SUMMARY OF KEY MESSAGES

A description of the levels of evidence and associated symbols can be found in the Introduction (see pages vi to vii).

1. PHYSIOLOGY AND PSYCHOLOGY OF ACUTE PAIN

Psychological aspects of acute pain

1. Preoperative anxiety, catastrophising, neuroticism and depression are associated with higher postoperative pain intensity (**U**) (**Level IV**).
2. Preoperative anxiety and depression are associated with an increased number of PCA demands and dissatisfaction with PCA (**U**) (**Level IV**).

☑ Pain is an individual, multifactorial experience influenced by culture, previous pain events, beliefs, mood and ability to cope (**U**).

Progression of acute to chronic pain

1. Some specific early anaesthetic and/or analgesic interventions reduce the incidence of chronic pain after surgery (**S**) (**Level II**).
2. Chronic postsurgical pain is common and may lead to significant disability (**U**) (**Level IV**).
3. Risk factors that predispose to the development of chronic postsurgical pain include the severity of pre- and postoperative pain, intraoperative nerve injury and psychosocial factors (**U**) (**Level IV**).
4. All patients with chronic postherniorrhaphy pain had features of neuropathic pain (**N**) (**Level IV**).
5 Spinal anaesthesia in comparison to general anaesthesia reduces the risk of chronic postsurgical pain after hysterectomy and Caesarean section (**N**) (**Level IV**).

Pre-emptive and preventive analgesia

1. The timing of a single analgesic intervention (preincisional rather than postincisional), defined as pre-emptive analgesia, has a significant effect on postoperative pain relief with epidural analgesia (**R**) (**Level I**).
2. There is evidence that some analgesic interventions have an effect on postoperative pain and/or analgesic consumption that exceeds the expected duration of action of the drug, defined as preventive analgesia (**U**) (**Level I**).
3. NMDA receptor antagonist drugs in particular show preventive analgesic effects (**U**) (**Level I**).
4. Perioperative epidural analgesia combined with ketamine intravenously decreases hyperalgesia and long-term pain up to 1 year after colonic surgery compared with intravenous analgesia alone (**N**) (**Level II**).

Adverse physiological and psychological effects of acute pain

1. Recognition of the importance of postoperative rehabilitation including pharmacological, physical, psychological and nutritional components has led to enhanced recovery (N) (Level II).

☑ Acute pain and injury of various types are inevitably interrelated and if severe and prolonged, the injury response becomes counterproductive and can have adverse effects on outcome (**U**).

Pharmacogenomics and acute pain

1. CYP2D6 polymorphisms affect plasma concentrations of active metabolites of codeine and tramadol (N) (Level II).

☑ Genetic polymorphisms explain the wide inter-individual variability in plasma concentrations of a given dose of methadone (**N**).

2. ASSESSMENT AND MEASUREMENT OF PAIN AND ITS TREATMENT

Measurement

1. Regular assessment of pain leads to improved acute pain management (**U**) (**Level III-3**).
2. There is good correlation between the visual analogue and numerical rating scales (**U**) (**Level III-2**).

☑ Self-reporting of pain should be used whenever appropriate as pain is by definition a subjective experience (**U**).

☑ The pain measurement tool chosen should be appropriate to the individual patient; developmental, cognitive, emotional, language and cultural factors should be considered (**U**).

☑ Scoring should incorporate different components of pain including the functional capacity of the patient. In the postoperative patient this should include static (rest) and dynamic (eg pain on sitting, coughing) pain (**U**).

☑ Uncontrolled or unexpected pain requires a reassessment of the diagnosis and consideration of alternative causes for the pain (eg new surgical/ medical diagnosis, neuropathic pain) (**U**).

Outcome measures in acute pain management

☑ Multiple outcome measures are required to adequately capture the complexity of the pain experience and how it may be modified by pain management interventions (**U**).

3. PROVISION OF SAFE AND EFFECTIVE ACUTE PAIN MANAGEMENT

Education

1. Preoperative education improves patient or carer knowledge of pain and encourages a more positive attitude towards pain relief (**U**) (**Level II**).
2. Video education of patients with a whiplash injury reduces the incidence of persistent pain (**N**) (**Level II**).
3. Written information given to patients prior to seeing an anaesthetist is better than verbal information given at the time of the interview (**N**) (**Level III-2**).

4. While evidence for the benefit of patient education in terms of better pain relief is inconsistent, structured preoperative education may be better than routine information, and information presented in video format may be better still (**N**) (**Level III-2**).
5. Implementation of an acute pain service may improve pain relief and reduce the incidence of side effects (**U**) (**Level III-3**).
6. Staff education and the use of guidelines improve pain assessment, pain relief and prescribing practices (**U**) (**Level III-3**).
7. Even 'simple' techniques of pain relief can be more effective if attention is given to education, documentation, patient assessment and provision of appropriate guidelines and policies (**U**) (**Level III-3**).

☑ Successful management of acute pain requires close liaison with all personnel involved in the care of the patient (**U**).

☑ More effective acute pain management will result from appropriate education and organisational structures for the delivery of pain relief rather than the analgesic techniques themselves (**U**).

4. SYSTEMICALLY ADMINISTERED ANALGESIC DRUGS

Opioids

1. Dextropropoxyphene has low analgesic efficacy (**U**) (**Level I** [Cochrane Review]).
2. Tramadol is an effective treatment for neuropathic pain (**U**) (**Level I** [Cochrane Review]).
3. Gabapentin, non-steroidal NSAIDs and ketamine are opioid-sparing medications and reduce opioid-related side effects (**N**) (**Level I**).
4. In appropriate doses, droperidol, metoclopramide, ondansetron, tropisetron, dolasetron, dexamethasone, cyclizine and granisetron are effective in the prevention of postoperative nausea and vomiting (**N**) (**Level I** [Cochrane Review]).
5. Alvimopan and methylnaltrexone are effective in reversing opioid-induced slowing of gastrointestinal transit time and constipation (**N**) (**Level I** [Cochrane Review]).
6. Droperidol, dexamethasone and ondansetron are equally effective in the prevention of postoperative nausea and vomiting (**U**) (**Level I**).
7. Paired combinations of 5HT3 antagonist, droperidol or dexamethasone provide superior prophylaxis of postoperative nausea and vomiting than either compound alone (**N**) (**Level I**).
8. Naloxone, naltrexone, nalbuphine, droperidol and 5HT3 antagonists are effective treatments for opioid-induced pruritus (**N**) (**Level I**).
9. Opioids in high doses can induce hyperalgesia (**N**) (**Level I**).
10. Tramadol has a lower risk of respiratory depression and impairs gastrointestinal motor function less than other opioids at equianalgesic doses (**U**) (**Level II**).
11. Pethidine is not superior to morphine in treatment of pain of renal or biliary colic (**U**) (**Level II**).
12. Morphine-6-glucuronide is an effective analgesic (**N**) (**Level II**).
13. In the management of acute pain, one opioid is not superior over others but some opioids are better in some patients (**U**) (**Level II**).

14. The incidence of clinically meaningful adverse effects of opioids is dose-related (**U**) (**Level II**).
15. High doses of methadone can lead to prolonged QT interval (**N**) (**Level II**).
16. Haloperidol is effective in the prevention of postoperative nausea and vomiting (**N**) (**Level II**).
17. Opioid antagonists are effective treatments for opioid-induced urinary retention (**N**) (**Level II**).
18. In clinically relevant doses, there is a ceiling effect for respiratory depression with buprenorphine but not for analgesia (**N**) (**Level III-2**).
19. Assessment of sedation is a more reliable way of detecting early opioid-induced respiratory depression than a decreased respiratory rate (**S**) (**Level III-3**).
20. The evidence for risk of cardiac arrhythmias following low-dose droperidol is poor (**N**) (**Level III-3**).
21. In adults, patient age rather than weight is a better predictor of opioid requirements, although there is a large interpatient variation (**U**) (**Level IV**).
22. Impaired renal function and the oral route of administration result in higher levels of the morphine metabolites morphine-3-glucuronide and morphine-6-glucuronide with increased risk of sedation and respiratory depression (**S**) (**Level IV**).

☑ The use of pethidine (**U**) and dextropropoxyphene (**N**) should be discouraged in favour of other opioids.

Paracetamol, non-selective non-steroidal anti-inflammatory drugs and coxibs

1. Paracetamol is an effective analgesic for acute pain; the incidence of adverse effects comparable to placebo (**S**) (**Level I** [Cochrane Review]).
2. Non-selective NSAIDs are effective in the treatment of acute postoperative and low back pain, renal colic and primary dysmenorrhoea (**N**) (**Level I** [Cochrane Review]).
3. Coxibs are effective in the treatment of acute postoperative pain (**N**) (**Level I** [Cochrane Review]).
4. With careful patient selection and monitoring, the incidence of nsNSAID-induced perioperative renal impairment is low (**U**) (**Level I** [Cochrane Review]).
5. Non-selective NSAIDs do not increase the risk of reoperation for bleeding after tonsillectomy in paediatric patients (**Q**) (**Level I** [Cochrane Review]).
6. Coxibs do not appear to produce bronchospasm in individuals known to have aspirin-exacerbated respiratory disease (**U**) (**Level I**).
7. In general, aspirin increases bleeding after tonsillectomy (**N**) (**Level I**).
8. Non-selective NSAIDs given in addition to paracetamol improve analgesia compared with paracetamol alone (**U**) (**Level I**).
9. Paracetamol given in addition to PCA opioids reduces opioid consumption but does not result in a decrease in opioid-related side effects (**N**) (**Level I**).
10. Non-selective NSAIDs given in addition to PCA opioids reduce opioid consumption and the incidence of nausea, vomiting and sedation (**N**) (**Level I**).

11. Non-selective NSAIDs and coxibs are effective analgesics of similar efficacy for acute pain (**U**) (**Level I**).
12. Preoperative coxibs reduce postoperative pain and opioid consumption, and increase patient satisfaction (**N**) (**Level I**).
13. Coxibs given in addition to PCA opioids reduce opioid consumption but do not result in a decrease in opioid-related side effects (**N**) (**Level I**).
14. Coxibs and non-selective NSAIDs have similar adverse effects on renal function (**U**) (**Level I**).
15. Non-selective NSAIDs do not significantly increase blood loss after tonsillectomy but do increase the need for reoperation due to bleeding (**N**) (**Level I**).
16. Parecoxib and/or valdecoxib compared with placebo do not increase the risk of cardiovascular adverse events after non-cardiac surgery (**N**) (**Level I**).
17. Coxibs and non-selective NSAIDs are associated with similar rates of adverse cardiovascular effects, in particular myocardial infarction; naproxen may be associated with a lower risk than other non-selective NSAIDs and celecoxib may be associated with a lower risk than other coxibs and non-selective NSAIDs overall (**N**) (**Level I**).
18. Perioperative non-selective NSAIDs increase the risk of severe bleeding after a variety of other operations compared with placebo (**N**) (**Level II**).
19. Coxibs do not impair platelet function; this leads to reduced perioperative blood loss in comparison with non-selective NSAIDs (**S**) (**Level II**).
20. Short-term use of coxibs results in gastric ulceration rates similar to placebo (**U**) (**Level II**).
21. Use of parecoxib followed by valdecoxib after coronary artery bypass surgery increases the incidence of cardiovascular events and is therefore contraindicated (**S**) (**Level II**).

☑ Adverse effects of NSAIDs are significant and may limit their use (**U**).

☑ The risk of adverse renal effects of non-selective NSAIDs and coxibs is increased in the presence of factors such as pre-existing renal impairment, hypovolaemia, hypotension, use of other nephrotoxic agents and ACE inhibitors (**U**).

Adjuvant drugs

Inhalational agents

1. Nitrous oxide has some analgesic efficacy and is safe during labour (**U**) (**Level I**).
2. Nitrous oxide is an effective analgesic agent in a variety of other acute pain situations (**U**) (**Level II**).
3. Methoxyflurane, in low concentrations, may be an effective analgesia in the hospital and prehospital setting (**N**) (**Level IV**).

☑ Neuropathy and bone marrow suppression are rare but potentially serious complications of nitrous oxide use, particularly in at-risk patients (**U**).

☑ The information about the complications of nitrous oxide is from case reports only. There are no controlled studies that evaluate the safety of repeated intermittent exposure to nitrous oxide in humans and no data to guide the appropriate maximum duration or number of times a patient can safely be exposed to nitrous oxide. The suggestions for the use of nitrous oxide are extrapolations only from the information above. Consideration should be given to duration of exposure and supplementation with vitamin B12, methionine, and folic or folinic acid (**U**).

☑ If nitrous oxide is used with other sedative or analgesic agents, appropriate clinical monitoring should be used (**U**).

NMDA-receptor antagonists

1. Perioperative low-dose ketamine used in conjunction with patient-controlled analgesia morphine is opioid-sparing and reduces the incidence of nausea and vomiting (**N**) (**Level I** [Cochrane Review]).
2. In general, a perioperative low-dose ketamine infusion is opioid-sparing, but does not produce a clinically significant reduction in pain scores or opioid-related adverse effects (**S**) (**Level I**).
3. Ketamine is a safe and effective analgesic for painful procedures in children (**N**) (**Level I**).
4. Ketamine and dextromethorphan have preventive (**U**) but not pre-emptive analgesic effects (**N**) (**Level I**).
5. Magnesium does not reduce postoperative pain scores or opioid consumption and has no preventive analgesic effect (**N**) (**Level I**).
6. Ketamine may improve analgesia in patients with severe acute pain that is poorly responsive to opioids, although evidence is conflicting (**W**) (**Level II**).
7. Ketamine reduces postoperative pain in opioid-tolerant patients (**N**) (**Level II**).

☑ The primary role of low dose ketamine is as an 'antihyperalgesic', 'antiallodynic', 'tolerance-protective' and preventive analgesic, rather than as an analgesic *per se* (**N**).

Antidepressant drugs

1. In neuropathic pain, tricyclic antidepressants are more effective than selective serotonergic re-uptake inhibitors (**S**) (**Level I** [Cochrane Review]).
2. Duloxetine is effective in painful diabetic neuropathy and fibromyalgia (**N**) (**Level I** [Cochrane Review]).
3. There is no good evidence that antidepressants are effective in the treatment of chronic low back pain (**R**) (**Level I** [Cochrane Review]).
4. Tricyclic antidepressants are effective in the treatment of chronic headaches (**U**) and fibromyalgia (**N**) (**Level I**).
5. Antidepressants reduce the incidence of chronic neuropathic pain after herpes zoster (**U**) (**Level II**).

   Note: withdrawal of previous key message:

   Antidepressants reduce the incidence of chronic neuropathic pain after breast surgery

   This has been deleted as the information and evidence supporting it has been withdrawn.

☑ Based on the experience in chronic neuropathic pain states, it would seem reasonable to use tricyclic antidepressants and selective serotonin re-uptake inhibitors in the management of acute neuropathic pain (**S**).

☑ To minimise adverse effects, particularly in elderly people, it is advisable to initiate treatment with low doses (**U**).

Anticonvulsant drugs

1. Gabapentin is effective in the treatment of chronic neuropathic pain (**Q**); lamotrigine is most likely ineffective (**N**) (**Level I** [Cochrane Review]).
2. Carbamazepine is effective in the treatment of trigeminal neuralgia (**N**) (**Level I** [Cochrane Review]).
3. Pregabalin is effective in the treatment of chronic neuropathic pain related to diabetic neuropathy (**N**) (**Level I**).
4. Perioperative gabapentinoids (gabapentin/ pregabalin) reduce postoperative pain and opioid requirements (**U**) and reduce the incidence of vomiting, pruritus and urinary retention, but increase the risk of sedation (**N**) (**Level I**).

☑ Based on the experience in chronic neuropathic pain states, it would seem reasonable to use anticonvulsants in the management of acute neuropathic pain (**U**).

Membrane stabilisers

1. Both lignocaine (lidocaine) and mexiletine are effective in the treatment of chronic neuropathic pain (**S**); there is no difference in efficacy or adverse effects compared with carbamazepine, amantadine, or morphine (**N**) (**Level I** [Cochrane Review]).
2. Perioperative intravenous lignocaine reduces pain and opioid requirements following abdominal surgery (**S**) as well as nausea, vomiting, duration of ileus and length of hospital stay (**N**) (**Level I**).

☑ Based on the experience in chronic neuropathic pain states, it would seem reasonable to use membrane stabilisers in the management of acute neuropathic pain (**U**).

☑ Lignocaine (intravenous or subcutaneous) may be a useful agent to treat acute neuropathic pain (**U**).

Alpha-2 agonists

1. The use of systemic alpha-2-agonists consistently improves perioperative opioid analgesia but the frequency and severity of side effects may limit their clinical usefulness (**U**) (**Level II**).

Salmon calcitonin and bisphosphonates

1. Bisphosphonates reduce bone pain associated with metastatic cancer and multiple myeloma (**N**) (**Level I** [Cochrane Review]).
2. Salmon calcitonin reduces pain and improves mobilisation after osteoporosis-related vertebral fractures (**S**) (**Level I**).
3. Salmon calcitonin reduces acute but not chronic phantom limb pain (**N**) (**Level II**).
4. Pamidronate reduces pain associated with acute osteoporotic vertebral fractures (**N**) (**Level II**).

Cannabinoids

1. Current evidence does not support the use of cannabinoids in acute pain management (**S**) but these drugs appear to be mildly effective when used in the treatment of chronic neuropathic pain, including multiple sclerosis-related pain (**N**) (**Level I**).

Glucocorticoids

1. Dexamethasone, compared with placebo, reduces postoperative pain, nausea and vomiting, and fatigue (Level II).

Complementary and alternative medicines

☑ There is some evidence that some complementary and alternative medicines may be effective in some acute pain states. Adverse effects and interactions with medications have been described with complementary and alternative medicines and must be considered before their use (**N**).

5. REGIONALLY AND LOCALLY ADMINISTERED ANALGESIC DRUGS

Local anaesthetics

1. Lignocaine is more likely to cause transient neurologic symptoms than bupivacaine, prilocaine and procaine (**N**) (**Level I** [Cochrane Review]).
2. The quality of epidural analgesia with local anaesthetics is improved with the addition of opioids (**U**) (**Level 1**).
3. Ultrasound guidance reduces the risk of vascular puncture during the performance of regional blockade (**N**) (**Level I**).
4. Continuous perineural infusions of lignocaine (lidocaine) result in less effective analgesia and more motor block than long-acting local anaesthetic agents (**U**) (**Level II**).
5. There are no consistent differences between ropivacaine, levobupivacaine and bupivacaine when given in low doses for regional analgesia (epidural and peripheral nerve blockade) in terms of quality of analgesia or motor blockade (**U**) (**Level II**).
6. Cardiovascular and central nervous system toxicity of the stereospecific isomers ropivacaine and levobupivacaine is less severe than with racemic bupivacaine (**U**) (**Level II**).
7. Lipid emulsion is effective in resuscitation of circulatory collapse due to local anaesthetic toxicity, however uncertainties relating to dosage, efficacy and side effects still remain and therefore it is appropriate to administer lipid emulsion once advanced cardiac life support has begun and convulsions are controlled (**N**) (**Level IV**).

☑ Case reports following accidental overdose with ropivacaine and bupivacaine suggest that resuscitation is likely to be more successful with ropivacaine (**U**).

Opioids

1. Intrathecal morphine produces better postoperative analgesia than intrathecal fentanyl after Caesarean section (**U**) (**Level I**).
2. Intrathecal morphine doses of 300 mcg or more increase the risk of respiratory depression (**N**) (**Level I**).
3. Morphine injected into the intra-articular space following knee arthroscopy does not improve analgesia compared with placebo when administered after surgery (**R**) (**Level I**).

4. Evidence for a clinically relevant peripheral opioid effect at non-articular sites, including perineural, is inconclusive (**U**) (**Level I**).
5. Epidural pethidine produces better pain relief and less sedation than IV pethidine after Caesarean section (**U**) (**Level II**).
6. Extended release epidural morphine provides analgesia for up to 48 hours, however central depressant effects, including respiratory depression, may also be increased and prolonged (**N**) (**Level II**).

☑ No neurotoxicity has been shown at normal clinical intrathecal doses of morphine, fentanyl and sufentanil (**U**).

☑ Neuraxial administration of bolus doses of hydrophilic opioids carries an increased risk of delayed sedation and respiratory depression compared with lipophilic opioids (**U**).

Adjuvant Drugs

1. Intrathecal clonidine improves duration of analgesia and anaesthesia when used as an adjunct to intrathecal local anaesthetics (**N**) (**Level I**).
2. Clonidine improves duration of analgesia and anaesthesia when used as an adjunct to local anaesthetics for peribulbar, peripheral nerve and plexus blocks (**N**) (**Level I**).
3. Intrathecal neostigmine marginally improves perioperative and peripartum analgesia in combination with other spinal medications but is associated with significant side effects (**S**) (**Level I**).
4. Epidural neostigmine combined with an opioid reduces the dose of epidural opioid that is required for analgesia (**U**) (**Level I**).
5. Epidural ketamine (without preservative) added to opioid-based epidural analgesia regimens improves pain relief without reducing side effects (**U**) (**Level I**).
6. Intrathecal midazolam combined with a local anaesthetic prolongs the time to first analgesia and reduces postoperative nausea and vomiting (**N**) (**Level I**).
7. Following Caesarean section, intrathecal morphine provides improved analgesia compared with placebo (**N**) (**Level I**) and more prolonged analgesia compared with more lipophilic opioids (**N**) (**Level II**).
8. Intrathecal clonidine added to intrathecal morphine improves and prolongs analgesia (**N**) (**Level II**).
9. Epidural clonidine reduces postoperative systemic opioid requirements (**N**) (**Level II**).
10. Epidural adrenaline (epinephrine) in combination with a local anaesthetic improves the quality of postoperative thoracic epidural analgesia (**U**) (**Level II**).
11. In obstetrics, epidural neostigmine improves postoperative analgesia without increasing the incidence of adverse events (**N**) (**Level II**).
12. Addition of either clonidine or dexmedetomidine to intrathecal bupivacaine increases the speed of onset and duration of motor and sensory block without additional side effects (**N**) (**Level II**).

Anti-inflammatory drugs

Corticosteroids

1. Subacromial injections of corticosteroids are superior to oral NSAIDs in treating rotator cuff tendonitis (**N**) (**Level I**).
2. Lumbar epidural steroid administration is effective for short -term relief of acute radicular pain (**N**) (**Level I**).
3. Following knee joint arthroscopy, intra-articular steroids in combination with either local anaesthetic or opioids reduce pain, analgesic consumption and duration of immobilisation (**N**) (**Level II**).
4. Intravenous regional anaesthesia combining dexamethasone with lignocaine improves analgesia for up to 24 hours (**N**) (**Level II**).
5. There is a risk of septic arthritis with intra-articular steroids (**N**) (**Level IV**).

Non-steroidal anti-inflammatory drugs

1. Topical NSAIDs are of limited efficacy in lateral elbow pain and provide short-term functional improvement; they result in fewer gastrointestinal side effects compared with oral NSAIDs (**N**) (**Level I** [Cochrane Review]).
2. Non-selective NSAIDs added to local anaesthetic solutions for IVRA improve postoperative analgesia (**N**) (**Level I**).
3. Topical NSAIDs are effective in treating acute strains, sprains or sports injuries for up to 1 week with ketoprofen being significantly better than all other topical NSAIDs, and indomethacin similar to placebo (**N**) (**Level I**).
4. Topical diclofenac significantly reduces pain and inflammation in a range of sports, traumatic and inflammatory conditions and in acute musculoskeletal injuries is at least comparable to oral naproxen (**N**) (**Level I**).
5. Topical NSAIDs are effective analgesics for traumatic corneal abrasions (**N**) (**Level I**).

6. ADMINISTRATION OF SYSTEMIC ANALGESIC DRUGS

1. Paracetamol combined with codeine is more effective than either drug alone and shows a dose-response effect (**N**) (**Level I** [Cochrane Review]).
2. NSAIDs (both nsNSAIDs and coxibs) given parenterally or rectally are not more effective and do not result in fewer side effects than the same drug given orally (**U**) (**Level I** [Cochrane Review]).
3. Paracetamol combined with tramadol is more effective than either drug alone and shows a dose-response effect (**N**) (**Level I**).
4. Early postoperative oral administration of paracetamol results in highly variable plasma concentrations that may remain subtherapeutic in some patients (**N**) (**Level II**).
5. Rectal administration of single doses of paracetamol results in highly variable plasma concentrations that often remain subtherapeutic (**N**) (**Level II**).
6. Intermittent subcutaneous morphine injections are as effective as intramuscular injections and have better patient acceptance (**U**) (**Level II**).
7. Intranasal opioids, in particular the more lipid-soluble drugs such as fentanyl, are effective for the management of acute pain (**N**) (**Level II**).

8. Continuous intravenous infusion of opioids in the general ward setting is associated with an increased risk of respiratory depression compared with other methods of parenteral opioid administration (**U**) (**Level IV**).

9. Transdermal fentanyl should not be used in the management of acute pain because of safety concerns and difficulties in short-term dose adjustments needed for titration; furthermore, in most countries, it lacks regulatory approval for use in other than opioid-tolerant patients (**S**) (**Level IV**).

☑ Other than in the treatment of severe acute pain, and providing there are no contraindications to its use, the oral route is the route of choice for the administration of most analgesic drugs (**U**).

☑ Titration of opioids for severe acute pain is best achieved using intermittent intravenous bolus doses as it allows more rapid titration of effect and avoids the uncertainty of drug absorption by other routes (**U**).

☑ Controlled-release opioid preparations should only be given at set time intervals (**U**).

☑ Immediate-release opioids should be used for breakthrough pain and for titration of controlled-release opioids (**U**).

☑ The use of controlled-release opioid preparations as the sole agents for the early management of acute pain is discouraged because of difficulties in short-term dose adjustments needed for titration (**U**).

☑ Neither oral transmucosal fentanyl citrate nor fentanyl buccal tablets should be used in the management of acute pain because of safety concerns and, in most countries, lack of regulatory approval for use in other than opioid-tolerant patients (**N**).

7. PCA, REGIONAL AND OTHER LOCAL ANALGESIA TECHNIQUES

Patient-controlled analgesia

1. Intravenous opioid PCA provides better analgesia than conventional parenteral opioid regimens (**S**) (**Level I** [Cochrane review]).

2. Opioid administration by intravenous PCA leads to higher opioid consumption (**R**), a higher incidence of pruritus (**R**), and no difference in other opioid-related adverse effects (**S**) or hospital stay (**S**) compared with traditional methods of intermittent parenteral opioid administration (**Level I** [Cochrane review]).

3. In settings where there are high nurse-patient ratios there may be no difference in effectiveness of PCA and conventional parenteral opioid regimens (**N**) (**Level I**).

4. Patient preference for intravenous PCA is higher when compared with conventional regimens (**U**) (**Level I**).

5. The addition of ketamine to PCA morphine does not improve analgesia or reduce the incidence of opioid-related side effects (**U**) (**Level I**).

6. Iontophoretic fentanyl PCA may not be as effective as intravenous morphine PCA, with more patients withdrawing from studies because of inadequate pain relief (**Level I**).

7. There is little evidence that one opioid via PCA is superior to another with regards to analgesic or adverse effects in general; although on an individual patient basis, one opioid may be better tolerated than another (**U**) (**Level II**).

8. There is no analgesic benefit in adding naloxone to the PCA morphine solution; however in ultra-low doses the incidence of nausea and pruritus may be decreased (**U**) (**Level II**).
9. The addition of a background infusion to intravenous PCA does not improve pain relief or sleep, or reduce the number of PCA demands (**U**) (**Level II**).
10. Subcutaneous PCA opioids can be as effective as intravenous PCA (**U**) (**Level II**).
11. Intranasal PCA opioids can be as effective as intravenous PCA (**U**) (**Level II**).
12. The risk of respiratory depression with PCA is increased when a background infusion is used (**U**) (**Level IV**).

☑ Adequate analgesia needs to be obtained prior to commencement of PCA. Initial orders for bolus doses should take into account individual patient factors such as a history of prior opioid use and patient age. Individual PCA prescriptions may need to be adjusted (**U**).

☑ The routine addition of antiemetics to PCA opioids is not encouraged, as it is of no benefit compared with selective administration (**U**).

☑ PCA infusion systems must incorporate antisyphon valves and in non-dedicated lines, antireflux valves (**U**).

☑ Drug concentrations should be standardised within institutions to reduce the chance of programming errors (**U**).

☑ Operator error remains a common safety problem (**N**).

Epidural analgesia

1. Thoracic epidural analgesia for open abdominal aortic surgery reduces the duration of tracheal intubation and mechanical ventilation, as well as the incidence of myocardial infarction, acute respiratory failure, gastrointestinal complications and renal insufficiency (**N**) (**Level I** [Cochrane]).
2. For all types of surgery, epidural analgesia provides better postoperative pain relief compared with parenteral (including PCA) opioid administration (**S**) (**Level I** [Cochrane review]); except epidural analgesia using a hydrophilic opioid only (**N**) (**Level I**).
3. High thoracic epidural analgesia used for coronary artery bypass graft surgery reduces postoperative pain, risk of dysrhythmias, pulmonary complications and time to extubation when compared with IV opioid analgesia (**N**) (**Level I**).
4. Epidural local anaesthetics improve oxygenation and reduce pulmonary infections and other pulmonary complications compared with parenteral opioids (**S**) (**Level I**).
5. Thoracic epidural analgesia improves bowel recovery after abdominal surgery (including colorectal surgery (**S**) (**Level I**).
6. Thoracic epidural analgesia extended for more than 24 hours reduces the incidence of postoperative myocardial infarction (**U**) (**Level I**).
7. Epidural analgesia is not associated with increased risk of anastomotic leakage after bowel surgery (**U**) (**Level I**).
8. Chlorhexidine-impregnated dressings of epidural catheters in comparison to placebo- or povidone-iodine-impregnated dressings reduce the incidence of catheter colonisation (**N**) (**Level I**).

9. The use of continuous background epidural infusion combined with PCEA results in improved maternal analgesia and reduced unscheduled clinician interventions (**N**) (**Level I**).
10. Thoracic epidural analgesia reduces need for ventilation in patients with multiple rib fractures (**S**) (**Level I**) and reduces incidence of pneumonia (**U**) (**Level II**).
11. The combination of thoracic epidural analgesia with local anaesthetics and nutritional support leads to preservation of total body protein after upper abdominal surgery (**U**) (**Level II**).
12. The risk of permanent neurological damage in association with epidural analgesia is very low; the incidence is higher where there have been delays in diagnosing an epidural haematoma or abscess (**S**) (**Level IV**).
13. Immediate decompression (within 8 hours of the onset of neurological signs) increases the likelihood of partial or good neurological recovery (**U**) (**Level IV**).

☑ The provision of epidural analgesia by continuous infusion or patient-controlled administration of local anaesthetic-opioid mixtures is safe on general hospital wards, as long as supervised by an anaesthesia-based pain service with 24-hour medical staff cover and monitored by well-trained nursing staff (**U**).

☑ Magnetic resonance imaging investigation may be warranted if patients who have had an epidural catheter inserted develop a fever and infection at the catheter insertion site; urgent investigation is especially indicated if other signs are present that could indicate an abscess, such as back pain or neurological change (**N**).

Intrathecal analgesia

1. Intrathecal morphine offers improved analgesia and opioid-sparing for up to 24 hours especially following abdominal surgery (**S**) (**Level I**).
2. Intrathecal morphine doses of 300 mcg or more increase the risk of respiratory depression (**N**) (**Level I**).
3. After major surgery, the incidence of respiratory depression and pruritus is higher with intrathecal morphine compared with IV PCA opioids, but there is no difference in the incidence of nausea and vomiting (**N**) (**Level I**).

☑ Clinical experience with morphine, fentanyl and sufentanil has shown no neurotoxicity or behavioural changes at normal clinical intrathecal doses (**U**).

☑ The absence of consistent dose-responsiveness to the efficacy of intrathecal opioids or the adverse event rate, suggests that the lowest effective dose should be used in all circumstances (**N**).

Regional analgesia and concurrent anticoagulant medications

1. Anticoagulation is the most important risk factor for the development of epidural haematoma after neuraxial blockade (**U**) (**Level IV**).

☑ Consensus statements of experts guide the timing and choice of regional anaesthesia and analgesia in the context of anticoagulation, but do not represent a standard of care and will not substitute the risk/benefit assessment of the individual patient by the individual anaesthetist (**U**).

Other regional and local analgesic techniques

1. Topical EMLA® cream (eutectic mixture of lignocaine [lidocaine] and prilocaine) is effective in reducing the pain associated with venous ulcer debridement (**U**) (**Level I** [Cochrane Review]).
2. Compared with opioid analgesia, continuous peripheral nerve blockade (regardless of catheter location) provides better postoperative analgesia and leads to reductions in opioid use as well as nausea, vomiting, pruritus and sedation (**N**) (**Level I**).
3. Femoral nerve block provides better analgesia compared with parenteral opioid-based techniques after total knee arthroplasty (**S**) (**Level I**).
4. Compared with thoracic epidural analgesia, continuous thoracic paravertebral analgesia results in comparable analgesia but has a better side effect profile (less urinary retention, hypotension, nausea, and vomiting) than epidural analgesia and leads to a lower incidence of postoperative pulmonary complications (**N**) (**Level I**).
5. Blocks performed using ultrasound guidance are more likely to be successful, faster to perform, with faster onset and longer duration compared with localisation using a peripheral nerve stimulator (**N**) (**Level I**).
6. Morphine injected into the intra-articular space following knee arthroscopy does not improve analgesia compared with placebo (**R**) (**Level I**).
7. Intra-articular local anaesthetics reduce postoperative pain to a limited extent only (**U**) (**Level I**).
8. Continuous local anaesthetic wound infusions lead to reductions in pain scores (at rest and with activity), opioid consumption, postoperative nausea and vomiting, and length of hospital stay; patient satisfaction is higher and there is no difference in the incidence of wound infections (**S**) (**Level I**).
9. Intraperitonal local anaesthetic after laparoscopic cholecystectomy improves early postoperative pain relief (**N**) (**Level I**).
10. Intraurethral instillation of lignocaine gel provides analgesia during flexible cystoscopy (**N**) (**Level I**).
11. Continuous interscalene analgesia provides better analgesia, reduced opioid-related side effects and improved patient satisfaction compared with IV PCA after open shoulder surgery (**U**) (**Level II**).
12. Continuous femoral nerve blockade provides postoperative analgesia that is as effective as epidural analgesia but with fewer side effects following total knee joint replacement surgery (**U**) (**Level II**).
13. Continuous posterior lumbar plexus analgesia is as effective as continuous femoral analgesia following total knee joint replacement surgery (**U**) (**Level II**).
14. Intra-articular bupivacaine infusions have been associated with chondrolysis and their use has been cautioned against (**N**) (**Level IV**).

8. NON-PHARMACOLOGICAL TECHNIQUES

Psychological interventions

1. Listening to music produces a small reduction in postoperative pain and opioid requirement (**N**) (**Level I** [Cochrane Review]).
2. The evidence that information is effective in reducing procedure-related pain is tentatively supportive and not sufficient to make recommendations (**Q**) (**Level I**).
3. Distraction is effective in procedure-related pain in children (**N**) (**Level I**).
4. Training in coping methods or behavioural instruction prior to surgery reduces pain, negative affect and analgesic use (**U**) (**Level I**).
5. Evidence of benefit of hypnosis in the management of acute pain is inconsistent (**W**) (**Level I**).
6. Immersive virtual reality distraction is effective in reducing pain in some clinical situations (**N**) (**Level III-2**).
7. Evidence for any benefit of relaxation techniques in the treatment of acute pain is weak and inconsistent (**N**) (**Level IV**).

Transcutaneous electrical nerve stimulation

1. Overall, there is no evidence that TENS is effective for the treatment of pain during labour (**N**) (**Level I** [Cochrane Review]).
2. Certain stimulation patterns of TENS are effective in some acute pain settings (**S**) (**Level I**).

Acupuncture

1. Acupuncture reduces postoperative pain as well as opioid-related adverse effects (**N**) (**Level I**).
2. Acupuncture may be effective in some other acute pain settings (**U**) (**Level I**).

9. SPECIFIC CLINICAL SITUATIONS

Postoperative pain

Risks of acute postoperative neuropathic pain

1. Acute neuropathic pain occurs after trauma and surgery (**U**) (**Level IV**).

☑ Diagnosis and subsequent appropriate treatment of acute neuropathic pain might prevent development of chronic pain (**U**).

Acute postamputation pain syndromes

1. Continuous regional blockade via nerve sheath catheters provides effective postoperative analgesia after amputation, but has no preventive effect on phantom limb pain (**U**) (**Level II**).
2. Calcitonin, morphine, ketamine, gabapentin, amitriptyline and tramadol reduce phantom limb pain (**S**) (**Level II**).
3. Sensory discrimination training and motor imagery reduce chronic phantom limb pain (**S**) (**Level II**).
4. Ketamine, lignocaine (lidocaine), tramadol and amitriptyline reduce stump pain (**S**) (**Level II**).

5. Perioperative epidural analgesia reduces the incidence of severe phantom limb pain (**U**) (**Level III-2**).

☑ Perioperative ketamine may prevent severe phantom limb pain (**U**).

Other postoperative pain syndromes

1. Perioperative epidural analgesia reduces the incidence of post-thoracotomy pain syndrome (**N**) (**Level II**).
2. Cryoanalgesia for thoracotomy relieves postoperative pain but increases the risk of post-thoracotomy pain syndrome (**N**) (**Level II**).
3. Preincisional paravertebral block and perioperative use of gabapentin, mexiletine and/or eutectic mixture of local anaesthetic reduce the incidence of postmastectomy pain (**N**) (**Level II**).
4. Post-thoracotomy, postmastectomy, postherniotomy and posthysterectomy pain syndromes occur frequently (**N**) (**Level IV**).

Day-stay or short-stay surgery

1. Infiltration of the wound with local anaesthetic agents provides good and long-lasting analgesia after ambulatory surgery (**U**) (**Level II**).
2. Peripheral nerve blocks with long-acting local anaesthetic agents provide long-lasting postoperative analgesia after ambulatory surgery (**U**) (**Level II**).
3. Single shot infraclavicular blocks provide effective analgesia and less nausea following hand and wrist surgery and earlier ambulation and hospital discharge compared with general anaesthesia (N) (L**evel II**).
4. Continuous peripheral nerve blocks provide extended analgesia after ambulatory surgery (**U**) (**Level II**), leading to reduced opioid requirements, less sleep disturbance, earlier achievement of discharge criteria and improved rehabilitation (**N**) (**Level II**).
5. Continuous peripheral nerve blocks have been shown to be safe at home, if adequate resources and patient education are provided (**U**) (**Level IV**).
6. Pain relief after ambulatory surgery remains poor (**N**) (**Level IV**) and is a common cause of unplanned readmissions (**N**) (**Level III-3**).

Cranial neurosurgery

1. Morphine is more effective than codeine and tramadol for pain relief after craniotomy (**N**) (**Level II**).
2. Local anaesthetic infiltration of the scalp provides early analgesia after craniotomy and reduces incidence of subsequent chronic pain (**N**) (**Level II**).
3. Craniotomy leads to significant pain in the early postoperative period (**N**) (**Level IV**), which is however not as severe as pain from other surgical interventions (**N**) (**Level III-2**).
4. Craniotomy can lead to significant chronic headache (**N**) (**Level IV**).

Acute pain following spinal cord injury

1. Gabapentinoids (gabapentin/pregabalin) (**S**), intravenous opioids, ketamine or lignocaine (lidocaine) (**U**) tramadol, self-hypnosis and electromyelograph biofeedback (**N**) are effective in the treatment of neuropathic pain following spinal cord injury (**Level II**).

☑ Treatment of acute spinal cord pain is largely based on evidence from studies of other neuropathic and nociceptive pain syndromes (**U**).

Acute burn injury pain

1. The use of biosynthetic dressings is associated with a decrease in time to healing and a reduction in pain during burn dressings changes (**N**) (**Level I** [Cochrane Review]).
2. Opioids, particularly via PCA, are effective in burn pain, including procedural pain (**S**) (**Level II**).
3. Augmented reality techniques (**N**) (**Level II**), virtual reality or distraction techniques (**N**) (**Level III-3**) reduce pain during burn dressings.
4. Gabapentin reduces pain and opioid consumption following acute burn injury (**N**) (**Level III-3**).
5. PCA with ketamine and midazolam mixture provides effective analgesia and sedation for burn dressings (**N**) (**Level IV**).

☑ Acute pain following burn injury can be nociceptive and/or neuropathic in nature and may be constant (background pain), intermittent or procedure-related.

☑ Acute pain following burn injury requires aggressive multimodal and multidisciplinary treatment.

Acute back pain

1. Acute low back pain is non-specific in about 95% of cases and serious causes are rare; common examination and investigation findings also occur in asymptomatic controls and may not be the cause of pain (**U**) (**Level I**).
2. Advice to stay active, 'activity-focused' printed and verbal information, and behavioural therapy interventions are beneficial in acute low back pain (**U**) (**Level I**).
3. Advice to stay active, exercises, multimodal therapy and pulsed electromagnetic therapy (in the short term) are effective in acute neck pain (**U**) (**Level I**).
4. Soft collars are not effective for acute neck pain (**U**) (**Level I**).
5. Appropriate investigations are indicated in cases of acute low back pain when alerting features ('red flags') of serious conditions are present (**U**) (**Level III-2**).
6. Psychosocial and occupational factors ('yellow flags') appear to be associated with progression from acute to chronic back pain; such factors should be assessed early to facilitate intervention (**U**) (**Level III-2**).

Acute musculoskeletal pain

1. Topical and oral NSAIDs improve acute shoulder pain (**U**) (**Level I**).
2. Subacromial corticosteroid injection relieves acute shoulder pain in the early stages (**U**) (**Level I**).
3. Exercises improve acute shoulder pain in patients with rotator cuff disease (**U**) (**Level I**).

4. Therapeutic ultrasound may improve acute shoulder pain in calcific tendonitis (**U**) (**Level I**).
5. Advice to stay active, exercises, injection therapy and foot orthoses are effective in acute patellofemoral pain (**U**) (**Level I**).
6. Low-level laser therapy is ineffective in the management of patellofemoral pain (**U**) (**Level I**).

☑ A management plan for acute musculoskeletal pain should comprise the elements of assessment (history and physical examination, but ancillary investigations are not generally indicated), management (information, assurance, advice to resume normal activity, pain management) and review to reassess pain and revise management plan (**U**).

☑ Information should be provided to patients in correct but neutral terms with the avoidance of alarming diagnostic labels to overcome inappropriate expectations, fears or mistaken beliefs (**U**).

☑ Regular paracetamol, then if ineffective, NSAIDs, may be used for acute musculoskeletal pain (**U**).

☑ Oral opioids, preferably short-acting agents at regular intervals, may be necessary to relieve severe acute musculoskeletal pain; ongoing need for such treatment requires reassessment (**U**).

☑ Adjuvant agents such as anticonvulsants, antidepressants and muscle relaxants are not recommended for the routine treatment of acute musculoskeletal pain (**U**).

Acute medical pain

Acute abdominal pain

1. Provision of analgesia does not interfere with the diagnostic process in acute abdominal pain (**S**) (**Level I** [Cochrane Review]).
2. Non-selective NSAIDs, opioids and intravenous metamizole (dipyrone) provide effective analgesia for renal colic (**N**) (**Level I** [Cochrane Review]).
3. Non-selective NSAIDs given for renal colic reduce requirements for rescue analgesia and produce less vomiting compared with opioids, particularly pethidine (meperidine) (**U**) (**Level I** [Cochrane Review]).
4. High frequency TENS is effective in primary dysmenorrhoea (**N**) (**Level I** [Cochrane Review]).
5. The onset of analgesia is faster when non-selective NSAIDs are given intravenously for the treatment of renal colic (**U**) (**Level I**).
6. Antispasmodics and peppermint oil are effective for the treatment of acute pain in irritable bowel syndrome (**U**) and gastrointestinal spasm (**N**) (**Level I**).
7. Non-selective NSAIDs and vitamin B1 are effective in the treatment of primary dysmenorrhoea (**U**) (**Level I**).
8. There is no difference between pethidine and morphine in the treatment of renal colic (**U**) (**Level II**).
9. Parenteral non-selective NSAIDs are as effective as parenteral opioids in the treatment of biliary colic (**U**) (**Level II**).

Herpes zoster-associated pain

1. Antiviral agents started within 72 hours of onset of the herpes zoster rash accelerate the resolution of acute pain (**U**) (**Level I**), but do not reduce the incidence of postherpetic neuralgia (**R**) (**Level I**) [Cochrane Review]).
2. Immunisation of persons aged 60 years or older with varicella-zoster virus vaccine reduces the incidence of herpes zoster and postherpetic neuralgia (**N**) (**Level II**).
3. Amitriptyline (used in low doses for 90 days from onset of the herpes zoster rash) reduces the incidence of postherpetic neuralgia (**U**) (**Level II**).
4. Topical aspirin, topical lignocaine patch or oxycodone controlled release, provide analgesia in herpes zoster (**N**) (**Level II**).

☑ Provision of early and appropriate analgesia is an important component of the management of herpes zoster and may have benefits in reducing the incidence of postherpetic neuralgia.

Acute cardiac pain

1. Morphine is an effective and appropriate analgesic for acute cardiac pain (**U**) (**Level II**).
2. Nitroglycerine is an effective and appropriate agent in the treatment of acute ischaemic chest pain (**U**) (**Level IV**).

☑ The mainstay of analgesia in acute coronary syndrome is the restoration of adequate myocardial oxygenation, including the use of supplemental oxygen, nitroglycerine, beta blockers and strategies to improve coronary vascular perfusion (**U**).

Acute pain associated with haematological disorders

1. Parenteral corticosteroids appear to reduce the duration of analgesia requirements and length of hospital stay, without major side effects, during sickle cell crises (**S**) (**Level I** [Cochrane Review]).
2. There is insufficient evidence to suggest that fluid replacement therapy reduces pain associated with sickle cell crises (**N**) (**Level I** [Cochrane Review]).
3. Hydroxyurea is effective in decreasing the frequency of acute crises, life-threatening complications and transfusion requirements in sickle cell disease (**U**) (**Level I**).
4. Intravenous opioid loading optimises analgesia in the early stages of an acute sickle cell crisis. Effective analgesia may be continued with intravenous opioid therapy, optimally as PCA (**U**) (**Level II**).
5. Oxygen supplementation does not decrease pain during a sickle cell crisis (**U**) (**Level II**).

☑ Pethidine should be avoided for the treatment of acute pain in sickle cell disease or acute porphyria, with increased seizure risk being a potential problem (**U**).

Acute headache

Tension-type headache

1. Acupuncture is effective in the treatment of tension-type heachache (**N**) (**Level I** [Cochrane Review]).
2. The addition of caffeine to aspirin or paracetamol improves analgesia in the treatment of episodic tension-type heachache (**U**) (**Level I**).
3. Simple analgesics such as aspirin, paracetamol or NSAIDs, either alone or in combination, are effective in the treatment of episodic tension-type heachache (**U**) (**Level II**).

Migraine

4. Triptans are effective in the treatment of severe migraine (**U**) (**Level I**).
5. Aspirin-metoclopramide is effective in the treatment of mild-to-moderate migraine (**U**) (**Level I**).
6. Parenteral metoclopramide is effective in the treatment of migraine (**U**) (**Level I**).
7. Over-the-counter medications, including combined paracetamol-aspirin-caffeine preparations, are effective in the treatment of migraine with mild-to-moderate symptoms and disability (**N**) (**Level I**).
8. Effervescent aspirin, ibuprofen or dipyrone are effective in the treatment of migraine (**N**) (**Level I**).
9. In children or adolescents with migraine, ibuprofen or intranasal sumatriptan (over 12 years of age) are effective treatments (**N**) (**Level I**).
10. Pethidine is less effective than most other migraine treatments and should not be used (**N**) (**Level I**).
11. Parenteral prochlorperazine, chlorpromazine or droperidol are effective in the treatment of migraine, especially in the emergency department (**N**) (**Level II**).
12. Paracetamol is effective in the treatment of mild-to-moderate migraine (**U**) (**Level II**).
13. A 'stratified care strategy' is effective in treating migraine (**U**) (**Level II**).

Cluster headache

14. Parenteral triptans (sumatriptan or zolmitriptan) (**S**) or oxygen therapy (**U**), are effective treatments for cluster headache attacks (**Level II**).

Postdural puncture headache

15. There is no evidence that bed rest is beneficial in the treatment and prevention of postdural puncture headache (**U**) (**Level I** [Cochrane Review]).
16. The incidence of postdural puncture headache is reduced by using small-gauge spinal needles and/or a non-cutting bevel (**U**) (**Level I**).
17. Further high quality trials are required to determine the efficacy of epidural blood patch administration in the treatment of postdural puncture headache (**U**) (**Level I**), however benefit is likely (**N**) (**Level II**).

☑ Opioids should be used with extreme caution in the treatment of headache (**U**).

☑ Frequent use of analgesics, triptans and ergot derivatives in the treatment of recurrent acute headache may lead to medication overuse headache (**U**).

Acute pain associated with neurological disorders

☑ Treatment of acute pain associated with neurological disorders is based largely on evidence from trials for the treatment of a variety of chronic neuropathic pain states.

Orofacial pain

Dental extraction

1. Paracetamol 1000 mg provides safe and effective analgesia with minimal adverse effects, following dental extraction (**N**) (**Level I** [Cochrane Review]).
2. Non-selective NSAIDs, coxibs, paracetamol, opioids or tramadol provide effective analgesia after dental extraction (**U**) (**Level I**).
3. Non-selective NSAIDs or coxibs provide better analgesia with fewer adverse effects, than paracetamol, paracetamol/opioid, paracetamol/tramadol, tramadol or weaker opioids, following dental extraction (**U**) (**Level I**).
4. Perioperative steroid administration reduces swelling (**S**) but not pain (**R**) (**Level I**) and reduces postoperative nausea (**U**) (**Level II**), following third molar extraction.
5. The combination of paracetamol with a non-selective NSAID provides analgesia that is superior to each drug given alone following third molar extraction (**N**) (**Level II**).

Tonsillectomy

6. Aspirin and some NSAIDs increase the risk of perioperative bleeding after tonsillectomy (**U**) except in children (**N**) (**Level I** [Cochrane Review]).
7. Peritonsillar infiltration or topical application of local anaesthetics produces a modest reduction in acute post-tonsillectomy pain (**R**) with topical application and infiltration being equally effective (**N**) (**Level I**).
8. Intraoperative dexamethasone administration reduces acute pain (**S**) (**Level I**), nausea and vomiting (**U**) (**Level I**) post-tonsillectomy, although there may be an increased bleeding risk (**N**) (**Level II**).
9. Peritonsillar infiltration with tramadol or ketamine may reduce post-tonsillectomy pain and analgesia requirements, but was no more effective than equivalent doses administered parenterally (**N**) (**Level II**).

Mucositis

10. Opioids, via PCA or a continuous infusion, provide effective analgesia in mucositis, however PCA is associated with reduced opioid requirements and pain duration (**U**) (**Level I** [Cochrane Review]).
11. Topical treatments, including oral cooling or povidone-iodine solution, provide effective analgesia in mucositis (**N**) (**Level I**).
12. Oral laser light therapy reduces mucositis pain and progression (**N**) (**Level II**).

Pharyngitis

13. Steroids improve analgesia in sore throat, in particular in severe and exudative conditions (**N**) (**Level I**).
14. Paracetamol, nsNSAIDs or coxibs and opioids, administered as monotherapy or in combination, are effective analgesics in acute pharyngitis (**N**) (**Level I**).

15. Steroids may reduce acute pain associated with severe pharyngitis or peritonsillar abscess (following drainage and antibiotics) (**N**) (**Level II**).

☑ Recurrent or persistent orofacial pain requires biopsychosocial assessment and appropriate multidisciplinary approaches. Neuropathic orofacial pain (atypical odontalgia, phantom pain) may be exacerbated by repeated dental procedures, incorrect drug therapy or psychological factors (**U**).

Acute pain in patients with HIV infection

1. High concentration capsaicin patches, smoking cannabis and lamotrigine are effective in treating neuropathic pain in patients with HIV/AIDS (**N**) (**Level II**).
2. Nucleoside reverse transcriptase inhibitor (NRTIs)-induced neuropathic pain in HIV/AIDS patients is treatable with acetyl-L-carnitine (ALCAR) (**N**) (**Level II**).
3. HIV/AIDS patients with a history of problematic drug use report higher opioid analgesic use, but also more intense pain (**N**) (**Level III-2**).

☑ Neuropathic pain is common in patients with HIV/AIDS (**U**).

☑ In the absence of specific evidence, the treatment of pain in patients with HIV/AIDS should be based on similar principles to those for the management of cancer and chronic pain (**U**).

☑ Interaction between antiretroviral and antibiotic medications and opioids should be considered in this population (**U**).

Acute cancer pain

1. Oral transmucosal fentanyl is effective in treating acute breakthrough pain in cancer patients (**S**) (**Level I** [Cochrane Review]).
2. Radiotherapy and bisphosphonates are effective treatments of acute cancer pain due to bone metastases (**N**) (**Level I** [Cochrane Review]).
3. Opioid doses for individual patients with cancer pain should be titrated to achieve maximum analgesic benefit with minimal adverse effects (**S**) (**Level II**).
4. Analgesic medications prescribed for cancer pain should be adjusted to alterations of pain intensity (**U**) (**Level III**).

☑ Acute pain in patients with cancer often signals disease progression; sudden severe pain in patients with cancer should be recognised as a medical emergency and immediately assessed and treated (**U**).

☑ Cancer patients receiving controlled-release opioids need access to immediate-release opioids for breakthrough pain; if the response is insufficient after 30 to 60 minutes, administration should be repeated (**U**).

☑ Breakthrough analgesia should be one-sixth of the total regular daily opioid dose in patients with cancer pain (except when methadone is used, because of its long and variable half life) (**U**).

☑ If nausea and vomiting accompany acute cancer pain, parenteral opioids are needed (**U**).

Acute pain management in intensive care

1. Daily interruptions of sedative infusions reduce duration of ventilation and ICU stay without causing adverse psychological outcomes (**U**) (**Level II**) or increasing the risk of myocardial ischaemia (**N**) (**Level III-1**).
2. Gabapentin is more effective than carbamazepine in reducing the pain associated with Guillain-Barre syndrome (**S**) (**Level II**).
3. Remifentanil or remifentanil with morphine provides better analgesia than morphine alone in ventilated intensive care unit patients (**N**) (**Level II**).
4. The use of formal pain and agitation assessment and subsequent treatment in ventilated intensive care unit patients decreases the incidence of pain and duration of ventilation (**N**) (**Level III-1**).

☑ Observation of behavioural and physiological responses permits assessment of pain in unconscious patients (**U**).

☑ Patients should be provided with appropriate sedation and analgesia during potentially painful procedures (**U**).

Acute pain management in emergency departments

Migraine

1. Triptans or phenothiazines (prochlorperazine, chlorpromazine) are effective in at least 75% of patients presenting to the emergency department with migraine (**U**) (**Level II**).

Local anaesthesia

2. Topical local anaesthetic agents (including those in liposomal formulations) (**N**) (**Level I**) or topical local anaesthetic-adrenaline agents (**N**) (**Level II**) provide effective analgesia for wound care in the emergency department.
3. Femoral nerve blocks in combination with intravenous opioids are superior to intravenous opioids alone in the treatment of pain from a fractured neck of femur (**S**) (**Level II**).

☑ To ensure optimal management of acute pain, emergency departments should adopt systems to ensure adequate assessment of pain, provision of timely and appropriate analgesia, frequent monitoring and reassessment of pain (**U**).

Prehospital analgesia

1. Intravenous morphine, fentanyl and tramadol are equally effective in the prehospital setting (**N**) (**Level II**).
2. Nitrous oxide is an effective analgesic agent in prehospital situations (**N**) (**Level IV**).
3. Methoxyflurane, in low concentrations, may be an effective analgesia in the hospital and prehospital setting (**N**) (**Level IV**).
4. Ketamine provides effective analgesia in the prehospital setting (**N**) (**Level IV**)**.**
5. Moderate to severe pain is common in both adult and paediatric patients in the prehospital setting (**N**) (**Level IV**).

- ☑ The ideal prehospital analgesic agent should be simple to use, safe, effective, not lead to delays in transport and have a rapid onset and short duration of action so that it can be repeated as often as necessary and titrated to effect for each patient. Consideration should be given to both choice of analgesic drug and route of administration (N).
- ☑ Non-pharmacological measures are effective in providing pain relief and should always be considered and used if practical (N).

10. THE PAEDIATRIC PATIENT

Long-term consequences of early pain and injury

- ☑ Following birth, even the most premature neonate responds to nociceptive stimuli (**U**).
- ☑ In early development more generalised reflex nociceptive responses occur in response to lower intensity stimuli (**U**).
- ☑ Due to the increased plasticity of the developing nervous system, pain and injury in early life may have adverse long-term consequences (**U**).

Paediatric pain assessment

- ☑ Pain assessment and measurement are important components of paediatric pain management (**U**).
- ☑ Pain measurement tools are available for children of all ages (**U**).
- ☑ Pain measurement tools must be matched to the age and development of the child, be appropriate for the clinical context and be explained and used consistently (**U**).

Management of procedural pain

1. Sucrose reduces the behavioural response to heel-stick blood sampling in neonates (**U**) (**Level I** [Cochrane Review]).
2. Breastfeeding or breast milk reduces measures of distress in neonates undergoing a single painful procedure compared to positioning or no intervention (**U**) (**Level I** [Cochrane Review]).
3. Distraction, hypnosis, and combined cognitive-behavioural interventions reduce pain and distress associated with needle-related procedures in children and adolescents (**S**) (**Level I** [Cochrane Review]).
4. EMLA® is an effective topical anaesthetic for children, but amethocaine is superior for reducing needle insertion pain (**N**) (**Level I** [Cochrane Review]).
5. Topical local anaesthetic application, inhalation of nitrous oxide (50%) or the combination of both provides effective and safe analgesia for minor procedures (**U**) (**Level I**).
6. Combinations of hypnotic and analgesic agents are effective for procedures of moderate severity (**U**) (**Level II**).

- ☑ Inadequate monitoring of the child, lack of adequate resuscitation skills and equipment, and the use of multiple drug combinations has been associated with major adverse outcomes during procedural analgesia and sedation (**U**).

Analgesic agents

1. Non-selective NSAIDs do not increase the risk of reoperation for bleeding after tonsillectomy in paediatric patients (**R**) (**Level I** [Cochrane Review]).
2. Dexamethasone reduces post-tonsillectomy pain and postoperative nausea and vomiting (**N**) (**Level I**) but high doses may increase the risk of bleeding (**N**) (**Level II**).
3. Paracetamol and non-selective NSAIDs are effective for moderately severe pain and decrease opioid requirements after major surgery (**U**) (**Level II**).
4. The efficacy of oral codeine in children is variable, individual differences in the ability to generate active metabolites may reduce efficacy (**U**) (**Level II**) or increase side effects (**N**) (**Level IV**).

☑ Safe dosing of paracetamol requires consideration of the age and body weight of the child, and the duration of therapy (**U**).

☑ Aspirin should be avoided in children, but serious adverse events after non-selective NSAIDs are rare in children over 6 months of age (**U**).

Opioid infusions and PCA

1. Routine morphine infusion does not improve neurological outcome in ventilated preterm neonates (**N**) (**Level I** [Cochrane Review]).
2. Postoperative intravenous opioid requirements vary with age in neonates, infants and children (**N**) (**Level II**).
3. Effective PCA prescription in children incorporates a bolus that is adequate for control of movement-related pain, and may include a low dose background infusion (**U**) (**Level II**).
4. Intermittent intramuscular injections are distressing for children and are less effective for pain control than intravenous infusions (**U**) (**Level III-1**).

☑ Intravenous opioids can be used safely and effectively in children of all ages (**U**).

☑ Initial doses of opioid should be based on the age, weight and clinical status of the child and then titrated against the individual's response (**U**).

Regional analgesia

1. Topical local anaesthetic does not adequately control pain associated with circumcision in awake neonates (**U**) (**Level I** [Cochrane Review]).
2. Caudal local anaesthetic and dorsal penile nerve block provide perioperative analgesia for circumcision (**U**) (**Level I** [Cochrane Review]).
3. Clonidine prolongs analgesia when added to caudal local anaesthetic blocks (**U**) (**Level I**) and improves analgesia when added to epidural local anaesthetic infusions (**U**) (**Level II**).
4. Wound infiltration, peripheral nerve blocks, and caudal local anaesthetic provide effective analgesia after day-case inguinal surgery (**U**) (**Level II**).
5. Epidural infusions of local anaesthetic and systemic opioids provide similar levels of analgesia (**U**) (**Level II**).
6. Epidural opioids alone are less effective than local anaesthetic or combinations of local anaesthetic and opioid (**U**) (**Level II**).
7. Intrathecal opioids provide prolonged analgesia after surgery (**N**) (**Level II**) and reduce blood loss during spinal fusion (**N**) (**Level II**).

- ☑ Caudal local anaesthetic blocks provide effective analgesia for lower abdominal, perineal and lower limb surgery and have a low incidence of serious complications (**U**).
- ☑ Continuous epidural infusions provide effective postoperative analgesia in children of all ages and are safe if appropriate doses and equipment are used by experienced practitioners, with adequate monitoring and management of complications (**U**).

Acute pain in children with cancer

1. PCA and continuous opioid infusions are equally effective in the treatment of pain in mucositis, but opioid consumption is less with PCA (**U**) (**Level I**).
2. PCA morphine and hydromorphone are equally effective for the control of pain associated with oral mucositis (**U**) (**Level II**).

11. OTHER SPECIFIC PATIENT GROUPS

The pregnant patient

Management of acute pain during pregnancy

1. Exercises reduce back and pelvic pain during pregnancy. There is weak evidence for improvements with acupuncture and chiropractic care (**N**) (**Level I**).
2. Use of NSAIDs during pregnancy is associated with an increased risk of miscarriage (**U**) (**Level III-2**).

- ☑ For pain management in pregnancy non-pharmacological treatment options should be considered where possible before analgesic medications are used (**U**).
- ☑ Use of medications for pain in pregnancy should be guided by published recommendations; ongoing analgesic use requires close liaison between the obstetrician and the medical practitioner managing the pain (**U**).
- ☑ NSAIDs should be used with caution in the last trimester of pregnancy and should be avoided after the 32nd week (**U**).

Management of pain during delivery

1. Epidural and combined spinal-epidural analgesia provide superior pain relief for labour and delivery compared with systemic analgesics (**S**) (**Level I** [Cochrane Review]).
2. Combined spinal-epidural in comparison with epidural analgesia reduces time to effective analgesia and increases the incidence of pruritus (**U**), does not increase maternal satisfaction (**R**), but increases the risk of urinary retention (**N**) (**Level I** [Cochrane Review]).
3. Epidural analgesia does not increase the incidence of Caesarean section or long-term backache (**S**) (**Level I** [Cochrane Review]).
4. Epidural analgesia is associated with increased duration of labour and increased rate of instrumental vaginal delivery (**S**) (**Level I** [Cochrane Review]).
5. Hypnosis used in labour reduces analgesic requirements (**S**) and improves satisfaction (**N**) (**Level I** [Cochrane Review]).
6. Acupuncture reduces analgesic requirements in labour (**U**) (**Level I** [Cochrane Review]).
7. TENS may reduce severe pain in labour but does not reliably reduce pain scores (**U**) or analgesic requirements (**N**) (**Level I** [Cochrane Review]).

8. Local anaesthetic wound infiltration and abdominal nerve blocks reduce opioid consumption following Caesarean section (**N**) (**Level I** [Cochrane Review]).
9. Continuous or one-to-one support by a midwife or trained layperson during labour reduces analgesic use, operative delivery and dissatisfaction (**U**) (**Level I**).
10. There is no significant difference in any outcome between use of bupivacaine and ropivacaine for epidural labour analgesia (**U**) (**Level I**).
11. Patient-controlled epidural analgesia provides effective analgesia but optimal settings are not clear (**N**) (**Level I**).
12. Single-injection intrathecal opioids provide comparable early labour analgesia to epidural local anaesthetics with increased pruritus (**U**) (**Level I**).
13. Systemic opioids in labour increase the need for neonatal resuscitation and worsen acid-base status compared with regional analgesia (**U**) (**Level I**).
14. Nitrous oxide has some analgesic efficacy and is safe during labour (**U**) (**Level I**).

Pain management during lactation

- ☑ Prescribing medications during lactation requires consideration of possible transfer into breast milk, uptake by the baby and potential adverse effects for the baby; it should follow available prescribing guidelines (**U**).
- ☑ Local anaesthetics, paracetamol and several non-selective NSAIDs, in particular ibuprofen, are considered to be safe in the lactating patient (**U**).
- ☑ Morphine and fentanyl are considered safe in the lactating patient and are preferred over pethidine (**U**).

Pain management in the puerperium

1. Routine episiotomy does not reduce perineal pain (**U**) (**Level I**).
2. Paracetamol and non-selective NSAIDs are effective in treating perineal pain after childbirth (**U**) (**Level I**).
3. Paracetamol and non-selective NSAIDs are equally but only modestly effective in treating uterine pain (**U**) (**Level II**).
4. Topical agents may improve nipple pain, but no one treatment is superior (**N**) (**Level I**).
5. There is only limited evidence to support the effectiveness of local cooling treatments in treatment of perineal pain after childbirth (**Q**) (**Level I**).
6. Topical local anaesthetic preparations are not effective for perineal pain after childbirth (**N**) (**Level I**).

- ☑ Pain after childbirth requires appropriate treatment as it coincides with new emotional, physical and learning demands and may trigger postnatal depression (**U**).
- ☑ Management of breast and nipple pain should target the cause (**U**).

The older patient

1. Experimental pain thresholds to a variety of noxious stimuli are altered in older people; there is also a reduction in tolerance to pain (**Q**) (**Level I**).
2. PCA and epidural analgesia are more effective in older people than conventional opioid regimens (**U**) (**Level II**).

3. Reported frequency and intensity of acute pain in clinical situations may be reduced in the older person (**U**) (**Level III-2**).
4. Common unidimensional self-report measures of pain can be used in the older patient in the acute pain setting; in the clinical setting, the verbal descriptor and numerical rating scales may be preferred (**S**) (**Level III-2**).
5. Undertreatment of acute pain is more likely to occur in cognitively impaired patients (**N**) (**Level III-2**).
6. There is an age-related decrease in opioid requirements; significant interpatient variability persists (**U**) (**Level IV**).
7. The use of nsNSAIDs and coxibs in older people requires extreme caution; paracetamol is the preferred non-opioid analgesic (**U**) (**Level IV**).

☑ The assessment of pain and evaluation of pain relief therapies in the older patient may present problems arising from differences in reporting, cognitive impairment and difficulties in measurement (**U**).

☑ Measures of present pain may be more reliable than past pain, especially in patients with some cognitive impairment (**U**).

☑ The physiological changes associated with ageing are progressive. While the rate of change can vary markedly between individuals, these changes may decrease the dose (maintenance and/or bolus) of drug required for pain relief and may lead to increased accumulation of active metabolites (**U**).

☑ The age-related decrease in opioid requirements is related more to the changes in pharmacodynamics that accompany aging than to the changes in pharmacokinetics (**N**).

Aboriginal and Torres Strait Islander peoples

1. The verbal descriptor scale may be a better choice of pain measurement tool than verbal numerical rating scales (**U**) (**Level III-3**).
2. Medical comorbidities such as renal impairment are more common in Aboriginal and Torres Strait Islander peoples and New Zealand Maoris, and may influence the choice of analgesic agent (**U**) (**Level IV**).
3. Clinicians should be aware that pain may be under-reported by this group of patients (**U**) (**Level IV**).

☑ Communication may be hindered by social, language and cultural factors (**U**).

☑ Provision of quality analgesia requires sensitivity to cultural practices and beliefs, and behavioural expressions of pain (**N**).

Different ethnic and cultural groups

1. Disparities in assessment and effective treatment of pain exist across ethnic groups (**N**) (**Level III-3**).

☑ Ethnic and cultural background can significantly affect the ability to assess and treat acute pain (**U**).

☑ Multilingual printed information and pain measurement scales are useful in managing patients from different cultural or ethnic backgrounds (**U**).

☑ Differences between different ethnic and cultural groups should not be used to stereotype patients and lead to assumptions about responses to pain or pain therapies; pain assessment and management should be done on an individual patient basis (**N**).

The patient with obstructive sleep apnoea

1. Patients with obstructive sleep apnoea may at higher risk of complications after some types of surgery (**Q**).
2. Patients with obstructive sleep apnoea have an increased risk of obstructive episodes and desaturations (**N**) (**Level III-2**).
3. Morbidly obese patients undergoing bariatric surgery may be at increased risk of postoperative hypoxaemia independent of a diagnosis of obstructive sleep apnoea (**N**) (**Level III-2**).
4. Continuous positive airway pressure does not increase the risk of anastomotic leak after upper gastrointestinal surgery (**U**) (**Level III-2**).

☑ Management strategies that may increase the efficacy and safety of pain relief in patients with obstructive sleep apnoea include the provision of appropriate multimodal opioid-sparing analgesia, continuous positive airway pressure, monitoring and supervision (in a high-dependency area if necessary) and supplemental oxygen (**U**).

The patient with concurrent hepatic or renal disease

☑ Consideration should be given to choice and dose regimen of analgesic agents in patients with hepatic and particularly renal impairment (**U**).

The opioid-tolerant patient

1. Opioid-tolerant patients report higher pain scores and have a lower incidence of opioid-induced nausea and vomiting (**U**) (**Level III-2**).
2. Ketamine improves pain relief after surgery in opioid-tolerant patients (**N**) (**Level II**).
3. Opioid-tolerant patients may have significantly higher opioid requirements than opioid-naive patients and interpatient variation in the doses needed may be even greater (**N**) (**Level III-2**).
4. Ketamine may reduce opioid requirements in opioid-tolerant patients (**U**) (**Level IV**).

☑ Usual preadmission opioid regimens should be maintained where possible or appropriate substitutions made (**U**).

☑ Opioid-tolerant patients are at risk of opioid withdrawal if non-opioid analgesic regimens or tramadol alone are used (**U**).

☑ PCA settings may need to include a background infusion to replace the usual opioid dose and a higher bolus dose (**U**).

☑ Neuraxial opioids can be used effectively in opioid-tolerant patients although higher doses may be required and these doses may be inadequate to prevent withdrawal (**U**).

☑ Liaison with all health care professionals involved in the treatment of the opioid-tolerant patient is important (**U**).

☑ In patients with escalating opioid requirements the possibility of the development of both tolerance and opioid-induced hyperalgesia should be considered (**N**).

The patient with an addiction disorder

- ☑ Naltrexone should be stopped at least 24 hours prior to elective surgery (**U**).
- ☑ Patients who have completed naltrexone therapy should be regarded as opioid naive; in the immediate post-treatment phase they may be opioid-sensitive (**U**).
- ☑ Maintenance methadone regimens should be continued where possible (**U**).
- ☑ Buprenorphine maintenance may be continued; if buprenorphine is ceased prior to surgery conversion to an alternative opioid is required (**U**).
- ☑ There is no cross-tolerance between central nervous system stimulants and opioids (**U**).