minutes for four hours, up to a total volume of 50 ml/kg.
  - Continue to offer normal breast or formula feeding if age-appropriate and the child will tolerate it without excessive vomiting.
  - After vomiting has settled, oral rehydration formula volume can be increased and the frequency of administration can be decreased.
- Consider administration of ondansetron PO if ongoing vomiting is impairing the child's ability to tolerate oral rehydration formula, or if there is clinical evidence of dehydration. See the paediatric drug dose tables.
- Ensure follow up (by phone/Clinical Desk) for two and four-hour reassessment.
- Children who have moderate dehydration, or high ongoing fluid losses may not be fully rehydrated after four hours. These children may need to continue at the same rehydration rate for longer or may need referral to an ED.
- Seek clinical advice if bacterial gastroenteritis is suspected.

Referral

Paediatric gastroenteritis transport/referral table

The patient requires immediate referral to an ED by ambulance:

- Aged ≤ 6 months.
- Severe dehydration.
- Moderate dehydration that does not respond to oral rehydration formula.
- Mild dehydration in young children, ongoing vomiting, and not settling.
- Shock.
- Blood in the diarrhoea.
- Vomiting for > 3 days.
- Vomiting not resolved with a single dose of ondansetron.
- Bile-stained vomit.
- Temperature > 38°C in patients aged ≤ 6 months.
- Temperature > 39°C in patients aged > 6 months.
- Persistent isolated vomiting.

Consider non-urgent referral to primary care:

- Moderate dehydration.
- Risk factors for dehydration present.
- High ongoing fluid losses.
- Recent overseas travel.
- Antibiotic treatment within the last three months.
- > 7 days of persistent diarrhoea.
- Ongoing vomiting.
- Isolated episodic vomiting that does not rapidly settle.

Additional information

Assessment

- Assess the oral mucosa immediately before administering any oral rehydration.
- Paediatric patients are at risk of dehydration if they have one or more of the following:
  - Aged less than one year (especially those aged less than six months).
  - High ongoing fluid losses.
  - Any limitation on intake of normal fluid intake (for example, reduced breastfeeding or bottle feeds).
  - Any limitation on supplemental fluids.
- Faecal specimens are only required if:
  - The patient has had recent overseas travel, or
  - Diarrhoea has continued for greater than seven days, or
  - The patient is immunocompromised, or
  - The diagnosis is unclear.
- Isolated episodic vomiting that does not rapidly settle could be due to unrecognised urinary tract infection or sepsis.

Oral rehydration formula

- Children generally prefer flavoured oral rehydration formula. Options for rehydration formula include:
  - Pedialyte.
  - Gastrolyte.
  - Diluted apple juice (one part apple juice to three parts water).
  - Age-appropriate fluids (for example, breast milk or formula) in similar volumes to oral rehydration formula.
- Refrigerated oral rehydration formula may be more palatable. Avoid highly sugared drinks, fruit juice and carbonated drinks, especially in those at risk of dehydration.
- Pre-mixed solutions such as Pedialyte and Plasmalyte should be refrigerated and discarded 48 hours after opening. Remaining solution can be made into ice-blocks.
- Children who are not significantly dehydrated may refuse oral rehydration formula due to its salty taste.
- Children with mild dehydration or who are not dehydrated may refuse to take the volumes described. This does not mean treatment with oral rehydration formula is failing, however it is important to ensure they are taking maintenance volumes of fluid as a minimum.

- Vomiting is not a contraindication to oral rehydration. Vomiting often settles when small volumes of oral rehydration formula are administered frequently, for example every five minutes.
- Oral rehydration formula may be administered by any of the following means:
  - Cup.
  - Bottle.
  - Syringe.
  - Spoon.
  - Medicine cup.
  - Ice-block.

Medicines

- Medicines usually have no role in the management of gastroenteritis in children. This includes loperamide and antibiotics.
- Discourage the use of over the counter, herbal or traditional medicines.

Food

- Children who are fed throughout gastrointestinal illness lose less weight and recover faster.
- During the acute phase (the first 2-4 hours) of oral rehydration, it is acceptable to administer oral rehydration fluids only, unless the child indicates a strong desire for milk or food as well.
- Following this brief period of 2-4 hours however, feeding should be reintroduced.
- Never discontinue breastfeeding, and formula may be administered at full strength.
- Infants who are on concentrated formula should have their formula made up at standard strength until well.
- Solids can be administered if the child is interested in them.
- Children who are not dehydrated can continue to be offered a normal diet.

Paediatric urine samples

- Small children may produce urine during an abdominal exam.
- Be prepared to capture the urine prior to commencing the examination.
- Do not perform urinalysis on urine from a nappy.

5.7 Gastro-oesophageal reflux disease (GORD) and dyspepsia

This section is for adult patients with a provisional diagnosis of GORD or dyspepsia.

Assessment

- Take a history and perform a physical examination, including:
  - A focused abdominal assessment.
  - An assessment of the features contained within the GORD and dyspepsia transport/referral table.
  - A focused cardiovascular assessment, including a 12 lead ECG.
- Perform urinalysis.
- Perform a pregnancy test in females aged 12-60 years.
- Consider the differential diagnoses for GORD and dyspepsia.
- Determine whether the patient has dyspepsia, GORD or both.

Management

- Avoid administration of NSAIDs.
- Advise the patient to take over the counter antacids or alginate.
- The patient may be a candidate for a trial of a proton pump inhibitor (for example, omeprazole) if there is no improvement in their symptoms. Consider providing a clear recommendation that the patient visit their local pharmacy or own GP to explore this option.

Referral

GORD and dyspepsia transport/referral table
The patient requires immediate referral to an ED by ambulance: • Unable to exclude serious pathology (for example, ACS or aortic dissection). • Abnormal 12 lead ECG. • Gastrointestinal bleeding. • Difficulty swallowing. • Persistent or protracted vomiting. • Abnormal vital signs. • Severe pain. • Abdominal mass.
The patient requires referral to an ED, however alternative transport may be appropriate: • Severe dyspepsia despite adequate treatment. • Positive pregnancy test.

Consider non-urgent referral to primary care:

- Unexplained weight loss associated with gastrointestinal symptoms.
- Risk factors for significant disease.

Additional information

General principles

- Dyspepsia includes a range of symptoms that may include significant disease. Most people with dyspepsia do not have underlying pathology, often do not seek medical advice, and do not require investigation.
- *Helicobacter pylori* infection is a potential cause of dyspepsia that may be treated with a proton pump inhibitor and/or antibiotics.
- A typical presentation of dyspepsia includes:
  - Epigastric pain or discomfort, described as burning or aching rising toward the neck, and
  - May/may not be related to eating, and
  - Can be episodic, recurrent or chronic, and
  - May have associated symptoms such as nausea and vomiting, belching, fullness after meals, early satiety, anorexia and bloating.
- 'Heartburn' is usually caused by reflux of acid into the oesophagus. Dyspepsia may exist with or without 'heartburn', whereas GORD is defined by predominant 'heartburn' symptoms.
- GORD is characterised by predominant 'heartburn'. Associated symptoms may include regurgitation of acid and/or food, chest pain, atypical asthma, unexplained hoarseness, cough, sore throat and erosion of dental enamel.
- Risk factors for significant disease as described in the GORD or dyspepsia transport/referral table includes:
  - Severe or persistent dyspepsia despite adequate treatment.
  - Previous peptic ulcer disease.
  - Family history of gastric cancer with age of onset less than 50 years.
  - New dyspepsia and aged greater than 50 years, or greater than 45 years in Māori, Pacific People or Asian ethnic groups.
  - NSAID and/or aspirin use.
  - Risk of Barrett's oesophagus.
- GORD and dyspepsia can be caused by:
  - Peptic ulcer disease.
  - Hiatus hernia.
  - Upper gastrointestinal malignancy (including pancreas and gallbladder).
  - Achalasia.
  - Gastroparesis.

Differential diagnoses for GORD and dyspepsia

- Differential diagnoses for GORD and dyspepsia include:
  - Aortic aneurysm.
  - Atypical presentation of ischaemic heart disease.
  - Functional symptoms.
  - Peptic ulcer disease.
  - Gallstones.
  - Pancreatitis.
  - Malignancy.

Barrett's oesophagus

- Barrett's oesophagus is where there are changes to the oesophagus lining caused by chronic reflux that predispose the patient to cancer.
- Barrett's oesophagus is asymptomatic but associated with GORD symptoms and occurs in about 1-2% of the population. Risk factors include:
  - Central obesity.
  - Male sex.
  - Aged 50-75 years.
  - Greater than five-year history of reflux.
  - Greater than five years use of proton pump inhibitors.
  - Family history of oesophageal adenocarcinoma.
  - Family history of Barrett's oesophagus in a patient aged within ten years of age of relatives' diagnosis.

5.8 Percutaneous endoscopic gastrostomy (PEG) tube problems

This section is for patients who have problems associated with PEG tubes, including PEG-jejunostomy (PEG-J) and low-profile (button) tubes.

Accidental tube removal

- Stoma closure will occur in 2-3 hours following inadvertent PEG removal.
- The priority is to maintain stoma tract patency to avoid the need for a surgical procedure to place another PEG tube.

Management

- Patients with an enteral feeding tube should have an emergency replacement kit and plan (which should be followed if feasible).
- If no replacement PEG is available, insert a Foley catheter of the same French gauge.
- Advance the catheter about 8 cm into the stoma tract. Do not inflate the balloon unless placement is confirmed with litmus paper.
- Tape securely to the skin.
- If there is no appropriately sized Foley catheter available, the dislodged PEG (balloon device only) can be washed and reinserted to temporarily maintain the tract.
- Contact the gastroenterology nurse specialist to arrange formal replacement.
- The patient must be given a clear recommendation to be seen in an ED if unable to maintain the tract or if unable to arrange PEG replacement.

Referral

- Refer the patient to an ED immediately without any further intervention if the PEG is newly inserted (less than six weeks).
- Seek clinical advice if there will be any delay in transport to an ED.

Blockage

- Tube blockage usually occurs due to inadequate flushing, inappropriate medication administration or device aging/failure.

Management

- Check for simple mechanical obstruction such as kinks or closed clamps.
- If the tube is predominantly external, attempt to massage it to clear the blockage.
- Flush the tube with 30-50 ml sterile warm water in a 60 ml catheter tip syringe.
- Use a pulsatile push-pull (instillation-aspiration) method a few times to clear the blockage. Do not use excessive force.
- Do not use beverages (for example, carbonated drinks or fruit juices).
- Do not insert any instrument.
- Solutions such as 'clog-zapper' may be required.
- PEG-J tubes may be knotted or kinked internally and will require an x-ray to identify this.

Tube migration

- Tubes can migrate inwards due to peristalsis and poor fit.
- Potential tube destinations include the oesophagus, the small bowel and into the peritoneal cavity.
- Tube migration inwards usually presents with vomiting and abdominal distention.

Management

- If the tube has incompletely migrated inward, gently pull until resistance is felt of the internal bumper against the gastric wall.
- Confirm the PEG length and document this, including the length at the top of the flange.

Referral

- If the tube has been successfully re-sited, the patient should receive non-urgent referral to their gastroenterology nurse specialist.
- If the tube has completely migrated, the patient requires immediate assessment by the patient's gastroenterology nurse specialist.

Leakage

- Some gastrostomy tubes and devices can leak intermittently. This is not always gastric fluid and may not cause problems. A small amount of clear fluid leaking from around the tube should not be of concern.
- Expect to see a small amount of clear drainage in the first 1-2 weeks especially if the patient is neutropenic, has diabetes or is taking steroids.
- Problematic leakage presents as formula exiting the stoma tract at time of feeding and can be due to:
  - Excessively rapid feeding rate.
  - Volume intolerance.
  - Poor fit (for example, from weight loss/gain, or device movement by external force such as wheelchair straps, belts).
  - Increased intrabdominal pressure (for example, during coughing or retching).
  - Poor gastric emptying (for example, in Parkinson's disease or multiple sclerosis).
  - Constipation.

Management

- Review the fit and condition of the device.
- Manage any constipation if present.
- Consider overfilling the balloon.
- Use barrier creams and/or absorbent dressings until the leakage is resolved.

Referral

- If feeding problems have caused the leakage, the patient may require dietitian review.
- If there are systemic issues contributing to leakage, the patient requires medical review.

Hypergranulation tissue

- Excessive granulation tissue forming around the stoma is common and not life-threatening.
- It usually occurs in the first six weeks after insertion and often resolves spontaneously.
- Hypergranulation (also known as "proud flesh") presents as light to dark red smooth, bumpy or granular tissue around the stoma which is soft, moist and bleeds easily. A small amount is normal.
- The exact cause is unknown but is exacerbated by factors such as:
  - Excessive tube movement.
  - Poorly fitting devices.
  - Infection.
  - Excessive moisture.

Management

- The device fit should be optimised and movement minimised.
- The stoma area should be kept clean and dry.
- Foam dressings may be required.

Referral

- Consider referral to primary care for topical corticosteroid ointment (unless infected) and/or cauterisation.

Aspiration

- Aspiration of food and saliva can be a complication in gastrostomy-fed patients.
- Aspiration pneumonia or pneumonitis is the most serious complication.
- Patients with previous history of pneumonia prior to PEG tube replacement are a high risk group for aspiration pneumonia.
- Prevention involves elevating the patient to 30 degrees or higher when feeding and for one hour after feeding.
- Recurrent aspiration may require input from dietician.
- Refer to the relevant section in these CPGs to manage aspiration pneumonia.

Referral

- The patient must be given a clear recommendation to be assessed in an ED if aspiration pneumonitis is suspected, unless the patient is palliative and their symptoms can be managed in the community.

Infection

- Infection may present with peristomal erythema, swelling, discharge and pain.
- Swab for microbiology and consider that the tube may be heavily contaminated and require changing.
- If cellulitis is prominent:
  - See the 'cellulitis' section in these CPGs.
  - The patient must be given a clear recommendation that the patient is seen by their gastroenterology nurse specialist non-urgently.
- Candidiasis may present with patchy red itchy macropapules with characteristic satellite lesions:
  - Keep the stoma area dry and clean and avoid dressings under the flange.
  - Swab if indicated.
  - Consider requirement for administration of topical anti-fungal powder or cream.

Medication administration

- Use only liquid or oro-dispersible medicines.
- Do not crush medicines as this is a leading cause of tube blockage and can significantly alter medicine pharmacokinetics.
- Never crush enteric coated tablets.
- Seek advice from a pharmacist if consideration is being given to crushing medicines.

6.1 Renal colic

This section is for adults with known or suspected renal colic.

Assessment

- Take a history and perform a physical examination, including:
  - A focused abdominal assessment.
  - The presence or absence of a previous nephrectomy scar.
  - An assessment of the features contained within the renal colic transport/ referral table.
- Perform urinalysis.
- Consider performing a pregnancy test for women aged 12-60 years.

Management

- Administer 40 mg parecoxib IV.
- Administer 1 g paracetamol IV.
- Administer fentanyl IV if the patient has moderate to severe pain.
- Administer an antiemetic if the patient has clinically significant nausea and/or vomiting.
- Administer 1 L 0.9% sodium chloride IV if the patient is vomiting or dehydrated. Administer further doses if required.
- For ongoing management of pain:
  - Advise the patient to take regular paracetamol PO four hours after administration of the paracetamol IV dose.
  - Advise the patient to take regular ibuprofen PO 24 hours after administration of the parecoxib IV dose. Consider high dose ibuprofen.
  - Consider adding a weak opioid if required in the acute phase.

Referral

Renal colic transport/referral table
The patient requires immediate referral to an ED by ambulance: • Suspected new diagnosis in patient aged > 50 years. • Temperature > 38°C. • Sepsis. • Rigors. • Greater than one dose of fentanyl IV administered. • Bilateral symptoms. • Known eGFR < 45 or clinically significant renal impairment. • Pregnant. • Immunocompromised (for example, on steroids or immunotherapy). • Urine output negligible over six hours or < 200 ml over last 12 hours. • Frank haematuria. • Known abdominal aortic aneurysm (AAA) or iliac aneurysm. • Spinal cord injury.
The patient requires referral to an ED, however alternative transport may be appropriate: • Solitary kidney. • Diabetes. • Diagnostic uncertainty. • Requiring referral to primary care but unable to be seen within appropriate timeframe.
Consider referral to primary care within four hours: • Suspected new diagnosis in patient aged < 50 years.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Maintain adequate fluid intake.
- Self- administer analgesia as required:
  - Paracetamol PO, and
  - An NSAID (for example, ibuprofen PO), and
  - An oral opioid (for example, codeine).
- Provide a renal colic patient information leaflet.
- Seek medical attention if:
  - Symptoms worsen.
  - Pain is not controlled.
  - Signs of infection or sepsis develop.
  - Signs of acute kidney injury develop.

Additional information

General principles

- Kidney stones occur in approximately 10% of people during their lifetime. There is a general recurrence rate of 15% at one year, 40% at five years, and 50% at ten years.
- The majority of stones pass spontaneously. Most ureteric calculi which are less than 5 mm in diameter will pass spontaneously within four weeks of onset of symptoms.
- Typical presentation of renal colic includes the following features:
  - Sudden onset of severe, unilateral loin pain.
  - Pallor and sweating.
  - Restlessness.
  - Nausea and vomiting.
  - Urinary symptoms (for example, dysuria or increased frequency).
  - A history of renal stones, and/or a history of dehydration (which may have precipitated the episode).

Investigation and assessment

- Excluding differential diagnoses is important, as approximately 50% of patients with severe loin pain radiating to the groin will not have a renal colic.
- Distinguish renal colic from other acute abdominal conditions through history of the pain. Consider the following differential diagnoses:
  - Abdominal aortic aneurysm.
  - Biliary colic.
  - Testicular torsion.
  - Gynaecological causes (for example, ovarian cyst).
  - Appendicitis.
  - Cholecystitis.
  - Diverticulitis.
  - Colitis.
  - Tumour.
  - Hernia.
- Abdominal vascular emergencies (for example, dissecting aortic aneurysm) must be excluded by formal imaging before reaching a new diagnosis of renal colic in those aged greater than 50 years.
- Pain experienced in renal colic is usually localised to the renal angle, lateral to sacrospinous muscle, beneath the twelfth rib.
- Patients often look uncomfortable, pale and diaphoretic; however the presentation can vary. Patients with renal colic are often restless and continually moving (compared to peritonitis where patients usually lie very still).

- Urinary symptoms associated with renal colic include dysuria, frequency and microscopic or macroscopic (but not frank) haematuria. Anuria suggests acute renal failure or obstruction.
- It is not necessary to sieve urine to collect stones unless this is part of planned medical expulsive therapy. Stones do not need to be tested for their composition unless recurrent.
- The preferred method of investigation to confirm a new diagnosis of renal stones is a same day CT scan of the kidneys, ureters and bladder (CT-KUB). Ultrasound and x-ray of the kidneys, ureters and bladder is an acceptable second choice.

Management

- There is no evidence that administration of IV fluid helps stones pass.
- The evidence supporting alpha antagonists (medical expulsive therapy) is evolving.
- Avoid administration of NSAIDs if the patient is known or suspected to have reduced renal function, or if there is a risk of renal impairment.

6.2 Urinary retention

- This section is for adults with acute urinary retention and catheter problems.
- Use this section in conjunction with the 'urinary tract infection (UTI)' section in these CPGs if symptomatic lower UTI is also present.

Assessment

- Take a thorough history, focusing on:
  - Factors causing acute urinary retention.
  - Factors causing reduced urine production.
  - Features contained within the urinary retention transport/referral table.
  - Catheter change history.
- Perform a physical examination, including:
  - A focused abdominal assessment.
  - Confirmation that the bladder is full of urine.
  - An assessment of features contained within the urinary retention transport/referral table.
  - Consider performing a digital rectal exam if constipation is a differential diagnosis.
- Consider other urological problems including bladder cancer if the patient has an indwelling catheter (IDC) and has developed haematuria and/or has had a marked change in urinary symptoms.
- Perform urinalysis.
- Perform a pregnancy test for females aged 12-60 years.
- Collect a urine sample for culture if:
  - Infections are recurrent, or
  - Prior to commencing antibiotic treatment for a symptomatic urinary tract infection following urinalysis (positive for nitrites and leukocytes).
- Assess for the need to place a new urinary catheter:
  - Acute urinary retention.
  - Failed trial of void.
  - Incontinence in the terminally ill (consult with palliative care team first).
  - Intubated and mechanically ventilated patients with an expected transport time of greater than two hours.
- Assess for the need to replace an existing urinary catheter:
  - The urinary catheter is blocked (regardless of whether the existing catheter can be temporarily unblocked or flushed).
  - Confirmed symptomatic urinary tract infection in a patient with a catheter.

Management

- Contraindications for placing a new urinary catheter:
  - Urethral trauma. Note that unplanned removal of a urinary catheter with an inflated balloon does not necessarily contraindicate replacement of the catheter unless there is evidence of trauma such as frank bleeding or a tear in the external urethral meatus.
  - Pelvic trauma.
  - Scrotal or perineal haematoma.
  - Surgery on the renal tract or prostate within the last four weeks, except in the setting of a failed TROC.
- Place a new urinary catheter or replace an existing urinary catheter with caution if the patient has:
  - Risk factors for infective endocarditis (for example, heart valve replacement).
  - Risk factors for infective prosthesis (for example, joint replacement within six weeks).
  - A history of difficult catheterisations.
  - Phimosis.
  - Known urethral stricture.
- A maximum of two gentle attempts may be made to place or replace a catheter.
- If a second attempt is required, then consider using a different size on the second attempt:
  - Consider using a larger size if failing to pass the prostate is the problem.
  - Consider using a smaller size if phimosis is the problem.
- Administer 160 mg gentamicin IV or IM (if IV access cannot be obtained) if the patient has risk factors for infective endocarditis or infected prosthesis.
- Consider a single dose of 100 mg nitrofurantoin PO if:
  - The patient has a history of symptomatic UTI or sepsis after previous catheter changes, or
  - There has been a traumatic insertion (frank haematuria following catheter placement, or greater than one attempt).
- Refer to the 'urinary tract infection' section in these CPGs to guide antibiotic choice if the patient has a symptomatic UTI.
- There is no requirement to routinely collect a urine sample for culture.

Referral

Urinary retention transport/referral table
The patient requires immediate referral to an ED by ambulance: • Urethral trauma or tear. • Pelvic trauma. • Scrotal or perineal haematoma. • Surgery on the renal tract or prostate within the last 4 weeks. • Frank haematuria. • Post-obstructive diuresis. • Sepsis.
The patient requires referral to an ED, however alternative transport may be appropriate: • Unsuccessful catheter change. • Unable to place SPC on first attempt. • Positive pregnancy test.
Consider non-urgent referral to primary care: • New catheter placed and all the following criteria are met: – No complications during placement. – Urine has been observed to be flowing well, prior to departing the scene. – The patient is capable of managing IDC and collection bags until review by their own GP. – A referral to district nursing for in-dwelling catheter consumables and support has been made. – The patient is systemically well with normal vital signs following the procedure.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Increase fluid intake.
- Provide a urinary retention patient information leaflet.
- Seek medical attention if:
  - Frank haematuria develops, or
  - Signs of infection or sepsis develop, or
  - The catheter does not pass urine.

Additional information

Bacteriuria and IDC

- After one month, almost all patients with an IDC will have bacteriuria. Over time, microbial colonisation becomes more complex and a polymicrobial "biofilm" will develop.
- Antibiotics will not resolve an infection while the foreign body remains in situ but will increase antibiotic resistance.
- If the patient is asymptomatic, there is no reason for concern or treatment.
- A confirmed UTI in the setting of a patient who is catheterised means:
  - Confirmation with symptoms and microbiology culture (preferred), or
  - Confirmation with clear symptoms and very clear UTI (nitrites and leukocytes) on urinalysis.

Catheter change frequency

- If a new catheter has been placed, the expected first change of catheter should be within six weeks, and thereafter at three-monthly intervals unless there is obstruction or symptomatic infection.

Replacing a suprapubic catheter

- Refer the patient to an ED immediately without any further intervention if the SPC is newly inserted (less than six weeks.
- Use the same principles to replace a SPC if the SPC has been dislodged within the last two hours, as would be used for replacement of an IDC.
- Insert a foley catheter of equivalent gauge and inflate the balloon as for a urethral catheter.
- If unable to pass a foley catheter of the same gauge on first attempt, then pass a smaller gauge foley catheter and refer to an ED.

Following placement of a new catheter

- Refer the patient to their own GP for ongoing care if a new catheter has been successfully replaced and there is no indication for referral to an ED.
- Ongoing care may include one or more of the following:
  - A potential referral to urology.
  - Planning for a trial of void in 3-5 days if retention was caused by an acute event (for example, dehydration, post-surgery, constipation, medical illness).
- Ensure the patient and caregivers are confident and capable in managing urine collection in bag, mobility with bag and bag emptying.

Complications after bladder decompression

- Haematuria commonly occurs but is usually minor and resolves without intervention over 24-48 hours. Refer any patient with frank haematuria to an ED.
- Post-obstructive diuresis may occur after bladder decompression and is defined as passing >200 ml urine per hour for at least two hours after decompression, or >3 litres per day. Rehydrate with IV 0.9% sodium chloride and refer to an ED.
- Vasovagal hypotension triggered by bladder stretch receptors is sometimes reported but usually involves small drops in systolic blood pressure of around 15 mmHg. Reducing the rate of bladder decompression by limiting urine release from the catheter bag to 500 ml/ 10 minutes may help mitigate this.

Blocked catheter

- Encourage the patient to increase fluid intake.
- Bladder washout using sterile warmed saline may be useful and referral to primary care (preferably the patient's own GP) should be considered for this.
- Consider catheter replacement using a larger bore catheter.
- The patient may need to consider increasing the frequency of planned catheter changes if recurrent blockages are occurring towards the end of the lifespan of the catheter.
- It is preferable to replace (rather than flush) a catheter blocked due to encrustation (for example by minerals, mucous, protein or bacteria), especially if:
  - The catheter is due or overdue for change, or
  - The patient has a history of recurrent blocked catheters, or
  - Attempts have already been made to unblock the catheter, or
  - The patient has a spinal cord injury.

Urine sample

- Collecting urine samples suitable for urinalysis or microbiology from a catheterised patient is problematic. To collect as clean a sample as possible from a catheterised patient:
  - Disconnect the bag.
  - Clean the catheter end with an alcohol swab.
  - Collect a fresh sample from the catheter (this may take a few minutes).
- There is no value in collecting a urine sample from a collection bag.

Antibiotic cover

- Routine prophylactic antibiotic cover is not required for a catheter change or replacement.
- Bacteria may enter the bloodstream following placement or replacement of a urinary catheter.
- These bacteria may colonise artificial heart valves (causing endocarditis) and artificial joints (causing infected prosthesis).
- Prophylactic antibiotics should be administered to reduce the incidence of endocarditis or an infected prosthesis in at-risk patients.

6.3 Urinary tract infection

This section is for adults with a UTI. Use this section in conjunction with the 'urinary retention' section in these CPGs if symptomatic lower UTI is present in a patient with an indwelling catheter (IDC).

Assessment

- Take a history, including:
  - Bowel and bladder habits.
  - Sexual activity.
  - Features contained within the UTI transport/referral table.
  - Frequency of UTIs.
  - Recent courses of antibiotics within the last three months (the same antibiotic should not routinely be repeated within the last three months).
- Perform a physical examination, including:
  - A focused abdominal assessment.
  - An assessment for dehydration.
- Consider other factors, including:
  - Sexually transmitted infection (STI) in the differential where appropriate.
  - Infection with a multidrug resistant gram-negative organism (MDRO) if there has been recent travel to India or Southeast Asia. Perform urinalysis to confirm the diagnosis.
- Perform a pregnancy test in females aged 12-60 years.
- Distinguish between lower and upper UTI (pyelonephritis).
- Do not routinely send urine to lab for culture.
- Consider falls risk in the elderly.

Management

UTI in males

- Administer 100 mg nitrofurantoin PO twice daily for six days.

UTI in females

- Administer 100 mg nitrofurantoin PO twice daily for three days (preferred).
- Administer 100 mg nitrofurantoin PO twice daily for six days if any MDRO risks are present, the patient has an abnormal urinary tract or there has been recent instrumentation.
- If the patient is pregnant:
  - Avoid empiric antibiotics.
  - Send urine specimen for culture.
  - Discuss treatment with the patient's GP.
  - Consider administration of 100 mg nitrofurantoin PO twice daily for six days if the patient is less than 36 weeks gestation.

Mild uncomplicated pyelonephritis

- Administer 160/800 mg trimethoprim/sulfamethoxazole PO twice daily for ten days, or
- Administer 500/125 mg amoxicillin/clavulanic acid PO three times daily for ten days.

Moderate uncomplicated pyelonephritis

- Administer a stat dose of gentamicin IV:
  - 400 mg if weight is greater than 80 kg.
  - 320 mg if weight is 60-80 kg.
  - 240 mg if weight is less than 60 kg.
- Follow with the standard oral treatment for mild uncomplicated pyelonephritis.

Referral

Urinary tract infection transport/referral table

The patient requires immediate referral to an ED by ambulance:

- Shock.
- Severe pain.
- Significant haematuria.
- Complicated pyelonephritis.
- Severe uncomplicated pyelonephritis.
- Inability to mobilise normally.
- Temperature > 40°C.
- Neutropenia or chemotherapy within the last 4 weeks.
- Pyelonephritis with persistent pain or fever despite 24 hours of antibiotics.

Consider urgent referral to primary care:

- Moderate uncomplicated pyelonephritis.
- Falls risk.
- Immunocompromised (for example, on steroids or immunotherapy).
- Pregnant.
- New onset confusion.
- Rigors.
- Suspected sexually transmitted infection.
- Suspected MDRO.
- Aged < 16 years.
- Aged > 75 years.
- Male sex.

Consider non-urgent referral to primary care:

- Immediate referral not required, and empiric antibiotic therapy commenced.
- > 2 UTIs in the previous 12 months.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Increase fluid intake to 1.5 litres per day.
- There is no evidence of benefit for cranberry juice or urinary alkalinisers in treating the infection, but urinary alkalinisers may provide symptomatic relief.
- Provide a urinary tract infection patient information leaflet.
- Seek medical attention if:
  - Symptoms get worse despite 48 hours of following antibiotic treatment properly.
  - Signs of pyelonephritis develop (if not already present).
  - Worsening sepsis.

Additional information

Assessment

- Classic symptoms in an uncomplicated UTI are far more likely to predict a UTI than positive urinalysis.
- Positive nitrites are more specific for UTI than leukocytes.

Sending urine to the lab for culture

- There is no need to send a urine sample to the lab for uncomplicated UTI, unless the patient is pregnant.
- All other UTIs should have a urine sample sent to the lab for culture.

MDRO risk

- High MDRO risk is defined as one or more of the following:
  - Current colonisation or previous infection with MDRO.
  - Recent inpatient in ICU, post-surgical or transplant ward.
  - Previous admission to overseas healthcare facility.
  - Travel to a developing country within the last six months.
  - Household contact with gram-negative bacteria.
  - Residence or admission to any facility with high prevalence of MDRO.
  - Recent broad-spectrum antimicrobial treatment.

Pyelonephritis

- Pyelonephritis (upper UTI) is more likely if there is:
  - Temperature greater than 38°C.
  - Rigors.
  - Loin/flank pain or tenderness.
- Moderate pyelonephritis is associated with:
  - Vomiting.
  - Dehydration.
  - Signs of sepsis.
- A primary care team may be able to manage uncomplicated upper urinary tract infection (pyelonephritis) in adults in the community. This may involve a blood test to establish renal function and titration of an initial dose of gentamicin IV to the measured renal function.
- If the patient presents at any time other than the morning of a normal business day it is unlikely that blood testing will be completed in time to enable community management. These patients should usually be referred to an ED.

Pyelonephritis suitability for community management

	Uncomplicated (potentially suitable)	Complicated (unsuitable)
Renal function	Normal	Known renal disease
Renal structure	Normal	Renal tract abnormality
Renal stones	None	Known or suspected stones
Pregnancy	Not pregnant	Pregnant
Immunocompromise	None	Any
Comorbidity	None	Diabetes, spinal cord injury
Age	< 50	≥ 50
Sex	Female	Male

Asymptomatic bacteriuria

- Asymptomatic bacteriuria (positive leukocytes only on urinalysis) is common in the elderly and inevitable in patients who are catheterised.
- Asymptomatic bacteriuria is not associated with increased morbidity and there is no benefit in treating it except if the patient is pregnant.

UTI in pregnancy

- Asymptomatic bacteriuria and urinary infections occurring in pregnancy have a much higher risk of progressing to pyelonephritis if untreated, compared to the same problems in non-pregnant women.
- This is due to factors including pressure on the bladder from the uterus as it gets larger, increased ureter size (due to smooth muscle relaxation) and pregnancy-related immunosuppression.
- However, antibiotic treatment is relatively complicated in all trimesters of pregnancy and empiric antibiotics should be avoided in pregnancy.
- Sending urine for culture and discussing this with the patient's GP is preferred. Consult prior to commencing treatment if:
  - Referral to the patient's own GP or discussion with the patient's GP is not an immediate option, and
  - The clinical situation suggests empiric treatment should be started (for example, obvious symptomatic UTI, high risk pregnancy, or high risk for pyelonephritis).
- Nitrofurantoin must be avoided if the patient is greater than or equal to 36 weeks gestation because of the risk of neonatal haemolysis.

6.4 Sexually transmitted infections

This section is for patients aged greater than or equal to 16 years with a provisional diagnosis of chlamydia, syphilis, or gonorrhoea sexually transmitted infection.

Assessment

- Take a history, focusing on:
  - Specific abdominal or genitourinary symptoms.
  - Sexual history focusing on level of risk.
  - Features contained within the sexually transmitted infection transport/ referral table.
  - Symptoms of sepsis.
- Screen for intimate partner violence.
- Ask the patient to self-swab if they present with urethral and/or vaginal discharge.
- Swab anal or genital lesions if present.
- Collect a start-of-stream urine for culture.
- Perform a pregnancy test in females aged 16-60 years.
- Assess the patient for risk factors for failing to attend follow up.

Management

- Provide an empiric course of antibiotics if chlamydia or gonorrhoea infection is suspected:
  - One stat dose of 500 mg ceftriaxone IM, and
  - One stat dose of 1 g azithromycin PO, and
  - 100 mg doxycycline twice daily for ten days.
- Consult regarding administration of 1800 mg (2,400,000 units) benzathine penicillin IM if primary syphilis is suspected.
- Arrange follow up in primary care (preferably the patient's own GP).
- If the patient's sexual partner is present, a clear recommendation should be given to them to also be assessed and treated.
- Advise the patient that they should start considering who they have had recent sexual contact with, for the purposes of contact tracing.

Referral

Sexually transmitted infection transport/referral table
The patient requires immediate referral to an ED by ambulance: • Severe abdominal pain or tenderness. • Systemic involvement. • Significant testicular pain.
The patient requires non-urgent referral to primary care: • Swab and/or urine specimen taken. • Antibiotics provided. • Syphilis suspected. • Positive pregnancy test.

Additional information

- Chlamydia and gonorrhoea are the most common sexually transmitted infections in New Zealand.
- The classic presentation of chlamydia and/or gonorrhoea infection can be variable, but usually consists of:
  - Offensive urethral and/or vaginal discharge.
  - Dysuria.
  - Painful sexual intercourse.
  - Vaginal bleeding between periods.
  - Sore throat.
- There are several common causes for offensive vaginal discharge other than chlamydia and/or gonorrhoea:
  - Bacterial vaginosis.
  - Trichomonas infection.
  - Retained foreign body.
  - Normal vaginal discharge (note there is a wide spectrum of what is considered normal).
- The presence of fever, significant abdominal pain or tenderness (pelvic inflammatory disease) suggests a more involved infection.
- The presence of testicular pain (epididimo-orchitis) suggests a more involved infection.
- The start-of-stream urine specimen should subsequently undergo chlamydia and gonorrhoea PCR.
- Administration of ceftriaxone and azithromycin is intended to provide antibiotic coverage for gonorrhoea.
- Administration of doxycycline is intended to provide antibiotic coverage for chlamydia.

Syphilis

- Syphilis has become increasingly common in the community. It should be suspected in any patient presenting with a history of unprotected sexual activity and a painless genital or oral ulcer.
- Any patient who is assessed for chlamydia or gonorrhoea infection should be referred to primary care (preferably their own GP) or a sexual health clinic to be tested for syphilis.

6.5 Emergency contraception

This section is for adults requesting emergency contraception within 72 hours of unprotected sexual intercourse.

Assessment

- Take a history, focusing on the appropriateness of administration of levonorgestrel to include:
  - Contraindications for levonorgestrel.
  - Risks for reduced efficacy of levonorgestrel.
- Confirm specifically with the patient that she is not known to be pregnant. If there is any doubt, a pregnancy test must be performed.
- Screen for intimate partner violence.
- A thorough patient examination is not required for administration of levonorgestrel.

Management

- Administer 1.5 mg levonorgestrel (Postinor-1) if the patient weighs less than or equal to 70 kg.
- Administer 3 mg levonorgestrel if the patient weighs greater than 70 kg or is taking any of the following medications:
  - Barbiturates and other medicines used to treat epilepsy (for example, primidone, phenytoin, and carbamazepine).
  - Medicines used to treat tuberculosis (for example, rifampicin or rifabutin).
  - A treatment for HIV (for example, ritonavir or efavirenz).
  - A medicine used to treat fungal infections (for example, griseofulvin).
  - Herbal remedies containing St John's Wort (Hypericum perforatum).

Referral

- Referral to primary care following administration of levonorgestrel is not routinely required.
- Efficacy of levonorgestrel decreases with increasing weight greater than 70 kg:
  - Despite increasing the levonorgestrel dose for patients who weigh greater than 70kg, the exact effectiveness of this approach is not known.
  - Advise the patient of this risk and provide a strong recommendation they make an urgent appointment with their own GP or Family Planning for consideration of intrauterine device placement (effective out to five days) or an appropriate alternative.
- If a patient is taking any medicines requiring an increase in levonorgestrel dosing:
  - Advise the patient of the increased risk of failure of the levonorgestrel, and
  - The patient must be given a clear recommendation to make an

appointment with their own GP or Family planning for consideration of intrauterine device placement.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- If the patient vomits within three hours of taking levonorgestrel, a second dose will be required. This could be obtained at a community pharmacy or through their GP.
- Advise the patient to take a pregnancy test four weeks after the episode of unprotected sexual intercourse.
- Advise the patient to be seen in primary care for a sexual health check within two weeks.
- Levonorgestrel offers no protection against sexually transmitted infections.
- Provide an emergency contraception patient information leaflet.
- If pregnancy occurs despite taking levonorgestrel, the patient must be assessed in primary care (preferably their own GP) to confirm the location of the pregnancy because of the increased risk of ectopic pregnancy.

Additional information

- Levonorgestrel, or the emergency contraceptive pill, is a high dose of progesterone and is believed to work by interfering with release of the egg from the ovary and making the environment more hostile for sperm.
- If taken within 12 hours of unprotected sexual intercourse, levonorgestrel is 98% successful in preventing pregnancy which would have otherwise occurred. If taken 72 hours after unprotected sexual intercourse, this success decreases to 60%.
- The main side effect associated with levonorgestrel is nausea shortly after ingestion. The patient may also experience transient mild breast tenderness, headache, dizziness, and lethargy.

6.6 Perianal pain

This section is for patients presenting with perianal pain.

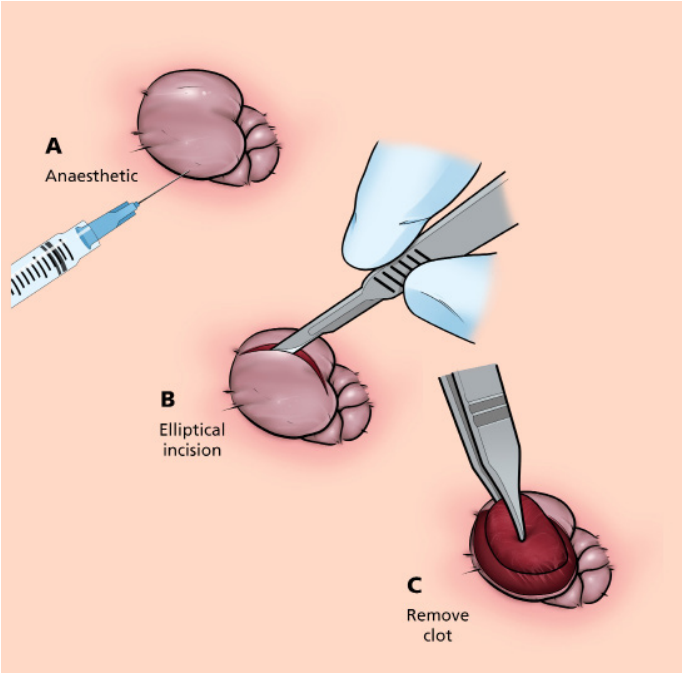
Assessment

- Take a history, including:
  - Diet and hydration status.
  - Bowel habits.
  - Local trauma.
  - Sexual-related trauma.
- Perform a physical examination, including:
  - A focused abdominal assessment (including the presence of lower abdominal tenderness).
  - An assessment of the features contained within the perianal pain transport/referral table.
  - An assessment of signs of infection.
  - A focused assessment of the perianal region, to identify the site of discomfort and examining for excoriated skin, skin fissures, haemorrhoids, or rectal prolapse.

Management

Haemorrhoids and perianal fissures

- The initial treatment is the same for both haemorrhoids and perianal fissures.
- Administer simple oral analgesia if required.
- Administer fentanyl IV if pain is severe:
  - 10-50 mcg every five minutes as required for an adult.
  - See the paediatric drug dose tables for a child.
- Apply topical Ultraproct ointment.
- If a diagnosis of external haemorrhoids is clear, consider removal of the thrombosed haemorrhoid.



Removal of a thrombosed haemorrhoid

Reducing rectal prolapse

- The rectal mucosa has no pain innervation, so sedation is not usually required to achieve reduction.
- Relaxation of the anal sphincter is required. Verbal calming is usually sufficient for this, however if someone is significantly tense consider administering inhaled methoxyflurane.
- Position the patient on their side with their knees pulled toward their chest.
- The distal portion of the prolapse should be firmly grasped and gently squeezed to reduce the mucosa back onto itself, up through the inside of the prolapse and through the anus.
- It may take 5-10 minutes to accomplish adequate reduction as oedematous fluid in the prolapsed portion will need to be gently compressed out.
- A minor amount of bleeding associated with the procedure is normal, however anything moderate to severe is a reason for referral to an ED.
- In children, a single gentle attempt at reduction should occur.

Referral

Perianal pain transport/referral table
The patient requires urgent review in an ED: • Perianal trauma. • > 1 dose of fentanyl IV required for pain. • Systemic involvement (for example, fever, rigors, nausea and/or vomiting). • Failure to reduce a rectal prolapse. • Ulceration or erosions of the exposed prolapsed rectal mucosa. • Child with a rectal prolapse, even if successfully reduced. • Moderate to severe bleeding associated with rectal prolapse.
The patient requires non-urgent referral to primary care: • Ongoing moderate pain for >72 hours. • Pruritus ani. • Successfully reduced rectal prolapse. • External haemorrhoids where incision and clot removal has been performed. • Perianal problem where constipation is a contributing factor.

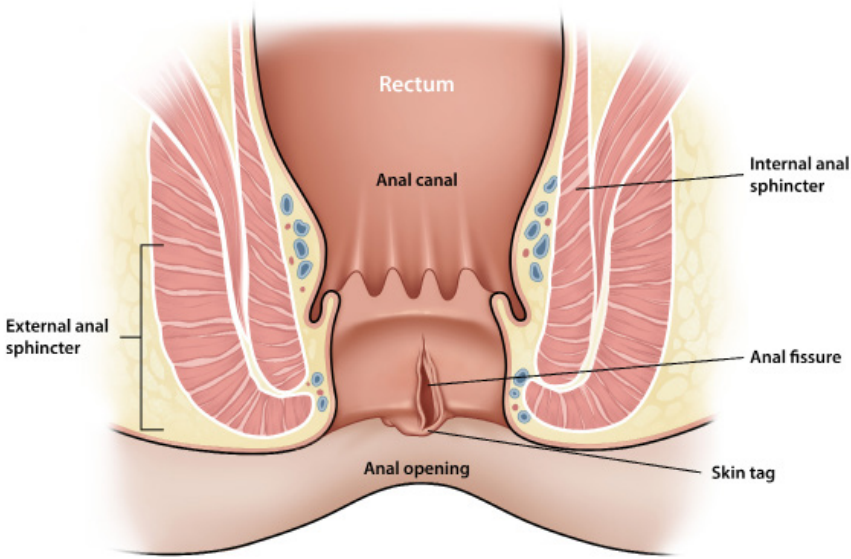
Advice

- Advise the patient of the importance of fibre in the diet.
- Recommend increasing the amount of fresh fruit in the diet initially.
- Stress the importance of hydration.

Additional information

General principles

- Perianal pain or discomfort is common and usually benign but requires a careful history and examination to rule out serious problems.
- Causes of perianal pain include:
  - Haemorrhoids.
  - Perianal fissures.
  - Pruritus ani (itchy anus).
  - Anal trauma.
  - Perianal abscess.
- Perianal fissures are splits in the external skin immediately radiating out from the anus. They generally occur due to local trauma or through straining with a hard stool.

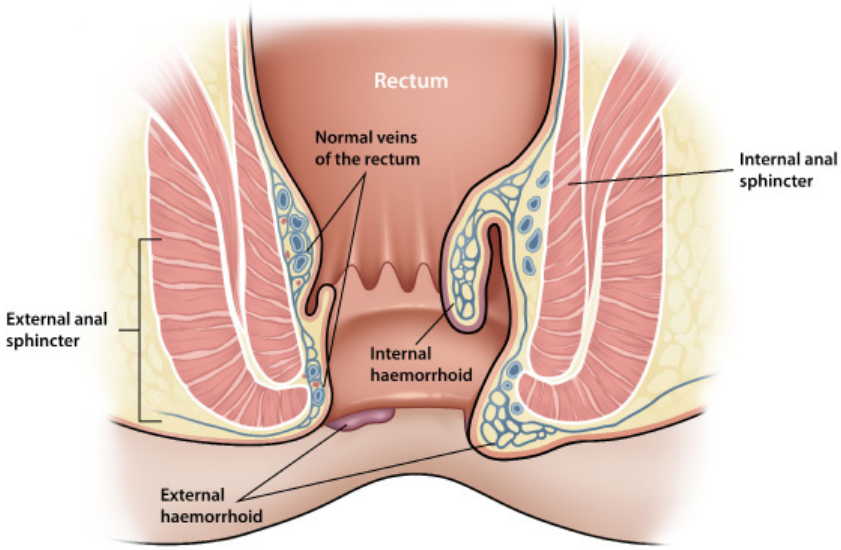


Perianal fissure

- Pruritus ani is a generic description for itching around the anus. There are many differential diagnoses, however the most common cause is poor hygiene and with first presentation, management should focus on this cause. Administration of an antihistamine may be useful for some patients.

Haemorrhoids

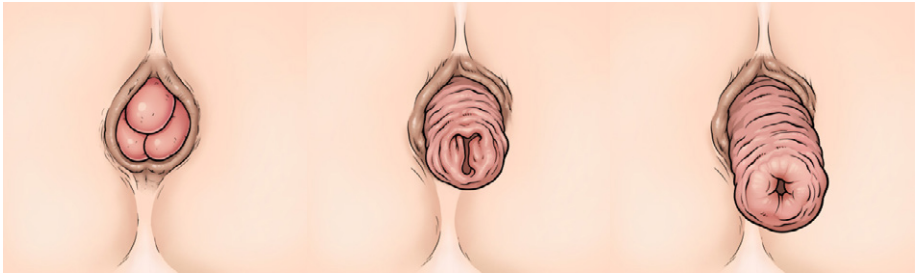
- Haemorrhoids are venous 'cushions' or plexuses found above and below the anal sphincter. Their role is thought to be related to smooth passage of stool through the anus and they should be considered varicose veins of these plexuses.
- Straining to defecate can cause haemorrhoids to prolapse and become congested (internal) or to become congested and thrombose (external).
- External haemorrhoids originate below the anal margin and are covered in skin.
- Internal haemorrhoids can be identified as coming through the anus and are covered in mucosa, not skin.



Internal and external haemorrhoid

Rectal prolapse

- Rectal prolapse occurs when the mucosa lining the rectum prolapses through the anus.
- There are two types of rectal prolapse:
  - Full thickness. This is where all layers of the bowel have telescoped on themselves through the anus. They can be more challenging to reduce.
  - Partial thickness. This is where only the mucosal layer prolapses through the anus.



Partial (mucosa only) rectal prolapse | **Intermediate rectal prolapse** | **Full thickness rectal prolapse**

- Rectal prolapse occurs most commonly in those aged approximately one year, and those aged greater than 70 years (mostly females).
- In adults, rectal prolapse is primarily associated with constipation or a weakness in pelvic floor muscles (associated with aging and/or childbirth).
- Any patient who has co-existing constipation should have this treated aggressively.

7.1 Conjunctivitis

- This section is for patients with conjunctivitis.
- Use this section in conjunction with the relevant section in the EAS CPGs.

Assessment

- Take a thorough history focusing on:
  - Duration of symptoms.
  - Progression of conjunctivitis (unilateral or bilateral).
  - Vision changes.
  - Discharge from eyes.
  - Exposure to chemicals and/or eye drops.
  - Previous eye problems.
  - Contact lens use.
  - Photophobia or eye pain.
  - Recent trauma.
  - Features contained within the conjunctivitis transport/referral table.
- Perform a focused eye examination, including a test of visual acuity and examination of the cornea.
- Consider differential diagnoses (see unilateral red eye differential diagnosis table).
- Swab the area if the patient has:
  - A history of sexually transmitted infection, or
  - Profuse discharge, or
  - Prolonged course, or
  - Neonatal conjunctivitis.

Management

- Irrigate with water or 0.9% sodium chloride.
- Consider administration of loratadine PO if prominent itch is a feature.

Referral

Conjunctivitis transport/referral table
The patient requires immediate referral to an ED: • History suggestive of penetrating trauma. • New change in vision. • Severe pain. • Suspicion of acute angle closure glaucoma. • Orbital or periorbital cellulitis. • Neonatal conjunctivitis.
The patient requires referral to primary care within 24 hours: • Unilateral red eye. • Headache. • Conjunctivitis persisting > 7 days.

Advice

- Advise the patient to avoid public places including work and school while they are infectious to prevent spread.
- If the patient wears contact lenses:
  - Refrain from wearing contact lenses for the duration of the infection, and for 48 hours after it has cleared.
  - Discard any disposable lenses and cases and use new ones once infection has cleared.
  - If using non-disposable lenses, ensure a full and complete cleaning and storage regime before re-using the lenses.

Additional information

- The three most common causes of conjunctivitis are bacterial, viral and allergic conjunctivitis, and the principles of management for each cause are the same.
- Most patients with conjunctivitis have relatively minor problems that rarely significantly affects vision.
- Bilateral red eye is common and seldom has sight-threatening causes.
- Sight-threatening causes of red eye are almost always accompanied by reduced vision (see the unilateral red eye differential diagnosis tables).

Unilateral red eye with reduced vision differential diagnosis table

Problem	Presentation	Population at risk	Management and referral
Infectious keratitis Corneal infection	• White corneal lesion (seen with torch/direct vision) • Extreme pain • Photophobia	• Contact lens wearers • Corneal trauma	Immediate referral to an ED
Iritis Inflammatory disease of uvea	• Blurred or decreased vision • Significant photophobia • Small pupil which may be distorted • Cornea usually clear, may be cloudy • No discharge, no eyelid inflammation • May be bilateral (uveitis) with insidious onset and less pain	• Previous episodes of iritis • Ankylosing spondylitis	Immediate referral to an ED
Glaucoma Acute angle closure	• Ache • Often associated with nausea and vomiting • Haloes (patient experience of rainbow rings around lights) • Cloudy cornea • Mid-dilated, unresponsive pupil	• Usually older • Asian ethnicity	Immediate referral to an ED
Herpes simplex keratitis HSV	• Corneal staining with fluorescein • Corneal haze • Photophobia • Mild/moderate pain for up to one week	• Past history (told they have had a "cold-sore" infection of their eye)	Referral to GP within 24 hours
Herpes zoster ophthalmicus Herpes zoster iritis or keratitis	• No corneal ulcer	• Shingles in V1 dermatome between ten days and several months ago	Referral to GP within 24 hours
Corneal ulcer	Could be due to: • Infection (herpetic) • Abrasion • Sterile ulcer in patients with chronic dry eye or poor blink		Referral to GP within 24 hours

Unilateral red eye with preserved vision differential diagnosis table

Problem	Presentation	Population at risk	Management and referral
Conjunctivitis Infectious or allergic	• Unilateral discharge progressing to bilateral discharge • Discharge may be watery if due to allergy or viral infection • Discharge may be purulent if due to a bacterial infection • May have eyelid swelling • May be painful if due to infection		
Subconjunctival haemorrhage Painless bleeding under the conjunctiva	• Common • Acute • Mild irritation • No effect on vision • Can have spectacular appearance	• Increasing age • Hypertension • Diabetes • Anticoagulation	No referral required. Usually self-limiting and should resolve over a few weeks
Scleritis Inflammation of the sclera	• Marked redness of the eyeball (not eyelids) either diffusely or localised • Severe, deep ache, worse on ocular movement • Bilateral in up to 50% of patients • Normal eyelids • Vision is usually normal • Eye movements are usually normal	• Often associated with connective tissue disease e.g. Rheumatoid arthritis, Wegener granulomatosis, lupus, vasculitis, inflammatory bowel disease	Administer NSAIDs or prednisone and refer to GP within 24 hours
Episcleritis	• Similar to scleritis but without deep ache		No referral required. Usually self-limiting and should resolve over a few weeks
Toxicity Chronic frequent use of preservative containing eye drops			Discontinue trigger, seek alternative

7.2 Corneal abrasions and corneal foreign bodies

This section is for patients who have a corneal abrasion and/or corneal foreign body.

Assessment

- Take a history, including:
  - Duration of symptoms.
  - Presence of conjunctivitis (unilateral or bilateral).
  - Vision changes.
  - Discharge from eyes.
  - Exposure to chemicals and/or eye drops.
  - Previous eye problems.
  - Contact lens use.
  - Photophobia or eye pain.
  - Recent trauma.
  - Features contained within the conjunctivitis transport/referral table and the corneal abrasion and foreign body transport/referral table.
- Perform a focused eye examination, including:
  - A test of visual acuity.
  - Examination of the cornea.
  - Examination for evidence of a foreign body (including inverting the eyelid to look underneath).
- If an ophthalmoscope is available:
  - Administer lignocaine 4%/fluorescein 0.25% eye drops to the affected eye.
  - Wait one minute and then examine the corneal surface under the blue light of an ophthalmoscope, looking for abrasions or foreign bodies.
- Consider differential diagnoses (see the unilateral red eye differential diagnosis table in the 'conjunctivitis' section).

Management

If the patient has a corneal abrasion:

- The patient must be given a clear recommendation to be assessed in an ED if the corneal abrasion is central and large.
- Provide chloramphenicol 1% ointment for application every three hours (up to a maximum of six times per day) to the affected eye.
- Advise the patient to continue application of chloramphenicol ointment for 48 hours following complete resolution of ophthalmic symptoms (usually 4-5 days).
- Administer paracetamol PO and/or ibuprofen PO as required for pain.

If the patient has a corneal foreign body:

- Administer lignocaine 4%/fluorescein 0.25% eye drops to the eye surface.
- Gently irrigate the eye to remove any smaller debris, such as grit or dirt.
- Using the tip of a wet cotton bud, have one gentle attempt to remove the foreign body by lightly swiping from the centre to the outside of the eye in a single fluid movement.
- Provide chloramphenicol 1% ointment for application every three hours (up to a maximum of six times per day) to the affected eye.
- Advise the patient to continue application of chloramphenicol 1% ointment for 48 hours following complete resolution of ophthalmic symptoms (usually 4-5 days).
- Administer paracetamol PO and/or ibuprofen PO as required for pain.

Referral

Corneal abrasion and foreign body transport/referral table
The patient requires referral to an ED, however alternative transport may be appropriate: • Greater than a two-line reduction in visual acuity compared to the unaffected eye. • Large central corneal abrasion. • Unable to remove foreign body if present. • Severe eye pain. • Severe photophobia. • Suspected penetrating foreign body. • Evidence of a painful inflamed cornea with an associated nearby vesicular rash. • Presence of a halo following metallic foreign body removal.

Additional information

- It can be difficult to differentiate between a corneal ulcer and corneal abrasion. On fluorescein staining, a corneal ulcer appears like a 'scooped-out' cavity on the surface of the cornea, whereas a corneal abrasion appears like one or more scratches on the surface of the cornea.
- Viral infections of the eye can present with a similar appearance to a simple corneal abrasion:
  - Corneal abrasions usually have a history of eye trauma which has caused the abrasion.
  - Viral infections may be associated with a co-existing influenza-like illness and/or a painful vesicular rash in the same dermatomal distribution as the eye (V1).

  - A painful inflamed cornea associated with a nearby vesicular rash is assumed to be a viral infection until proven otherwise and requires urgent assessment in an ED.
- Mild to moderate eye pain or photophobia is common with corneal abrasions and foreign bodies, but severe pain is uncommon.
- Metallic foreign bodies frequently leave a small halo around the location where they were embedded in the eye (a 'rust ring'). This is likely to require specialist review but is non-urgent and can occur within 48 hours.
- Chloramphenicol ointment can cause blurring of the patient's vision. However, due to the viscous nature of chloramphenicol it adheres better to the damaged surface of the eye than chloramphenicol eye drops.

7.3 Epistaxis

This section is for patients aged greater than two years with non-traumatic epistaxis.

Assessment

- Take a history, including:
  - Duration of the bleeding.
  - Trauma.
  - Surgery.
  - Previous epistaxis and treatments.
  - Medications (especially antiplatelets and anticoagulants).
  - Comorbidities (for example, bleeding disorders or hypertension).
  - Features contained within the epistaxis treatment/referral table.
- Determine the severity of bleeding.
- Determine the location of the bleeding (anterior or posterior).

Management

Mild bleeding

- Firmly compress the fleshy part of the nose for 15 minutes.
- If the bleeding is not controlled, administer a vasoconstrictor IN as below.

Moderate to severe bleeding

- Blow the nose to clear clots.
- Firmly compress the fleshy part of the nose for 15 minutes.
- Administer a vasoconstrictor IN:
  - For adults:
    a) Five sprays of lignocaine 5%/phenylephrine 0.5% into each nostril via applicator, or
    b) 0.2 mg adrenaline and 2 mg lignocaine 1% (from a solution of 1 mg adrenaline and 10 mg lignocaine 1%, diluted to 10 ml with 0.9% sodium chloride) using a mucosal atomising device (MAD), or
    c) 0.2 mg of adrenaline (2 ml of 1:10,000) into each nostril using a MAD.
  - For patients aged 2-11 years:
    a) Five sprays of lignocaine 5%/phenylephrine 0.5% into each nostril via applicator, or
    b) 0.1 mg adrenaline and 1 mg lignocaine 1% (from a solution of 1 mg adrenaline and 10 mg lignocaine 1%, diluted to 10 ml with 0.9% sodium chloride) using a mucosal atomising device (MAD), or
    c) 0.1 mg of adrenaline (1 ml of 1:10,000) into each nostril using a MAD.

- Provide nasal packing:
  - Anterior packing with alginate/foam (for example, Ivalon), or
  - Use an inflatable nasal tampon (for example, a Rapid Rhino™) and titrate the inflation of the nasal tampon to the patient's discomfort.
- Administer fentanyl IV as required.

Severe bleeding that remains uncontrolled

- Treat as per the 'epistaxis' section in the EAS CPGs.
- Pack the nose posteriorly with 1-2 Foley (urinary) catheters:
  - Cut the catheter tip off.
  - Ensure the balloon still functions.
  - Mark 8 cm and lubricate with lignocaine gel.
  - Insert the catheter 8 cm into the nasal passage.
  - Inflate with approximately 5 ml 0.9% sodium chloride or sterile water.
  - Withdraw until the balloon lodges in the posterior nasopharynx.
  - Apply anterior packing.

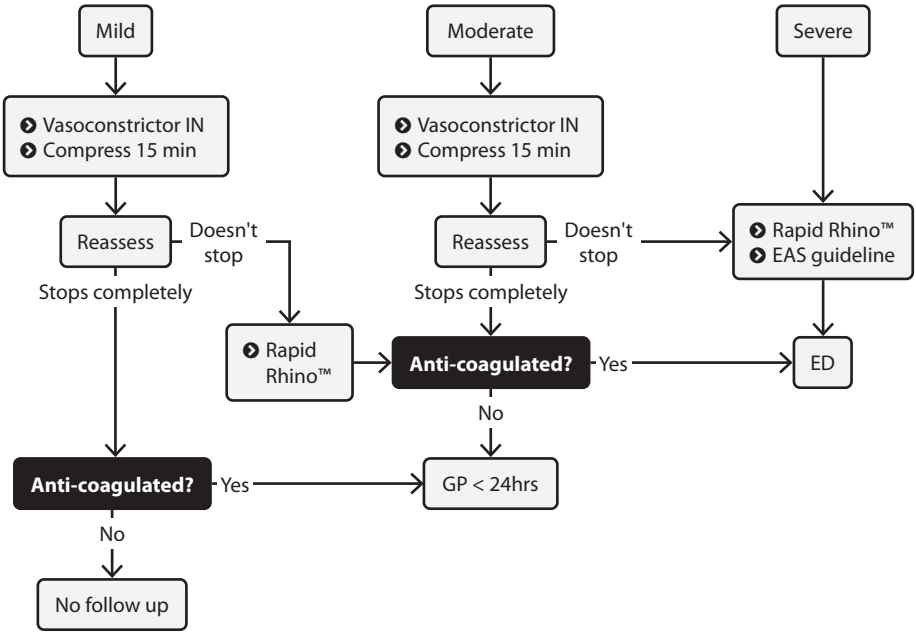
Antibiotic administration

- Consider administration of antibiotics if the:
  - Packing will be in place for greater than 24 hours, or
  - Patient is immunocompromised, or
  - Patient has a heart valve replacement.
- Administer amoxicillin PO:
  - Adults:
    a) 500 mg three times daily until reviewed , or
    b) 800 mg of erythromycin PO four times daily until reviewed if allergic to penicillin.
  - See the paediatric drug dose tables for a child.

Referral

Epistaxis transport/referral table
The patient requires immediate referral to an ED by ambulance: • Signs of hypovolaemia. • Uncontrolled moderate to severe bleeding.
The patient requires referral to an ED, however alternative transport may be appropriate: • Anaemia. • Aspiration. • Controlled moderate or severe bleeding and taking an anticoagulant. • Temperature > 38°C. • Required more than one dose of fentanyl IV.
The patient requires referral to primary care within 24 hours: • Controlled mild bleeding without nasal packing and taking an anticoagulant. • Controlled mild bleeding using nasal packing and not taking an anticoagulant. • Controlled moderate bleeding without using nasal packing and not taking an anticoagulant.

Epistaxis transport/referral summary flowchart



Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Avoid hot showers, hot drinks and exertion for 24 hours.
- Do not blow, pick or otherwise tamper with the nose for 24 hours.
- Ideally packing is removed within 24 hours but may remain in place for up to three days.
- Provide an epistaxis patient information leaflet.

Additional information

- To control anterior bleeding, sustained direct pressure must be applied to the fleshy part of the nose. The goal is to maintain pressure on the highly vascular area known as Little's area or the Keisselbach plexus.
- Use a watch or other device to ensure timing is accurate. If there are interruptions to direct pressure with re-bleeding, then recommence compression and be prepared to continue for a further 15 minutes to ensure haemostasis.
- Patients who are elderly, frail or distracted may struggle to maintain continuous direct pressure for 15 minutes. Using an improvised nose clip made of two tongue depressors joined with a rubber band is a useful way to enable uninterrupted direct pressure.
- Encourage the patient to spit any blood out into a container rather than swallowing it because blood is pro-emetic and it is difficult to assess the volume of blood loss.
- Adrenaline is administered to both nostrils regardless of which is bleeding. This ensures vessels with blood flow across the septum are vasoconstricted.

7.4 Throat infection

Assessment

- Take a history, including:
  - Features contained within the throat infection treatment/referral table.
  - The risk of rheumatic fever.
  - The likelihood of Group A *Streptococcus* (GAS) pharyngitis.
  - The likelihood to attend follow up.
- Perform a physical examination, including an assessment of:
  - Signs of sepsis.
  - Abnormalities on the tonsils or pharynx.
  - Peritonsillar cellulitis or abscess (quinsy).
  - Cervical lymphadenopathy and systemic signs.
  - Hydration.
  - The ability to swallow.
  - Features contained within the throat infection treatment/referral table.
- Swab the throat if either GAS pharyngitis is possible (score ≥ 2 on GAS pharyngitis likelihood table) or the patient is at high risk of rheumatic fever (RF) (score ≥ 2 on risk for rheumatic fever table).

GAS pharyngitis likelihood criteria		Score
Temperature > 38°C		**+ 1**
No cough		**+ 1**
Tender anterior cervical lymphadenopathy		**+ 1**
Tonsillar swelling or exudate		**+ 1**
Age (in years)	3 - 14 years	**+ 1**
	15 - 44 years	**0**
	≥ 45 years	**- 1**

Score 0 - 1 = no swab, no antibiotics

2 - 3 = swab, no antibiotics

≥ 4 = swab and antibiotics

Risk for rheumatic fever criteria	Score
Personal, family or household history of RF	**+ 2**
Māori or Pacific People	**+ 1**
Age 3-35 years	**+ 1**
Living in crowded living circumstances or low socioeconomic area	**+ 1**

Score ≥ 2 = high risk for RF = swab and antibiotics

Management

- Administer analgesia:
  - Simple oral analgesia should be sufficient.
  - Avoid NSAIDs in those at high risk of rheumatic fever.
  - Consider liquid formulations of analgesia if the patient is having difficulty swallowing.
- Administer oral fluids and consider IV rehydration if the patient is showing signs of dehydration.
- Administer antibiotics if:
  - GAS pharyngitis is likely (score ≥ 4), or
  - High risk for rheumatic fever (score ≥ 2), or
  - High risk of failing to attend follow up.
- Antibiotic dosing:
  - 1000 mg amoxicillin PO once daily for ten days, or
  - 900 mg benzathine penicillin IM (1,200,000 units) if the patient is at high risk of failing to follow up, or
  - 300 mg roxithromycin PO once daily for ten days.
  - If the patient has an allergy to penicillin:
    a) Administer 300 mg roxithromycin PO once daily for ten days, or
    b) Administer 800 mg erythromycin PO twice daily for ten days.
    c) See the paediatric drug dose tables for a child.

Referral

Throat infection transport/referral table
The patient requires immediate referral to an ED by ambulance: • Drooling. • Airway compromise. • Abnormal speech. • Severe difficulty swallowing.
The patient requires referral to an ED, however alternative transport may be appropriate: • Quinsy. • Peritonsillar cellulitis. • Temperature > 40°C. • Rigors. • Neutropenia. • Chemotherapy within the last four weeks.
The patient requires referral to primary care within 24 hours: • Onset occurred < 24 hours. • Temperature > 38°C. • Aged < 15 years. • High risk for rheumatic fever (score ≥ 2).
The patient requires non-urgent referral to primary care: • A swab has been taken and follow up is required.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Maintain good fluid intake.
- Take regular paracetamol as required.
- Avoid NSAIDs if the patient is at risk for rheumatic fever.
- Provide a throat infection patient information leaflet.
- Advise a minimum of 24 hours restriction on activity (isolation) to reduce the risk of spreading GAS, if the patient is a:
  - Healthcare worker.
  - Teacher.
  - Food handler.
- Call an ambulance if the patient develops:
  - Difficulty breathing, speaking or swallowing.
  - Rigors, confusion or a temperature greater than 40°C.

Additional information

General principles

- The intent of this section is to ensure treatment of all patients with GAS pharyngitis who are also at high risk of rheumatic fever, to prevent the development of rheumatic heart disease.
- Most sore throats are as a result of a viral infection, and only a small number are caused by GAS.
- GAS pharyngitis (also known as strep throat) is uncommon in children aged less than three years, but very common in children aged 5-14 years.
- Visual appearance of the pharynx alone can make it difficult to differentiate between viral and bacterial causes of infection. Viral and bacterial causes of sore throat cannot be reliably differentiated by clinical signs or symptoms, severity, or duration of illness.
- Signs of peritonsillar abscess (quinsy) include unilateral tonsillar displacement, trismus, drooling and severe unilateral ear/neck pain.
- If possible, avoid NSAIDs in populations at high risk of rheumatic fever due to the risk of masking symptoms and missing the diagnosis.

7.5 Toothache

This section is for adults with acute orofacial pain from 1-2 teeth and/or a localised area of the gum.

Assessment

- Take a history including:
  - Trauma.
  - Dental hygiene.
  - Diet.
  - Previous dental procedures.
  - Risks for dental disease progression.
- Perform a physical examination, including assessment of:
  - The nature and location of the pain (using the tooth notation diagram).
  - The features contained within the toothache transport/referral table.
  - The oral cavity and look for swelling, redness, temperature and lymphadenopathy.
  - The presence of a dental abscess.
- Consider non-dental causes of pain.

Management

- Administer analgesia:
  - Simple oral analgesia in combination should be sufficient.
  - Consider a dental block if pain is severe. Also consider administration of lignocaine/phenylephrine topical spray prior to administering a dental block.
- Incise and drain any abscess and follow with a warm salty mouthwash.
- Administer antibiotics if a dental abscess is present and there are risk factors including:
  - Delay accessing dental care, or
  - Infection is severe and spreading, or
  - Patient has diabetes or is immunocompromised.

Antibiotic dosing

- Mild to moderate infection:
  - 1000 mg amoxicillin PO, and then 500 mg PO three times daily for five days, or
  - 400 mg metronidazole PO three times daily for five days.
  - If the patient has an allergy to penicillin:
    a) Erythromycin 800 mg PO twice daily for five days, or
    b) Roxithromycin 300 mg PO once daily for five days.

- Severe infection:
  - 1000 mg amoxicillin PO, and then 500 mg PO three times daily for five days, and
  - 400 mg metronidazole PO three times daily for five days.
  - If the patient has an allergy to penicillin:
    a) 800 mg erythromycin PO twice daily for five days and 400 mg metronidazole PO three times daily for five days, or
    b) 300 mg roxithromycin PO once daily for five days and 400 mg metronidazole PO three times daily for five days.
- See the paediatric drug dose tables for a child.

Referral

Toothache transport/referral table
The patient requires immediate referral to an ED by ambulance: • Airway compromise. • Severe facial swelling. • Trismus. • Floor of mouth swelling. • Drooling. • Neurological signs.
The patient requires referral to an ED, however alternative transport may be appropriate: • Orbital cellulitis. • Temperature > 40°C. • Rigors. • Neutropenia. • Chemotherapy within the last four weeks. • Significant mandibular, submandibular or infraorbital swelling. • Administered antibiotics and multiple risk factors for dental disease progression are present.
The patient requires referral to dental care within 48 hours: • Localised gum swelling only. • Administered antibiotics. • Administered a dental block.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Emphasise the need to seek treatment from a dentist as soon as possible.
- Be clear that antibiotics will not clear the source of a dental infection (this requires dental care by a dentist).

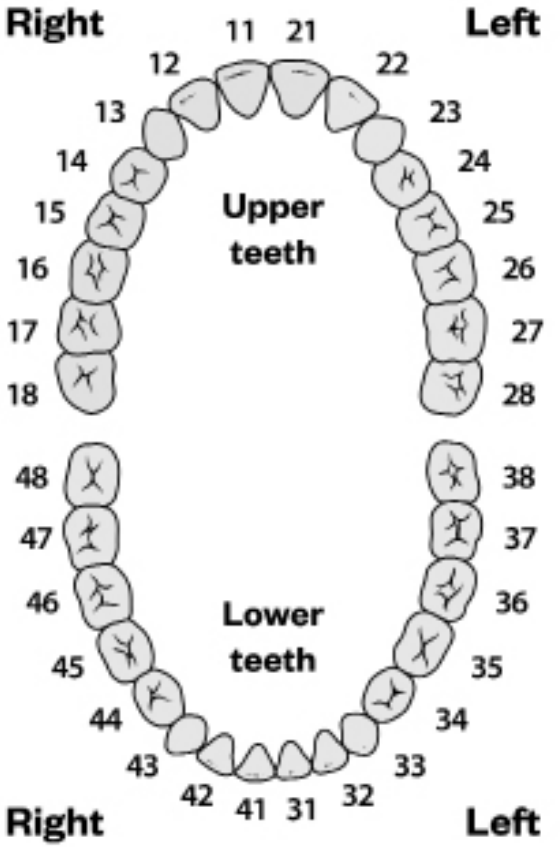
- Maintain good oral hygiene.
- Maintain a good diet (in particular, avoid sugary drinks).
- Eat cool, soft foods, chew on the unaffected side of the mouth and avoid flossing near the abscess to avoid aggravation of the symptoms.
- Use a warm salty mouthwash three times daily for five days to promote continued drainage, if an abscess has been drained.
- Provide a toothache patient information leaflet.
- Call an ambulance if any of the following develops:
  - Any difficulty breathing, speaking or swallowing.
  - Rigors, confusion or temperature greater than 40°C.

Additional information

General principles

- Dental causes of orofacial pain include tooth pathologies such as trauma, ulceration, erupting tooth and decay.
- The typical presentation of tooth pain is:
  - Dull/aching/nagging.
  - Unilateral.
  - Poorly localised.
  - Mild to severe intensity.
  - May be associated with an increased sensitivity to hot or cold food or fluids.
- Non-dental causes of orofacial pain include:
  - Temporomandibular joint disease.
  - Ear or maxillary sinus infection.
  - Neck or shoulder musculoskeletal pain.
  - Temporal arteritis.
  - Neoplasm.
  - Salivary gland problems.
  - Referred pain from acute coronary syndrome.
- Trigeminal neuralgia may present as tooth pain, but the brief stabbing quality is unusual for tooth disease.
- Risk factors for dental disease progression include:
  - Comorbidities, for example diabetes.
  - Immunocompromise.
  - Smoking.
  - Medications causing a dry mouth.
- Antibiotics are not usually indicated for toothache unless there are signs of abscess, cellulitis or systemic symptoms.

- Severe or spreading infection is defined as signs of lymph node involvement or systemic signs such as fever or malaise.
- Floor of mouth swelling suggests Ludwig's angina, a rapidly spreading connective tissue infection with potential for airway compromise.



Tooth notation diagram

Dental abscess

- Signs of dental abscess include:
  - Unpleasant taste.
  - Fever and malaise.
  - Facial swelling, with or without cellulitis.
  - Regional lymphadenopathy.
  - Gum swelling.
  - Purulent discharge.
  - Increased tooth mobility and tenderness.

- Differential diagnoses for dental abscess include:
  - Mumps.
  - Sinusitis.
  - Acute otitis media.
  - Facial cellulitis.
  - Osteomyelitis.
  - Peritonsillar abscess (quinsy).
  - Infectious mononucleosis.
  - Common pathogens.
- Dental abscesses are commonly caused by polymicrobial infection with various anaerobes including:
  - Viridans streptococci.
  - *Streptococcus anginosus* group.
  - *Prevotella* spp.
  - *Fusobacterium* spp.
- Promotion of continued abscess drainage with warm salty mouthwashes avoids incisions healing superficially and re-filling the abscess with pus.

Referral

- Financial issues and difficulty accessing dental care are common reasons for patients to seek dental care from health providers other than a dentist.
- The local DHB or PHO can provide information on available funding and services if there are barriers to private dental care.
- DHB dental services such as a Relief of Pain Clinic or referral to a subsidised private general dental practice may be available in business hours for low-income patients aged greater than or equal to 18 years who are either on a WINZ benefit or are NZ super annuitants.
- Free dental care for those aged less than 18 years is available from DHB community dental services and DHB listed subsidised general dental practices.
- Patients who have been treated for dental abscess must be referred for dental treatment as it is likely that abscess will reoccur, and tooth extraction or root canal will be required.
- Antibiotic courses in this section are relatively short. This is because it is expected that the patient will have seen a dentist during this time and the dentist will reassess to confirm if further antibiotic treatment is needed.

7.6 Earache

Assessment

- Take a history, focusing on:
  - Recent upper respiratory tract infection symptoms.
  - Dental problems.
  - Features contained within the earache transport/referral table.
- Perform a physical examination, including an assessment of:
  - The head and neck, for areas of tenderness and enlarged lymph nodes.
  - The throat, for erythema and enlarged tonsils.
  - The teeth for localised tenderness.
  - The ears externally, for redness, swelling or discharge.
- Perform otoscopy, if an otoscope is available.

Management

Otitis media

- Administer oral analgesia as required for pain.
- Administer amoxicillin PO if a bacterial infection is suspected (for example, copious discharge or disproportionate pain):
  - 500 mg three times daily for five days for an adult.
  - See the paediatric drug dose tables for children.
- If the patient has an allergy to penicillin:
  - Administer 160/800 mg trimethoprim/sulfamethoxazole PO twice daily for 5 days.
  - See paediatric drug dose tables for children.

Otitis externa

- Administer oral analgesia as required for pain.
- Advise the patient to avoid placing any foreign bodies in the canal to relieve itch.
- Provide Kenacomb™ ear drops if otitis externa is contained to the external auditory canal. Administer two drops four times daily for five days.
- Administer flucloxacillin PO if otitis externa is visible externally in the external auditory meatus or on the lobe, or is getting worse despite 48 hours of ear drops:
  - 500 mg for an adult four times daily for five days.
  - See the paediatric drug dose tables for children.
- Consult if penicillin allergic.

Impacted wax

- Advise the patient to soften the wax twice daily with 2-3 drops of olive oil for 3-4 days.

Referral

Earache transport/referral table
The patient requires immediate referral to an ED by ambulance: • Systemic involvement. • Pain uncontrolled by simple analgesia. • Facial weakness or sensory tenderness. • Mastoid involvement or malignant otitis externa. • Headache. • Vertigo.
The patient requires non-urgent referral to primary care: • Worsening or persisting symptoms of impacted wax. • Otitis externa. • Otitis media.

Additional information

General principles

- On otoscopy, the appearance of the tympanic membrane is variable from dull grey to bright pink.
- Determining when a tympanic membrane is abnormal in appearance is based on experience, comparison with the unaffected ear, and patient history.

Otitis media

- Otitis media is much more common in children than adults.
- The classic presentation of otitis media is:
  - Ear pain.
  - Low grade fever. This is more common in infants and young children.
- Headache, neck pain, nausea, vomiting and problems with balance may be present but are rare.
- Otitis media commonly presents in infants and small children and should be considered if the child is excessively crying, fussing, pulling at their ear, irritable, not sleeping well or is uninterested in their normal diet.
- Bloody discharge is uncommon however it can occur following a period of intense pain and sudden relief where pressure in the middle ear builds and ruptures the tympanic membrane.
- On otoscopy, otitis media appears as:

  - A red, inflamed tympanic membrane.
  - Is frequently associated with a collection of pus in the middle ear pushing against the ear drum and creating a bulge.
  - Extra prominent and congested vascular pattern.
- Otitis media infections are usually viral but can also be bacterial. Bacterial infection should be suspected if:
  - The patient appears very unwell.
  - The pain is disproportionate.
  - There is copious discharge from one or both ears.
- Risk factors for bacterial infection include:
  - Frequent previous antibiotic courses.
  - Use of a dummy in infants.
  - A sibling with a history of glue ear.
- Mastoiditis is a complication of otitis media involving osteitis of the mastoid process of the temporal bone. It may be associated with:
  - Erythema, tenderness and swelling of the mastoid process.
  - Persistent otorrhoea lasting for greater than three weeks.
  - Persistent deep pain, typically worse at night.

Otitis externa

- Otitis externa is also known as 'swimmers' ear', as it can be associated with the irritant effect of water in the external auditory canal. It can also be seen in those with atopic skin, as a consequence of local trauma (for example, using cotton buds for itch or to remove wax), or as a result of fungal infections.
- The classic presentation of otitis externa is:
  - Ear discomfort and itch.
  - Dull hearing.
  - Bloody discharge.
- In mild cases of otitis externa, the inflammation is usually confined to the external auditory canal.
- In more severe cases, the inflammation may extend onto the external ear and there may be extensive swelling.
- On otoscopy, the external auditory membrane looks inflamed and eroded (similar to an eczematous skin rash) and pus may also be present.
- Malignant otitis externa (also known as necrotising otitis externa) is progression of infection to osteomyelitis of the temporal bone. It is more common in the elderly and those who are immunocompromised (for example patients with diabetes or on chemotherapy). It may be associated with persistent severe deep pain, headache, dysphagia, hoarseness, and facial nerve dysfunction.

Differential diagnosis for earache

- The differential diagnosis for earache includes:
  - Otitis media.
  - Otitis externa.
  - Impacted wax.
  - Bullous myringitis.
  - Primary dental problems.
  - Foreign body in the ear.
  - Mastoiditis.
  - Shingles.
  - Neuralgia.
- Impacted wax should be suspected when:
  - There is isolated earache associated with muffled hearing in the same ear and no associated systemic symptoms.
  - There is nothing visible in the external ear canal except wax.
- Dental pain is commonly referred to the ear and can be perceived as earache. The examination for a patient presenting with earache should always include an intra-oral assessment.
- Foreign bodies are common, especially in smaller children who like to place objects in their ears. They should be easily removed, but have a low threshold for non-urgent referral to an ED.
- Insects occasionally crawl into ears and can cause extreme distress and pain. Removal in an ED or an urgent care clinic is usually required because of access to specific equipment. Prior to referral, the insect should be drowned in olive oil (fill the ear canal), which will provide considerable relief.

Bullous myringitis

- Bullous myringitis is an infection of the tympanic membrane.
- The tympanic membrane is very well innervated, and subsequently the usual presentation is one of severe pain.
- Bullous myringitis is characterised by blistering on the tympanic membrane and may have bloody discharge.
- The aetiology is complicated and can occur due to secondary infection following minor trauma, or due to a primary viral or bacterial infection.
- Bullous myringitis is more common in children.
- It can be very difficult to distinguish bullous myringitis and acute otitis media.

Chronic otitis media with effusion

- Chronic otitis media with effusion is a chronic condition that may follow an acute episode of otitis media.
- The fluid remains in the middle ear, reducing the conduction of sound and pushing on the tympanic membrane.
- Usually, the patient is well, the tympanic membrane does not appear inflamed, but there is fluid collection bulging behind it.
- This is not an emergency but does require non-urgent referral to primary care.

7.7 Headache

- This section is for adults with headache, where the cause is likely to be a primary headache syndrome.
- Use this section to guide the expansion of assessment and treatment, in conjunction with the relevant section in the EAS CPGs.
- Do not use this section if the patient is pregnant.

Assessment

- Take a history and perform a physical examination, including:
  - A focused neurological assessment.
  - An assessment of the features contained within the EAS CPG flag table for headache.
  - An assessment for the presence of any tenderness in the head or neck (especially the temple region).

Management

- Administer 900 mg soluble aspirin PO.
- Consider adding paracetamol PO or IV.
- Do not administer opiates.
- Administer ondansetron as a first-line antiemetic:
  - 8 mg ondansetron PO/IV, or
  - 4 mg ondansetron IM.
- Administer prochlorperazine as a second-line antiemetic:
  - 12.5 mg IM, or
  - 5 mg PO.
- Administer 1 L 0.9% sodium chloride IV over 20 minutes if the patient has nausea and/or vomiting or any clinical signs of dehydration.
- Administer 15 litres/minute of oxygen via a reservoir mask for 15-20 minutes as described in the EAS CPGs if the patient has a provisional diagnosis of cluster headache.
- Arrange for follow up if required.

Referral

Headache transport/referral table
The patient requires immediate referral to an ED by ambulance: • Presence of any EAS CPG red flags for headache (exception- persistent vomiting).
The patient requires non-urgent referral to primary care: • Presence of any EAS CPG orange flags for headache.
The patient requires no specific follow up: • Presence of only EAS CPG green flags for headache.

Additional information

- Examples of primary headache syndromes include tension headaches, migraines, and cluster headaches.
- The management of primary headache syndromes can be challenging, particularly when the patient has exhausted their standard prescribed approach for managing their headache.
- The management goal for these patients is not to completely resolve the headache, but to reduce pain, settle nausea and vomiting, rehydrate and enable the patient to sleep/rest.
- Opiate analgesia is discouraged for a patient with headache as it is not usually required, but is not contraindicated if the headache is severe, or due to subarachnoid haemorrhage or intracerebral haemorrhage. In these situations, an opiate may be administered prior to arrival of a transporting ambulance crew.
- Persistent vomiting does not trigger immediate referral to an ED by ambulance if this is a feature of the patient's usual presentation for migraine or tension headache.

7.8 Vertigo

- This section is for patients with vertigo.
- Use this section to guide the expansion of assessment and treatment, in conjunction with the relevant section in the EAS CPGs.

Assessment

- The focus of assessment should be on determining whether the vertigo is due to a central cause (cerebellar stroke) or a peripheral cause (BPPV or vestibular neuritis).
- Take a history and perform a physical examination, including:
  - An assessment of the features contained within the EAS CPG flag table for vertigo.
  - Use of the HINTs exam if the patient has continuous vertigo and spontaneous nystagmus.
  - Use of the Dix- Hallpike test if the patient does not have continuous vertigo or spontaneous nystagmus (note this is not necessary if the patient has a known history of BPPV).
- Persistent nystagmus for greater than ten seconds or persistence of symptoms when the head is still is not a contraindication for further assessment.

Management

- If the patient has a clear history of BPPV or a positive Dix- Hallpike test:
  - Administer prochlorperazine:
    a) 12.5 mg IM, or
    b) 5 mg PO.
    c) Provide a short course of 5 mg PO three times daily for three days if the patient is not immediately being referred to an ED.
  - Perform the Epley manoeuvre as described in the EAS CPGs.

Referral

Vertigo transport/referral table
The patient requires immediate referral to an ED by ambulance: • Presence of any EAS CPG red flags for vertigo. • Central cause suspected based on results of HINTs exam.
The patient requires non-urgent referral to primary care: • Vertigo with a clear history of BPPV or positive Dix-Hallpike test but there is no or minimal improvement in vertigo. • Presence of any EAS CPG orange flags for vertigo.
The patient requires no specific follow up: • Vertigo with a clear history of BPPV or positive Dix-Hallpike test and vertigo improved significantly. • Presence of only EAS CPG green flags for vertigo.

Additional information

General principles

- Vertigo is the false sensation that the body or its surroundings are moving or spinning and is usually accompanied by nausea and a loss of balance.
- Central causes of vertigo (for example, cerebellar stroke) are more serious with an increased risk of adverse outcomes, whereas peripheral causes (BPPV and vestibular neuritis) are usually benign.
- Manage central causes of vertigo using the relevant EAS CPG for stroke.

HINTs exam

- HINTs stands for head impulse, nystagmus, and test of skew.
- To perform the head impulse test:
  - Ask the patient to focus on your nose.
  - Rotate the patient's head 30-40 degrees to the left and then rapidly back to centre, repeat each side.
  - Look for one eye that lags behind the other, when attempting to maintain a forward gaze, and then makes a quick movement to 'catch up' (corrective saccade).
  - A positive head impulse test (a normal result) is when the eye lags, and then corrective saccade occurs.
  - A negative head impulse test suggests a central cause for the vertigo.

- To assess direction-changing nystagmus:
  - Ask the patient to look at your finger held 30 centimetres from their face.
  - Move your finger in all the cardinal directions looking for nystagmus.
  - Horizontal nystagmus is associated with peripheral vertigo.
  - Vertical or rotational nystagmus is associated with a central cause.
- To perform the test of skew:
  - Cover one eye, and then alternate.
  - The test is positive if on uncovering an eye, the gaze has drifted up and quickly corrects to the mid-point.
- A negative head impulse test, vertical or rotational nystagmus, or a test of skew that is positive is each highly sensitive and specific for a cerebellar cause of vertigo.

Dix-Hallpike test

- The Dix-Hallpike test is conducted to identify BPPV and is not required if the patient has a known history of BPPV.
- To conduct the test:
  - Sit the patient upright on a bed or stretcher, so if lying supine their head and neck will extend beyond the end of the bed or stretcher.
  - Turn the patient's head 45 degrees to the right and then assist the patient to lie flat (stabilising their head and neck). Observe for nystagmus.
  - Sit the patient up and repeat the test on the left side.
- The test is positive if vertigo or nystagmus symptoms are provoked.

Dix-Hallpike manoeuvre

8.1 Rashes

Assessment

- Take a history and perform a physical examination, including an assessment of:
  - Signs and symptoms of systemic involvement.
  - Features contained within the rashes transport/referral table.
  - The rash itself.
- Determine the most likely provisional diagnosis.

Management

- General management for rashes:
  - Administer simple oral analgesia for non-specific discomfort.
  - Recommend the patient takes cool showers or baths to manage itch.
  - Administer loratadine PO if itch is prominent:
    a) 10-20 mg for patients aged greater than or equal to 12 years.
    b) 5 mg for patients aged 1-11 years.
    c) Provide a package of care of 10-20 mg once daily for three days if the patient is not immediately being referred to an ED.
- Provide the patient with topical hydrocortisone 1% cream if an eczematous rash is present and advise them to apply it topically twice daily for five days.
- Provide the patient with topical miconazole 2%/hydrocortisone 1% cream if a fungal infection is suspected. Advise them to apply it topically 2-3 times daily and continue for 2-3 days after the rash has completely resolved (this may take 1-2 weeks).
- For folliculitis and staphylococcal skin infections:
  - Manage small crops of folliculitis with hot compresses and chlorhexidine skin wash.
  - Advise the patient to avoid picking or squeezing the lesions.
  - For more severe cases of folliculitis, treat as per the cellulitis section.

Referral

Rashes transport/referral table
The patient requires immediate referral to an ED by ambulance: • Significantly abnormal vital signs. • Petechial/purpuric rash without a clear benign cause.
The patient requires urgent referral to primary care: • Second presentation with the same problem but no improvement. • Shingles, within 3 days of onset of symptoms.

The patient requires non-urgent referral to primary care:

- Lack of clear diagnosis.
- Second presentation with the same problem but some improvement.
- Recurrent staphylococcus infections.
- Suspected scabies.
- Chronic rash (present for > 4 weeks).

- Patients are much more likely to recieve an accurate diagnosis of the cause of their rash if they present to their GP. This is because rashes are dealt with much more frequently in primary care than they are within the ED.

Advice

- Most patients with an isolated rash should receive general management advice and be referred to primary care (preferably their own GP) within five days.
- If patients have suspected scabies, advise that all clothing and bedding needs to be hot washed.

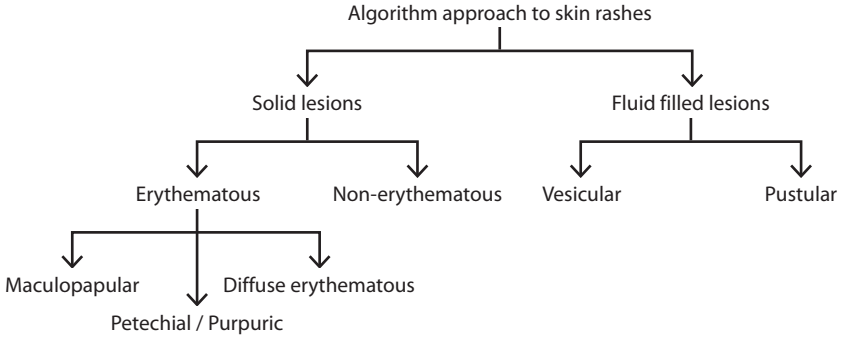
Additional information

Assessment principles

- The goal of assessment of a rash is to distinguish between a rash secondary to a wider systemic illness (for example, meningococcal septicaemia or measles), and a rash that is the primary clinical problem (for example, eczema or athlete's foot).
- In the absence of a clear benign diagnosis, a rash should be considered the sign of a more serious pathology if it is associated with moderate to severe symptoms of a viral illness.
- There are extensive differential diagnoses for each type of rash, and only the common and/or important differentials are specified within this section.
- The provisional diagnosis of a rash is determined by the rash appearance and the associated history and clinical findings.
- DermNet NZ provides a very useful reference for skin conditions.

Dermatology terminology

- An accurate description of a rash is important, especially when the patient is being referred to primary care.
- Use the flow chart below and the subsequent definitions to guide accurate description of a rash.



Dermatology terminology flow chart

- **Bulla**. A raised circumscribed lesion greater than 0.5 cm in diameter, containing a serous fluid. It is similar to a blister, but a blister is smaller (less than 0.5 cm).
- **Crusting**. When material (serous fluid or pus) has leaked from skin lesions and formed a dry crust on the skin.
- **Erosion**. When there is loss of the superficial layer of the epidermis, often observed by a shiny exposed area of skin where flakes of skin have come off.
- **Erythema**. Red skin that blanches.
- **Induration**. A thickening of the dermal layer, which can be difficult to see but easy to feel. Induration is common in cellulitis and anaphylaxis (in these cases, the thickening of the dermal layer is due to fluid).
- **Macule**. A circumscribed change in skin colour without any elevation or depression. It is a normal sheet of epidermis, with an area of pigmental change. Macules are less than 1 cm in diameter.
- **Patch**. A circumscribed change in skin colour without any elevation or depression. It is a normal sheet of epidermis, with an area of pigmental change. The only difference between a patch and a macule is size, where a patch is greater than 1 cm in diameter.
- **Papule**. A superficial solid lesion, which is raised and palpable, and less than 0.5 cm in diameter.
- **Nodule**. A palpable lump less than 1 cm in size. Nodules are usually found in the dermal or subcutaneous tissue layer.
- **Plaque**. A superficial solid lesion, which is raised and palpable. The only difference between a papule and a plaque is size, where the plaque is greater than 0.5 cm in diameter.
- **Petechiae**. A small, non-blanching erythematous macule that occurs in the skin due to the rupture of one or more small blood vessels. Petechiae are less than 0.5 cm in diameter.

- **Purpura**. A small, non-blanching erythematous macule, that occurs in the skin due to rupture of one of the small blood vessels. The only difference between petechiae and purpura is size, where purpura are greater than 0.5 cm in diameter.
- **Pustule**. A small lesion that is less than 1 cm in diameter, superficial in nature, and filled with pus.
- **Scaling**. Where there are visible fragments of epidermis coming away in sheets. For example, that which is observed in psoriasis.
- **Tumour**. A solid firm lesion that is greater than 1 cm in diameter.
- **Ulcer**. Any lesion on the skin where greater than 50% of surface area has broken down.
- **Urticaria**. An elevated papule or plaque which is often associated with erythema and generally has a sharply defined border with a quite pale centre.
- **Wheal**. Urticarial lesions with a classic expanding erythematous border and very pale centre.
- **Vesicle**. A small superficial, well circumscribed lesion that is less than 1 cm diameter and contains serous fluid.

Differential diagnoses for rashes

Maculopapular rash

- Viral exanthema:
  - This is more common in young children however can be observed in patients of all ages.
  - Usually an extensive truncal rash which may be a maculopapular or coalesced into a generalised erythematous rash.
  - A viral exanthema should be considered if the rash is associated with mild viral signs and symptoms such as low grade fever and upper respiratory tract symptoms.
- Measles:
  - Measles is a highly infectious viral disease. It usually begins with development of a fever, dry cough, runny nose and conjunctivitis.
  - The patient may also develop white spots on the buccal surface of the oral cavity which are known as koplik spots and are pathognomonic of measles.
  - The initial presentation is followed by a classic widespread maculopapular rash, which spreads from the head and neck caudally.
- Erythema infectiosum (slapped cheek disease):
  - This is most commonly seen in young children.
  - The classic presentation is a high grade fever for several days, followed by development of a bright erythematous rash on the patient's cheeks.

- Drug reaction:
  - This is usually an extensive truncal rash, in the absence of any viral symptoms.
  - Drug reaction should be considered if the patient has recently started any new medication.
- Scarlet fever:
  - This is most commonly seen in young children.
  - The classic presentation is an extensive blanching rash with a sandpaper-like texture.
  - If scarlet fever follows a streptococcal pharyngitis or skin infection, Pastia lines (petechiae in antecubital and axillary folds) may be observed.
  - The patient is also likely to be moderately unwell with fever, vomiting, headache and abdominal pain.

Petechial rash

- A petechial and/or purpuric rash can be observed in any type of sepsis that causes disseminated intravascular coagulation (DIC), for example:
  - Meningococcal septicaemia.
  - Gonorrhoea septicaemia.
  - *Streptococcus* infections.
  - Staphylococcus infections.
- Meningococcal septicaemia:
  - This is an infection within blood from the bacterium Neisseria meningitidis. It is uncommon and has a high mortality rate.
  - Meningococcal septicaemia commonly triggers DIC. Within EAS practice, the presence of a petechial rash must be assumed to be meningococcal septicaemia until proven otherwise. Within ECP practice, alternative diagnoses may be considered if the patient is systemically well.
- Vasculitis:
  - Vasculitis is the inflammation of mid-sized blood vessels.
  - It may be associated with a raised/palpable petechial rash, particularly on the legs.
- Immune thrombocytopenia (ITP):
  - This is a disease mostly seen in children and is an autoimmune process which results in destruction of platelets.
- Forceful vomiting or coughing can result in petechial rashes, particularly above the clavicle or in the face.
- In tropical and subtropical regions, there is a more extensive number of differential diagnoses for petechial and purpuric rashes.

Diffuse erythematous rash

- Viral exanthema:
  - This is more common in young children however can be observed in patients of all ages.
  - Usually an extensive truncal rash which may be a maculopapular or coalesced into a generalised erythematous rash.
  - A viral exanthema should be considered if the rash is associated with mild viral signs and symptoms such as low grade fever and upper respiratory tract symptoms.
- Toxic shock syndrome (TSS):
  - TSS is the consequence of infection with *staphylococcus aureus* and toxin production.
  - TSS is classically associated with retained tampons but could also be due to nasal packing left in situ for greater than 36 hours.
  - It presents with a widespread generalised rash usually associated with a high grade fever and sepsis.
- Erythema multiforme (EM):
  - EM is a hypersensitivity reaction, commonly associated with the herpes simplex virus.
  - The associated rash is patchy and erythematous, often with circular lesions with a pale centre, producing the classic 'target' lesions commonly seen.
  - The patient is also usually systemically well, although may have minor symptoms such as fever or joint aches.
- Eczema and atopic dermatitis:
  - While eczema and atopic dermatitis are distinct diagnoses, they have very similar clinical presentations.
  - They are allergic skin conditions which present with a patchy erythematous rash, often on the flexor surfaces or hands.
  - The rash is intensely itchy and it is common for the skin to be broken down due to scratching.
- Urticaria:
  - This is a patchy erythematous rash and is usually associated with allergic reactions.
  - The edges of the lesions are raised and often the central areas are slightly paler.
- Psoriasis:
  - Psoriasis is a hereditary autoimmune skin disease.
  - The associated rash is usually widespread and erythematous and has a classic pattern of scaling which are usually raised plaque lesions.
  - Psoriasis is unlikely to be a new diagnosis and is considered an incidental finding.

- Fungal infections:
  - The associated rash tends to be moist, erythematous, scaly and most commonly due to *candida albicans*.
  - The rash usually occurs in skin folds (for example, under breasts, in the groin or between the toes). The location of the rash can almost be considered diagnostic.
- Scabies:
  - The scabies rash is caused by the burrowing of the scabies mite and the subsequent immune reaction.
  - The rash consists of discrete erythematous burrows and associated vesicles, papules, and pinpoint erosions.
  - The rash can be found on fingers, finger webs, the belt line, ankles, wrists, elbows, knees, groin, buttocks, penis, scrotum, axillae, ankles and feet.

Non-erythematous rash

- Sexually active adults with a non-erythematous rash and mild febrile illness should be tested for syphilis.
- Primary syphilis infection presents with painless genital or oral lesion(s), which self-resolve over 3-4 weeks and often go unnoticed.
- Secondary syphilis occurs in 25% of patients who present with the primary infection about 2-3 months following the initial lesion.
- The rash associated with secondary syphilis usually consists of extensive pale papules or plaques which are predominantly found on the trunk, hands and feet.
- Mucosal surfaces may also become ulcerated, the patient will have a low grade fever, headache, myalgia and sore joints.

Vesicular lesions

- Chicken pox:
  - Chicken pox is caused by the varicella zoster virus (or herpes zoster) and is a childhood disease.
  - The classic presentation is a febrile illness for several days followed by the outbreak of a vesicular rash.
  - The lesions generally appear in clusters over the course of 5-7 days. The rash is made up of new lesions appearing like small red pinheads, slightly older lesions, and broken-down, crusted lesions.
- Shingles:
  - Shingles is caused by the reactivation of the varicella zoster virus. It initially presents with hyperalgesia of the skin and development of a vesicular rash (confined to a dermatomal distribution) over 24-48 hours.
  - Singles can be very painful, and the pain needs to be managed aggressively.

- Hand, foot and mouth disease:
  - This is caused by the coxsackievirus and occurs in infants and small children.
  - It usually presents with a prodrome of fever, vomiting, and loss of appetite before development of vesicular lesions on the patient's hands, feet, and around their mouth.
- Other differential diagnoses for vesicular lesions include Kawasaki disease, bullus impetigo, and staph-scalded skin syndrome.

Pustular lesions

- Folliculitis:
  - These are multiple small pustules localised to hair follicles on any body surface.
- Staphylococcal skin infections:
  - These may present as an isolated pustular lesion, a small cluster of lesions, or multiple widespread lesions.
  - Usually there is a break in the skin associated with each lesion, for example a small graze, cut from shaving, or insect bite.
- Gonorrhoea:
  - This is a more unusual explanation for a pustular rash.
  - Gonorrhoea classically presents as a widespread rash of small pustular lesions.
  - The classic presentation of chlamydia and/or gonorrhoea infection can be variable, but usually consists of offensive urethral and/or vaginal discharge, dysuria, painful sexual intercourse, and vaginal bleeding between periods.

8.2 Abscesses

- This section is for patients with one or more simple cutaneous abscesses. Do not use this section for breast, genital or perianal abscesses.
- Use this section in conjunction with the 'cellulitis' section in these CPGs if cellulitis is also present, or the relevant sections in the EAS CPGs if sepsis is present.

Assessment

- Take a history and perform a physical examination, including assessment of:
  - Whether there are pre-existing lesions at the site.
  - Site, size, depth and proximity to mucosa, joints, nerves, cavities and possible extensions or sinuses.
  - The degree of surrounding inflammation, lymphangitis, and/or presence of cellulitis.
  - Signs of systemic involvement.
  - Features contained within the abscess transport/referral table.
- Swab the abscess if it is complicated or recurrent.
- Determine whether the abscess is simple, intermediate or complicated using the abscess assessment table.

Abscess assessment table

	Simple ECP	Intermediate GP	Complicated ED
Size, diameter	< 4 cm	≥ 4 cm	
Depth	Superficial to fascia	Deep to fascia	
Fluctuant	Yes – fluid filled	No – firm, solid	
Location	Below the clavicle	Below the clavicle	Above the clavicle
Involves mucosa	No	No	Yes
Involves a joint	No	No	Yes
Other structures	None	None	Yes (for example, nerves)
Involves a body cavity	No	No	Yes
Involves a sinus	No	No	Yes

Management

- Do not incise or drain an abscess if the patient is a child.
- For simple small abscesses:
  - Aspirate the abscess if necessary.
  - Select a dressing appropriate for moderate exudate.
  - Administer oral analgesia.
- For simple larger abscesses:
  - Administer a field block if the patient requires local anaesthetic to enable incision and drainage.
  - Consider inhaled analgesia.
  - Aspirate the abscess with an 18 gauge needle and a 10 ml syringe to confirm the site of the pus.
  - Make a single incision or a cruciate incision over the centre of the abscess, cutting deep enough to enter the abscess cavity (usually approximately 5 mm).
  - Deroof the abscess by removing a small piece of skin to allow drainage.
  - Gently probe to identify any extensions and break down any septa.
  - Gently expel the pus using the minimum amount of pressure.
  - Do not pack the abscess.
  - Consider inserting a wick after deroofing to keep the incision open to allow further drainage.
  - Select a dressing appropriate for moderate exudate.
  - Administer oral analgesia.
- For paronychia:
  - Incise and drain (by following the plane of the nail up into the skin fold around the proximal cuticle) if an abscess is present.

Antibiotics

- Administer antibiotics if the abscess or paronychia is associated with:
  - Fever, or
  - Spreading cellulitis, or
  - Comorbidity (for example, diabetes), or
  - The patient has a complicated abscess and they are not immediately being referred to a medical facility, or
  - Inflammatory mass with unsuccessful drainage.
- Antibiotic dosing:
  - 500 mg flucloxacillin PO four times daily for five days, or
  - If the patient has MRSA or an allergy to flucloxacillin:
    a) 800 mg erythromycin PO twice daily for five days, or
    b) 160/800 mg trimethoprim/sulfamethoxazole PO twice daily for 5-7 days.
  - See the paediatric drug dose tables for children.

Referral

Abscess transport/referral table
The patient requires immediate referral to an ED by ambulance: • Suspected necrotising fasciitis. • Sepsis with one or more high risk factors. • Aged ≤ 2 years and abscess requiring incision and drainage.
The patient requires referral to an ED, however alternative transport may be appropriate: • Temperature > 39°C. • Sepsis ≥ 2 medium risk factors. • Septic arthritis. • Head or neck abscess (above the clavicle). • Immunocompromised (for example, on steroids or immunotherapy). • Complicated abscess in any age. • Aged < 3 months.
The patient requires referral to primary care within 24 hours: • Uncomplicated abscess and aged 2-12 years. • Recurrent abscess. • Abscess that required incision and drainage. • Antibiotics administered. • Intermediate abscess.

Additional information

General principles

- Abscesses are sometimes referred to as boils, carbuncles and furuncles, but this is imprecise.
- A furuncle is an infected hair follicle with an abscess at the base, also known as a boil.
- A carbuncle is a cluster of infected furuncles (or boils) connected under the skin.
- Common pathogens responsible for abscesses include:
  - *Staphylococcus aureus*.
  - Consider MRSA if there is lack of response to a beta-lactam antibiotic (for example, flucloxacillin, another penicillin or a cephalosporin).

Incision and drainage

- Simple small abscesses will not usually require local anaesthesia to enable drainage.
- Non-surgical management with dressings is appropriate if a simple small abscess is already draining or is going to drain spontaneously.
- Aspirate with an 18 gauge needle and a 10 ml syringe if drainage of a simple small abscess is required.
- Wear PPE including a mask and safety glasses to incise and drain larger abscesses under tension.
- If no pus is drained after incision but the problem appears to be an inflammatory mass, dress and provide antibiotic cover as described previously.

Paronychia

- Paronychia is the inflammation of the skin around a finger or toenail.
- The inflammation commonly follows a break in the skin, especially between the proximal nail fold/cuticle and the nail plate.
- Refer the patient to primary care or a podiatrist non-urgently if an ingrown toenail is also present.

Antibiotic cover

- Successfully drained abscesses in systemically well patients will not usually require antibiotic cover.
- Minor surrounding cellulitis usually settles after drainage.

8.3 Cellulitis

- This section is for patients aged greater than or equal to 12 years with cellulitis and supersedes the 'cellulitis' section in the EAS CPGs.
- Refer to the 'mammal bite' section in these CPGs if the patient has cellulitis secondary to a mammal bite or the 'abscess' section if an abscess is present.
- Refer to the relevant sections in the EAS CPGs if the patient has sepsis.

Assessment

- Take a history and perform a physical examination, including an assessment of:
  - Causes and risk factors for cellulitis.
  - Signs of systemic involvement.
  - Acute complications of cellulitis.
  - Differential diagnoses.
  - Features contained within the cellulitis transport/referral table.
- A swab for microbiology is not routinely required. Swab only if:
  - There is significant discharge.
  - The lesion is not improving or is deteriorating.
  - The presence of MRSA is suspected.
  - Empiric antibiotic treatment has failed.
- Mark the outer margins of the erythema as a baseline for future reference.
- Determine cellulitis severity, using the assessing cellulitis severity table.

Assessing cellulitis severity table

	Mild	Moderate	Severe
Extent	< 2% BSA	2-5% BSA	> 5% BSA
Location	Usually lower leg	Other than a limb	Face, neck, hands, genitals
Sepsis	None	One or more moderate risk factors	One or more high risk factors
Necrosis	None	Minor	Moderate to severe
Blistering	None	Minor	Moderate to severe
Comorbidities	None or single	Minor	Significant or multiple
Response to treatment	Good	Poor	Deterioration despite adhering to treatment regimen
Vomiting	No	Nausea	Vomiting
Pain	Minor	Moderate	Moderate to severe
Age	16-65 years	66-80 years	> 80 years

Management

Mild cellulitis

- 500 mg flucloxacillin PO four times daily for five days, or
- 800 mg erythromycin twice daily for five days if the patient has an allergy to penicillin.

Moderate cellulitis

- 1000 mg flucloxacillin PO four times daily for seven days, or
- If the patient has an allergy to penicillin:
  - 800 mg erythromycin PO twice daily for seven days, or
  - 300 mg roxithromycin PO once daily for seven days.

Severe cellulitis

- Consider immediate referral to an ED.
- Consider eligibility for a community IV antibiotic regimen such as cefazolin and oral probenecid, providing a local pathway is available.
- If there is any delay in pursuing a local pathway for IV antibiotics administer:
  - 2 g ceftriaxone IV, and
  - 1000 mg flucloxacillin PO four times daily for seven days.
- If the patient has an allergy to penicillin and there is a delay pursuing a local pathway for IV antibiotics, administer:
  - 2 g ceftriaxone IV, and
  - 800 mg erythromycin PO twice daily for seven days, or
  - 300 mg roxithromycin PO once daily for seven days.
- Monitor the patient for at least 20 minutes after administration of antibiotics IV.

Referral

The cellulitis transport/referral table in this section supersedes the flag table in the EAS CPGs relating to cellulitis.

Cellulitis transport/referral table
The patient requires immediate referral to an ED by ambulance: • Suspected necrotising fasciitis. • Inability to mobilise. • Temperature > 40°C.
The patient requires referral to an ED, however alternative transport may be appropriate: • Features of severe cellulitis. • Extensive or severe oedema. • Immunocompromised (for example, on steroids or immunotherapy). • Neutropenic. • Chemotherapy within the last four weeks. • Associated with an abscess requiring surgical drainage. • Rapidly spreading. • Periorbital, facial, neck, hand or genital location. • Associated with a diabetic foot ulcer. • Significant lymphangitis. • Frail, elderly or significant comorbidities. • Significant vomiting.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Keep the affected area elevated (if possible) for comfort and to relieve oedema.
- Redness and swelling may continue to extend outside the marked area in the first 1-2 days even if treatment is appropriate.
- Provide a cellulitis patient information leaflet.
- Take oral analgesia as required.
- To control the infection, the antibiotics must be taken regularly.
- Arrange for review of response to treatment in two days.
- Seek medical attention earlier if:
  - Cellulitis spreads significantly 24 hours after starting antibiotics.
  - There are signs of sepsis.
  - The patient develops severe pain.
  - The patient develops vomiting.

Additional information

General principles

- Cellulitis is an acute, bacterial infection of the lower dermis and subcutaneous tissue most commonly affecting the lower limbs in adults.
- Cellulitis is characterised by unilateral localised pain, swelling, erythema and heat. Patients may also present with fever, malaise and in severe cases oedema, blisters, ulcers and lymphangitis.
- Cellulitis usually begins with a breach in the skin, noting that the breach may be tiny and difficult to locate. Causes of cellulitis include:
  - Dry, cracked skin.
  - Eczema.
  - Tinea pedis.
  - Cuts or other wounds.
  - Burns.
  - Insect bites or stings.
  - Surgery.
  - IV cannulation.
- Common pathogens responsible for cellulitis include:
  - *Streptococcus pyogenes*.
  - *Staphylococcus aureus*.
  - Group C or Group G streptococci.
- Risk factors for cellulitis include:
  - Obesity.
  - Diabetes.
  - Pregnancy.
  - Venous insufficiency.
  - Peripheral artery disease.
  - Ulcers.
  - Lymphoedema.
  - History of previous cellulitis or erysipelas.
- Risk factors for a poor outcome secondary to cellulitis include:
  - Advanced age.
  - Frailty.
  - Diabetes.
  - Impaired renal function.
- Community management in most uncomplicated cellulitis begins with high dose oral antibiotics.

- Acute complications of cellulitis include:
  - Necrotising fasciitis.
  - Myositis.
  - Subcutaneous abscesses.
  - Septicaemia.
  - Post-streptococcal nephritis.

Differential diagnoses for cellulitis

- Deep vein thrombosis (DVT).
- Septic arthritis.
- Gout.
- Ruptured Baker's cyst.
- Thrombophlebitis.
- Cutaneous abscess.
- Metastatic cancer.
- Chronic conditions that are usually bilateral but may present with superimposed cellulitis include:
  - Varicose eczema or venous insufficiency.
  - Lipodermatosclerosis.
  - Cutaneous small vessel vasculitis.
  - Oedema with or without blisters.

Deep vein thrombosis (DVT)

- Exclude DVT before electing to manage unilateral localised pain, swelling, erythema and heat in a lower limb as cellulitis.
- DVT is the most common alternative diagnosis for patients who present with unilateral leg swelling and erythema. Where it cannot be confidently excluded, the patient should be referred.

Cellulitis in children

- Cellulitis is uncommon in children.
- Have a low threshold for recommending transport to an ED.
- Seek clinical advice before commencing treatment in a child.

Necrotising fasciitis

- Necrotising fasciitis is a rare but important differential that must be confidently excluded before making the decision to manage cellulitis in the community.
- Necrotising fasciitis is a rapidly progressing soft tissue infection with a high mortality rate characterised by extensive and progressive necrosis of the subcutaneous tissue and fascia.

- Extreme tenderness, dusky (not red or pink) discolouration, severity of illness, high fever, tachycardia and hypotension assist in differentiating necrotising fasciitis from cellulitis.

Erysipelas

- Erysipelas is a superficial form of cellulitis affecting the upper dermis and presents with bright red clearly demarcated inflammation.
- It may coexist with cellulitis and is treated in the same way.

Antibiotic treatment

- Antibiotic treatment is required for all patients with cellulitis.
- Oral antibiotic treatment is appropriate for those with mild to moderate cellulitis.
- Intravenous antibiotic treatment is usually required for patients with severe cellulitis or those not responding to oral treatment despite concordance with the treatment regimen.
- The optimal duration of oral antibiotic treatment is uncertain due to a lack of clinical trials and published guidelines, but range from 5-10 days. In general, antibiotics should be taken until cellulitis has cleared.
- The expectation is that clinical review of the response to the initial antibiotic regimen will be conducted in primary care (preferably the patient's own GP), who will make the decision about the antibiotic course duration.

Reassessment

- Include an assessment of the response to treatment only if appropriate treatment has been commenced greater than 24 hours ago.
- Patients may experience an increase in erythema and swelling within the first 48 hours of treatment even if the antibiotics are going to successfully control the infection.
- Evidence that the infection is being brought under control (despite the area of erythema remaining unchanged or enlarging) is indicated in most patients by:
  - Reduction in pain.
  - Improvement in appetite.
  - Increase in energy levels.
- Assess treatment concordance in patients who are not responding as well as expected. This includes assessing whether the patient is:
  - Resting and elevating the limb as instructed, and
  - Concordance with the antibiotic dosing regimen.
- Overall deterioration in condition (for example, increasing fever or tachycardia) is a more reliable indication of the need to escalate treatment rather than changes in the size of erythema.

8.4 Minor burns

- This section is for patients with minor burns including epidermal, superficial dermal and small mid-dermal burns.
- Refer to the relevant section in the EAS CPGs if burns are moderate to severe.

Assessment

- Take a history and perform a physical examination, including:
  - The mechanism of the burn.
  - The location where burn occurred (for example, an enclosed space with potential for airway burns and/or toxic fume inhalation).
  - Any associated trauma.
  - Burn depth and size (document the method used to estimate burn size).
  - Location on body.
  - The time of the burn.
  - Any first aid measures taken.
  - The presence of risk factors for infection or delayed healing.
  - Tetanus status.
  - Comorbidities.
  - Features contained within the minor burns transport/referral table.
- Consider non-accidental injury in children with burns.

Management

- Ensure the burn has been cooled for at least 20 minutes:
  - Use cool (not ice cold) running water.
  - There is benefit in cooling the burn up to three hours post injury if adequate cooling has not already occurred.
- Remove any jewellery or affected clothing.
- Administer analgesia as required.
- Leave small blisters intact.
- Debride or aspirate blisters over joints if they are restricting movement.
- Snip or deroof large tense blisters.
- Use simple non-alcoholic, non-perfumed moisturiser (for example, fatty cream) without any dressing for superficial epidermal burns.
- If dressing is required, then use a primary non-adherent layer (for example, Cuticerin), and cover with a sterile combine/gauze pad.
- Routine prophylactic antibiotics are not required.

Referral

Minor burns transport/referral table
The patient requires immediate referral to an ED by ambulance: • Suspected non-accidental injury. • Burns associated with trauma. • Chemical burns. • Electrical burns. • Inhalation burns. • Partial thickness burns (mid-dermal) > 10% TBSA in an adult. • Partial thickness burns (mid-dermal) > 5% TBSA in a child.
The patient requires referral to an ED, however alternative transport may be appropriate: • Full thickness burns wider than 1 cm in an adult. • Any full thickness burns in a child. • Burns involving the face, hands, feet, perineum, genitalia, breast or major joints. • Any circumferential burn on a limb, the neck or the trunk. • Significant infection or sepsis. • Significant comorbidities. • Aged < 2 years.
The patient requires referral to primary care within 24 hours: • Partial thickness burn (mid-dermal) > 5% TBSA in an adult or > 2% TBSA in a child. • Aged < 5 years. • Burns unhealed after two weeks.

Advice

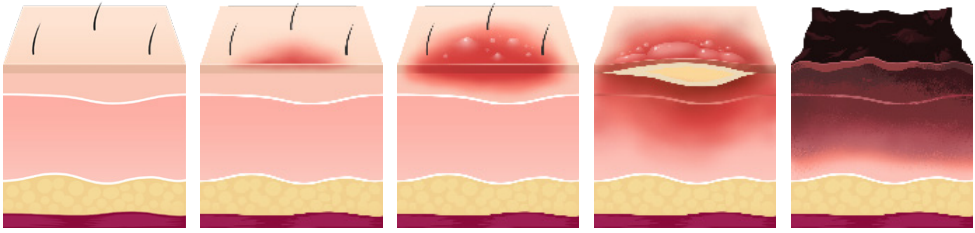
Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Elevate the burn where possible.
- Maintain good hydration and a good diet to promote wound healing.
- Provide a minor burns patient information leaflet.
- Seek further help if:
  - The burn becomes very painful.
  - The burn becomes malodourous or develops other signs of infection (including fever).
  - The dressing becomes soaked with exudate.
- Arrange for an initial burn review in 24-48 hours.

Additional information

Burn features

- Epidermal burns have the following features:
  - Simple erythema.
  - Dry, no blisters.
  - Very superficial.
  - Heal spontaneously in 7-10 days.
- Superficial dermal burns have the following features:
  - Fine blisters, blanch with pressure.
  - Dermal elasticity normal.
  - Heal within two weeks.
- Mid-dermal burns have the following features:
  - Dark pink.
  - Large blisters.
  - Sluggish refill.
  - Dermis feels firm.
  - Less painful.
  - Heal in 14-21 days.
- Full thickness burns have the following features:
  - May have a waxy, white, or charred appearance.
  - Although the full thickness burnt area is usually denervated and painless, it will often be surrounded by painful partial thickness burns.
  - Does not heal spontaneously.



Burn features

8.5 Lacerations

This section is for patients with lacerations suitable for closure in the community by an ECP.

Assessment

- Take a history and perform a physical examination, including:
  - A focused wound assessment.
  - An assessment of features contained within the laceration transport/ referral table.
  - Consideration for whether formal closure is required.
  - An assessment of patient factors including:
    a) Allergies (for example, latex, tape, local anaesthetic, or antibiotics).
    b) The presence of risks for poor healing (for example, diabetes).
    c) Tetanus immunisation status.
    d) Occupation.
    e) Hand dominance (if the injury involves a hand).
    f) Falls risk.
- Consider non-accidental injury in children with lacerations.
- Consider referral for an x-ray prior to closure if a radio-opaque foreign body is suspected (for example, glass or metal). Formal closure may be completed prior to x-ray if:
  - There is a low probability of glass being embedded in the wound, or
  - No glass can be seen in the wound.
- Consider referral for an ultrasound prior to closure if a radiolucent foreign body is suspected (for example, wood or plastic).

Management

Preparation for closure

- The base of the wound must be visualised.
- Comprehensive wound assessment may first require local anaesthetic administration.
- Assess and document distal motor and sensory function prior to local anaesthetic infiltration (distal motor function should not be affected by local anaesthetic).
- Consider establishing a haemostatic field to enable visualising the wound using either direct pressure or a proximal tourniquet.
- Consider administration of parenteral fentanyl in patients aged greater than or equal to two years to enable wound closure.

Closure

- Primary closure is contraindicated for:
  - Face/scalp lacerations with a delayed presentation of greater than 24 hours (preferably closure occurs within 18 hours).
  - Lacerations in other areas with a delayed presentation of greater than 18 hours (preferably closure occurs within six hours).
  - Deep puncture wounds.
  - Mammal bites (refer to the 'mammal bites' section for exceptions).
- Primary closure is not contraindicated for patients aged younger than two years, but the expectation is that they will be referred to an ED for management.
- Steristrips are suitable for:
  - Wounds with good approximation.
  - Superficial short wounds.
  - Clean and linear wounds.
  - Skin flaps.
  - Superficial ragged wounds.
- Tissue adhesive (glue) is suitable for:
  - Wounds with good approximation and no tension.
  - Superficial short wounds.
  - Clean and linear wounds.
  - Dry or low moisture areas.
- Tissue adhesive and steristrips can be used in layers, for example on digit injuries.
- Sutures:
  - Single interrupted sutures are suitable for deeper wounds.
  - Consider using horizontal mattress sutures if there is wound tension. Use 3.0 nylon for the scalp and 4.0 nylon for all other areas.
  - The scalp, trunk and limbs are areas suitable for ECP wound closure with sutures.
  - Wounds on the hands, feet, neck and ears should only be closed if they are very superficial.
  - Avoid closing lacerations with sutures if they involve the face, eyelids, mouth/lips, fingers, toes or groin.
- Staples are suitable for wounds on the scalp, trunk or limbs.

Dressing and bandaging

- Use a non-adherent base layer (for example, Mepitel or Cuticerin) with an absorbent pad and showerproof top layer (for example, Opsite or Telfa and Tegaderm).
- Consider using a pressure bandage (for example, Tubigrip)
- Consider immobilisation and splinting if the laceration is over a joint.

Antibiotics

- Prophylactic antibiotic administration is not routinely required. Consider prophylactic antibiotic cover if any of the following are present:
  - Immunocompromised.
  - Vascular insufficiency.
  - Elderly.
  - Diabetes.
  - Wounds greater than six hours old.
  - Deep or penetrating wounds that are not being referred.
  - Moderately contaminated wounds (noting that heavily contaminated wounds are expected to be referred to an ED for wash-out).
- Antibiotic dosing:
  - 1000 mg flucloxacillin PO four times daily for three days (initially), or
  - If the patient has an allergy to penicillin:
    a) Administer 800 mg erythromycin PO four times a day for three days, or
    b) Administer 300 mg roxithromycin PO once daily for three days.
  - See the paediatric drug dose tables for a child.
  - Administer antibiotics for five days if the wound is clearly infected.

Tetanus prophylaxis

- Administer (or arrange for administration of) an ADT booster vaccine IM if the wound is tetanus-prone and:
  - There are no complicating factors or contraindications, and
  - The wound is clean and last tetanus immunisation or booster was more than ten years ago, or
  - The wound is dirty and last tetanus immunisation or booster was more than five years ago.

Review

- Arrange for an initial wound review and an ADT booster vaccine (if required) at 1-2 days.
- Plan for suture removal:
  - Face: 5-7 days. Consider suture removal at 3-5 days, replacing with glue or steristrips.
  - Scalp: 5-7 days.
  - Trunk, limbs, peripheries: 7-10 days.
  - Extensor surface/over joints: 10-14 days.
- Review the need for ongoing prophylactic antibiotics (if provided) at three days.

Referral

Lacerations transport/referral table
The patient requires immediate referral to an ED by ambulance: • Penetrating wounds of unknown depth. • Artery involvement. • Full thickness eyelid, ear or facial lacerations.
The patient requires referral to an ED, however alternative transport may be appropriate: • Joint or other deep structure involvement. • Nerve involvement (other than small superficial areas of numbness). • Tendon involvement. • Bone involvement. • Heavily contaminated wounds. • Aged < 2 years and requiring suture or staples. • Of significant cosmetic concern. • Requires referral to primary care but unable to be seen within an appropriate timeframe. • Deep hand or foot wounds. • Complex nail bed lacerations. • Full-thickness tissue loss greater than 1 cm^2. • Foreign body contamination that cannot be easily removed.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Keep the wound elevated if possible.
- Keep wound dry for the first 48 hours.
- Provide a wound care patient information leaflet.
- Take analgesia as required.
- Watch for signs and symptoms of infection.

Additional information

Tetanus

- Assessment for tetanus immunisation status means checking for a completed primary course of three doses of tetanus toxoid-containing vaccine and the date of last tetanus booster:
  - Treat interrupted tetanus immunisation courses of three doses as complete.
  - Treat an unknown history or no history of tetanus immunisation as incomplete.
  - Boosters are offered at age 11, 45 and 65 years, and with wound management.
- Tetanus-prone lacerations are those with any of the following features:
  - Deep or penetrating wounds.
  - Wounds contaminated with foreign bodies (particularly wood splinters), soil, dust, or manure.
  - Infected wounds.
  - Wounds that have had cleaning (irrigation) delayed for greater than four hours.
- Dirty wounds have any of the following features:
  - Obviously contaminated or likely to be contaminated.
  - Infected.
  - Penetrating.
  - More than six hours old.
  - More extensive tissue damage.
- Complications requiring clinical consultation prior to administering the ADT booster vaccine include:
  - Aged less than or equal to 18 years.
  - Incomplete tetanus immunisation status.
  - History of sensitivity to the vaccine.
  - Temperature greater than 38°C.
  - Systemic illness.

8.6 Mammal bites

- This section is for patients who have sustained a bite from a human, dog, or cat.
- Seek clinical advice for management of bites inflicted by other animals (for example, pigs) or for bites incurred while in countries with risk of rabies.

Assessment

- Take a history and perform a physical examination, including:
  - A focused wound assessment.
  - An assessment for risk factors for infection or delayed healing.
  - The patient's tetanus immunisation status.
  - Whether the bite injury was sustained overseas (prompting consideration of the rabies virus).
  - An assessment of the features contained within the mammal bites transport/referral table.
  - Whether an x-ray is required.
- Consider non-accidental injury in children with bite wounds.
- Consider blood-borne disease (for example, HIV or hepatitis) if the bite is from a human.
- Swab the bite wound only if it is clearly infected.

Management

Initial management

- Irrigate with copious volumes of 0.9% sodium chloride.
- Administer analgesia as required.

Closure

- Primary closure is usually contraindicated for bite wounds due to the risk of infection.
- Consider performing primary closure if the bite wound is from a dog and:
  - The bite is less than six hours old, and
  - There are no signs of infection, and
  - The bite does not involve the hand or foot, and
  - The patient is not immunocompromised, and
  - There are no other significant risks for infection.
- Allow the following wounds to heal without formal closure:
  - Bite wounds greater than 24 hours old.
  - Infected bite wounds.
  - Deep puncture wounds.
  - Bites to hands and feet.

Antibiotics

- Swab the wound and commence a seven day course of antibiotics if there are signs of infection or if antibiotic prophylaxis is indicated.
- Antibiotic prophylaxis is indicated for:
  - Dog bites to the face, hand, foot or genitals.
  - Dog bites that have undergone primary closure.
  - All cat bites.
  - All human bites less than 72 hours old.
  - Patients at risk of infection.
- Antibiotic dosing:
  - 500/125 mg amoxicillin/clavulanic acid PO three times daily for seven days, or
  - If the patient has an allergy to penicillin:
    a) 600 mg metronidazole PO twice daily for seven days, and
    b) 160/800 mg trimethoprim/sulfamethoxazole PO twice daily for seven days.
  - See the paediatric drug dose tables for a child.

Tetanus prophylaxis

- Administer (or arrange for administration of) an ADT booster vaccine IM if:
  - There are no complicating factors or contraindications, and
  - The wound is clean and last tetanus immunisation or booster was more than ten years ago, or
  - The wound is dirty and last tetanus immunisation or booster was more than five years ago.

Dressing

- Select and apply a dressing that is suitable for moderate exudate.

Referral

Mammal bites transport/referral table
The patient requires referral to an ED, however alternative transport may be appropriate: • Suspected non-accidental injury. • Deep wounds of the hand or foot. • Devitalised wound requiring extensive debridement. • Severity of injury difficult to assess. • Joint, tendon or bone involvement. • Nerve involvement (other than small superficial areas of numbness). • Artery involvement. • Systemically unwell. • Bite inflicted overseas. • Of significant cosmetic concern.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Arrange for an initial wound review in 24-48 hours.
- Take analgesia as required.
- Provide a mammal bites patient information leaflet.
- Provide advice on when to seek medical attention:
  - Evidence of infection.
  - Signs of sepsis.
  - Exudate is overwhelming the dressings.

Additional information

- Most dog bites, and all cat and human bites, are left to heal by secondary intention unless there are significant cosmetic concerns.
- Common pathogens implicated in mammal bites include:
  - Polymicrobial infection.
  - *Pasteurella multocida*.
  - *Capnocytophaga canimorsus* (cat and dog bites).
  - *Eikenella corrodens* (fist injury, human bites).
  - *Staphylococcus aureus*.
  - Streptococci.
  - Anaerobes.
- Risk factors for infection or delayed healing include:
  - Diabetes.
  - Immunosuppression.
  - Significant tissue damage (for example, crush injury associated with dog and human bites).
  - Wound involving the hand or foot.
- Features of a mammal bite that meet the requirement for an x-ray include:
  - Clenched fist injuries.
  - Crush injuries.
  - Possible fractures.
  - Wounds that may be contaminated with a foreign body.

Tetanus

- Assessment for tetanus immunisation status means checking for a completed primary course of three doses of tetanus toxoid-containing vaccine and date of last tetanus booster:
  - Treat interrupted tetanus immunisation courses of three doses as complete.
  - Treat an unknown history or no history of tetanus immunisation as incomplete.
  - Boosters are offered at age 11, 45 and 65 years, and with wound management.
- Complications requiring clinical consultation prior to administering an ADT booster vaccine include:
  - Aged less than or equal to 18 years.
  - Incomplete tetanus immunisation status.
  - History of sensitivity to the vaccine.
  - Temperature greater than 38°C.
  - Systemic illness.

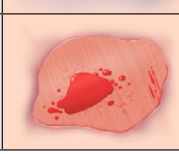
8.7 Skin tears

This section is for patients with skin tears, including pre-tibial lacerations.

Assessment

- Take a history and perform a physical examination, including:
  - An assessment of risk factors for skin tears and poor healing.
  - A focused wound assessment, including use of the STAR skin tear classification system.
  - Features contained within the skin tear transport/referral table.
  - An assessment of the patient's tetanus immunisation status.
- Use the TIME model to assess the wound progression at the three-day review:
  - Remove dressing (in direction of the arrow if indicated) and assess flap and overall skin integrity.
  - Extensive or full-thickness flaps which appear necrotic may require acute plastic surgery assessment.

STAR skin tear classification table

Category	Example	Edge alignment	Flap colour
1a		CAN be realigned to the normal anatomical position (without undue stretching)	NOT pale, dusky or darkened
1b		CAN be realigned to the normal anatomical position (without undue stretching)	IS pale, dusky or darkened
2a		CANNOT be realigned to the normal anatomical position	NOT pale, dusky or darkened
2b		CANNOT be realigned to the normal anatomical position	IS pale, dusky or darkened
3		Flap is completely absent	N/A

Management

Preparation for closure

- Anticipate minor bleeding during preparation for closure.
- Invert the skin flap.
- Irrigate thoroughly under the flap using 0.9% sodium chloride, and ensure all debris, non-viable adipose tissue and clots are removed.
- Dried skin flaps may require hydration to enable inversion.
- Consider re-attaching skin flaps.
- Oppose edges where possible.

Closure

- Use of a silicone mesh (for example, Silflex or Mepitel) is preferred.
- Use of Steristrips is acceptable if a silicone mesh is not available.
- Apply the closure option lightly and avoid stretching.
- Do not suture.

Dressing and bandaging

- Avoid using adhesive dressings on fragile skin.
- Apply a secondary dressing to suit moderate exudate over Silflex or Mepitel.
- Apply a low adherence dressing first (for example, Cuticerin or Adaptic) then a secondary dressing to suit moderate exudate over Steristrips.
- Consider drawing on the dressing (with an arrow) the direction in which the dressing should be removed.
- Apply a firm supportive bandage using:
  - Orthopaedic wool padding (Sofban), and
  - Crepe bandage, and
  - A tubular retention bandage to the whole limb.

Referral

Skin tear transport/referral table
The patient requires referral to an ED, however alternative transport may be appropriate: • Deep flap wounds. • Necrotic wounds. • Significant residual haematoma or debris following irrigation.
The patient requires referral to primary care for wound review within 48 hours: • Risks for poor healing. • Risks for infection.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Elevate the arm, hand or leg when sedentary or resting.
- Consider the use of protective garments, such as shin protectors, to reduce the risk of further skin tears.
- Contact the GP if:
  - There are signs and symptoms of infection, or
  - There is excessive exudate or bleeding.
- Arrange for an initial wound review at 1-2 days and again at three days.

Additional information

General principles

- Skin tears are wounds caused by a shearing force resulting in separation of skin layers.
- Skin tears can be partial thickness (separation of the epidermis from the dermis) or full thickness (separation of both the epidermis and dermis from the underlying structures.
- Skin tears are an important cause of morbidity in the elderly as they may be poorly vascularised and are at risk of poor healing and ulcer formation.

Risk factors

- Risk factors for developing skin tears include:
  - Advanced age.
  - Dependence on others for activities of daily living.
  - Impaired mobility.
  - History of previous skin tears.
  - Compromised nutritional status.
  - Sensory or cognitive deficits, particularly vision deficits.
  - Visible changes in skin condition (for example, dry, fragile skin).
  - Polypharmacy (for example, steroids, NSAIDS or anticoagulants).
  - Agitation, resistive or combative behaviour.
  - Cardiac, pulmonary or vascular comorbidity.
- Risk factors for poor healing include:
  - Residual debris or clots under the flap.
  - Comorbidities (for example, diabetes or peripheral vascular disease).
  - Medications (for example steroids, NSAIDS and anticonvulsants).
  - Smoking.
  - Reduced mobility.
  - Poor nutrition.

Management

- Be patient if preparation promotes renewed minor bleeding. If this occurs, elevate the limb, compress the wound, and resume irrigation after bleeding has stopped.
- If there is detached skin, it can be cleaned and applied to the wound as it may take, much like a skin graft.
- Oppose edges where possible but there is no need to force skin edges together as tension causes ischaemia and healing is more likely if a gap of a few millimetres is left.
- If using steristrips, apply sparingly and leave at least a steristrip width gap between each strip to allow free drainage of exudate and blood.
- Apply a bandage from the base of the toes to below the knee when bandaging a lower limb.

9.1 Gout

This section is for adults with acute gout.

Assessment

- Take a history and perform a physical examination, including assessment of:
  - Risk factors for gout.
  - History of the current episode.
  - Previous episodes.
  - Signs of sepsis.
  - Potential triggers for acute gout.
  - Differential diagnoses for gout (using the monoarthritis differential diagnosis table).
  - Features contained within the gout transport/referral table.
- X-ray is not required in the acute phase.

Monoarthritis differential diagnosis

Joint	Gout Sodium urate	Pseudogout Calcium pyrophosphate	Septic arthtitis Bacterial joint infection	Reactive arthritis Non-joint infection
Multiple joints	Usually not	Usually not	Usually not	Often
Tophi	Maybe	No	No	No
First MTPJ	Most common			
Foot	Common			
Ankle	Common		Possible	
Knee	Common	Most common	Most common	Common
Hip	Uncommon		Common	
Sacroiliac				Common
Shoulder	Less common		Possible	
Elbow	Common			
Wrist	Less common		Possible	
Finger	Less common			
Sepsis	No	No	Maybe	Maybe
Fever	Low grade	No	Maybe	Maybe
Other infection	No	No	No	Yes

Management

- Administer 40 mg parecoxib IV.
- Administer 1 g paracetamol IV.
- Consider administering 40 mg prednisone PO once daily for three days, with a referral to primary care for an ongoing prednisone regime if:
  - NSAIDs are contraindicated, or
  - The patient is aged greater than 70 years and there is no infection present.
- Consider urgent referral to primary care (preferably the patient's own GP) for consideration of low-dose colchicine therapy if neither NSAIDs nor prednisone can be administered.
- For ongoing management of pain:
  - Advise the patient to take regular paracetamol PO four hours after administration of the paracetamol IV dose.
  - Advise the patient to take regular ibuprofen PO 24 hours after administration of the parecoxib IV dose. Consider high dose ibuprofen.
  - Consider adding a weak opioid if required in the acute phase.

Referral

Gout transport/referral table
The patient requires immediate referral to an ED by ambulance: • Temperature > 38°C. • Systemically unwell. • Suspected septic arthritis. • Disproportionately severe pain. • Immunocompromised (for example, on steroids or immunotherapy).
The patient requires referral to an ED, however alternative transport may be appropriate: • Risk factors for septic arthritis are present.
Consider urgent referral to primary care: • Episode onset < 12 hours ago and may benefit from colchicine therapy.
Consider non-urgent referral to primary care: • First episode of gout. • Concurrent sexually transmitted infection. • Concurrent gastroenteritis.

Advice

Provide the following information and advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Continue to take allopurinol or other urate-lowering medication.
- Maintain an ideal body weight.
- Elevate and cool affected joints.
- Hydrate well by drinking at least two litres of water per day (unless fluid restricted).
- Avoid or limit alcohol (especially beer).
- Avoid sugary drinks. Sugary drinks can interfere with urate excretion.
- Eat regular meals. Both fasting and overeating can contribute to gout.
- Avoid eating shellfish, red meat, oily fish and offal.
- Seek medical attention if:
  - The patient has severe pain not managed with analgesia, or
  - Signs of infection or sepsis.

Additional information

General principles

- Gout is acute inflammation and eventual tissue damage from the deposition of sodium urate crystals within and around joints.
- The most common cause of gout is under-excretion of uric acid.
- A typical episode of acute gout is characterised by rapid onset of joint pain associated with swelling, erythema and malaise.
- Symptoms of an acute gout attack peak 12-24 hours following onset and most people seek treatment due to pain.
- The first metatarsal phalangeal joint (MTPJ) is involved in half of all gout attacks, and approximately 70% of first attacks. Other common affected joints are the knee, foot, wrist, ankle, hand and elbow.
- Poorly treated recurrent gout can progress to chronic tophaceous gout. Tophi are symmetric firm yellow-white subcutaneous nodules commonly located in the olecranon, distal interphalangeal joints (DIPs) and ear pinnae. Associated features include:
  - Increased frequency of attacks.
  - Increased number of affected joints.
  - Gradual worsening of inflammatory arthritis and erosive joint damage.
  - Urate nephropathy.
  - Renal calculi.

- Gout usually manifests from age 40-60 years, although onset can be earlier in those with a genetic predisposition and can occur for the first time to someone in their 80s.
- Differential diagnoses for acute monoarthritis (such as gout), include:
  - Septic arthritis.
  - Pseudo-gout.
  - Inflammatory arthritis.
  - Reactive arthritis.
  - Trauma.
- There is no urgency for referral to primary care. Investigations in primary care for gout may include blood tests to confirm serum urate levels and renal function, and joint aspiration. However, as uric acid may normalise or fall during an acute gout attack, immediate testing of uric acid levels may not be necessary.

Risk factors for gout

- Māori or Pacific People.
- Family history of gout.
- Male sex (the male to female ratio is approximately 9:1).
- A diet high in meat and seafood.
- Daily alcohol intake.
- Taking diuretics.
- Obesity.
- Hypertension.
- Coronary artery disease.
- Diabetes.
- Chronic renal failure.
- Hypertriglyceridemia (high triglycerides).

Septic arthritis

- Septic arthritis is the most important differential diagnosis to exclude prior to management of a monoarthritic joint in the community.
- Septic arthritis usually involves a single large joint. Over 50% of cases involve the knee joint, however the wrist, ankle, hip and shoulder are also common.
- Approximately 15% of cases involve more than one joint. This is more likely when associated with sepsis or a history of rheumatoid arthritis or a connective tissue disorder.

- Risk factors for septic arthritis include:
  - Abnormal joint architecture:
    a) Pre-existing joint disease (for example, gout, rheumatoid arthritis or osteoarthritis).
    b) Prosthetic joint (has fewer signs and is more difficult to diagnose).
    c) Recent joint surgery.
  - Advancing age, especially aged greater than 80 years.
  - Diabetes.
  - Skin infection and/or cutaneous ulcers.
  - Intravenous drug use.
  - Alcoholism.
  - Previous intra-articular corticosteroid injection.
  - Immunosuppression.
  - Trauma, bite wounds and instrumentation.
- Risk for septic arthritis is substantially increased by the presence of one or more risk factors.
- Charcot arthropathy is the progressive degeneration of a weight-bearing joint (for example, the heel) associated with neuropathy.

Pseudo-gout

- Pseudo-gout is joint inflammation due to calcium pyrophosphate crystals (as opposed to urate crystals in gout).
- Pseudo-gout may present similarly to gout and be triggered by trauma, surgery or severe illness.
- It can cause recurrent (usually monoarthritic) joint attacks, affecting the knee in more than 50% of all acute attacks.

Reactive arthritis

- Reactive arthritis is joint inflammation caused by an infection somewhere else in the body such as recent viral illness, chlamydia, gonorrhoea, gastroenteritis or rheumatic fever.
- Reactive arthritis usually involves less than five joints, and commonly involves the knee or sacroiliac joints.

Inflammatory arthritis

- Inflammatory arthritis is a group of diseases that includes rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis and systemic lupus erythematosus.
- Inflammatory arthritis is characterised by early morning stiffness and pain lasting more than 30 minutes that generally improves with activity and may be worse at night.
- Inflammatory arthritis usually involves multiple swollen joints and persists for longer than six weeks.

Acute pharmacological management of gout

- Acute pharmacological management of gout is different to chronic gout management, where medicines such as allopurinol may be used.
- Avoid NSAIDs in the elderly and those with cardiac or renal disease.
- Colchicine:
  - Referral to primary care for consideration of low-dose colchicine therapy in the situation where both NSAIDs and prednisone are contraindicated is only of value if colchicine can be commenced within 12 hours of the episode onset.
  - Colchicine is indicated less than 24 hours from episode onset and caution is required in the elderly and dose reduction required in renal impairment.
- Patients who are already prescribed allopurinol should be advised to continue taking it, even if they have an acute attack of gout.

9.2 Non-traumatic lumbar back pain

- This section is for adults with non-traumatic lumbar back pain.
- Use this section to guide the expansion of assessment and treatment, in conjunction with the relevant section in the EAS CPGs.

Assessment

- Take a history, considering the patient's ability to cope and any other important social issues.
- Perform a physical examination, including:
  - A focused neurological examination, focusing on loss of power, abnormal sensation, or altered deep tendon reflexes.
  - A focused musculoskeletal exam, localising any areas of tenderness or deformity.
  - A functional examination, focusing on mobility and the ability to perform normal activities of daily living (ADLs).
  - An assessment of the features contained within the EAS CPG flag table for non-traumatic lumbar back pain.

Management

- Administer oral analgesia, including paracetamol, ibuprofen, and codiene.
- Consider administration of oxycodone CR PO if pain is still uncontrolled.
- Consider administration of parecoxib IV instead of ibuprofen PO if pain is severe.
- Consider administering a single 1-2 mg IV dose of midazolam if muscle spasm is prominent.

Referral

Non-traumatic lumbar back pain transport/referral table
The patient requires immediate referral to an ED by ambulance: • Presence of any EAS CPG red flags for non-traumatic lumbar back pain.
The patient requires non-urgent referral to primary care: • Presence of any EAS CPG orange flags for non-traumatic lumbar back pain. • Oxycodone PO, parecoxib IV or midazolam IV has been administered.
The patient requires no specific follow up: • Presence of only EAS CPG green flags for non-traumatic lumbar back pain.

- Where a local pathway exists (for example, the ability to refer the patient to a physiotherapist or community mobility support service), consideration for referral is appropriate.

Additional information

- In the absence of red flags, aggressive management of the patient's pain is the primary focus.
- The management goal for patients with non-traumatic lumbar back pain (and no red flags) is not to completely resolve their pain, but ensure the patient is comfortable enough to mobilise to the toilet and perform basic ADLs.

10.1 Mild cognitive impairment

- This section is for elderly patients who have new onset of mild to moderate cognitive impairment.
- Refer to the relevant section within these CPGs or the EAS CPGs if the patient has a non-dementia cause of acute cognitive impairment.

Assessment

- Take a history, including:
  - A collateral history from other sources such as family, caregivers and close friends. Have the patient present if possible, during the history taking.
  - Caregiver stress.
  - The presence and duration of features associated with cognitive impairment.
  - Signs of elder abuse.
- Perform a physical examination, including:
  - The presence of risk factors for cognitive impairment.
  - A focused mental status assessment.
  - A focused neurological assessment.
  - Use of the Mini-ACE tool to screen for cognitive impairment.
  - An assessment for any impairments in ADLs (also called daily functioning) and identify the presence of potential harms (see additional information).
  - Signs of elder abuse.
  - An assessment of the features contained within the mild cognitive impairment transport/referral table.
- Consider possible non-dementia causes of cognitive impairment.
- Consider whether the features of the cognitive impairment are more consistent with delirium, dementia or depression.

Management

- Refer patients with a suspected new diagnosis of cognitive impairment to their GP for further assessment, referral, management and communication of any confirmed diagnosis.
- Mitigate potential harms wherever possible.

Referral

Mild cognitive impairment transport/referral table
The patient requires immediate referral to an ED by ambulance: • Neurological non-dementia cause for symptoms. • Metabolic non-dementia cause for symptoms. • Significantly abnormal vital signs. • Suspected elder abuse. • Challenging behaviours with risk of harm to self or others.
The patient requires referral to an ED, however alternative transport may be appropriate: • Requiring referral to primary care but unable to be seen within appropriate timeframe. • Aged less than 60 years with a new onset of cognitive impairment.
Consider referral to primary care within 48 hours: • Non-dementia cause for symptoms (for example psychiatric, medication or substance cause of symptoms). • Difficult behaviours but minimal risk of harm to self or others. • Significantly impaired ADLs. • Inadequate care available in the community. • The likely cause is previously undiagnosed dementia.
Consider referral to primary care within one week: • Low risk for harm. • Suitable care available in the community. • The likely cause is previously undiagnosed mild cognitive impairment. • No complicating behaviours. • Minor impairment to daily functioning.

Advice

Provide the following simple brain protection advice to the patient if non-transport and referral to primary care is deemed the most appropriate course of action.

- Encourage exercise, ideally with another person for safety and socialisation.
- Ensure adequate nutrition. Dietary management is particularly important when the patient also has diabetes.
- Reduce alcohol intake, especially for those who drink regularly or binge drink.
- Encourage smoking cessation at all stages.
- Encourage cognitive stimulation such as puzzles for those who enjoy them.
- Encourage social activity and engagement.

Additional information

Mini-ACE screening tool

- The Mini-ACE tool is designed to screen for cognitive impairment.
- Prepare the patient and environment. Ensure the patient is calm, seated, undistracted and has all usual hearing and visual aids. Do not rush.
- Use the Mini-ACE tool in conjunction with Mini-ACE New Zealand Administration and Scoring Instructions.
- Mini-ACE is the preferred screening tool for cognitive impairment in primary care. Scores are interpreted by a specialist geriatrician in conjunction with the patient's age, level of education and other components of a comprehensive assessment. However, as a guideline:
  - A score of below 21 is concerning for cognitive impairment.
  - A score of between 21 and 25 is equivocal.
  - A score of above 25 is less worrying for cognitive impairment.

Patients in aged residential care facilities (ARCF)

- Nursing and care staff in ARCFs occasionally request assistance for patients with challenging behaviours related to a known cognitive impairment.
- This may involve situations where:
  - Patient behaviours have gradually exceeded the limits of staff to care for them in their current setting, and
  - There is no significant clinical deterioration.
- In this case it is reasonable to aim to continue management in the ARCF provided the following criteria are met:
  - The decline is not sudden or unexpected.
  - The patient is physiologically stable.
  - Acute clinical problems (for example UTI) are not contributing to the situation.
  - The risk of harm from challenging behaviours can be safely managed in the ARCF with increased care.
  - The primary trigger for the request for help is a funding or procedural problem accessing increased care in the ARCF.
  - Key stakeholders (for example, family members and ARCF management) are contacted and are supportive of continued community management.
- When these criteria are met the balance of risk is usually in favour of continuing care at the ARCF. This is because transfer to an ED is often distressing for the patient and usually adds no significant diagnostic or clinical value to their management.

Dementia

- Dementia is increasing in incidence and prevalence in New Zealand due to an aging population.
- A higher proportion of those with dementia are female, because females have a longer life expectancy.
- Most patients with mild to moderate dementia can be identified and managed in primary care.
- For those with mild cognitive impairment, the cognitive changes exceed those of normal aging but the functional impairment that characterises dementia is absent.

Non-dementia causes of cognitive impairment

Causes	Examples	
Delirium	• Infection • Dehydration • Faecal impaction • Urinary retention	• Hypothermia • Recent surgery • Pain
Psychiatric illness	• Depression • Pseudo-dementia	• Chronic psychotic illness
Medication or substance problem	• Alcohol • Anticholinergics • Anticonvulsants • Benzodiazepines • Opioids	• Sedatives • OTC anticholinergics (for example Dimetapp, Benadryl)
Metabolic or electrolyte problem	• B12 deficiency • Folate deficiency • Hypothyroidism • Hyponatraemia	• Hypercalcaemia • Hepatic dysfunction • Renal failure
Neurological problem	• Subdural haematoma • Mass lesion • Hydrocephalus	• CNS infection • Stroke

Features associated with cognitive impairment

Features	Examples	
Cognitive impairments	• Memory • Language • Insight • Judgement • Problem-solving • Processing speed	• Concentration and attention • Ability to recognise objects • Ability to use objects • Orientation • Mathematical ability
Behavioural changes	• Apathy • Sleeping problems • Restlessness • Agitation • Calling out • Repetitive behaviour • Wandering	• Socially inappropriate behaviour • Aggression • Disinhibition • Changes in eating and drinking behaviours
Psychiatric symptoms	• Anxiety • Affective instability (rapid repeated shifts in mood)	• Depression • Psychosis • Personality change
Neurological impairment	• Gait • Balance • Vision • Speech and language • Dyspraxia (coordination) • Dysphagia	• Tremor • Parkinsonism • Seizures • Upper motor neuron symptoms (weakness, slowness)

Impairments in daily functioning and potential harms

Impairments in daily functioning (ADLs)	Potential harms
• Bathing, shaving, hair and teeth care • Continence and toilet hygiene • Cooking • Dressing • Eating and drinking • Employment • Housework and gardening • Managing money • Socialising • Shopping • Managing transport (for example driving, catching public transport)	• Aggression towards others • Caregiver stress, burnout or abandonment • Dangers in the home (for example stoves, appliances) • Elder abuse • Falls • Financial mismanagement • Getting lost • Inappropriate or unwanted sexual behaviour • Medication concordance issues • Severely compromised self-care • Taking things of others (theft from shops or other residents) • Unsafe driving

Risk factors for cognitive impairment

- Risk factors for cognitive impairment include:
  - Aged greater than 65 years.
  - Family history of dementia.
  - Historical head injury.
  - Congenital intellectual disability, especially Down syndrome (screen from 35 years).
  - Vascular risk factors or disease.
  - Alcohol abuse.
  - History of depression or major mental illness.
  - Significant social isolation.

10.2 Transient loss of consciousness

- This section is for patients aged greater than or equal to 12 years who have had a transient loss of consciousness and then completely returned to their normal baseline.
- This section supersedes the 'syncope' section in the EAS CPGs for this cohort of patients.

Assessment

- Take a history, including:
  - The presence or absence of prodromal symptoms.
  - Bystander reports of the episode.
  - Posture and other provoking factors.
  - The appearance of the patient during the episode.
  - Duration of the episode.
  - Symptoms following the episode (for example, confusion or headache).
  - Medications.
  - Comorbidities.
  - Family history (for example, sudden cardiac death or seizure disorders).
  - Associated trauma.
- Eyewitnesses often provide the most accurate history. Witnesses to the event who are not still present should be contacted, by phone if necessary.
- Perform a physical examination, including:
  - A focused cardiovascular system assessment, including a 12 lead ECG.
  - A focused neurological assessment.
  - Measurement of a sitting and standing blood pressure with a manual sphygmomanometer.
- Consider the differential diagnoses for transient loss of consciousness.
- On the basis of initial assessment, determine the most likely cause:
  - Uncomplicated faint or vasovagal syncope (most common).
  - Situational syncope.
  - Postural hypotension.
  - Presentation strongly suggesting epilepsy.
  - Psychogenic episode.
  - Possible cardiac syncope.

Referral

Transient loss of consciousness transport/referral table
The patient requires immediate referral to an ED by ambulance: • Suspected cardiac syncope. • Abnormal 12 lead ECG. • New or unexplained dyspnoea. • Headache. • Pregnant. • Chest pain. • Exertional syncope (exception: exercise-induced syncope occurring shortly after stopping exercise is most likely to be vasovagal). • Supine syncope. • Syncope occurring in dangerous situations (for example, while driving, at height or in control of machinery). • Aged > 65 years, without prodromal symptoms. • Significantly abnormal vital signs. • Ongoing symptoms.
Consider non-urgent referral to primary care: • Heart failure. • Postural hypotension. • Family history of sudden cardiac death. • Possible first seizure. • Uncomplicated faint or vasovagal syncope. • Situational syncope. • Presentation strongly suggesting epilepsy. • Psychogenic episode.
Consider no referral: • Transient loss of consciousness with a complete return to baseline and no indications for referral to an ED or primary care.

Additional information

General principles

- Transient loss of consciousness is very common. It can be also referred to as syncope, blackout, faint, 'dizzy turn', 'funny turn' or collapse.
- It is important to distinguish terms that describe the circumstances or nature of the episode from those that define the mechanism for the loss of consciousness:
  - Terms describing the event tend to guide assessment.
  - Terms that describe the mechanism tend to guide management.

Assessment

- Differential diagnoses for transient loss of consciousness include:
  - Vertigo.
  - Seizure.
  - Transient ischaemic attack (TIA).
  - Hyperventilation/panic attack.
  - Metabolic abnormalities (for example, hypoglycaemia or adrenal insufficiency).
  - Postural orthostatic tachycardia syndrome (POTS).
- Vertigo, TIA and hyperventilation/anxiety do not usually cause a loss of consciousness.
- POTS usually occurs in young females and causes recurrent lightheadedness and tachycardia on standing, but without loss of consciousness.
- Cardiac syncope is less likely if the 12 lead ECG is normal. ECG abnormalities that should trigger referral to an ED include:
  - Conduction abnormality (LBBB, RBBB, or any heart block).
  - Inappropriate persistent bradycardia.
  - Any ventricular dysrhythmia.
  - Short or long QTc (less than 350 msec or greater than 450 msec).
  - Brugada syndrome.
  - Ventricular pre-excitation (for example, WPW).
  - Ventricular hypertrophy.
  - Any ST segment or T wave abnormality.
  - Sustained atrial dysrhythmia.
  - Paced rhythm.

First seizure

- Features suggesting a seizure include:
  - Bitten tongue.
  - Head turning to one side during the transient loss of consciousness.
  - No memory of abnormal behaviour that was witnessed before, during or after a transient loss of consciousness by someone else.
  - Unusual posturing or prolonged limb jerking.
  - Confusion following the event.
  - Prodromal déjà vu, or jamais vu.
- Be cautious with a presumed diagnosis of possible first seizure. A substantial proportion of people initially diagnosed with, and treated for, epilepsy have a cardiovascular cause for their loss of consciousness.
- Low risk patients with a clear diagnosis of first seizure can be managed in primary care, providing:
  - It was a single, unprovoked typical seizure.
  - The patient has returned to normal health.

  - There is no suggestion of intracranial pathology.
- Anti-epilepsy medication is usually not commenced until two seizures have occurred.
- Features making a diagnosis of first seizure less likely include:
  - Prodromal symptoms that on other occasions have been abolished by sitting or lying down.
  - Sweating prior to the episode.
  - Prolonged standing that appeared to precipitate the transient loss of consciousness.
  - Pallor during the episode.
  - Aged greater than 20 years.
- Electroencephalogram (EEG) is not routinely used in the investigation of transient loss of consciousness.

Vasovagal syncope (uncomplicated faint)

- A diagnosis of vasovagal syncope relies on:
  - The presence of the 'three P's' (prodromal symptoms, provoking factors, and posture), and
  - The absence of any features suggesting an alternative diagnosis.

Situational syncope

- Consider a diagnosis of situational syncope if:
  - There are no features suggesting an alternative diagnosis, and
  - Syncope is clearly and consistently provoked by straining during micturition, coughing, swallowing or another equivalent process.

Postural hypotension

- Consider a diagnosis of postural hypotension if:
  - There are no features suggesting an alternative diagnosis, and
  - The history is typical of postural hypotension, and
  - There is a fall of greater than 20 mmHg in the systolic or greater than 10 mmHg in the diastolic blood pressure when standing.
- The patient may benefit from a referral to their own GP for consideration to reduce or cease:
  - Psychotropic medications, especially benzodiazepines.
  - Tricyclic antidepressants.
  - Antipsychotics.
  - Antihypertensives.
  - Nitrates.
  - Diuretics.
  - Oxybutynin.
  - Morphine.

10.3 Unexpected deterioration in the elderly

- This section is for elderly patients who have been observed to deteriorate unexpectedly.
- Use this section in conjunction with the relevant sections within these CPGs and the EAS CPGs if a specific condition is likely.

Assessment

- Take a history, including:
  - The speed of the patient's decline.
  - A collaborative history whenever cognitive impairment is present or suspected.
  - Whether the patient has any advance directives.
  - The patient's baseline function.
- Perform an assessment of the patient's psychosocial situation including:
  - Their degree of social independence or isolation.
  - Their available social supports.
  - Their ability to complete ADLs.
  - Their mobility and fall risk.
  - Their cognitive function.
  - A mental health assessment.
  - Their ability and likelihood to be concordant with medicine regimes.
  - Their ability and likelihood to attend follow up appointments.
  - Their likelihood to seek help in the event of lack of improvement or deterioration.
  - Their alcohol and recreational drug use.
  - The warmth, cleanliness, tidiness and general suitability of their living circumstances.
  - Any risks to their independence in the community.
  - Any risk or evidence of elder abuse.
- Assess the patient for:
  - Important markers, and common triggers of deterioration.
  - Potential medication factors contributing to the deterioration.
- Consider a diagnosis of constipation in the elderly if there are non-specific symptoms such as confusion, delirium, functional decline, nausea, anorexia, overflow diarrhoea or urinary retention.

Management

Use the unexpected deterioration in the elderly table to guide decisions regarding patient management.

Unexpected deterioration in the elderly

	May be suitable for community management	Likely requires in-hospital management
Competent and willing caregiver	Available	Not available
Level of GP support	After hours support available if needed	Likely to need after hours support and not available
Speed and acuity of decline	Slower rate of decline	Rapid decline
Treatment options	Treatment in the community is an option and available	More intensive treatment required
Acute demand management or support services	Available	Insufficient or not available

Referral

- Consider referral to an ED if the patient is likely to require in-hospital management (determined using the unexpected deterioration in the elderly table).
- Consider referring the patient to primary care for:
  - Formal cognitive testing.
  - Blood testing or medical imaging if the cause is unclear.

Additional information

General principles

- Use the 'special considerations in the elderly' section of the EAS CPGs in conjunction with these CPGs to guide assessment of the patient.
- Sudden unexpected deterioration in the elderly should be investigated and managed with relative urgency as it is usually due to a health problem rather than a normal part of aging.
- Non-clinical and non-medical problems contribute to a significant proportion of elderly presentations to acute care. This is why a robust assessment of the patient's psychosocial situation is important.

Elder abuse

- Consider the possibility of elder abuse when any of the following are present:
  - Risk factors for increasing vulnerability (for example, cognitive impairment, psychiatric illness, frailty or dependency).
  - Behavioural indicators (for example, fear, unexplained anxiety, suicidal thoughts, contradictory statements not arising from altered mentation or reluctance to talk with the caregiver present).
  - Unexplained injuries, bilateral injuries or grip injuries.
  - Multiple injuries in different stages of healing.
  - Signs of sexual abuse (for example genital injuries, pain or bleeding).
  - Signs of psychological abuse (for example fear, shame, confusion or anger).
  - Signs of financial abuse (for example depleted savings, lack of money for necessities).
  - Delays in seeking care or reporting injuries.
  - Signs of inadequate care (for example, poor hygiene, poor nutrition, weight loss, poor clothing, missing dentures/glasses or hearing aids or poorly controlled medical conditions).
  - Caregiver features such as caregiver stress, over protection or controlling behaviours.
- All personnel must follow the general principles outlined in organisational policy for identification and reporting of vulnerable persons, including patients in whom elder abuse is suspected.

Markers and common triggers of deterioration

- Markers of deterioration include:
  - Sudden decline or acceleration of decline in physical, cognitive or social function.
  - Recurrent requests for help from a healthcare provider.
  - Caregiver concern.
  - Caregiver strain or loss of caregiver.
- Common triggers for deterioration include:
  - Alcohol use.
  - Changes in bowel or bladder function.
  - Changes in cognition (especially delirium).
  - Dehydration.
  - Exacerbation of an existing problem (for example, COPD or multiple sclerosis).
  - Falls.
  - Heart failure.
  - Infection (for example UTI, pneumonia).
  - Silent myocardial infarction.

- Medication factors that may contribute to sudden deterioration include:
  - Recent changes in medication, including prescription and over the counter medicines.
  - Drug interactions.
  - Medication adverse effects especially anticholinergic, sedative, hypotensive or delirium-inducing effects.

10.4 Minor head injury

This section is for patients aged greater than two years who have sustained a head injury and have returned to normal neurological function.

Assessment

- Take a history, ideally from both the patient and a witness who was present, including the following features:
  - Mechanism of injury.
  - Duration of loss of consciousness (if any).
  - Whether there was any seizure activity.
  - Whether the patient recalls the event.
  - Any repetitive questioning or confusion.
  - The presence of nausea and/or vomiting.
  - Any ongoing symptoms.
  - Any alcohol or drug intake.
  - Past history, focusing on prior head injuries, previous neurosurgical procedures or bleeding disorders (acquired or due to anticoagulants).
  - Social supports for the patient, including a responsible adult caregiver.
- Perform a physical examination, including:
  - GCS and pupillary response.
  - A focused neurological assessment.
  - Signs of a basal skull fracture.
  - Evidence of cervical spine injury.
  - Evidence of other injuries.
- Non-accidental injury should be considered.
- The social situation should be carefully reviewed in patients aged greater than 65 years.

Referral

Minor head injury transport/referral table
The patient requires immediate referral to an ED by ambulance: • Altered level of consciousness. • Any focal neurological deficit. • Ongoing amnesia or abnormal behavior. • Evidence of skull fracture including basal skull fracture. • Possible cervical spine injury. • Witnessed seizure. • High impact mechanism of injury. • Suspected non-accidental injury.
The patient requires referral to an ED, however alternative transport may be appropriate: • More than one episode of vomiting. • Severe headache. • Worsening or deterioration of symptoms. • The patient has a bleeding disorder or is on an anticoagulant. • No reliable caregiver is available to observe the patient at home.
Consider non-urgent referral to primary care: • Any symptoms suggestive of concussion. • Ongoing dizziness or balance problems. • Ongoing nausea. • Sensitivity to light or noise. • The patient is working or at school and requires clearance before returning to usual activity.

Consideration of management in the community

- Consider community management for patients who had brief loss of consciousness following a head injury, and have returned to normal neurological function, provided all the following conditions are met:
  - They do not meet any of the criteria in the transport/referral table above.
  - They do not have ongoing amnesia.
  - They do not have evidence of skull fracture, including basal skull fracture.
  - They do not have concern for cervical spine injury.
  - Vital signs are normal or near normal.
  - A reliable caregiver is able to care for the patient for the next 48 hours.
  - There are no elements of concern for non-accidental injury in young patients.
  - There are no elements of concern for increased falls risk in the elderly.
  - Referral, follow up, and safety netting are all straightforward.

Advice

Provide the following information and advice to the patient if non-transport and non-urgent referral to primary care is deemed the most appropriate course of action.

- Rest as much as possible for the next 2-3 days.
- Minimise screen time.
- Expect minor symptoms of concussion over the next few days.
- Do not work or return to school/preschool until symptoms are resolved or cleared to do so by a GP.
- If symptoms of concern develop over the first 48 hours, please attend an ED or call for an ambulance:
  - Seizure.
  - Abnormal level of consciousness or confusion.
  - Persistent vomiting.
  - Worsening headache or other severe symptoms.
- Provide a minor head injury patient information leaflet.

Additional information

General principles

- Minor head injury is very common, and relatively few patients will go on to have complications.
- Loss of consciousness, focal neurological signs, and signs of skull fracture are each predictive of an intracranial injury.
- The presence of other injuries must also be considered, including to the cervical spine.
- Patients with concern for intracranial injury or significant associated injury will require referral to an ED for further assessment.
- A high impact mechanism is defined as:
  - Pedestrian struck by motor vehicle.
  - Fall from more than one metre or more than five stairs.
  - Diving injury.
  - High speed motor vehicle collision.
  - Bicycle collision.
  - Injury from a projectile or other hard object (for example, a hammer).
- Signs of skull fracture can be subtle, and include:
  - Boggy scalp haematoma.
  - Haemotympanum.
  - Bruising behind the ear.
  - Bilateral periorbital ecchymosis ('racoon eyes').

  - CSF rhinorrhoea or otorrhoea.
  - Bleeding from the ears.
- Have a low threshold for referral if the clinical presentation does not strongly suggest a low risk injury or social concerns are present.
- Refer to the relevant section in the EAS CPGs for commentary on head injury considerations in the elderly.

Post-concussion syndrome

- Most patients who have sustained a head injury will have some ongoing symptoms, which will usually self-resolve over the first 7-10 days.
- Typical symptoms are:
  - Headaches.
  - Dizziness.
  - Difficulty sleeping.
  - Difficulty with concentration and memory.
  - Mood changes.
- Patients with ongoing symptoms after 7-10 days are at risk of persistent post-concussion syndrome. This can have significant effects on the patient's work and function for some time, and is the reason that patients are advised to see their GP in one week if symptoms are ongoing.

Medical clearance following a minor head injury

- It is a common request for medical clearance (to continue with the activity there were engaging in at the time of the injury) following minor head injury during sporting events.
- Repeated minor head injury can predispose patients to very serious consequences including permanent cognitive and neurological deficits, and so provision of clearance to resume activity should be carefully considered by personnel.
- A number of sporting codes have their own clearance processes and provided these are formally structured, documented and contain questions which can be accurately answered in the out-of-hospital environment, these may be followed.
- Patients who have suffered a head strike / concussive-type injury and have any of the following, should not be allowed to return to play or racing (but may not need referral to hospital):
  - Loss of consciousness.
  - Any level of disorientation at any stage since their injury, including being stunned or dazed.
  - Any seizure activity.
  - Any vomiting.

- The minimum safe period of time between minor head injuries is unclear. Four weeks (in absence of formal clearance by a health practitioner) is a minimum recommendation.
- A patient who has been stood down due to a minor head injury cannot be cleared to return to sporting activities by an ECP.

11.1 Medicines

Introduction

- This section must be read in conjunction with the medicines section in the EAS CPGs.
- This section contains additional information on ECP medicines but does not incorporate all required knowledge.
- The information is limited to that which is particularly relevant. For example, only cautions and adverse effects relevant to ECP medicine administration in the out-of-hospital setting are listed.
- There are some medicines described in both the EAS CPGs and the ECP CPGs. Within these CPGs, these medicines are described in relation to what can be administered specifically by an ECP. For example, some medicines can be administered by ECPs via a different route, or for a different indication. Medicines that fall into this category are:
  - Aspirin.
  - Amoxicillin/clavulanic acid.
  - Ceftriaxone.
  - Droperidol.
  - Gentamicin.
  - Loratadine.
  - Metoprolol.
  - Midazolam.
  - Ondansetron.
  - Prednisone and prednisolone.
  - Paracetamol.
- Some medicines are incorporated into the ECP CPGs, but the dosing and indications are the same as described in the EAS CPGs and so they have not been included in this section. These medicines are:
  - Fentanyl.
  - Ipratropium.

Package of care and dosing regimes

- If a package of care is provided to the patient, the number of tablets or volume of liquid will be specified within the relevant CPGs, or will require calculation by the ECP, based on the dosing regimen specific to the patient and indication.
- The information required to do this can be found within each relevant CPG.

5 kg / less than 1 year

	Dose	Volume
Adrenaline/lignocaine 1% IN	-	-
Adrenaline/lignocaine 1% SC	-	-
Amoxicillin tablet PO		
(throat infection)	-	-
(other indications)	-	-
Amoxicillin liquid PO		
(throat infection)	-	-
(other indications)	-	-
Amoxicillin/clavulanic acid tablet PO	-	-
Amoxicillin/clavulanic acid liquid PO	75/18.75 mg	1.5 ml (250/62.5 mg/5 ml)
Benzathine penicillin IM	-	-
Erythromycin tablet PO	-	-
Erythromycin liquid PO	100 mg	1.25 ml (400 mg/5 ml)
Flucloxacillin liquid PO		
(abscess)	-	-
(mild cellulitis)	-	-
(moderate – severe cellulitis)	-	-
(laceration)	125 mg	2.5 ml (250 mg/5 ml)
Flucloxacillin tablet PO		
(abscess)	-	-
(mild cellulitis)	-	-
(moderate – severe cellulitis)	-	-
(laceration)	-	-
Hyoscine butylbromide SC	-	-
Hyoscine butylbromide IV	-	-
Levomepromazine SC	-	-
Levomepromazine IV	-	-
Loratadine PO	-	-
Metronidazole PO	-	-
Ondansetron PO	-	-
Ondansetron IM	-	-
Ondansetron IV	-	-
Oral rehydration formula PO	1 ml/kg	5 ml
Prednisone PO	-	-
Prednisolone PO	5 mg	1 ml (5 mg/ml)
Roxithromycin PO	-	-
Trimethoprim/sulfamethoxazole tablet PO	-	-
Trimethoprim/sulfamethoxazole liquid PO	20/100 mg	2.5 ml (40/200 mg/5 ml)

10 kg / 1 year

	Dose	Volume
Adrenaline/lignocaine 1% IN	-	-
Adrenaline/lignocaine 1% SC	-	-
Amoxicillin tablet PO		
(throat infection)	750 mg	1 ½ tablets
(other indications)	-	-
Amoxicillin liquid PO		
(throat infection)	750 mg	15 ml (250 mg/5 ml)
(other indications)	150 mg	3 ml (250 mg/5 ml)
Amoxicillin/clavulanic acid tablet PO	-	-
Amoxicillin/clavulanic acid liquid PO	150/37.5 mg	3 ml (250/62.5 mg/5 ml)
Benzathine penicillin IM	450 mg (600,000 units)	1.15 ml (900 mg/2.3 ml)
Erythromycin tablet PO	-	-
Erythromycin liquid PO	200 mg	2.5 ml (400 mg/5 ml)
Flucloxacillin liquid PO		
(abscess)	-	-
(mild cellulitis)	-	-
(moderate – severe cellulitis)	-	-
(laceration)	250 mg	5 ml (250 mg/5 ml)
Flucloxacillin tablet PO		
(abscess)	-	-
(mild cellulitis)	-	-
(moderate – severe cellulitis)	-	-
(laceration)	-	-
Hyoscine butylbromide SC	-	-
Hyoscine butylbromide IV	-	-
Levomepromazine SC	-	-
Levomepromazine IV	-	-
Loratadine PO	-	-
Metronidazole PO	100 mg	½ tablet
Ondansetron PO	-	-
Ondansetron IM	1 mg	0.5 ml (undiluted)
Ondansetron IV	2 mg	1 ml (undiluted)
Oral rehydration formula PO	1 ml/kg	10 ml
Prednisone PO	10 mg	½ tablet
Prednisolone PO	10 mg	2 ml (5 mg/ml)
Roxithromycin PO	-	-
Trimethoprim/sulfamethoxazole tablet PO	-	-
Trimethoprim/sulfamethoxazole liquid PO	40/200 mg	5 ml (40/200 mg/5 ml)

20 kg / 2-5 years

	Dose	Volume
Adrenaline/lignocaine 1% IN	0.1 mg adrenaline + 1 mg lignocaine 5%	1 ml (0.1 mg/ml adrenaline and 1 mg/ml lignocaine 5%)
Adrenaline/lignocaine 1% SC	60 mg (max)	6 ml (max)
Amoxicillin tablet PO		
(throat infection)	750 mg	1 ½ tablets
(other indications)		
Amoxicillin liquid PO		
(throat infection)	750 mg	15 ml (250 mg/5ml)
(other indications)	300 mg	6 ml (250 mg/5 ml)
Amoxicillin/clavulanic acid tablet PO	-	-
Amoxicillin/clavulanic acid liquid PO	300/75 mg	6 ml (250/62.5 mg/5 ml)
Benzathine penicillin IM	450 mg (600,000 units)	1.15 ml (900 mg/2.3 ml)
Erythromycin tablet PO	400 mg	1 tablet
Erythromycin liquid PO	400 mg	5 ml (400 mg/5 ml)
Flucloxacillin liquid PO		
(abscess)	250 mg	5 ml (250 mg/5 ml)
(mild cellulitis)	-	-
(moderate – severe cellulitis)	-	-
(laceration)	500 mg	10 ml (250 mg/5 ml)
Flucloxacillin tablet PO		
(abscess)	250 mg	½ tablet
(mild cellulitis)		
(moderate – severe cellulitis)		
(laceration)	500 mg	1 tablet
Hyoscine butylbromide SC	6 mg	0.3 ml (undiluted)
Hyoscine butylbromide IV	6 mg	3 ml (2 mg/ml)
Levomepromazine SC	2.5-5 mg	0.1- 0.2 ml (undiluted)
Levomepromazine IV	2.5-5 mg	0.5-1 ml (5 mg/ml)
Loratadine PO	5 mg	½ tablet
Metronidazole PO	200 mg	1 tablet
Ondansetron PO	4 mg	½ tablet
Ondansetron IM	2 mg	1 ml (undiluted)
Ondansetron IV	4 mg	2 ml (undiluted)
Oral rehydration formula PO	1 ml/kg	20 ml
Prednisone PO	20 mg	1 tablet
Prednisolone PO	20 mg	4 ml (5 mg/ml)
Roxithromycin PO	-	-
Trimethoprim/sulfamethoxazole tablet PO	80/400 mg	1 tablet
Trimethoprim/sulfamethoxazole liquid PO	80/400 mg	10 ml (40/200 mg/5 ml)

30 kg / 6-10 years

	Dose	Volume
Adrenaline/lignocaine 1% IN	0.1 mg adrenaline + 1 mg lignocaine 5%	1 ml (0.1 mg/ml adrenaline and 1 mg/ml lignocaine 5%)
Adrenaline/lignocaine 1% SC	90 mg (max)	9 ml (max)
Amoxicillin tablet PO		
(throat infection)	1000 mg	2 tablets
(other indications)	500 mg	1 tablet
Amoxicillin liquid PO		
(throat infection)	100 mg	20 ml (250 mg/5 ml)
(other indications)	450 mg	9 ml (250 mg/5 ml)
Amoxicillin/clavulanic acid tablet PO	-	-
Amoxicillin/clavulanic acid liquid PO	450/112.5 mg	9 ml (250/62.5 mg/5 ml)
Benzathine penicillin IM	900 mg (1,200,000 units)	2.3 ml (900 mg/2.3 ml)
Erythromycin tablet PO	400 mg	1 tablet
Erythromycin liquid PO	400 mg	5 ml (400 mg/5 ml)
Flucloxacillin liquid PO		
(abscess)	500 mg	10 ml (250 mg/5 ml)
(mild cellulitis)	-	-
(moderate – severe cellulitis)	-	-
(laceration)	750 mg	15 ml (250 mg/5 ml)
Flucloxacillin tablet PO		
(abscess)	500 mg	1 tablet
(mild cellulitis)		
(moderate – severe cellulitis)		
(laceration)	750 mg	1 ½ tablets
Hyoscine butylbromide SC	9 mg	0.45 ml (undiluted)
Hyoscine butylbromide IV	9 mg	4.5 ml (2 mg/ml)
Levomepromazine SC	3.75-7.5 mg	0.15-0.3 ml (undiluted)
Levomepromazine IV	3.75-7.5 mg	0.75-1.5 ml (5 mg/ml)
Loratadine PO	5 mg	½ tablet
Metronidazole PO	200 mg	1 tablet
Ondansetron PO	4 mg	½ tablet
Ondansetron IM	3 mg	1.5 ml (undiluted)
Ondansetron IV	6 mg	3 ml (undiluted)
Oral rehydration formula PO	1 ml/kg	30 ml
Prednisone PO	30 mg	1 ½ tablets
Prednisolone PO	30 mg	6 ml (5 mg/ml)
Roxithromycin PO	-	-
Trimethoprim/sulfamethoxazole tablet PO	120/600 mg	1 ½ tablets
Trimethoprim/sulfamethoxazole liquid PO	120/600 mg	15 ml (40/200 mg/5 ml)

40 kg / 11-13 years

	Dose	Volume
Adrenaline/lignocaine 1% IN	0.2 mg adrenaline + 2 mg lignocaine 5%	2 ml (0.1 mg/ml adrenaline and 1 mg/ml lignocaine 5%)
Adrenaline/lignocaine 1% SC	120 mg (max)	12 ml (max)
Amoxicillin tablet PO		
(throat infection)	1000 mg	2 tablets
(other indications)	500 mg	1 tablet
Amoxicillin liquid PO		
(throat infection)	100 mg	20 ml (250 mg/5 ml)
(other indications)	600 mg	12 ml (250 mg/5 ml)
Amoxicillin/clavulanic acid tablet PO	625 mg	1 tablet
Amoxicillin/clavulanic acid liquid PO	500/125 mg	10 ml (250/62.5 mg/5 ml)
Benzathine penicillin IM	900 mg (1,200,000 units)	2.3 ml (900 mg/2.3 ml)
Erythromycin tablet PO	400 mg	1 tablet
Erythromycin liquid PO	400 mg	10 ml (200 mg/5 ml) or 5 ml (400 mg/5 ml)
Flucloxacillin liquid PO		
(abscess)	500 mg	10 ml (250 mg/5 ml)
(mild cellulitis)	500 mg	10 ml (250 mg/5 ml)
(moderate – severe cellulitis)	1000 mg	20 ml (250 mg/5 ml)
(laceration)	1000 mg	20 ml (250 mg/5 ml)
Flucloxacillin tablet PO		
(abscess)	500 mg	1 tablet
(mild cellulitis)	500 mg	1 tablet
(moderate – severe cellulitis)	1000 mg	2 tablets
(laceration)	1000 mg	2 tablets
Hyoscine butylbromide SC	12 mg	0.6 ml (undiluted)
Hyoscine butylbromide IV	12 mg	6 ml (2 mg/ml)
Levomepromazine SC	5-10 mg	0.2-0.4 ml (undiluted)
Levomepromazine IV	5-10 mg	1-2 ml (5 mg/ml)
Loratadine PO	5 mg	½ tablet
Metronidazole PO	300 mg	1 ½ tablets
Ondansetron PO	8 mg	1 tablet
Ondansetron IM	4 mg	2 ml (undiluted)
Ondansetron IV	8 mg	4 ml (undiluted)
Oral rehydration formula PO	1 ml/kg	40 ml
Prednisone PO	40 mg	2 tablets
Prednisolone PO	40 mg	8 ml (5 mg/ml)
Roxithromycin PO	150 mg	½ tablet
Trimethoprim/sulfamethoxazole tablet PO	160/800 mg	2 tablets
Trimethoprim/sulfamethoxazole liquid PO	160/800 mg	20 ml (40/200 mg/5 ml)

11.2 Absorbed diphtheria and tetanus (ADT) booster vaccine

Mechanism of action

- The ADT booster vaccine contains small amounts of inactivated diphtheria toxin and tetanus toxin. Following administration, it stimulates the production of anti-toxin (antibody) within the body.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Tetanus-prone wound that is:
  - Clean and last tetanus immunisation or booster more than ten years ago, or
  - Dirty and last tetanus immunisation or booster more than five years ago.

Contraindications

✖ Known severe allergy.

✖ Known hypersensitivity to ADT booster vaccine.

Cautions

⛔ Previous severe allergy or hypersensitivity to other vaccines or their components.

Use in pregnancy or when breastfeeding

- ADT booster vaccine is safe to administer during pregnancy and while breastfeeding.

Dosage

- 0.5 ml.

Administration

- Administer IM undiluted. The preferred site is the lateral upper arm.

Common adverse effects

- Pain, swelling and redness at the site of injection are very common.
- Low grade fever and lethargy are common.
- Anaphylaxis and high grade fever are rare.

Usual duration of effect

- ADT booster vaccine is effective in a previously vaccinated patient for a minimum of five years.

Usual preparation

- Pre-filled 1 ml syringe containing 0.5 ml of clear fluid with white and black particles in suspension.

Common interactions

- None.

Additional information

- The ADT booster vaccine requires refrigeration and storage in 2-8°C.
- The ADT booster vaccine is not a primary vaccination. It requires the patient to have previously completed a childhood vaccination course for both diphtheria and tetanus.
- For a patient who has not been vaccinated previously for tetanus and has a tetanus-prone wound, a full vaccination course is required. The patient will also require administration of tetanus immunoglobulin (TIG) to protect them from any risk associated with the current wound.

11.3 Adrenaline/lignocaine 1%

Mechanism of action

- Lignocaine is a local anaesthetic. It blocks the initiation and transmission of nerve impulses by blocking the movement of sodium ions across the nerve cell membrane.
- Adrenaline stimulates alpha and beta receptors and is used for the alpha 1 receptor stimulation in the context of epistaxis for the vasoconstrictive effects.
- Adrenaline also prolongs the duration of action of lignocaine 1%.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Moderate to severe epistaxis.

✔ Subcutaneous infiltration for local anaesthesia.

Contraindications

✖ Known severe allergy.

Cautions

⛔ Use in areas of terminal circulation, for example fingers or toes.

Use in pregnancy or when breastfeeding

- Adrenaline/lignocaine 1% is safe to administer during pregnancy and while breastfeeding.

Dosage

- Epistaxis:
  - For adults: 0.2 mg adrenaline and 2 mg lignocaine 1% per nostril.
  - For patients aged 5-11 years: 0.1 mg adrenaline and 1 mg lignocaine 1% per nostril.
- Subcutaneous infiltration for local anaesthesia:
  - The volume required is proportional to the size of the area being anaesthetised.
  - Use the minimum volume required to achieve adequate local anaesthesia.
  - The maximum dose of lignocaine 1% for an adult is 200 mg.
  - See the paediatric drug dose tables for the maximum dose for a child.

Administration

- Epistaxis:
  - Combine 1 mg of adrenaline with 10 mg lignocaine 1% into one syringe and dilute to a total of 10 ml using 0.9% sodium chloride.
  - This will provide a 0.1 mg/ml adrenaline and 1 mg/ml lignocaine 1% solution.
  - Administer the appropriate dose into each bleeding nostril using a mucosal atomising device, in addition to direct pressure.
- Subcutaneous infiltration for local anaesthesia:
  - Infiltrate using a small gauge needle either through the wound margin (edge infiltration) or using a field block.

Common adverse effects

- None.

Usual onset of effect

- The onset of vasoconstriction is immediate on contact with the target site.
- The onset of local anaesthesia is 2-3 minutes.

Usual duration of effect

- The effects of adrenaline last 5-15 minutes.
- The effects of the lignocaine 1% lasts 30-60 minutes.

Usual preparation

- Adrenaline: ampoule containing 1 mg in 1 ml.
- Lignocaine: ampoule containing 50 mg in 5 ml.
- Lignocaine (xylocaine) 1%/ adrenaline 1:100,000 in 5 ml

Pharmacokinetics

- Adrenaline is metabolised in the liver and taken up by sympathetic nerve endings.
- Lignocaine is metabolised in the liver and excreted in the urine.
- There are no significant effects from liver impairment on acute administration of adrenaline or lignocaine.

Common interactions

- None.

11.4 Amlodipine

Mechanism of action

- Amlodipine is a dihydropyridine calcium channel blocker with predominantly peripheral action causing vascular smooth muscle relaxation and antihypertensive effects.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Adults with severe hypertension who are not immediately being referred to an ED.

Contraindications

✖ Known severe allergy.

✖ Unstable angina.

✖ Severe aortic stenosis.

✖ Pregnant.

Cautions

⛔ Severe renal disease. Consult the patient's renal team prior to administration of amlodipine.

⛔ Currently prescribed an antihypertensive. Seek advice from the patient's primary healthcare provider if the patient has severe hypertension and is currently prescribed an antihypertensive.

Use in pregnancy or when breastfeeding

- Safety has not been demonstrated in pregnancy or while breastfeeding. Do not administer amlodipine.

Dosage

- 5 mg PO once daily for seven days.

Administration

- Administer PO. The absorption of amlodipine is unaffected by food.

Common adverse effects

- Headache.
- Palpitations.
- Flushing.
- Nausea.
- Fatigue.
- Ankle swelling.

Usual onset of effect

- 6-8 hours.

Usual duration of effect

- 24 hours.

Usual preparation

- 5 mg tablets.

Pharmacokinetics

- Amlodipine is metabolised in the liver and mostly excreted in the urine.

Common interactions

- Plasma levels and hypotensive effects of amlodipine may be increased by CYP3A4 enzyme inhibitors, for example ketoconazole, itraconazole, ritonavir and clarithromycin.

11.5 Amoxicillin

Mechanism of action

- Amoxicillin is in the penicillin class of medicines and is a beta-lactam antibiotic with a medium spectrum of activity against gram-positive streptococci and some anaerobes.
- Amoxicillin inhibits production of the bacterial cell wall, causing bacteria to die.
- Amoxicillin is ineffective in the presence of beta-lactamase enzymes found in the cell wall of some bacteria.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ COPD and increased sputum purulence, increased sputum volume, or increased breathlessness.
- ✔ Mild to moderate community-acquired pneumonia.
- ✔ Throat infection and:
  - GAS pharyngitis is likely (score ≥ 4), or
  - High risk for rheumatic fever (score ≥ 2), or
  - It is highly likely patient will be lost to follow up.
- ✔ Epistaxis with nasal packing and:
  - Packing will be in place for greater than 24 hours, or
  - Patient is immunocompromised, or
  - Patient has a heart valve replacement.
- ✔ Dental abscess and risk factors for infection.
- ✔ Otitis media with suspected bacterial infection.

Contraindications

- ✖ Known severe allergy.
- ✖ Known severe allergy to penicillins. Up to 10% of the population claim to have a penicillin allergy, but only 1% will have a clinically significant allergy.
- ✖ Anaphylaxis to any beta-lactam antibiotic, for example penicillins (for example, flucloxacillin) or cephalosporins (for example, cefalexin or ceftriaxone).

Cautions

- ⛔ Recently prescribed amoxicillin, or amoxicillin/clavulanic acid
- ⛔ Prescribed anticoagulants, digoxin, methotrexate or probenecid.

Use in pregnancy or when breastfeeding

- Amoxicillin is safe to administer during pregnancy and while breastfeeding.

Dosage

- The dose and duration of amoxicillin course is dependent on the indication. See the individual sections.

Administration

- Administer PO.
- Amoxicillin can be taken independently of meals.

Common adverse effects

- Diarrhoea. This is due to an antibiotic effect on the bacterial flora within the bowel and is not an allergy.
- Rash.
- Headache.
- Oral or vaginal candidiasis (thrush). This is due to an antibiotic effect on the bacterial flora within the oral cavity and the vagina and is not an allergy.

Usual onset of effect

- Clinical effects are usually observed within 48-72 hours.

Usual duration of effect

- 6 - 8 hours.

Usual preparation

- 500 mg tablets.
- Liquid containing 250 mg in 5 ml.

Pharmacokinetics

- Amoxicillin is predominantly excreted in the urine.
- Clearance is prolonged if the patient has significant renal impairment, but this does not alter the initial loading dose.

Common interactions

- May interact with anticoagulants, digoxin, methotrexate, probenecid.

11.6 Amoxicillin/clavulanic acid

Mechanism of action

- Amoxicillin/clavulanic acid is a beta-lactam antibiotic with a wide spectrum of activity against gram-negative and gram-positive bacteria. It also has some activity against anaerobic bacteria, particularly those from the mouth.
- Amoxicillin is the active ingredient and is part of the penicillin class of antibiotics. Amoxicillin inhibits production of the bacterial cell wall, causing bacteria to die.
- Many bacteria are resistant to amoxicillin due to their ability to produce beta-lactamase (an enzyme) which destroys the active part of beta lactam antibiotics. Clavulanic acid inhibits the beta-lactamase enzyme and has no direct antibacterial action.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ COPD with atypical bacterial infection or no improvement with amoxicillin.
- ✔ Mild to moderate community-acquired aspiration pneumonia.
- ✔ Diverticulitis with features of infection.
- ✔ Mild uncomplicated pyelonephritis.
- ✔ Mammal bites requiring prophylactic antibiotics.

Contraindications

- ✖ Known severe allergy.
- ✖ Known severe allergy to penicillins. Up to 10% of the population claim to have a penicillin allergy, but only 1% will have a clinically significant allergy.
- ✖ Anaphylaxis to any beta-lactam antibiotic, for example penicillins (for example, flucloxacillin) or cephalosporins (for example, cefalexin or ceftriaxone).
- ✖ Previous amoxicillin/clavulanic acid-associated jaundice or hepatic dysfunction.

Cautions

- ⛔ Recently prescribed amoxicillin or amoxicillin/clavulanic acid.
- ⛔ Prescribed anticoagulants, digoxin, methotrexate or probenecid.
- ⛔ Renal impairment.

Use in pregnancy or when breastfeeding

- Amoxicillin/clavulanic acid is safe to administer during pregnancy and while breastfeeding.

Dosage

- The dose and duration of amoxicillin course is dependent on the indication. See the individual sections.

Administration

- PO: Take amoxicillin/clavulanic acid with food and a glass of water.
- IV:
  - Dissolve 1.2 g using approximately 4 ml of 0.9% sodium chloride and dilute to a total of 10 ml.
  - Administer IV over 1-2 minutes, preferably into a running IV line.
  - Do not administer IM if IV access cannot be obtained.

Common adverse effects

- Nausea and/or vomiting.
- Diarrhoea. This is due to an antibiotic effect on the bacterial flora within the bowel and is not an allergy.
- Rash.
- Headache.
- Oral or vaginal candidiasis (thrush). This is due to an antibiotic effect on the bacterial flora within the oral cavity and the vagina and is not an allergy.
- Jaundice or hepatic dysfunction is rare.

Usual onset of effect

- Clinical effects are usually observed within 48-72 hours.

Usual duration of effect

- 6-8 hours.

Usual preparation

- Ampoule containing 1000 mg of amoxicillin and 200 mg clavulanic acid as a powder for reconstitution.
- 625 mg tablets (containing 500 mg amoxicillin and 125 mg of clavulanic acid).
- Liquid containing 250 mg of amoxicillin and 62.5 mg of clavulanic acid in 5 ml.

Pharmacokinetics

- Amoxicillin is predominantly excreted in the urine.
- Clearance is prolonged if the patient has significant renal impairment, but this does not alter the initial loading dose.
- Clavulanate is excreted by renal and non-renal mechanisms.

Common interactions

- May interact with anticoagulants, digoxin, methotrexate, and probenecid.

11.7 Aspirin

This medicine section describes aspirin in the context of the ECP CPGs. For other indications, refer to the relevant section in the EAS CPGs.

Mechanism of action

- Aspirin (acetylsalicylic acid) has antiplatelet, antipyretic, anti-inflammatory and analgesic effects.
- Aspirin inhibits the enzyme cyclooxygenase which results in a reduction in the formation of prostaglandins and thromboxane.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Headache, where the cause is likely to be a primary headache syndrome.

Contraindications

✖ Known severe allergy.

✖ Pregnancy.

✖ Aged less than 16 years. This is due to the risk of Reye's Syndrome.

✖ Known bleeding disorder or taking an anticoagulant.

Cautions

⛔ Clinically significant bleeding. Aspirin will increase the risk of bleeding and the nature and risk of the bleeding must be taken into account.

⛔ Known worsening of bronchospasm with NSAIDs. Some patients with asthma or COPD have known worsening of bronchospasm with NSAIDs (including aspirin) and a decision must be made based on the balance of risk. If there is a clear history of significant bronchospasm with NSAIDs, aspirin should be withheld.

Use in pregnancy or when breastfeeding

- May cause harm during pregnancy. Aspirin has been associated with premature delivery and premature closure of the ductus arteriosus, when administered in the third trimester of pregnancy.
- May be administered if the patient is breastfeeding. Advise the patient to stop breastfeeding and seek further advice from their lead maternity carer or GP.

Dosage

- 900 mg.

Administration

- Administer PO. Dispersible tablets may be chewed or dissolved in water.

Common adverse effects

- Increased bleeding.
- Although indigestion, gastrointestinal ulceration and gastrointestinal bleeding are commonly listed as adverse effects, these are only associated with long-term administration.

Usual onset of effect

- 30-60 minutes.

Usual duration of effect

- Analgesic effect is 3-4 hours.
- Antiplatelet effect is 3-5 days. This is because platelets exposed to aspirin are impaired for the life of the platelet which is 7-10 days. Approximately 10% of platelets are replaced each day.

Usual preparation

- 300 mg dispersible tablets.

Pharmacokinetics

- Absorption occurs in the stomach and small intestine. The presence of food in the stomach will delay absorption, but this is not usually clinically significant.
- Aspirin is predominantly metabolised in the liver.
- There are no significant effects from liver impairment on acute administration.

Common interactions

- Aspirin displaces warfarin from binding sites and increases the activity of warfarin.

Additional information

- Urea impairs platelet function, but aspirin is not contraindicated in the setting of renal failure.
- Reye's syndrome is a rare but serious condition that causes swelling in the liver and brain. It most often affects children and teenagers recovering from a viral infection, most commonly influenza or chicken pox and is associated with aspirin use.

11.8 Azithromycin

Mechanism of action

- Azithromycin is a macrolide antibiotic which interferes with microbial protein synthesis by binding to and inhibiting the assembly of the 50S ribosome subunit.
- It has a wide spectrum of activity against both gram-positive and gram-negative bacteria.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Suspected chlamydia or gonorrhoea infection.

Contraindications

✖ Known severe allergy.

✖ Known hypersensitivity to macrolide antibiotics.

✖ Known long QT syndrome.

Cautions

⛔ None.

Use in pregnancy or when breastfeeding

- Azithromycin is safe to administer during pregnancy and while breastfeeding.

Dosage

- 1 g.

Administration

- Administer PO.

Common adverse effects

- Mild gastrointestinal upset.
- Rash and/or itch.

Usual onset of effect

- Clinical effects are usually observed within 48-72 hours.

Usual duration of effect

- Azithromycin has a half life of 60 hours.

Usual preparation

- 500 mg tablets.

Pharmacokinetics

- Azithromycin is absorbed rapidly following oral administration.
- It has a bioavailability of 40% when administered orally and is widely distributed throughout the body.
- Azithromycin is predominantly excreted in the bile.

Common interactions

- When a course of azithromycin is taken, there are multiple drug interactions. However, when administered as a single dose, drug interactions are extremely rare.

11.9 Benzathine penicillin

Mechanism of action

- Benzathine penicillin is a beta-lactam penicillin antibiotic that is effective for Group A streptococcal infections, prevention of rheumatic heart disease, syphilis, and prophylaxis of glomerulonephritis.
- It works by inhibiting bacterial cell wall production and is bactericidal.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Sore throat with risk of GAS pharyngitis or rheumatic heart failure and unlikely to attend primary care appointments.

✔ Primary syphilis.

Contraindications

✖ Known severe allergy.

Cautions

⛔ None.

Use in pregnancy or when breastfeeding

- Benzathine penicillin is safe to administer during pregnancy and while breastfeeding.

Dosage

- 900 mg (1,200,000 units) for sore throat.
- 1800 mg (2,400,000 units) for syphilis.

Administration

- Administer IM. The preferred site is the upper outer quadrant of the gluteus. If this site is not suitable, use the lateral thigh.

Common adverse effects

- Rash.

Usual onset of effect

- 12-24 hours.

Usual duration of effect

- 14 days.

Usual preparation

- 2.3 ml prefilled syringe containing 900 mg (1,200,000 IU) of benzathine penicillin.

Pharmacokinetics

- Benzathine penicillin has a very slow absorption following IM administration compared to other parenteral penicillins.
- It is predominantly excreted in the urine.

Common interactions

- Tetracycline may antagonise the bactericidal effect of penicillin.
- Benzathine penicillin is inactivated by beta lactamases.

Additional information

- Benzathine penicillin has a shelf-life of up to two years when refrigerated at 2-8°C.
- It may be stored below 30°C for a single period of up to two months prior to expiry.
- Benzathine benzylpenicillin should not be confused with penicillin V (benzylpenicillin sodium).

11.10 Bisocodyl suppository

Mechanism of action

- Bisacodyl is a locally acting laxative.
- It stimulates peristalsis of the colon and promotes accumulation of water and consequently electrolytes in the colonic lumen. This results in a stimulation of defecation and softening of the stool.

Delegated scopes of practise

- Extended Care Paramedics.

Indications

✔ Constipation.

Contraindications

✖ Acute inflammatory bowel disease.
✖ Acute abdominal condition likely to require surgery.
✖ Severe dehydration.
✖ Intestinal obstruction.
✖ Severe abdominal pain with nausea and vomiting.
✖ Aged less than 12 years.

Cautions

⛔ Prolonged or excessive use. This may lead to dehydration and electrolyte loss.
⛔ Taking diuretics. This may increase the risk of electrolyte imbalance.

Use in pregnancy or when breastfeeding

- Bisacodyl suppository is safe to administer during pregnancy and while breastfeeding.

Dosage

- 10 mg PR.

Administration

- Warm the suppository in the hand before removing from the foil wrapper to produce sufficient lubrication.
- Insert into the rectum pointed end first.

Common adverse effects

- Abdominal pain.
- Diarrhoea.
- Nausea.
- Vomiting.
- Syncope.
- Dizziness.

Usual onset of effect

- 10 – 30 minutes.

Usual duration of effect

- 45 minutes.

Usual preparation

- Foil wrapped suppository.

Pharmacokinetics

- Metabolism by hydrolysis in the large intestine.
- 90% excreted unchanged in the stools.

Common interactions

- Diuretics.

11.11 Ceftriaxone

This medicine section describes ceftriaxone in the context of the ECP CPGs.
For other indications, refer to the relevant section in the EAS CPGs.

Mechanism of action

- Ceftriaxone is a cephalosporin antibiotic with broad activity against gram-negative and gram-positive bacteria. It inhibits production of the bacterial cell wall, causing bacteria to die.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Severe cellulitis and there is a delay pursuing a local pathway for IV antibiotics.

✔ Suspected chlamydia or gonorrhoea infection.

Contraindications

✖ Known severe allergy.

Cautions

⛔ None.

Use in pregnancy or when breastfeeding

- Ceftriaxone is safe to administer during pregnancy and while breastfeeding.

Dosage

- 2 g IV for an adult with severe cellulitis.
- 500 mg IM if chlamydia or gonorrhoea infection suspected.

Administration

- IV administration:
  - Add 4 ml of 0.9% sodium chloride to a 2 g ampoule and shake until dissolved.
  - Draw up the ampoule and dilute to a total of 10 ml.
  - Administer IV over 1-2 minutes, preferably into a running line.
- IM administration:
  - Add 4 ml of 0.9% sodium chloride to a 2 g ampoule and shake until dissolved.
  - Draw up the contents of the ampoule into a syringe.
  - Discard all but 1 ml of the 500 mg/ml solution.
  - Administer IM. The preferred site is the lateral thigh. If this site is not suitable, use the lateral upper arm.

Common adverse effects

- None.

Usual onset of effect

- 30-60 minutes.

Usual duration of effect

- 24 hours.

Usual preparation

- Ampoule containing 2 g of ceftriaxone as a powder for reconstitution.

Pharmacokinetics

- 50% is excreted in urine and 50% in bile.
- Neither renal impairment nor hepatic impairment alter the initial (loading) dose.

Common interactions

- None.

11.12 Chloramphenicol 1% ointment

Mechanism of action

- Chloramphenicol is a broad-spectrum antibiotic. It is primarily bacteriostatic and inhibits protein synthesis by interfering with the transfer of activated amino acids from soluble RNA to ribosomes.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Corneal abrasion or corneal foreign body.

Contraindications

✖ Known severe allergy.

✖ Aged less than two years.

Cautions

⛔ None.

Use in pregnancy or when breastfeeding

- Chloramphenicol 1% ointment is safe to administer during pregnancy and while breastfeeding.

Administration

- Ensure contact lenses have been removed prior to administration.
- Apply 1.5 cm into the lower eyelid of the affected eye every three hours (up to a maximum of six times per day). Continue for 48 hours after symptoms have resolved, or for up to five days.
- Systemic absorption can be reduced by blocking the tear duct with a finger for one minute following application.

Common adverse effects

- Chloramphenicol ointment can cause blurring of the patient's vision. However, due to the viscous nature of chloramphenicol it adheres better to the damaged surface of the eye than chloramphenicol eye drops.
- Patients are at increased risk of mechanical falls due to the clouded vision that may result from application of chloramphenicol 1% ointment.

Usual onset of effect

- Antibacterial effects are observed within 30 minutes.

Usual duration of effect

- The half life of chloramphenicol is four hours.

Usual preparation

- Tube containing a yellow-white ointment.

Pharmacokinetics

- Chloramphenicol that is absorbed systemically is metabolised in the liver and excreted in the urine.

Common interactions

- None.

Additional information

- Chloramphenicol can rarely cause bone marrow suppression and aplastic anaemia. There is a small amount of systemic absorption with eye ointment and bone marrow suppression has been seen with chronic use.
- Advise the patient to avoid using contact lenses for the duration of treatment with chloramphenicol.

11.13 Codeine

Mechanism of action

- Codeine is a weak opioid analgesic and also reduces intestinal motility and suppresses the cough reflex.
- It exerts its effects primarily at mu opioid receptors in the brain and the gut.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ Moderate to severe pain not responding to initial analgesic options.
- ✔ Severe diarrhoea in adults if loperamide is not available.

Contraindications

- ✖ Known severe allergy.
- ✖ Aged less than 12 years.
- ✖ Respiratory depression.
- ✖ Constipation or at significant risk of constipation.
- ✖ Diarrhoea from poisoning or suspected pseudomembranous colitis (*Clostridium difficile* infection).
- ✖ Acute alcoholism.
- ✖ Asthma exacerbation.
- ✖ Heart failure secondary to COPD.
- ✖ Breastfeeding.

Cautions

- ⛔ Aged greater than 65 years.
- ⛔ At risk of constipation.
- ⛔ Hypothyroidism.
- ⛔ Adrenal insufficiency.
- ⛔ Renal impairment.
- ⛔ Impaired liver function.
- ⛔ Myasthenia gravis.
- ⛔ Chronic alcoholism.
- ⛔ Pregnant.

Use in pregnancy or when breastfeeding

- Codeine has no established risk of teratogenicity. Prolonged or high doses of codeine risk foetal dependence, respiratory depression and withdrawal symptoms in the newborn.
- Codeine administration should usually be avoided in pregnant patients.
- Codeine is contraindicated in patients who are breastfeeding due to the risk of opioid toxicity in the breastfed infant.

Dosage

- 15-60 mg PO four times daily (up to three days).
- Administration of doses larger than the recommended dose rarely achieves improved analgesia but may cause restlessness and excitement.
- The maximum amount of codiene to be supplied to a patient is 8 tablets.

Administration

- Administer PO.

Common adverse effects

- Constipation.
- Sedation.
- Nausea and/or vomiting.

Usual onset of effect

- Initial onset will be 20-30 minutes, with peak effect achieved in 1-2 hours.

Usual duration of effect

- 4 hours.

Usual preparation

- 30 mg tablets.

Pharmacokinetics

- Codeine is metabolised into morphine with considerable variability between patients. Morphine has approximately 200 times more affinity than codeine for the mu opioid receptor. The variation in codeine metabolism explains the variability in effect between patients.
- Codeine is readily absorbed from the gastrointestinal tract and is metabolised by the liver.
- Codeine metabolites are predominantly excreted in the urine.

Common interactions

- Alcohol. This will enhance the sedative effects of codeine.
- Hypnotics and anxiolytics (for example, benzodiazepines). This will enhance the sedative and hypotensive effects of codeine and increase the risk of respiratory depression.
- Anticholinergics. There is a risk of severe constipation leading to paralytic ileus and/or urinary retention.
- Metoclopramide and domperidone (pro-kinetics). These have an antagonistic effect on gastrointestinal activity.
- Anti-diarrhoeal drugs (for example, loperamide). This will increase the risk of severe constipation.
- Tricyclic antidepressants (TCAs) such as amitriptyline, clomipramine, doxepin. This will enhance the sedative effects of codeine.
- Antihypertensive drugs. This will enhance the hypotensive effect of codeine.
- Antipsychotics. This will enhance the hypotensive and sedative effect of codeine.

Additional information

- Codeine may be partially metabolised by the CYP2D6 enzyme to morphine. Evidence suggests that of the Caucasian population, up to 10% may be poor metabolisers and may not obtain adequate analgesia. Conversely, up to 10% of the population may be ultra-rapid metabolisers of codeine to morphine and are at risk of opioid toxicity (even at low doses).
- The prevalence of genetic polymorphisms affecting codeine metabolism in other ethnic groups such as Māori or Pacific People is unknown.
- Have a low threshold for concurrently administering Sennoside-B if the patient does not have access to laxatives. This will minimize the risk of opioid induced constipation.

11.14 Doxycycline

Mechanism of action

- Doxycycline is a broad-spectrum tetracycline-based antibiotic. It is primarily bacteriostatic and inhibits bacterial growth by reversibly binding to 30S and other ribosomal subunits and inhibiting protein synthesis.
- Doxycycline is active against a wide range of gram-positive and gram-negative organisms.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ COPD with increased sputum purulence, increased sputum volume, or increased breathlessness.
- ✔ Mild to moderate community-acquired pneumonia if:
  - The patient is allergic to penicillin, or
  - If Legionella or other atypical organisms are suspected.
- ✔ Suspected chlamydia or gonorrhoea infection.

Contraindications

- ✖ Aged less than 12 years.
- ✖ Pregnancy or breastfeeding.

Cautions

- ⛔ Systemic lupus erythematosus.
- ⛔ Alcohol dependence.
- ⛔ Renal impairment.
- ⛔ Liver impairment.

Use in pregnancy or when breastfeeding

- Not safe in pregnancy or breastfeeding.

Dosage

- The dose is dependent on the indication. See the relevant section.

Administration

- Administer PO.
- Take with food and swallow the tablet whole with plenty of fluid.
- Remain in an upright position for 30 minutes after administration.

Common adverse effects

- Nausea and/or vomiting.
- Diarrhoea.
- Dysphagia.
- Oesophageal irritation.
- Photosensitivity.
- Headache and visual disturbances.

Usual onset of effect

- Clinical effects are usually observed with 48-72 hours.

Usual duration of effect

- 72 hours.

Usual preparation

- 100 mg tablets.

Pharmacokinetics

- Doxycycline is nearly completely absorbed after oral administration.
- It is predominantly excreted in the urine and faeces.

Common interactions

- May interact with penicillin, warfarin and antacids.

Additional information

- Doxycycline may induce hypoplasia of the enamel and discolouration of the teeth.

11.15 Droperidol

This medicine section describes droperidol in the context of the ECP CPGs. For other indications, refer to the relevant section in the EAS CPGs.

Mechanism of action

- Droperidol blocks dopamine and alpha receptors centrally, and at low doses, it provides an antiemetic effect.

Delegated scopes of practice

- Extended Care Paramedics: IV for end of life care.

Indications

✔ Management of breakthrough nausea or vomiting during end of life care.

Contraindications

✖ Known severe allergy.

Cautions

⛔ Parkinson's disease. There is a risk of worsening the movement disorder associated with Parkinson's disease.

⛔ Concurrent administration of other sedatives. This will increase and prolong the effects.

⛔ Intoxication. This will increase and prolong the effects.

⛔ Elderly and/or frail. These will increase and prolong the effects.

Use in pregnancy or when breastfeeding

- Patients receiving end of life care are unlikely to be pregnant or breastfeeding and personnel should seek clinical advice.

Dosage

- 0.625- 1.25 mg droperidol IV (up to a maximum of 5 mg over 30 minutes).

Administration

- For the 2.5 mg/ml presentation:
  - Dilute 2.5 mg of droperidol to a total of 10 ml using 0.9% sodium chloride, giving a solution of 0.25 mg/ml.
  - Administer 2.5-5 ml IV over 1-2 minutes.
- For the 10 mg/2ml presentation:
  - Dilute 2.5 mg of droperidol (0.5 ml) to a total of 10 ml using 0.9% sodium chloride, giving a solution of 0.25 mg/ml.
  - Administer 2.5-5 ml IV over 1-2 minutes.

Common adverse effects

- Hypotension. This particularly occurs if an IV dose is administered rapidly.

Usual onset of effect

- 5-10 minutes.

Usual duration of effect

- 4-6 hours.

Usual preparation

- Ampoule containing 2.5 mg in 1 ml.
- Ampoule containing 10 mg in 2 ml.

Pharmacokinetics

- Droperidol is predominantly metabolised in the liver with metabolites being excreted in the urine.
- There are no significant effects from liver impairment on acute administration.

Common interactions

- Intoxication. Droperidol will have increased sedative effects if the patient is intoxicated with alcohol or has taken recreational drugs.
- Sedative drugs. Concurrent administration with other sedative drugs (such as olanzapine or midazolam) will result in an increased sedative effect.

Additional information

- Droperidol has been reported to prolong the QT interval. This generally involved repeated and/or high doses and one or two doses are safe, even if the patient is known to have a prolonged QT interval.
- Droperidol may cause dyskinesia (abnormal, uncoordinated and involuntary movements) but this is unusual following one or two doses.

11.16 Erythromycin

Mechanism of action

- Erythromycin is a macrolide antibiotic with activity against gram-positive, some gram-negative and some atypical bacteria.
- It inhibits protein synthesis in the bacteria and is bactericidal or bacteriostatic depending on the organism and drug concentration at the site of infection.
- Erythromycin also stimulates stomach and duodenal contractions and may have some anti-inflammatory effects.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ Dental abscess with additional risk factors for infection and allergic to penicillin.
- ✔ Cutaneous abscess and MRSA positive or allergic to flucloxacillin and:
  - Fever, or
  - Spreading cellulitis, or
  - Comorbidity (for example, diabetes), or
  - The patient has a complicated abscess and they are not immediately being referred to a medical facility.
- ✔ Mild to moderate cellulitis and allergic to penicillin.
- ✔ Severe cellulitis and:
  - Allergic to penicillin, and
  - There is a delay in pursuing a local pathway for IV antibiotics.
- ✔ Laceration requiring prophylactic antibiotics and allergic to penicillin.

Contraindications

- ✖ Known severe allergy.
- ✖ Severe hepatic impairment.
- ✖ Severe renal impairment.
- ✖ Concurrent administration of QT-prolonging medicines (for example, antihistamines and class IA and III antidysrhythmics).

Cautions

- ⛔ Recently prescribed a macrolide antibiotic (for example, roxithromycin or erythromycin). These patients may have developed an infection with organisms that are resistant to macrolide antibiotics.

Use in pregnancy or when breastfeeding

- Erythromycin is safe to administer during pregnancy and while breastfeeding.

Dosage

- The dose and duration of the erythromycin course is dependent on the indication. See the individual sections.

Administration

- Administer PO.
- Take erythromycin with a glass of water.

Common adverse effects

- Dose-related abdominal discomfort.
- Nausea and/or vomiting.
- Diarrhoea.
- QT prolongation is rare.
- Jaundice or liver dysfunction is rare.

Usual onset of effect

- Clinical effects are usually observed within 48-72 hours.

Usual duration of effect

- 4-6 hours.

Usual preparation

- 400 mg tablets.
- Liquid containing 400 mg in 5 ml.

Pharmacokinetics

- Erythromycin is primarily metabolised by the liver and excreted in the bile.

Common interactions

- May increase the concentrations of theophylline, carbamazepine, digoxin and anticoagulants.
- Concurrent use with QT-prolonging medicines may further prolong the QT interval.

11.17 Flucloxacillin

Mechanism of action

- Flucloxacillin is a semi-synthetic, penicillin-based beta-lactam antibiotic.
- Flucloxacillin has a narrow spectrum of activity compared to amoxicillin, but still has good coverage of gram-positive aerobes such as *Staphylococcus aureus* and group-A *Streptococcus* infections.
- Like other penicillins, flucloxacillin inhibits production of the bacterial cell wall.
- Unlike other penicillins, flucloxacillin has activity against beta-lactamase producing organisms (such as *Staphylococcus aureus*) and is considered beta-lactamase resistant.
- Flucloxacillin is ineffective against methicillin-resistant *Staphylococcus aureus* (MRSA).

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ Cutaneous abscess and:
  - Fever, or
  - Spreading cellulitis, or
  - Comorbidity (for example, diabetes), or
  - The patient has a complicated abscess and they are not immediately being referred to a medical facility.
- ✔ Cellulitis.
- ✔ Laceration requiring prophylactic antibiotics.

Contraindications

- ✖ Known severe allergy.
- ✖ Known severe allergy to penicillins. Up to 10% of the population claim to have a penicillin allergy, but only 1% will have a clinically significant allergy.
- ✖ Anaphylaxis to any beta-lactam antibiotic, for example penicillins or cephalosporins.

Cautions

- ⛔ Recently prescribed flucloxacillin. These patients may have developed an infection with organisms that are resistant to penicillin-based antibiotics.
- ⛔ Known severe renal disease (eGFR of less than 3).
- ⛔ Concurrent administration of maximum daily dose paracetamol in patients with sepsis, malnutrition, or renal failure. These patients are at increased risk of metabolic acidosis.

Use in pregnancy or when breastfeeding

- Flucloxacillin is safe to administer during pregnancy and while breastfeeding.

Dosage

- The dose and duration of a flucloxacillin course is dependent on the indication. See the individual sections.
- Consider reducing the dose or increasing the dose interval if the patient has known severe renal disease.

Administration

- Administer PO. Flucloxacillin should be taken with a glass of water, and preferably prior to eating (as it is absorbed better on an empty stomach).

Common adverse effects

- Rash.
- Nausea and/or vomiting.
- Diarrhoea.

Usual onset of effect

- Clinical effects are usually observed with 48-72 hours.

Usual duration of effect

- 6-8 hours.

Usual preparation

- 500 mg tablets.
- Liquid containing 250 mg/5 ml.

Pharmacokinetics

- Flucloxacillin is primarily excreted in the urine.
- Renal failure will slow the elimination of flucloxacillin.

Common interactions

- Probenecid will delay renal excretion of flucloxacillin.

11.18 Gentamicin

This medicine section describes gentamicin in the context of the ECP CPGs. For other indications, refer to the relevant section in the EAS CPGs.

Mechanism of action

- Gentamicin is an aminoglycoside antibiotic with broad activity against gram-negative bacteria. It inhibits bacterial cell protein synthesis.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Urinary catheter placed or changed, with risk factors for infective endocarditis or infected prosthesis.

✔ Moderate uncomplicated pyelonephritis.

Contraindications

✖ Known severe allergy.

✖ Pregnant.

Cautions

⛔ None.

Use in pregnancy or when breastfeeding

- May cause foetal harm during pregnancy and should not be administered.
- May be administered if the patient is breastfeeding. Advise the patient to stop breastfeeding and seek further advice from their lead maternity carer or GP.

Dosage

- The dose is dependent on the indication.
- See the relevant sections.

Administration

- IV: dilute the dose to a total of 10-20 ml using 0.9% sodium chloride and administer IV over 1-2 minutes, preferably into a running IV line.
- IM: Administer undiluted.

Common adverse effects

- Although renal impairment is commonly listed, this is usually not of significant concern unless there is repeated and/or prolonged dosing.
- Ototoxicity (damage to the inner ear) has been reported, but this usually only happens with repeated and/or prolonged dosing.

Usual onset of effect

- 30-60 minutes.

Usual duration of effect

- 24 hours.

Usual preparation

- Ampoule containing 80 mg in 2 ml.

Pharmacokinetics

- Gentamicin is excreted in urine.
- Clearance is prolonged if the patient has significant renal impairment, but this does not alter the initial (loading) dose.

Common interactions

- Gentamicin may potentiate the actions of neuromuscular blockers, resulting in a longer duration of action from these drugs.

Additional information

- Gentamicin is not contraindicated if the patient has renal failure.
- Seek clinical advice if the patient is aged less than 12 years.

11.19 Hydrocortisone 1%

Mechanism of action

- Hydrocortisone 1% cream is a mild topical corticosteroid.
- It works by diffusing across epithelial cell membranes and fusing with specific cellular receptors, stimulating production of proteins which exert a widespread anti-inflammatory effect (including reduction of oedema, capillary dilation and the influx of inflammatory mediators).

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Eczematous rash.

Contraindications

✖ Known severe allergy.

✖ Bacterial or viral infections of the skin.

Cautions

⛔ Severe eczema. May require a more potent topical steroid.

⛔ Pregnancy.

Use in pregnancy or when breastfeeding

- Application of hydrocortisone 1% to a small area for a short period of time is safe in pregnancy as there is minimal risk of systemic absorption.
- Hydrocortisone 1% is safe to administer while breastfeeding.

Administration

- Apply a thin topical layer to affected area twice daily for five days.
- Advise the patient to wash their hands following application.

Common adverse effects

- Excessive use (weeks to months) of corticosteroid creams can thin the skin and predispose to stretch marks and atrophy.

Usual onset of effect

- Clinical effects are usually observed within 24-48 hours.
- It may take 3-5 days for the rash to clear.

Usual duration of effect

- The duration of effect for a single application of topical hydrocortisone is 12-24 hours.

Usual preparation

- 30 g tube of thick, white cream, containing 1% hydrocortisone.

Pharmacokinetics

- Following topical application, hydrocortisone diffuses through the skin and hair follicles.
- Absorption varies depending on where on the body the cream is applied.
- Hydrocortisone is excreted into the urine over approximately ten days.

Common interactions

- None.

Additional information

- Patients with an extensive history of use of potent topical corticosteroids are unlikely to derive any benefit from topical hydrocortisone 1%.
- Hydrocortisone cream should not be used to treat acne.
- Eczema is best managed by basic measures such as avoiding irritants, using soap substitutes and regular hydration and emollient use. This usually means:
  - Encouraging the patient to have a bath or shower, then incompletely drying the skin and while still wet immediately and liberally applying an emollient lotion (for example fatty cream). This approach "traps" moisture in the affected skin.
- Topical steroid creams are not effective substitutes for hydration and emollient use and should be considered as an adjunct to effective moisturisation.
- Moderate to severe eczema may require more potent topical steroids than hydrocortisone 1%.

11.20 Hyoscine butylbromide

Mechanism of action

- Hyoscine butylbromide has peripheral antimuscarinic antisecretory effects and gastrointestinal, biliary and urinary tract antispasmodic effects.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ Excessive oral secretions in the unconsious patient during end of life care.
- ✔ Abdominal colic during end of life care.
- ✔ Abdominal colic due to muscle spasm of the GI tract.

Contraindications

- ✖ Known severe allergy.
- ✖ Pregnant.
- ✖ Breastfeeding.

Cautions

- ⛔ Myasthenia gravis.
- ⛔ Gastrointestinal obstruction except in end of life care.
- ⛔ Urinary retention.
- ⛔ Glaucoma.
- ⛔ Tachydysrhythmia.

Use in pregnancy or when breastfeeding

- Safety has not been demonstrated during pregnancy or breastfeeding.

Dosage

- Adults:
  - Oral secretions in end of life care: 20 mg IV or SC, repeat at one-hour intervals if required.
  - Abdominal colic in end of life care: 20 mg IV or SC, repeated at 1-4 hours, to a maximum of 300 mg/day.
  - Abdominal colic due to muscle spasm of the GI tract: 20 mg IV or SC, first repeat after 30 minutes, then repeat at six-hour intervals to a maximum of 100 mg per day.
- Children: see the paediatric drug dose table.

Administration

- Adults: Administer IV or SC undiluted over one minute.
- Children:
  - IV: dilute 20 mg to a total of 10 ml using 0.9% sodium chloride. This solution contains 2 mg/ml.
  - SC: administer undiluted.

Common adverse effects

- Drowsiness.
- Tachycardia.

Usual onset of effect

- IV and SC: 10 minutes.

Usual duration of effect

- 5-6 hours.

Usual preparation

- Ampoule containing 20 mg in 1 ml.

Pharmacokinetics

- Hyoscine butylbromide is highly polar and does not cross the blood brain barrier.
- Approximately two-thirds is excreted renally and one-third excreted via the urine after IV administration.

Common interactions

- Anticholinergic effects of other medicines may be intensified by hyoscine butylbromide. These include:
  - Tricyclic antidepressants.
  - Antihistamines.
  - Antipsychotics.
  - Anticholinergics (for example, ipratropium and atropine).
- The tachycardic effects of beta agonists (for example, salbutamol) may be enhanced by hyoscine butylbromide.

Additional information

- Hyoscine butylbromide does not enter the CNS and has no central anticholinergic effects. It has peripheral anticholinergic effects resulting from anti-muscarinic action. These include drying of the oral mucosa.
- The cautions listed in this section are more relevant to oral dosing for antispasmodic action in non-terminal patients and are less relevant to patients in the final days of terminal illness.

11.21 Ibuprofen

This medicine section describes ibuprofen in the context of the ECP CPGs. For other indications/dosing, refer to the relevant section in the EAS CPGs.

Mechanism of action

- Ibuprofen is a non-steroidal anti-inflammatory drug (NSAID) that is predominantly used for treating pain.
- Ibuprofen inhibits the activity of the enzyme prostaglandin synthetase, reducing prostaglandin production and causing a reduction in inflammation, pain and fever.

Delegated scopes of practice

- Extended Care Paramedics (high dose ibuprofen).

Indications

- ✔ Mild pain (usually in combination with paracetamol), particularly soft tissue pain, musculoskeletal pain or headache.
- ✔ May be administered in addition to other medicines for moderate to severe pain.
- ✔ Pain associated with renal colic, gout and musculoskeletal problems (particularly arthritis).

Contraindications

- ✖ Known severe allergy.
- ✖ Third trimester of pregnancy.

Cautions

- ⛔ The patient has taken ibuprofen within the last four hours. Ibuprofen is contained in many products such as cold and flu tablets/drinks, combination analgesics and migraine tablets. Additional ibuprofen may be administered provided it is clear that the total dose taken within a four hour period does not exceed the dose described within these CPGs. Withhold ibuprofen if there is any doubt.
- ⛔ Abdominal pain, particularly if the patient is very unwell or vomiting. Clinical judgement is required, but if the patient is very unwell or vomiting the possibility of significant intra-abdominal pathology exists and oral medicine should usually be withheld.
- ⛔ Age greater than or equal to 75 years, particularly in the presence of illness, infection or dehydration. In this setting renal impairment is likely and ibuprofen may worsen renal impairment.
- ⛔ Dehydration or shock. Renal impairment is likely and ibuprofen may worsen renal impairment.

- Has taken parecoxib in the last 24 hours.
- Known renal impairment. Ibuprofen may worsen renal impairment.
- Known bleeding disorder. Ibuprofen will increase the risk of bleeding and because other forms of analgesia are available, the balance of risk is usually in favour of withholding ibuprofen.
- Clinically significant bleeding. Ibuprofen will increase the risk of bleeding and the nature and risk of the bleeding must be taken into account.
- Known worsening of bronchospasm with NSAIDs. Some patients with asthma or COPD have known worsening of bronchospasm with NSAIDs. If there is a clear history of significant bronchospasm with NSAIDs, ibuprofen should be withheld.
- Taking warfarin. Ibuprofen displaces warfarin from binding sites and increases the activity of warfarin. This effect is usually only clinically important with chronic administration, however ibuprofen should be withheld if a patient taking warfarin has signs of bleeding or a clinical condition that may involve bleeding. Examples include trauma or a likely need for surgery. If there is any doubt the balance of risk is in favour of withholding ibuprofen.
- Pregnancy.
- Chicken pox. This is due to the increased risk of cellulitis or abscess.

Use in pregnancy or when breastfeeding

- May cause harm during pregnancy. Ibuprofen has been associated with premature delivery and premature closure of the ductus arteriosus, when administered during the third trimester of pregnancy. Because other forms of analgesia are available ibuprofen should be usually be withheld during pregnancy.
- May be administered if the patient is breastfeeding. Advise the patient to stop breastfeeding and seek further advice from their lead maternity carer or GP.

Dosage

- Adults: 400 – 600 mg PO three to four times a day, up to a maximum of 2400 mg per day.
- The dose range for ECP administration of ibuprofen is significantly higher than for EAS situations.
- Use the lowest dose for the shortest duration.
- Short-term escalation of ibuprofen doses up to a maximum of 2400 mg/day for presentations with more severe pain is usually safe in patients at low risk of adverse effects from NSAIDs.

Administration

- Administer PO.
- Children unable to swallow tablets may be administered ibuprofen syrup, or tablets that have been crushed and placed in a soft food such as jam or honey.

Common adverse effects

- Renal impairment.
- Increased bleeding.
- Although indigestion, gastrointestinal ulceration and gastrointestinal bleeding are commonly listed as adverse effects, these are only associated with chronic administration.

Usual onset of effect

- 30-60 minutes.

Usual duration of effect

- 4-6 hours.

Usual preparation

- 200 mg tablets.
- Syrup containing 20 mg/ml.

Pharmacokinetics

- Ibuprofen is absorbed in the stomach and small intestine. The presence of food in the stomach will delay absorption, but this is not usually clinically significant.
- Ibuprofen is metabolised by the liver.
- There are no significant effects from liver impairment on acute administration.

Common interactions

- Warfarin. Ibuprofen displaces warfarin from binding sites and increases the activity of warfarin.

11.22 Kenacomb™ ear drops

Mechanism of action

- Kenacomb™ ear drops contain 0.025% gramicidin, 0.25% neomycin, 100,000 units nystatin and 0.1% triamcinolone acetonide per gram.
- Triamcinolone acetonide is a potent corticosteroid with rapid anti-inflammatory, anti-pruritic and anti-allergenic actions.
- The combined action of the neomycin and gramicidin antibiotics provides coverage of a wide range of gram-positive and gram-negative bacteria, including organisms responsible for most bacterial skin infections.
- Nystatin is an antifungal agent, which is active against a wide range of yeast and yeast-like fungi (including *candida albicans*).

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Otitis externa.

Contraindications

✖ Known severe allergy.

Cautions

⛔ None.

Use in pregnancy or when breastfeeding

- Kenacomb™ ear drops are safe to administer during pregnancy and while breastfeeding.

Dosage

- Two drops per affected ear 3-4 times daily for five days.

Administration

- Administer the drops into the ear canal.

Common adverse effects

- Minor skin irritation is the most common adverse effect but is still rare.

Usual onset of effect

- 1-2 hours.

Usual duration of effect

- 12-18 hours. The effects of some components of the ear drops can last longer.

Usual preparation

- Dropper bottle containing 7.5 ml.
- Kenacomb™ ear drops require refrigeration and storage at 2-8°C.

Pharmacokinetics

- The systemic pharmacokinetics of individual ingredients of the ear drops is not known.

Common interactions

- None.

Additional information

- If unable to view the tympanic membrane (therefore unable to confirm membrane rupture), Kenacomb™ ear drops should still be administered.

11.23 Levonorgestrel

Mechanism of action

- The precise mechanism of action is unknown, however levonorgestrel is thought to work mainly by preventing ovulation and fertilisation if sexual intercourse has taken place in the pre-ovulatory phase when likelihood of fertilisation is highest.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Emergency contraception within 72 hours of unprotected sexual intercourse.

Contraindications

✖ Known severe allergy.

✖ Pregnant.

Cautions

⛔ Uncertainty about the timing of the most recent unprotected sexual intercourse.

⛔ Unprotected sexual intercourse more than 72 hours earlier in the same menstrual cycle.

⛔ Patients at risk of ectopic pregnancy (for example, history of salpingitis or of ectopic pregnancy).

Use in pregnancy or when breastfeeding

- Levonorgestrel should not be administered to patients who are pregnant.
- Levonorgestrel will not abort a pregnancy.
- Reduction of exposure of levonorgestrel to an infant who is breastfeeding can be reduced by taking levonorgestrel immediately after feeding and then delaying the next breast feed for eight hours.

Dosage

- 1.5mg PO if the patient weighs less than or equal to 70 kg.
- 3 mg PO (two tablets) if the patient weighs greater than 70 kg or is taking any of the medications that are CYP3A4 enzyme inducers:
  - Barbiturates (for example primidone) and other medications used to treat epilepsy (for example phenytoin and carbamazepine).
  - Medicines used to treat tuberculosis (for example rifampicin, rifabutin).
  - A treatment for HIV (for example ritonavir, efavirenz).
  - A medicine used to treat fungal infections (for example griseofulvin).
  - Herbal remedies containing St John's Wort (Hypericum perforatum).

Administration

- Administer PO.
- If vomiting occurs within three hours of taking a tablet, another tablet should be taken immediately.

Common adverse effects

- Nausea.

Usual onset of effect

- Two hours.

Usual duration of effect

- 6-8 hours.

Usual preparation

- 1.5 mg tablets.

Pharmacokinetics

- Levonorgestrel is metabolised in the liver and is excreted in equal proportions in urine and faeces.

Common interactions

- Levonorgestrel plasma levels may be reduced by up to 50% by medications that are CYP3A4 enzyme inducers.

Additional information

- The efficacy of increasing levonorgestrel doses for patients weighing greater than or equal to 70 kg or who are taking CYP3A4 enzyme inducers is not known.

11.24 Levomepromazine

Mechanism of action

- Levomepromazine is a neuroleptic antipsychotic with complex actions including strong sedative effects and analgesic, antiemetic, antihistaminic and anti-adrenergic effects.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Agitation during end of life care that is not rapidly managed by midazolam.

✔ Breakthrough nausea and/or vomiting in end of life care.

Contraindications

✖ Known severe allergy.

Cautions

⛔ Mobile elderly or frail patients.

⛔ Hypotension.

Use in pregnancy or when breastfeeding

- Patients receiving end of life care are unlikely to be pregnant or breastfeeding and personnel should seek clinical advice.

Dosage

- Adults:
  - Agitation: 10-15 mg IV or SC.
  - Nausea and/or vomiting: 5-10 mg IV or SC, repeat at four-hour intervals to a maximum of 25 mg/day.
- Children: see the paediatric drug dose table.
- Repeat hourly until control of symptoms is achieved.

Administration

- For IV administration: dilute 25 mg to a total of 5 ml using 0.9% sodium chloride. This solution contains 5 mg/ml.
- For SC administration: administer undiluted.

Common adverse effects

- Hypotension.
- Drowsiness.
- Confusion.

- Extrapyramidal effects.
- Urinary retention in the elderly.

Usual onset of effect

- IV: 5-10 minutes.
- SC: 30-90 minutes.

Usual duration of effect

- 12-24 hours.

Usual preparation

- Ampoule containing 25 mg in 1 ml.

Pharmacokinetics

- Levomepromazine has a half life of approximately 30 hours and is slowly excreted in the urine and faeces.

Common interactions

- Like other neuroleptics, levomepromazine may prolong the QT interval. This is very rare.

Additional information

- Levomepromazine does not lead to significant respiratory depression and is useful in situations with respiratory compromise.
- Consider commencing with IV dosing and then de-escalate to SC dosing when control of symptoms has been achieved.

11.25 Lignocaine 2%/chlorhexidine 0.05% gel

Mechanism of action

- Lignocaine is a local anaesthetic. It blocks the initiation and transmission of nerve impulses by blocking the movement of sodium ions across the nerve cell membrane.
- Chlorhexidine is a broad spectrum antimicrobial disinfectant with rapid activity against gram- positive, gram-negative and anerobic bacteria, yeasts and some viruses. It works by cationic binding to cell membrane. At low concentrations it is bacteriostatic and at high concentrations is destroys the cell membrane and is bactericidal.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Prior to placement of a urinary catheter.

Contraindications

✖ Known severe allergy to lignocaine or chlorhexidine.

Cautions

⛔ None.

Use in pregnancy or when breastfeeding

- Lignocaine 2%/chlorhexidine 0.05% gel is safe to administer during pregnancy and while breastfeeding.

Dosage

- 11-22 ml (1-2 syringes)

Administration

- Insert the shaped applicator nozzle 5-10 mm into the external urethral meatus and gently instill the entire contents of the syringe.
- Wait 2-3 minutes before placing a catheter to allow time for the local anaesthetic to work.
- Use a second syringe in men if required.

Common adverse effects

- There are no common adverse effects.

Usual onset of effect

- The onset of local anaesthetic effect is 2-3 minutes.

Usual duration of effect

- The local anaesthetic effects last for 20-40 minutes.

Usual preparation

- Pre-filled syringe containing 11 ml of lignocaine 2% and chlorhexidine 0.05% lubricant gel.

Pharmacokinetics

- There is minimal evidence of systemic absorption.

Common interactions

- None.

11.26 Lignocaine 4%/fluorescein 0.25% eye drops

Mechanism of action

- Lignocaine is a local anaesthetic. It blocks the initiation and transmission of nerve impulses by blocking the movement of sodium ions across the nerve cell membrane.
- Fluorescein is an organic dye. It does not stain a normal cornea but will stain conjunctival abrasions yellow or orange, corneal abrasions or ulcers bright green and surround foreign bodies with a green ring.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Suspected corneal abrasions and/or corneal foreign bodies.

Contraindications

✖ Known allergy to lignocaine or fluorescein.

Cautions

⛔ None.

Use in pregnancy or when breastfeeding

- Lignocaine 4%/fluorescein 0.25% eye drops are safe to administer during pregnancy and while breastfeeding.

Dosage

- Two drops for each eye being examined.

Administration

- Apply two drops into the outer temporal aspect of the eye. Ask the patient to blink several times.
- The anaesthetised eye needs to be protected from foreign body contamination for the duration of the anaesthetic effect.

Common adverse effects

- There are no common adverse effects.
- If the fluorescein comes into contact with skin, it may stain the skin for several days.

Usual onset of effect

- The onset of local anaesthetic effect is 2-3 minutes.
- The fluorescein staining effect is immediate. The patient may need to blink several times to move the dye around the eye surface.

Usual duration of effect

- The local anaesthetic effect last for 20-40 minutes.
- The dye effect last for 10-15 minutes until it is washed away by the tears.

Usual preparation

- Plastic ampoule containing 0.5 ml of solution.
- Lignocaine 4%/fluorescein 0.25% eye drops require refrigeration and storage at 2-8°C.

Pharmacokinetics

- There is minimal evidence of systemic absorption and local pharmacokinetic behaviour on the surface of the eye is not well understood.

Common interactions

- None.

11.27 Lignocaine 5%/phenylephrine 0.5% spray

Mechanism of action

- Lignocaine 5%/phenylephrine 0.5% spray is also known as Entop spray.
- Lignocaine is a local anaesthetic. It blocks the initiation and transmission of nerve impulses by blocking the movement of sodium ions across the nerve cell membrane.
- Phenylephrine is a selective alpha-1 receptor agonist and causes vasoconstriction of blood vessels.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Moderate to severe epistaxis.

✔ Toothache requiring a dental block.

Contraindications

✖ Known severe allergy.

✖ Known hypersensitivity to amide local anaesthetics.

Cautions

⛔ Known severe liver impairment.

⛔ Prescribed moclobemide or tricyclic antidepressants.

Use in pregnancy or when breastfeeding

- Safety during pregnancy has not been demonstrated and it is unknown how much is excreted in breast milk.
- Lignocaine 5%/phenylephrine 0.5% spray should be avoided unless there is a compelling clinical reason to administer it and no other reasonable alternative treatment option.

Dosage

- Five sprays.

Administration

- Epistaxis: Administer five sprays IN into each nostril via the applicator.
- Dental block: Administer five sprays onto the area of pain on the gum.

Common adverse effects

- Bitter taste.
- Adverse effects due to systemic absorption should not occur at the recommended doses.

Usual onset of effect

- 1-3 minutes.

Usual duration of effect

- 30-60 minutes.

Usual preparation

- 50 ml multi-dose container with disposable applicators.

Pharmacokinetics

- Clearance is prolonged if the patient has significant renal impairment, but this does not alter the initial dose.

Common interactions

- None.

11.28 Loperamide

Mechanism of action

- Loperamide binds to the opiate receptors in the gut wall, reducing peristalsis and enhancing resorption of water and electrolytes.
- It also increases the tone of the anal sphincter, which reduces faecal incontinence and urgency.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Severe acute diarrhoea (greater than six per day), or if at risk of dehydration or acute kidney injury.

Contraindications

✖ Known severe allergy.
✖ Aged less than 12 years.
✖ Acute bloody diarrhoea with high fever.
✖ Acute ulcerative colitis.
✖ Bacterial enterocolitis from invasive organisms (such as salmonella, shigella, and campylobacter).
✖ Glucose-galactose malabsorption.

Cautions

⛔ Glaucoma.
⛔ Intestinal stasis.
⛔ Liver impairment.

Use in pregnancy or when breastfeeding

- Loperamide is safe to administer during pregnancy and while breastfeeding.

Dosage

- Initial dose: 4 mg.
- Subsequent doses: 2 mg after each loose bowel motion (up to 16 mg per day).

Administration

- Administer PO.

Common adverse effects

- Nausea.
- Abdominal cramping.
- Dizziness.
- Drowsiness.
- Urticaria.
- Rash.

Usual onset of effect

- 1 hour.

Usual duration of effect

- 14 hours.

Usual preparation

- 2 mg capsules.

Pharmacokinetics

- Loperamide is metabolised in the liver and predominantly excreted in the faeces.

Common interactions

- None.

11.29 Loratadine

This medicine section describes loratadine in the context of the ECP CPGs. For other indications, refer to the relevant section in the EAS CPGs.

Mechanism of action

- Loratadine is a non-sedating antihistamine.
- Loratadine antagonises (blocks) peripheral histamine receptors, blocking the action of histamine and reducing itching and redness.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Rash associated with prominent itch.

✔ Conjunctivitis with prominent itch.

Contraindications

✖ Known severe allergy.

✖ Aged less than one year.

Cautions

⛔ Pregnancy.

Use in pregnancy or when breastfeeding

- No evidence of teratogenicity. May cause neonatal irritability and tremor in late third trimester. Avoid in the third trimester.
- May be administered if the patient is breastfeeding. Advise the patient to stop breastfeeding and seek further advice from their lead maternity carer or GP.

Dosage

- 10-20 mg for an adult or child aged greater than or equal to 12 years. The larger dose should be considered if the rash and/or itch is severe.
- See the paediatric drug dose tables for a child.

Administration

- Administer PO.
- Always ask a parent (or guardian) if a young child can swallow tablets.
  Loratadine may be crushed and placed in a soft food such as jam or honey.

Common adverse effects

- None.

Usual onset of effect

- 30-60 minutes.

Usual duration of effect

- 12-24 hours.

Usual preparation

- 10 mg tablets.

Pharmacokinetics

- Loratadine is predominantly metabolised in the liver.
- There are no significant effects from liver impairment on acute administration.

Common interactions

- None.

11.30 Metoprolol

This medicine section describes metoprolol in the context of the ECP CPGs. For other indications, refer to the relevant section in the EAS CPGs.

Mechanism of action

- Metoprolol is a beta-blocker. It preferentially antagonises (blocks) beta-1 adrenergic receptors in the heart, causing a decrease in heart rate, cardiac output and blood pressure.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Adults with atrial fibrillation who are asymptomatic or have only mild symptoms with no myocardial ischaemia.

Contraindications

✖ Known severe allergy.
✖ Bradycardia. Metoprolol will further reduce the heart rate.
✖ Hypotension. Metoprolol will further reduce the blood pressure.
✖ Any history of heart block.
✖ Asthma or COPD.
✖ Concurrent use of diltiazem or verapamil.
✖ Already taking metoprolol.

Cautions

⛔ Heart failure.

Use in pregnancy or when breastfeeding

- Safety has not been demonstrated during pregnancy. The likelihood of administration being required in a woman who is pregnant is so low that personnel must seek clinical advice prior to administration.
- May be administered if the patient is breastfeeding. Advise the patient to stop breastfeeding and seek further advice from their lead maternity carer or GP.

Dosage

- 47.5 mg PO once daily for five days.

Administration

- Administer PO. Do not to crush or chew.

Common adverse effects

- Bradycardia.
- Bronchospasm.
- Fatigue.
- Dizziness.
- Headache.
- Nausea.

Usual onset of effect

- The onset of effect for controlled release (CR) metoprolol is not clear but is likely to be approximately 4-6 hours.

Usual duration of effect

- 20 hours.

Usual preparation

- 47.5 mg tablets in a controlled release (CR) coating.

Pharmacokinetics

- Metoprolol is metabolised in the liver and excreted in the urine.

Common interactions

- The blood pressure effect will be potentiated by other medicines that lower blood pressure. For example, GTN, antihypertensive medicines and amiodarone.
- The heart rate effects will be potentiated by other medicines that lower the heart rate. For example, amiodarone, and centrally acting calcium channel blockers such as diltiazem.

11.31 Metronidazole

Mechanism of action

- Metronidazole is in the nitroimidazoles class of antimicrobials and has activity against protozoa (trichomonas, amoebae and giardia lamblia) and anaerobic bacteria (including Bacteroides).
- The exact mechanism of action of metronidazole is unknown but involves disruption of DNA synthesis.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ Mild community-acquired aspiration pneumonia and allergic to penicillin.
- ✔ Diverticulitis with features of infection and allergic to penicillin.
- ✔ Dental abscess and risk factors for infection.
- ✔ Mammal bite requiring antibiotic prophylaxis and allergic to penicillin.

Contraindications

- ✖ Known severe allergy.
- ✖ Known severe allergy to nitroimidazole antimicrobials.
- ✖ History of leukaemia or white blood cell abnormality.
- ✖ Pregnant or breastfeeding.

Cautions

- ⛔ Alcohol use. When alcohol is taken in combination with metronidazole, this can trigger an 'antabuse-like' effect (including nausea, vomiting, abdominal pain and myalgia).

Use in pregnancy or when breastfeeding

- There is evidence that metronidazole causes harm during pregnancy, particularly in the first trimester of pregnancy. Metronidazole is contraindicated during pregnancy.
- Metronidazole is excreted at relatively high concentrations in breastmilk and is contraindicated if the patient is breastfeeding.

Dosage

- The dose is dependent on the indication. See the relevant sections.

Administration

- Administer PO.

Common adverse effects

- Rash or itch.
- Mild gastrointestinal effects including nausea, vomiting, abdominal pain and a metallic taste.

Usual onset of effect

- Clinical effects are usually observed within 48-72 hours.

Usual duration of effect

- Metronidazole has a half life of 7-8 hours.

Usual preparation

- 200 mg tablets.

Pharmacokinetics

- Metronidazole has a high oral bioavailability but does undergo a degree of first pass metabolism in the hepatic circulation.
- It is widely distributed throughout the body and is metabolised extensively in the liver.
- The way in which metronidazole is excreted is not fully understood but is thought to be via renal clearance.

Common interactions

- Alcohol. Consumption must be avoided for up to 72 hours following completion of the course of metronidazole.

11.32 Miconazole 2%/hydrocortisone 1%

Mechanism of action

- Miconazole 2%/hydrocortisone 1% cream is a topical anti-fungal cream that has two active ingredients.
- Miconazole has a broad antimycotic spectrum of action, including coverage of dermatophytes, yeasts, moulds and some gram-positive bacteria. It inhibits an enzyme required for synthesis of ergosterol, leading to structural and functional impairment of the fungus.
- Topical hydrocortisone 1% is a mild corticosteroid. It works by diffusing across epithelial cell membranes and fusing with specific cellular receptors, stimulating production of proteins which exert a widespread anti-inflammatory effect (including reduction of oedema, capillary dilation and the influx of inflammatory mediators).

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Rash suspected to be caused by a fungal infection.

Contraindications

✖ Known severe allergy.

✖ Known hypersensitivity to hydrocortisone, miconazole or other azoles.

Cautions

⛔ None.

Use in pregnancy or when breastfeeding

- Topical miconazole 2% /hydrocortisone 1% cream is safe to administer during pregnancy and while breastfeeding.

Administration

- Apply to the affected area 2-3 times daily for 2-3 days after the rash has completely resolved (which may take 1-2 weeks).
- Advise the patient to wash their hands following application.

Common adverse effects

- None.

Usual onset of effect

- 2-3 days.

Usual duration of effect

- The exact duration of action is not known, but some effect may continue for 48-72 hours following a single application.

Usual preparation

- 15 g tube.

Pharmacokinetics

- Following topical application, hydrocortisone diffuses through the skin and hair follicles. Absorption varies depending on where on the body the cream is applied, and the hydrocortisone is excreted into the urine over approximately ten days.
- Miconazole can remain on the skin for up to four days following a single topical administration. Due to the rapid hepatic metabolism of miconazole into pharmacologically inactive metabolites, there is no measurable systemic effect with normal usage.

Common interactions

- None.

Additional information

- This preparation is not suitable for the treatment of internal vaginal thrush and is suitable for external use only.

11.33 Microlax enema

Mechanism of action

- Microlax enema is an osmotic laxative and contains sorbitol, citrate sodium dihydrate and lauryl sulfoacetate sodium.
- It works by drawing fluid from the body into the large bowel. The increased fluid in the bowel softens the stool and stimulates peristalsis.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Moderate constipation.

Contraindications

✖ Known severe allergy.

✖ Acute gastrointestinal conditions (other than constipation).

✖ Aged less than 12 years.

Cautions

⛔ Elderly.

Use in pregnancy or when breastfeeding

- Short term use of Microlax is safe during pregnancy and while breastfeeding.

Dosage

- 5 ml. Can be repeated once.

Administration

- Administered PR.
- Insert the contents of one enema into the rectum as a single dose.

Common adverse effects

- Nausea.
- Abdominal cramping.
- Flatulence.
- Electrolyte disturbance.

Usual onset of effect

- 15 minutes.

Usual duration of effect

- 1-2 hours.

Usual preparation

- 5 ml enema tube.
- Made up of sorbitol 3.125 g/5 ml, citrate sodium dihydrate 450 mg/5 ml, and lauryl sulfoacetate sodium 45 mg/5 ml.

Pharmacokinetics

- The components of the enema are not absorbed or metabolised in the body.
- Excretion occurs via the faeces.

Common interactions

- None.

Additional information

- Enema failure usually occurs as a result of failure to retain the enema contents in the rectum long enough for them to take effect (usually 10 - 15 minutes).

11.34 Midazolam

This medicine section describes midazolam in the context of the ECP CPGs. For other indications, refer to the relevant section in the EAS CPGs.

Mechanism of action

- Midazolam is a benzodiazepine which enhances the activity of gamma-aminobutyric acid (GABA) at GABA receptors within the central nervous system, resulting in anticonvulsant activity, sedation, amnesia, anxiolysis and muscle relaxation.

Delegated scopes of practice

- Extended Care Paramedics:
  - IV, SC, and IM for end of life care.
  - IN for severe end-stage COPD.
  - IV for severe muscle spasm in non-traumatic lower back pain.

Indications

- ✔ Breakthrough symptoms of agitation, myoclonic jerks or seizure activity during end of life care.
- ✔ Severe end-stage COPD that is being managed conservatively.
- ✔ Severe muscle spasm in non-traumatic lower back pain.

Contraindications

- ✖ Known severe allergy.

Cautions

- ⛔ Concurrent administration of opiates, ketamine or other sedatives. This will increase and prolong the effects.
- ⛔ Intoxication. This will increase and prolong the effects.
- ⛔ Elderly and/or frail. These will increase and prolong the effects.

Use in pregnancy or when breastfeeding

- Patients receiving end of life care or with COPD are unlikely to be pregnant or breastfeeding and personnel should seek clinical advice.

Dosage

- The dose is dependent on the indication and route. See the individual sections.

Administration

- IV administration:
  - Dilute 2 ml from a 15 mg/3 ml ampoule to a total of 10 ml using 0.9% sodium chloride. This solution contains 1 mg/ml.
  - Administer IV as a bolus.

- SC administration: Draw up the dose from the 15 mg/3 ml ampoule and administer undiluted.
- IM administration:
  - Draw up the dose from the 15 mg/3 ml ampoule. Do not dilute.
  - The preferred site is the lateral thigh as this has the best absorption. If this site is not suitable use the lateral upper arm.
- IN administration:
  - Dilute 1 ml from a 15 mg/3 ml ampoule to a total of 5 ml using 0.9% sodium chloride. This solution contains 1 mg/ml.
  - Draw off 0.5 ml (0.5 mg) of this 1 mg/ml solution. The dead space of the mucosal atomiser is very small in relation to the overall volume administered and does not need to be taken into account.
  - Administer 0.5 mg midazolam IN by rapidly injecting it into the nostril. Rapid injection is required in order to achieve a fine mist, which maximises absoprtion.

Common adverse effects

- Sedation.
- Respiratory depression.
- Hypotension.
- Amnesia.

Usual onset of effect

- IV: 2-3 minutes.
- IM/SC: 3-5 minutes.
- IN: 3-5 minutes.

Usual duration of effect

- 30-60 minutes. The sedative effect may be longer, particularly in the elderly.

Usual preparation

- Ampoule containing 15 mg in 3 ml.

Pharmacokinetics

- Midazolam is predominantly metabolised by the liver.
- There are no significant effects from liver impairment on acute administration.

Common interactions

- The effects will be increased and prolonged in the presence of other sedatives or pain relieving medicines (for example other benzodiazepines, opiates, ketamine and alcohol).

Additional information

- When administering midazolam for sedation or analgesia the patient must be able to obey commands at all times.

11.35 Nitrofurantoin

Mechanism of action

- Nitrofurantoin has a unique and complex mechanism of action targeting bacterial DNA.
- Nitrofurantoin is indicated for urinary tract infections because it is concentrated in the urine.
- Nitrofurantoin is bacteriostatic at low doses and bactericidal at high doses.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Urinary tract infection.

✔ Following urinary catheter placement if:

  – The patient has a history of symptomatic UTI or sepsis after previous catheter changes, or
  – There has been a traumatic insertion (frank haematuria following catheter placement, or greater than one attempt).

Contraindications

✖ Known severe allergy.

✖ Moderate to severe renal impairment.

✖ G6PD deficiency or acute porphyria.

✖ Aged less than one year.

✖ Pregnant and greater than or equal to 36 weeks gestation.

Cautions

⛔ Suspected renal impairment.

⛔ Breastfeeding infant aged three months or less.

Use in pregnancy or when breastfeeding

- Nitrofurantoin must be avoided if the patient is greater than or equal to 36 weeks gestation because of the risk of neonatal haemolysis.
- Nitrofurantoin should be avoided if breastfeeding an infant aged three months or less.

Dosage

- The dose is dependent on the indication, patient sex, and other clinical features. See the relevant section.

Administration

- Administer PO. Absorption is improved by taking nitrofurantoin with food as it delays gastric emptying.

Common adverse effects

- Mild gastrointestinal upset.

Usual onset of effect

- Clinical effects are usually observed within 48-72 hours.

Usual duration of effect

- The half life of nitrofurantoin is 3-4 hours.

Usual preparation

- 100 mg tablets (modified release).

Pharmacokinetics

- Nitrofurantoin is absorbed moderately well when taken orally and is rapidly excreted in the urine.

Common interactions

- Antacids may reduce absorption.
- Probenecid may cause an increase in nitrofurantoin to toxic levels and should not be administered simultaneously.

Additional information

- Nitrofurantoin may colour the urine yellow or brown. Patients should be advised of this.

11.36 Ondansetron

This medicine section describes ondansetron in the context of the ECP CPGs, specifically administration by the PO route. For other indications, refer to the relevant section in the EAS CPGs.

Mechanism of action

- Ondansetron is an antiemetic.
- Ondansetron antagonises serotonin receptors centrally in the brain and peripherally in the gastrointestinal tract, resulting in a reduction in nausea and vomiting.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Clinically significant nausea and/or vomiting.

Contraindications

✖ Known severe allergy.

✖ Aged less than one year.

Cautions

⛔ Concurrent use of other serotonergic medications (for example, antidepressants).

Use in pregnancy or when breastfeeding

- Safety has not been demonstrated during pregnancy, but ondansetron may be administered if nausea and/or vomiting is severe.
- May be administered if the patient is breastfeeding. Advise the patient to stop breastfeeding and seek further advice from their lead maternity carer or GP.

Dosage

- For adults:
  - PO: 8 mg. Repeat at 12 hours if required.
  - IM: 4 mg. The dose may be repeated once after 20 minutes.
  - IV: 8 mg.
- See the paediatric drug dose table for children.

Administration

- Administer IV and IM undiluted.
- The preferred site for IM administration is the lateral thigh as this has the best absorption. If this site is not suitable use the lateral upper arm.

Common adverse effects

- Constipation.
- Headache.
- Flushing.

Usual onset of effect

- PO: 20 minutes.
- IM: 5-10 minutes.
- IV: 2-5 minutes.

Usual duration of effect

- 4-8 hours.

Usual preparation

- Ampoule containing 8 mg in 4 ml.
- 8 mg tablets
- 4 mg tablets.

Pharmacokinetics

- Ondansetron is predominantly metabolised by the liver.
- There are no significant effects from liver impairment on acute administration.

Common interactions

- Ondansetron has been reported to prolong the QT interval, particularly if doses are high and are administered in conjunction with other medicines that also prolong the QT interval, for example erythromycin. However, one or two doses in this setting is safe.
- Ondansetron may contribute to serotonin syndrome when administered to patients who are concurrently taking other serotonergic medicines including:
  - SSRIs such as citalopram, fluoxetine or sertraline.
  - Tricyclic antidepressants such as amitriptyline, clomipramine or dothiepin.
  - Synthetic opioid analgesics such as tramadol or fentanyl.

Additional information

- Prophylactic administration of ondansetron is not routinely required. Consider administering ondansetron if the nature of the patient's injuries and transport position are such that vomiting would be particularly problematic.
- Ondansetron should not be administered for vomiting associated with an altered level of consciousness because it is rarely effective in this setting.
- Ondansetron has been reported to further prolong the QT interval in patients known to have a prolonged QT syndrome. This generally involved repeated and/or high doses and one or two doses is safe, even if the patient is known to have a prolonged QT syndrome.

11.37 Oral rehydration formula

Mechanism of action

- Oral rehydration formula (ORF) is a balanced electrolyte solution containing sodium, potassium and glucose.
- Transport proteins within the small intestine pump the glucose and sodium into the capillaries of the small bowel, creating an osmotic gradient and pulling water from the intestine into the capillaries.
- This provides both electrolytes and water to the intravascular space.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Mild to moderate dehydration in gastroenteritis (predominantly in children).

Contraindications

✖ Severe dehydration. This requires IV fluid administration.

Cautions

⛔ Suspected abdominal pathology requiring surgery.

Use in pregnancy or when breastfeeding

- ORF is safe to administer during pregnancy and while breastfeeding.

Dosage

- 1 ml/kg every five minutes for four hours (to a maximum of 50 ml/kg).
- If the patient is vomiting, small amounts of ORF may be administered and the volume increased once the vomiting has settled.

Administration

- Administer PO.

Common adverse effects

- None.

Usual onset of effect

- 10-15 minutes.

Usual duration of effect

- This is dependent on the severity of dehydration and volume of ORF ingested.

Usual preparation

- Sachet containing powder for reconstitution.

Common interactions

- None.

Additional information

- If the patient is still being breastfed or formula fed, they may continue to take this if it is tolerated without excessive vomiting.

11.38 Oxycodone

Mechanism of action

- Oxycodone is an opiate agonist that binds to opiate receptors in the brain and spinal cord causing analgesia.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ Adults with lumbar back pain not controlled with simple oral analgesia.
- ✔ Step three analgesia for adults aged 13-65 years.

Contraindications

- ✖ Known severe allergy.
- ✖ Severe liver disease.
- ✖ Pregnancy.
- ✖ Breastfeeding.
- ✖ Age less than 15 years.

Cautions

- ⛔ High risk of respiratory depression. For example, severe COPD, morbid obesity or on home BiPAP. Such patients may develop respiratory depression following opiate administration.
- ⛔ Elderly and/or frail.
- ⛔ Known opiate dependence.
- ⛔ Concurrent alcohol or recreational drug use.
- ⛔ Concurrent use of sedatives or antidepressants.

Use in pregnancy or when breastfeeding

- Oxycodone is not safe in pregnancy and must not be administered.
- Oxycodone must not be administered if the patient is breastfeeding as it risks respiratory depression in the breastfeeding infant.

Dosage

- 10 mg PO.
- Repeat once after 12 hours if required.
- The maximum amount of oxycodone to be supplied to a patient is one tablet.

Administration

- Administer PO.
- Swallow the tablets whole, do not crush or chew.

Common adverse effects

- Respiratory depression.
- Nausea.
- Constipation.

Usual onset of effect

- 1-2 hours.

Usual duration of effect

- 12 hours.

Usual preparation

- 10 mg tablets in a CR coating.

Pharmacokinetics

- Absorption of CR oxycodone is biphasic with initial absorption of approximately 40% of the dose meaning most patients experience analgesia within one hour. This is followed by more controlled absorption over many hours.
- Oxycodone is metabolised in the liver and excreted via urine and faeces.
- Oxycodone crosses the placenta and is found in breast milk.

Common interactions

- The effects of anticholinergic medicines may be increased resulting in increased risk of constipation and/or urinary retention.
- Oxycodone may potentiate the effects of other opioids, sedatives, hypnotic agents and alcohol resulting in respiratory depression and/or sedation.

Additional information

- Oxycodone has approximately three times the oral bioavailability compared to morphine and this accounts for its potency.
- Chewing or crushing the controlled release preparation of oxycodone may cause rapid release and absorption of a potentially toxic dose of oxycodone.
- Have a low threshold for concurrently administering sennoside-B if the patient does not have access to laxatives. This will minimise the risk of opioid induced constipation.

11.39 Paracetamol

This medicine section describes paracetamol IV in the context of the ECP CPGs. For other indications and routes, refer to the relevant section in the EAS CPGs.

Mechanism of action

- Paracetamol inhibits the production of prostaglandins resulting in a reduction in pain and fever.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ Breakthrough pain in adults during end of life care.
- ✔ Headache, where the cause is likely to be a primary headache syndrome.
- ✔ Pain associated with gout.
- ✔ Pain associated with renal colic.
- ✔ Step three analgesia in patients aged 13-65 years.

Contraindications

- ✖ Known severe allergy.

Cautions

- ⛔ The patient has taken paracetamol within the last four hours. Paracetamol is contained in many products such as cold and flu tablets/drinks, cough mixtures, combination pain relievers and migraine tablets. Withhold paracetamol if there is any doubt.
- ⛔ Known severe liver disease. Liver disease must be severely impaired before paracetamol clearance is altered, but the balance of risk is such that paracetamol should usually be withheld in this setting.

Use in pregnancy or when breastfeeding

- Paracetamol is safe to administer during pregnancy and while breastfeeding.

Dosage

- 1 g IV.

Administration

- Administer IV undiluted over 15 minutes as an infusion.

Common adverse effects

- None.

Usual onset of effect

- IV: 10-15 minutes.

Usual duration of effect

- The half life of paracetamol is 3-4 hours.

Usual preparation

- Bag containing 1 g in 100 ml.

Pharmacokinetics

- Paracetamol is metabolised in the liver.
- If liver impairment is severe, paracetamol clearance will be significantly delayed, but this does not affect the initial dose.

Common interactions

- None.

11.40 Parecoxib

Mechanism of action

- Parecoxib is a non-steroidal anti-inflammatory drug (NSAID).
- Parecoxib reduces prostaglandin production by inhibiting cyclooxygenase (COX-1 and COX-2) resulting in analgesic, anti-inflammatory and anti-pyretic effects.
- Parecoxib selectively inhibits COX-2, resulting in fewer adverse gastrointestinal effects compared to non-selective NSAIDs.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ Pain associated with renal colic.
- ✔ Other painful conditions where a strong NSAID may be useful (for example, gout, musculoskeletal problems such as non-traumatic lumbar back pain, biliary or renal colic, acute on chronic pancreatitis, or endometriosis).

Contraindications

- ✖ Known severe allergy to parecoxib or valdecoxib.
- ✖ NSAID use within the last six hours.
- ✖ Known hypersensitivity to aspirin or other NSAID.
- ✖ Allergic-type reaction to sulphonamides.
- ✖ Cardiac surgery in the last three months.
- ✖ Previous myocardial infarction or stroke.
- ✖ Severe liver impairment.
- ✖ Active gastrointestinal bleeding, ulceration or perforation.
- ✖ Pregnant or breastfeeding.
- ✖ Aged less than 18 years.

Cautions

- ⛔ Aged greater than 65 years.
- ⛔ Asthma and COPD.
- ⛔ Hypertension.
- ⛔ Renal disease.
- ⛔ Fluid retention.
- ⛔ Liver disease.
- ⛔ Cardiovascular disease.

- Concurrent aspirin use.
- At risk of gastrointestinal bleeding, ulceration or perforation.
- Concurrent use of ACE inhibitors, angiotensin receptor blockers, or diuretics.

Use in pregnancy or when breastfeeding

- Parecoxib is contraindicated during pregnancy and breastfeeding. Administration increases the risk of spontaneous abortion in the first trimester and premature closure of the patent ductus arteriosus in the third trimester.

Dosage

- 40 mg IV or IM for adults weighing greater than or equal to 50 kg.
- 20 mg IM or IV for patients aged greater than 65 years and weighing less than 50 kg.

Administration

- IV administration:
  - Dissolve the powder in the ampoule using 2 ml 0.9% sodium chloride.
  - Draw up the required dose into one syringe.
  - Administer IV as a bolus.
- IM administration:
  - Dissolve the powder in the ampoule using 2 ml 0.9% sodium chloride.
  - Draw up the required dose into one syringe.
  - Administer IM. The preferred site is the lateral thigh as this has the best absorption. If this site is not suitable use the upper outer quadrant of the gluteus.

Common adverse effects

- Gastrointestinal discomfort.
- Nausea and/or reduced appetite.
- Increased flatus.
- Hypertension.
- Sodium and fluid retention.
- Headache.
- Dizziness.

Usual onset of effect

- 10 minutes.

Usual duration of effect

- 6-24 hours.
- Parecoxib has a rapid onset and much longer duration of action compared to other NSAIDs.

Usual preparation

- Ampoule containing 40 mg as powder for reconstitution.

Pharmacokinetics

- Parecoxib is rapidly metabolised to valdecoxib in the liver and is predominantly excreted in the urine.

Common interactions

- Concurrent use with anticoagulant and/or antiplatelet medication may increase the risk of bleeding.
- Concurrent use of ACE inhibitors, angiotensin receptor blockers or diuretics. This combination can be nephrotoxic and may cause acute kidney injury.

Additional information

- Gastrointestinal adverse effects are usually proportionate to the parecoxib dose and duration of treatment.
- A lower rate of gastrointestinal adverse effects is expected with parecoxib, however selective COX-2 NSAIDs are associated with an increased risk of cardiovascular adverse effects such as myocardial infarction and stroke, compared to non-selective NSAIDs.

11.41 Phosphate enema (Fleet enema)

Mechanism of action

- Fleet enema is an osmotic laxative which works by drawing and retaining water in the large intestine.
- Fluid accumulation in the lower bowel produces distension and promotes peristalsis and bowel movement.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Severe constipation.

Contraindications

✖ Known severe allergy.
✖ Acute gastrointestinal conditions (other than constipation).
✖ Aged less than 12 years.

Cautions

⛔ Elderly.
⛔ Electrolyte imbalance (including hypocalcaemia and hypokalaemia).
⛔ Heart failure.
⛔ Ascites.
⛔ Uncontrolled hypertension.
⛔ Unable to maintain adequate hydration.
⛔ Renal impairment.

Use in pregnancy or when breastfeeding

- Short term use of Fleet enema is safe during pregnancy and while breastfeeding.

Dosage

- 118 ml. May be repeated once.

Administration

- Administer PR.
- Insert the contents of one enema into the rectum.

Common adverse effects

- Local irritation.
- Electrolyte disturbance.
- Bloating.
- Nausea.
- Thirst.

Usual onset of effect

- 5-30 minutes.

Usual duration of effect

- 3-6 hours.

Usual preparation

- 118 ml solution.
- Made up of phosphate sodium dibasic 59.3 mg/ml and phosphate sodium monobasic 161 mg/ml.

Pharmacokinetics

- The exact absorption of components of the enema is not known.
- Excretion occurs via the faces.

Common interactions

- None.

Additional information

- Enema failure usually occurs as a result of failure to retain the enema contents in the rectum long enough for them to take effect (usually 10 - 15 minutes).

11.42 Prednisone and prednisolone

This medicine section describes prednisone and prednisolone in the context of the ECP CPGs. For other indications, refer to the relevant section in the EAS CPGs.

Mechanism of action

- Prednisone is a prodrug that is metabolised to prednisolone in the liver.
- Prednisolone is a corticosteroid with anti-inflammatory and immunosuppressant actions. It inhibits the production of inflammatory mediators, including prostaglandins and leukotrienes, resulting in a reduction in the inflammatory and immune response.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Mild to moderate exacerbation of asthma.

✔ Mild to moderate exacerbation of COPD.

✔ Acute gout.

Contraindications

✖ Known severe allergy.

Cautions

⛔ Aged less than two years with asthma. Steroids do not usually have a role in children aged less than two years because they do not generally alter the course of their asthma exacerbation. However, a steroid is indicated if the child has a clear history of asthma and has previously received oral steroids.

Use in pregnancy or when breastfeeding

- Safety has not been demonstrated during pregnancy. However, there is significant clinical experience with steroids, and they appear to be safe. A steroid should be administered if there is bronchospasm but should be withheld if the clinical problem is minor, for example rash or itch.
- May be administered if the patient is breastfeeding. Advise the patient to stop breastfeeding and seek further advice from their lead maternity carer or GP.

Dosage

- Dose is dependent on the indication. See the relevant section.
- If the patient is already taking prednisone:
  - Administer an additional full dose if the patient is taking a dose that is lower than that described in these CPGs. If the patient is not transported

by ambulance to a medical facility, advise the patient to discontinue their usual prednisone, take the prednisone supplied by ambulance personnel and have their treatment reviewed in primary care (preferably by their own GP) within two days.

- Do not administer an additional dose if the patient is taking a dose equal to or higher than that described in these CPGs. If the patient is not transported by ambulance to a medical facility, advise the patient to continue taking their usual prednisone and have their treatment reviewed by a doctor (preferably their own GP) within two days.

Administration

- Administer PO.
- Prednisone tablets are very bitter. Do not crush prednisone tablets because this may cause vomiting.
- The tablets may be divided. The tablet does not always break evenly and this is not of clinical importance. The larger piece of the divided tablet should be chosen for administration.
- Patients aged ten years and over should usually be administered prednisone tablets, but may be administered the same dose of prednisolone syrup.
- Patients aged under ten years should usually be administered prednisolone syrup, but may be administered the same dose of prednisone tablets.
- Always ask a parent (or guardian) of a young child if the child can swallow tablets.
- Advise the patient to self-administer their prescribed doses of prednisone in the morning if possible.

Common adverse effects

- Fatigue.
- Sodium and water retention. This may worsen hypertension and heart failure but is usually only of clinical significance with prolonged dosing.
- Gastrointestinal reflux.

Usual onset of effect

- 3-4 hours.

Usual duration of effect

- 24 hours.

Usual preparation

- 5 mg prednisone tablets.
- 20 mg prednisone tablets.
- Prednisolone syrup containing 5 mg/ml.

Pharmacokinetics

- Prednisone and prednisolone are predominantly metabolised by the liver.
- Prednisone is a prodrug that is metabolised to prednisolone in the liver. A dose of prednisone provides slightly less steroid equivalence than the same dose of prednisolone, but this is not clinically significant.
- There are no significant effects from liver impairment on acute administration.

Common interactions

- None.

11.43 Prochlorperazine

Mechanism of action

- Prochlorperazine is a phenothiazine antipsychotic with antiemetic effects.
- Prochlorperazine has complex actions on multiple neurotransmitter systems with the following effects:
  - Anti-dopaminergic effects (such as dyskinesia).
  - Alpha adrenergic antagonistic effects (for example, hypotension).
  - Weak anticholinergic effects (for example, dry mouth).
  - Impaired temperature control.
- It is relatively less sedating than other antipsychotics.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Nausea and/or vomiting in adults in the context of headache, or vertigo.

Contraindications

✖ Known severe allergy.

Cautions

⛔ Hypotension.
⛔ Epilepsy.
⛔ Risk of constipation or urinary retention.
⛔ Concurrent antipsychotic medication usage.
⛔ Elderly.

Use in pregnancy or when breastfeeding

- Prochlorperazine is safe to use in pregnancy.
- Pregnant patients are excluded from coverage in the headache section.

Dosage

- 12.5 mg IM.
- 5 mg PO three times daily for up to five days.

Administration

- Administer IM undiluted.
- Delay oral administration for six hours if prochlorperazine has been administered IM.

Common adverse effects

- Drowsiness.
- Constipation.
- Dry mouth.
- Dyskinesia.
- Blurred vision.
- Photosensitivity.

Usual onset of effect

- IM: 15 minutes.
- PO: 30 minutes.

Usual duration of effect

- IM: 12 hours.
- PO: 3-4 hours.

Usual preparation

- Ampoule containing 12.5 mg in 1 ml.
- 5 mg tablets.
- Store prochlorperazine ampoules in tin foil to prevent discolouration from light.

Pharmacokinetics

- Prochlorperazine is metabolised in the liver and is slowly eliminated primarily via the faeces.

Common interactions

- Prochlorperazine may enhance the sedative effects of other medicines or alcohol.

Additional information

- Prochlorperazine is presented IM as prochlorperazine mesylate and PO as prochlorperazine maleate. There is no significant pharmacodynamic difference between the presentations.
- Patients must be advised not to drive or operate machinery while taking prochlorperazine.

11.44 Roxithromycin

Mechanism of action

- Roxithromycin is a macrolide antibiotic with medium spectrum activity against gram-positive, some gram-negative and some atypical bacteria.
- It inhibits protein synthesis in the bacteria and is bactericidal or bacteriostatic depending on the organism and drug concentration at the site of infection.
- Roxithromycin also stimulates stomach and duodenal contractions and may have some anti-inflammatory effects.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ Mild to moderate community- acquired pneumonia and allergic to penicillin.
- ✔ Throat infection and:
  - GAS pharyngitis is likely (score ≥ 4), or
  - High risk for rheumatic fever (score ≥ 2), or
  - It is highly likely patient will be lost to follow up.
  - Dental abscess and allergic to penicillin.
- ✔ Moderate cellulitis and allergic to penicillin.
- ✔ Severe cellulitis and:
  - Allergic to penicillin, and
  - There is a delay in pursuing a local pathway for IV antibiotics.
- ✔ Laceration requiring prophylactic antibiotics and allergic to penicillin.

Contraindications

- ✖ Known severe allergy.
- ✖ Severe liver impairment.
- ✖ Severe renal impairment.
- ✖ Concurrent administration of QT prolonging medicines such as antihistamines and class IA and III antidysrhythmics.
- ✖ Pregnant.
- ✖ Breastfeeding.

Cautions

- ⛔ Recently prescribed a macrolide antibiotic (for example, roxithromycin or erythromycin). These patients may have developed an infection with organisms that are resistant to macrolide antibiotics.

Use in pregnancy or when breastfeeding

- Safety has not been demonstrated in pregnancy or breastfeeding and roxithromycin should not be used.

Dosage

- The dose is dependent on the indication and route. See the relevant section.

Administration

- Administer PO. Take with a glass of water.
- The absorption of roxithromycin is delayed by food intake and so taking it on an empty stomach is preferable.

Common adverse effects

- Gastrointestinal discomfort.
- Nausea and/or vomiting.
- Diarrhoea.
- Headache.
- Cholestatic hepatitis is rare.

Usual onset of effect

- Clinical effects are usually observed within 48-72 hours.

Usual duration of effect

- 18-24 hours.

Usual preparation

- 300 mg tablets.

Pharmacokinetics

- Roxithromycin undergoes limited metabolism.
- It is predominantly excreted in the faeces, with the remainder being excreted in the urine and via the lungs.

Common interactions

- May interact with QT prolonging medications.
- May increase the concentrations of theophylline, carbamazepine, digoxin and anticoagulants.

Additional information

- Roxithromycin is a derivative of erythromycin with similar coverage but superior pharmacokinetics, allowing lower doses at less frequent intervals to achieve similar serum concentrations.
- Roxithromycin is typically used to treat susceptible infections in patients with a penicillin allergy.

11.45 Salbutamol

This medicine section describes salbutamol in a metered dose inhaler (MDI) in the context of the ECP CPGs. For other indications and routes, refer to the relevant section in the EAS CPGs.

Mechanism of action

- Salbutamol is a bronchodilator. It is an agonist (stimulator) of beta-2 receptors.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Mild to moderate exacerbations of asthma or COPD.

Contraindications

✖ Known severe allergy.

Cautions

⛔ None.

Use in pregnancy or when breastfeeding

- Salbutamol is safe to administer during pregnancy and while breastfeeding.

Dosage

- Administer 600 mcg (six puffs). Repeat up to three times every 20 minutes.

Administration

- Administer using a spacer where possible.

Common adverse effects

- Tremor.
- Tachycardia.

Usual onset of effect

- 2-5 minutes.

Usual duration of effect

- 1-2 hours.

Usual preparation

- A metered dose inhaler delivering 100 mcg per puff.

Pharmacokinetics

- Inhaled salbutamol is absorbed through the lungs and some is swallowed.
- Salbutamol is metabolised in the liver and excreted in the urine.
- There are no significant effects from liver or kidney impairment on acute administration.

Common interactions

- Salbutamol will be less effective in the presence of a beta-blocker, with the reduction in effect being most pronounced with a non-selective beta-blocker such as propranolol.

Additional information

- Salbutamol does not have a significant role in the treatment of chest infection. However it may be administered if bronchospasm is prominent.

11.46 Sennoside B

Mechanism of action

- Sennoside B is a naturally occurring plant-based stimulant laxative.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ Mild to moderate constipation.
- ✔ Prophylaxis of constipation if administering an oral opiate.

Contraindications

- ✖ Known severe allergy.
- ✖ Bowel obstruction.
- ✖ Acute inflammatory bowel disease.
- ✖ Severe abdominal pain with nausea and vomiting.
- ✖ Severe dehydration.

Cautions

- ⛔ Prolonged or excessive use. This can cause dehydration.

Use in pregnancy or when breastfeeding

- Sennoside B is safe to administer during pregnancy and while breastfeeding.

Dosage

- 16-32 mg PO once daily.

Administration

- Administer PO preferably at night.
- Swallow the tablets whole, do not crush or chew.

Common adverse effects

- Abdominal discomfort.
- Nausea.
- Diarrhoea.
- Red or yellow discolouration of urine and faeces.

Usual onset of effect

- 8-12 hours.

Usual duration of effect

- 12-24 hours.

Usual preparation

- 8 mg tablets.

Pharmacokinetics

- There is minimal GI absorption of sennoside B after oral administration.

Common interactions

- Sennoside B will have an additive effect if concurrently administered with other laxatives.

Additional information

- Mild stimulant laxatives such as sennoside B work more effectively when the patient is well hydrated.
- Tolerance to stimulant laxatives is uncommon.

11.47 Trimethoprim/sulfamethoxazole

Mechanism of action

- Trimethoprim is an anti-folate antibiotic with activity mainly against gram-negative bacteria and some coverage of gram-positive bacteria. It works by reversibly interrupting folate synthesis and has a 50,000 times stronger preference for bacterial folate mechanisms compared to human folate mechanisms.
- Trimethoprim is usually bactericidal but may be bacteriostatic depending on the organism and drug concentration at the site of infection.
- Sulfamethoxazole is an anti-folate bacteriostatic agent. It works by competitively inhibiting a different step in bacterial folate synthesis than trimethoprim.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

- ✔ Mild community- acquired aspiration pneumonia and allergic to penicillin.
- ✔ Diverticulitis with features of infection.
- ✔ Mild uncomplicated pyelonephritis.
- ✔ Cutaneous abscess or paronychia associated with the following if allergic to flucloxacillin or MRSA positive:
  - Fever, or
  - Spreading cellulitis, or
  - Comorbidity (for example, diabetes), or
  - The patient has a complicated abscess and they are not immediately being referred to a medical facility.
- ✔ Mammal bite requiring antibiotic prophylaxis and allergic to penicillin.

Contraindications

- ✖ Known severe allergy to trimethoprim or sulfa drugs.
- ✖ Severe renal impairment.
- ✖ Severe liver impairment.
- ✖ Folate deficiency anaemia.
- ✖ Pregnancy or breastfeeding.
- ✖ Concurrent use of methotrexate.

Cautions

- ⛔ Patients with folate deficiency.
- ⛔ Porphyria.

- Liver impairment.
- Renal impairment.
- Concurrent administration of warfarin, phenytoin, digoxin, amantadine or procainamide.

Use in pregnancy or when breastfeeding

- Trimethoprim/sulfamethoxazole is contraindicated in pregnancy due to teratogenic effects of trimethoprim in the first trimester and sulfamethoxazole in the third trimester.
- Trimethoprim/sulfamethoxazole can be excreted in breast milk and should not be used in patients who are breastfeeding an infant aged three months or less.

Dosage

- The dose is dependent on the indication and route. See the relevant section.

Administration

- Administer PO with a glass of water. May also be taken with food if gastrointestinal discomfort is a factor.

Common adverse effects

- Rash. Advise the patient to stop taking the trimethoprim/sulfamethoxazole immediately.
- Nausea.
- Diarrhoea.
- Hyperkalaemia.
- Increased sensitivity to sunlight.

Usual onset of effect

- Clinical effects are usually observed within 48-72 hours.

Usual duration of effect

- 18-24 hours.

Usual preparation

- 480 mg tablets (containing 80 mg of trimethoprim and 400 mg of sulfamethoxazole).
- Liquid containing 240 mg/5ml (containing 40 mg of trimethoprim and 200 mg of sulfamethoxazole per 5 ml).

Pharmacokinetics

- Trimethoprim undergoes limited metabolism, and most is excreted unchanged in the urine.
- Sulfamethoxazole undergoes more extensive hepatic metabolism and is excreted primarily in the urine.

Common interactions

- Warfarin. Trimethoprim may potentiate the anticoagulant effect of warfarin. Check the patient's INR three days after starting a course of trimethoprim/sulfamethoxazole.
- Phenytoin, digoxin, amantadine or procainamide. Trimethoprim may increase serum concentrations and potentiate the effect of phenytoin, digoxin, amantadine or procainamide.
- Methotrexate. Methotrexate and trimethoprim/sulfamethoxazole are both anti-folates. Concurrent use of both is associated with fatal bone-marrow depression.

11.48 Ultraproct ointment

Mechanism of action

- Ultraproct is an ointment containing corticosteroid and local anaesthetic (fluocortolone pivalate, fluocortolone hexanoate and cinchocaine hydrochloride).
- Fluocortolone is the glucocorticoid component and exerts anti-inflammatory, anti-allergenic, and anti-pruritic effects. The two different esters of fluocortolone (pivalate and hexanoate) provide both immediate and sustained effects.
- Cinchocaine hydrochloride is a local anaesthetic that blocks the initiation and transmission of nerve impulses by blocking the movement of sodium across the nerve cell membrane.

Delegated scopes of practice

- Extended Care Paramedics.

Indications

✔ Haemorrhoids.

✔ Perianal fissure.

Contraindications

✖ Known allergy to topical corticosteroids or local anaesthetics.

✖ Lesions likely due to viral infection (herpes or shingles) or syphilis.

Cautions

⛔ Pregnancy.

Use in pregnancy or when breastfeeding

- Application of ultraproct ointment to a small area for a short period of time is safe in pregnancy as there is minimal risk of systemic absorption.
- Ultraproct is safe to use while breastfeeding.

Administration

- First day of treatment: apply a thick smear of the ointment topically four times daily.
- Every day thereafter: apply a thick smear of the ointment topically twice daily. This should continue until 48 hours after resolution of symptoms.
- Apply the ointment following defecation and cleaning of the area.
- Advise the patient to wash their hands thoroughly after each application.

Common adverse effects

- Prolonged use (more than four weeks) may cause skin atrophy.

Usual onset of effect

- The patient should experience a clinical benefit within 1-2 applications.

Usual duration of effect

- The half life of Ultraproct is not known, but the clinical effect appears to continue for 12-24 hours following an application.

Usual preparation

- 30 g tube of thick, tan ointment.

Pharmacokinetics

- Fluocortolone is absorbed into the rectal portal circulation, metabolised in the liver and excreted in the urine.
- The two types of fluocortolone provide both:
  - Onset of steroid effect by diffusion with a rapid onset of action over minutes to hours, and
  - A slower, more sustained effect over hours to days.

Common interactions

- None.

Additional information

- Prolonged application of the ointment (more than two weeks) should automatically trigger a review in primary care.

12.1 Abbreviations and acronyms

A	**AAA**	abdominal aortic aneurysm
	ACE	angiotensin converting enzyme
	ACOS	asthma COPD overlap syndrome
	ACS	acute coronary syndrome, or ambulance care summary
	ACT	asthma control test
	ADL	activities of daily living
	ADT	absorbed diphtheria and tetanus
	AKI	acute kidney injury
	ARCF	aged residential care facility
B	**BGL**	blood glucose level
	BPPV	benign paroxysmal positional vertigo
	BSA	body surface area
C	**CABG**	coronary artery bypass grafting
	CAD	coronary artery disease
	CAP	community-acquired pneumonia
	CAT	COPD assessment test
	CHA_2DS_2VASc	Congestive heart failure, hypertension, age, diabetes, stroke/ transient ischemic attack, vascular disease, sex category
	CKD	chronic kidney disease
	CNS	central nervous system
	COPD	chronic obstructive pulmonary disease
	COX	cyclooxygenase
	CR	controlled release
	CRB-65	confusion, respiratory rate, blood pressure, age 65 score
	CRM	crew resource management
	CT	computerised tomography
	CT-KUB	CT scan of the kidneys, ureters and bladder
D	**DHB**	district health board
	DIC	disseminated intravascular coagulation
	DIP	distal interphalangeal joint
	DKA	diabetic ketoacidosis
	DNA	deoxyribonucleic acid
	DVT	deep vein thrombosis
E	**EAS CPGs**	Emergency Ambulance Sector Clinical Procedures and Guidelines

ECG electrocardiogram
ED emergency department
ECP Extended Care Paramedic
EDACS Emergency Department Assessment of Chest Pain Score
eGFR estimated glomerular filtration rate
EM erythema multiforme

G

GAS group A beta-haemolytic *streptococcus*
GCS glasgow coma score
GI gastrointestinal
GORD gastro-oesophageal reflux disease
GP general practitioner

H

HHS hyperosmolar hyperglycaemic state
HINTs head impulse, nystagmus, and test of skew
HIV human immunodeficiency virus
HONK hyperosmolar non-ketosis

I

ICS inhaled corticosteroid
ICU intensive care unit
IDC indwelling catheter
IM intramuscular
IN intranasal
INR international normalised ratio
IPV intimate partner violence
ITP immune thrombocytopenia
IU international units
IV intravenous

L

LABA long acting beta agonist
LAMA long acting muscarinic antagonist
LBBB left bunch branch block
LMC lead maternity carer

M

MACE major adverse cardiac event
MAD mucosal atomisation device
MDI metered dose inhaler
MDRO multi-drug resistant organisms
mmHg millimeters of mercury
MRSA methicillin resistant *Staphylococcus aureus*
MSSA methicillin susceptible *Staphylococcus aureus*

	MTPJ	metatarsal phalangeal joint
N	**NSAIDs**	non-steroidal anti-inflammatories
O	**ORF**	oral rehydration formula
	OECD	Organisation for Economic Co-operation and Development
P	**PEFR**	peak expiratory flow rates
	PCI	percutaneous coronary intervention
	PCR	polymerase chain reaction
	PE	pulmonary embolism
	PEG	percutaneous endoscopic gastrostomy
	PERC	pulmonary embolism rule-out criteria
	PHO	primary health organisation
	PIL	patient information leaflet
	PO	per oral
	POCT	point of care testing
	POTS	postural orthostatic tachycardia syndrome
	PPE	personal protective equipment
	PR	per rectum
R	**RBBB**	right bundle branch block
	RSV	respiratory syncytial virus
S	**SABA**	short acting beta agonist
	SC	subcutaneous
	SPC	suprapubic catheter
	STAR	skin tear audit research
T	**TBSA**	total body surface area
	TD	transdermal
	TIA	transient ischaemic attack
	TIG	tetanus immunoglobulin
	TIME	tissue infection moisture edge
	TROC	trial removal of catheter
	TSS	toxic shock syndrome
U	**UTI**	urinary tract infection
V	**VTE**	venous thromboembolism
W	**WPW**	Wolff Parkinson White syndrome

12.2 Antibiotic susceptibility tables

Bacterial classification

Gram positive	**Cocci**	**Staphylococcus**	Staphylococcus aureus (MRSA)
			Staphylococcus aureus (MSSA)
			Staphlococcus saprophyticus
		Enterococcus	Enterococcus faecium ~10%
			Enterococcus faecalis ~90%
		Streptococcus	Streptococcus pyogenes (GAS)
			Streptococcus pneumoniae
			Streptococcus spp. NOS
			Streptococcus Group C & G
	Anaerobes		Anaerobic bacteria NOS
			Eikenella corrodens
			Clostridium difficile
			Bacteroides fragilis
			Fusobacterium spp.
Gram negative	**Cocci and Cocco bacilli**	**Neisseria**	Neisseria meningitidis
			Neisseria gonorrhoeae
		H. influenzae	Haemophilus influenzae
		Moraxella	Moraxella catarrhalis
		Bordatella	Bordetella pertussis
			Pasturella multocida
	Bacilli	**Enterobacterales**	Escherichia coli
			Klebsiella spp.
			Proteus mirablis
		Pseudomonas	Pseudomonas aeruginosa
		Legionella	Legionella pneumophila
		Campylobacter	Campylobacter jejuni
		Salmonella	Salmonella spp.
			Capnocytophaga canimorsus
Atypicals	**Myco-plasmas**		Mycoplasma pneumoniae
	Intracellular bacteria		Chlamydophila pneumoniae
			Chlamydophila trachomatis
	Myco-bacteria		Mycobacteria tuberculosis

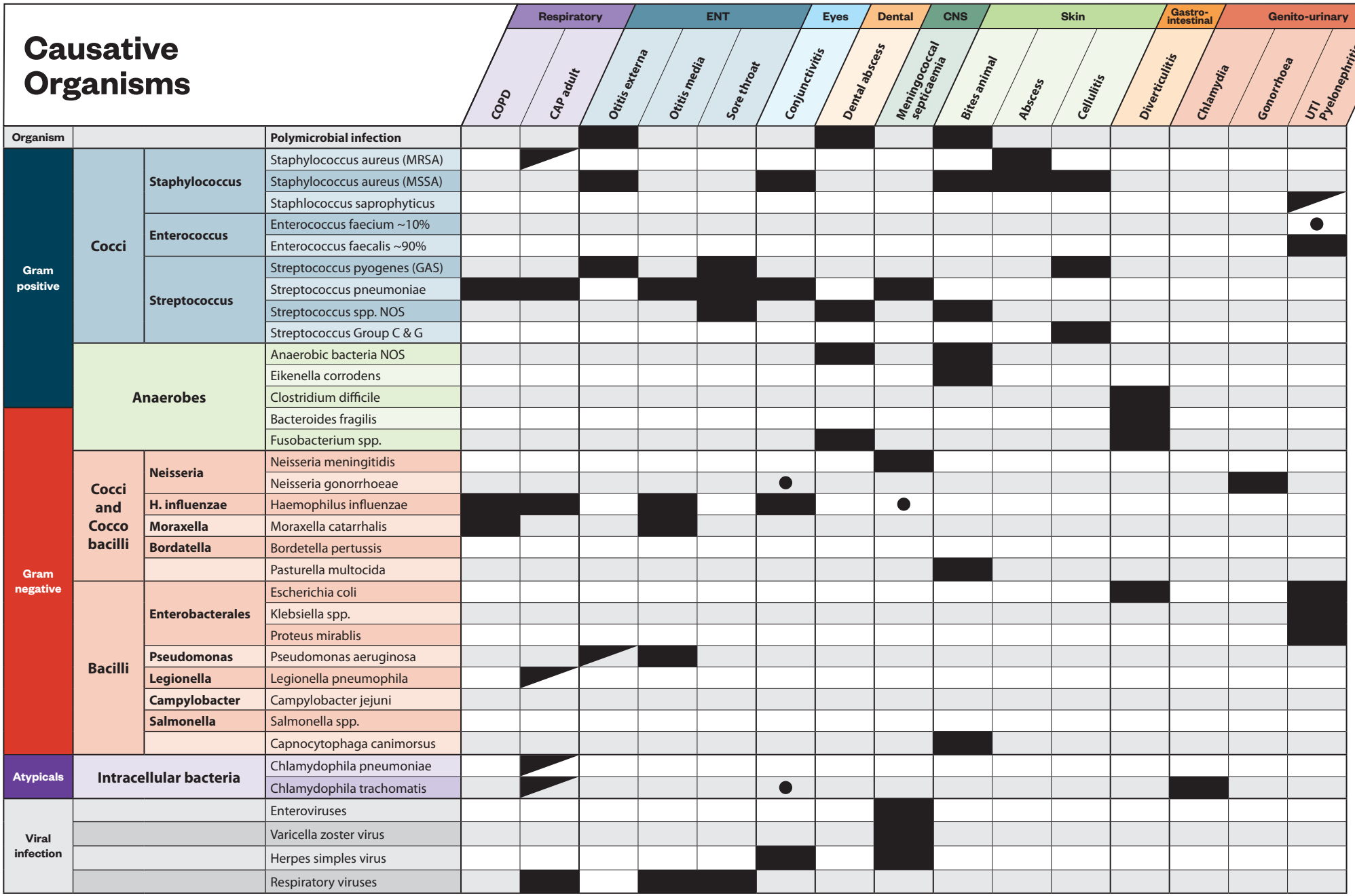
Antibiotic classes

Miscellaneous	Nucleic acid synthesis inhibitors (anti-folates)				
Anti-DNA	Nitroimidazoles	Quinolones			Sulphonamide
Nitrofurantoin	Metronidazole	Norfloxacin	Ciprofloxacin	Trimethoprim	Cotrimoxazole

Protein synthesis inhibitors								
Topicals		Lincosamides	Macrolides			Tetracyclines	Aminoglycosides	
Chloramphenicol	Fusidic	Clindamycin	Erythromycin	Azithromycin	Roxithromycin	Doxycycline	Gentamicin	Neomycin

Beta Lactams						
Cephalosporins		Penicillins				
Cefalexin	Ceftriaxone	Flucloxacillin	Amox clav	Amoxycillin	Pen. V	Benzathine Benzylpenicillin

Causative Organisms



ECP Antibiotic susceptibility overview

		Misc.	Nucleic acid synthesis inhibitors (anti-folates)					Protein synthesis inhibitors									Beta Lactams						
		Nitrofurantoin	Metronidazole	Norfloxacin	Ciprofloxacin	Trimethoprim	Cotrimoxazole	Chloramphenicol	Fusidic acid	Clindamycin	Erythromycin	Azithromycin	Roxithromycin	Doxycycline	Gentamicin	Neomycin	Cefalexin	Ceftriaxone	Flucloxacillin	Amox clav	Amoxycillin	Pen. V	Benzathine Pen.
Organism																							
Gram positive	Staphylococcus aureus (MRSA)			87	77–87		98–99		33–70	82–84	67–78			97–98	92–96				×	×	×	×	×
	Staphylococcus aureus (MSSA)				80		99		72–83	88–92	87–89			90–99	94–99		88–95	95	83–95	88–95	×	×	×
	Staphylococcus saprophyticus	99–100				89–94	89								64				82	100	Variable		
	Enterococcus faecium ~10%	49		×		×	×			×	×		×	×	×		×	×	×		×		
	Enterococcus faecalis ~90%	100		96		×	×			×	×		×	×	×		×	×	×		99–100		
	Streptococcus pyogenes (GAS)					×	×			97–98	95–98			74					100		100	100	100
	Streptococcus pneumoniae				×		74–84			80	73–88			70–91				97		97	97	83–94	97
	Streptococcus spp. NOS										78			53								100	100
	Streptococcus Group C & G					×	×				77												
Anaerobes	Anaerobic bacteria NOS																						
	Eikenella corrodens																						
	Clostridium difficile																						
	Bacteroides fragilis					×																	
	Fusobacterium spp.																						
Gram negative	Neisseria meningitidis																						
	Neisseria gonorrhoeae																						
	Haemophilus influenzae				100	70	70–79				×		×	98–100				97	×	80–100	71–76	×	×
	Moraxella catarrhalis																		×	100	×	×	×
	Bordetella pertussis																						
	Pasturella multocida																						
	Escherichia coli	96–99		75–91	74–94	64–76	66–76								67–96		36–97	89–99		71–91	32–53		
	Klebsiella spp.	34–95		83–94	86–96	76–86	81–86								92–99		76–96	87–99		86–96	×		
	Proteus mirablis	×		94	94–99	75–87	78–87								89		90–99	98		91–99	75–92		
	Pseudomonas aeruginosa	×		91–97	82–94	×	×			×	×	×	×	×	85–97		×	×	×	×	×	×	×
	Legionella pneumophila																×	×	×	×	×	×	×
	Campylobacter jejuni				72						98												
	Salmonella spp.																						
	Capnocytophaga canimorsus																						
Atypicals	Chlamydophila pneumoniae																						
	Chlamydophila trachomatis																						

Key × Known or established resistance ■ Expected susceptibility to antibiotic **0–100** % susceptibility to antibiotic (based on testing)

St John
Here for Life

clinical.excellence@stjohn.org.nz

Name

Staff ID