Queensland Clinical Guidelines

Translating evidence into best clinical practice

Maternity and Neonatal **Clinical Guideline**

Intrapartum pain management

Queensland Government

Document title:	Intrapartum pain management
Publication date:	February 2023
Document number:	MN23.75-V1-R28
Document supplement:	The document supplement details development processes and implementation activities, and is integral to and should be read in conjunction with this guideline
Amendments:	Full version history is supplied in the document supplement
Amendment date:	New document February 2023
Replaces document:	New document
Author:	Queensland Clinical Guidelines
Audience:	Health professionals in Queensland public and private maternity and neonatal services
Review date:	February 2028
Endorsed by:	Queensland Clinical Guidelines Steering Committee Queensland Maternity and Neonatal Clinical Network
Contact:	Email: Guidelines@health.qld.gov.au URL: www.health.qld.gov.au/qcg

Cultural acknowledgement

The Department of Health acknowledges the Traditional Custodians of the lands, waters and seas across the State of Queensland on which we work and live. We also acknowledge First Nations peoples in Queensland are both Aboriginal Peoples and Torres Strait Islander Peoples and pay respect to the Aboriginal and Torres Strait Islander Elders past, present and emerging.

Disclaimer

This guideline is intended as a guide and provided for information purposes only. The information has been prepared using a multidisciplinary approach with reference to the best information and evidence available at the time of preparation. No assurance is given that the information is entirely complete, current, or accurate in every respect.

The guideline is not a substitute for clinical judgement, knowledge and expertise, or medical advice. Variation from the guideline, taking into account individual circumstances, may be appropriate.

This guideline does not address all elements of standard practice and accepts that individual clinicians are responsible for:

- Providing care within the context of locally available resources, expertise, and scope of practice
- Supporting consumer rights and informed decision-making, including the right to decline intervention or ongoing management
- Advising consumers of their choices in an environment that is culturally appropriate and which enables comfortable and confidential discussion. This includes the use of interpreter services where necessary
- Ensuring informed consent is obtained prior to delivering care
- Meeting all legislative requirements and professional standards
- Applying standard precautions, and additional precautions as necessary, when delivering care
- Documenting all care in accordance with mandatory and local requirements

Queensland Health disclaims, to the maximum extent permitted by law, all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs incurred for any reason associated with the use of this guideline, including the materials within or referred to throughout this document being in any way inaccurate, out of context, incomplete or unavailable.

Recommended citation: Queensland Clinical Guidelines. Intrapartum pain management. Guideline No. MN23.75-V1-R28. Queensland Health. 2023. Available from: http://www.health.qld.gov.au/qcg

© State of Queensland (Queensland Health) 2023

This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives V4.0 International licence. In essence, you are free to copy and communicate the work in its current form for non-commercial purposes, as long as you attribute Queensland Clinical Guidelines, Queensland Health and abide by the licence terms. You may not alter or adapt the work in any way. To view a copy of this licence, visit https://creativecommons.org/licenses/by-nc-nd/4.0/deed.en
For further information, contact Queensland Clinical Guidelines, RBWH Post Office, Herston Qld 4029, email Guidelines@health.qld.gov.au. For permissions beyond the scope of this licence, contact: Intellectual Property Officer, Queensland Health, GPO Box 48, Brisbane Qld 4001, email ip_officer@health.qld.gov.au

Flowchart: Summary of intrapartum pain management

Good practice points

- Discuss labour pain management antenatally, early in labour, intermittently during labour
- Share information to support decision making and enhance sense of autonomy
- Consider values, beliefs, culture, expectations, intentions, previous experiences
- Support the woman's preferences, choices and promote a flexible approach
- Create clinical spaces that feel calm, safe and private
- Provide known carers whenever possible
- Sensitively discuss normal labour sensations as physiological and purposeful—less fear, intervention and greater self-efficacy
- Encourage support person/s to provide continuous presence, praise and advocacy
- If heightened anxiety or fear of childbirth, offer additional support/referral
- Audit feedback about pain management and impact on birth experience
- Consider environmental impact of pain relief strategies

Non-pharmacological strategies

- Align strategies with the body's physiology/psychology to alter or change response to labour sensations/pain
- Offer reduction in pain intensity with few or no adverse effects
- Combine strategies/use alongside pharmacological agents (if chosen) to increase relief

Neurotransmitter release

- Acupuncture
- Acupressure
- Distraction
- Sterile water injections

Gate control theory

- Massage, touch, warmth
- Movement, active positioning
- TENS
- Water immersion

CNS activation

- Aromatherapy
- Breathing
- Hypnosis
- Mindfulness
- Yoga

Pharmacological options

- Consider side effects and impact on labour and birth
- Efficacy and outcomes unclear due to conflicting findings and limited high quality evidence

Nitrous oxide/oxygen

- Mild inhalation analgesia
- Use in any stage of active labour
- Consider contraindications
- Side effects (e.g. nausea, vomiting, dizziness)
- Self administer only
- Coach with breathing: inhale—exhale via mask/ mouthpiece
- Combine with other strategies (e.g. TENS)
- Use in well ventilated space
- Use safety equipment (e.g. filters) and demand valve to reduce occupational exposure

Opioids

- Variable analgesic response
- Follow local prescribing protocols
- Side effects (e.g. nausea, vomiting, drowsiness, sedation, dysphoria)
- Consider anti-emetic
- Changes in FHR more likely
- Consider estimated TOB prior to administration and possible post-natal impacts
- If neuraxial analgesia isn't an option, consider remifentanil or fentanyl via PCA

Neuraxial analgesia

- Most effective pharmacological method
- Use in any stage of labour following anaesthetic assessment
- May be clinically indicated (e.g. for hypertensive or cardiac conditions)
- Gain IV access
- Low concentration LA with opioid reduces motor block
- Additional surveillance (e.g. CEFM, motor weakness, block height)
- Mobility assessment prior to active positioning
- Bladder management required
- May increase length of labour
- Increased likelihood of assisted birth, maternal hyperthermia, antibiotic use

CNS: central nervous system; **>:** greater than; **TENS:** transcutaneous electrical nerve stimulation; **TOB:** time of birth, **FHR:** fetal heart rate, **PCA:** patient controlled analgesic, **IV:** intravenous; **LA:** local anaesthetic; **CEFM:** continuous electronic fetal monitoring; **IDC:** indwelling catheter

Flowchart: F23.75-1-V1-R28

Table of Contents

List of Tables

Abbreviations

CEFM	Continuous electronic fetal monitoring
CNS	Central nervous system
FHR	Fetal heart rate
IDC	Indwelling catheter (urinary)
IV	Intravenous
LA	Local anaesthetic
PCA	Patient controlled analgesia
SpO_2	Peripheral capillary oxygen saturation
TENS	Transcutaneous electrical nerve stimulation
UTI	Urinary tract infection

Definitions

Combined spinal/ epidural	A form of regional anaesthesia or analgesia in which medications are administered into the cerebrospinal fluid (spinal block) and into the epidural space through an epidural catheter.
Epidural block	A type of regional anaesthesia or analgesia in which pain medications are given into the epidural space.
Gate Control Theory	Nociceptive fibres in the spine transmit sensations to the central nervous system (CNS). If these fibres are saturated with a range of sensations (massage, touch, warmth, ambulation) the transmission of pain may be reduced.
Multidisciplinary team	Membership of the healthcare team is influenced by the needs of the woman, availability of staff, and other local resourcing issues. May include but is not limited to: nurse, midwife, obstetrician, general practitioner, anaesthetist, feto-maternal specialist, social worker, counsellor or hospital liaison officer.
Neuraxial	Term that includes both spinal, epidural or combined spinal epidural.
Nociceptive pain	Activation of nerve fibres in response to noxious stimuli that the individual perceives as pain.
Non-pharmacological	Without the use of medication.
Opioid	A group of drugs, both naturally occurring and synthetic which act on opioid receptors to provide analgesia.
Spinal block	A type of regional anaesthesia or analgesia in which medications are administered into the cerebrospinal fluid.
Systemic/parenteral analgesics	Medications that provide pain relief affecting the entire body without causing loss of consciousness.
Woman/women	In QCG documents, the terms *woman* and *women* include people who do not identify as women but who are pregnant or have given birth.

1 Introduction

The physiological response to birth creates sensations and pain that each woman experiences in a unique and individual way. The approach and management of labour pain can contribute significantly to a woman's overall satisfaction with the birth experience.[1] Effective pain management includes supporting the woman's choices and working 'with woman' to enhance the body's physiological responses during labour and birth.[2] The World Health Organisation advises caution in using "too many interventions too soon", and emphasises the need for woman centred care encompassing the woman's perspective, preferences and satisfaction with pain management.[3] This guideline is informed by a growing body of low to medium level evidence on pain management in labour and provides best practice guidance to inform woman centred, intrapartum pain management.

1.1 Clinical standards

Table 1. Foundations of pain management in labour

Aspect	Consideration
Standard care	• Refer to Queensland Clinical Guideline *Standard care*[4] for care considered 'usual' or 'standard', includes for example: o Privacy, consent, documentation, decision-making, sensitive communication, medication administration for safety, staff education and support, culturally appropriate care o A supportive birthing environment to promote neurophysiological and hormonal mechanisms to reduce pain, stress and fear[5] • Refer to Queensland Clinical Guidelines: *Normal birth*[6]
Labour companions	• Labour companions are chosen by the woman (e.g. partner, family, friend, birth companion, doula) and offer benefit in managing pain by[7]: o Providing continuous presence, emotional support, encouragement and coaching o Implementing non-pharmacological strategies o Enhancing confidence and autonomy through praise and reassurance o Advocating to support the woman's wishes, when needed
Supportive clinicians	• Attitudes to labour pain and the ability to communicate respect for a woman's choice, is fundamental to respectful maternity care[3] o Attentive, supportive, sensitive clinicians are valued[8] • A woman receiving midwifery continuity of care more frequently perceives labour pain positively, labours without analgesia and is more satisfied[9,10] o Refer to Queensland Clinical Guidelines: *Normal birth*[6]
Psychoeducation	• Psychoeducation is a recognised strategy to support information sharing and may reduce fear and anxiety around sensations and pain[11] o Commence in the antenatal period and involve labour companions • Discuss: o Labour pain as a purposeful, normal, and physiological event[3] o An adaptive neurobiological state to pain may develop (e.g. acceptance of working with pain), when woman sees labour pain as beneficial[12] o The aim of pain management is preventing overwhelming, physiological and psychological responses (e.g. increased catecholamine release, changes in maternal circulation and reduced oxygenation)[2] • Offer information about pain management options including[13]: o Effectiveness, side effects for either woman or baby, additional monitoring (if any) o Clinical outcomes for labour, birth, breastfeeding o Availability or access (e.g. epidural) o Refer to Queensland Clinical Guidelines: *Consumer information: Managing labour and birth*[14] • If high levels of anxiety, trauma or fear specific to childbirth are identified, offer additional support (e.g. mindfulness program)[15,16] o Refer as required (e.g. perinatal mental health, social worker)
Environmental impact	• Consider environmental impacts of pain relief strategies (e.g. disposable packaging, electricity usage, harvesting of essential oils) • Nitrous oxide is a potent greenhouse gas with an estimated carbon footprint much higher than other types of analgesia[17,18] o Recommended system maintenance schedules identify pipeline gas leaks to reduce waste[19]

2 Assessment of labour pain

Table 2. Responsive assessment of labour pain

Aspect	Consideration
Individual experiences	• Satisfaction with pain management is multidimensional and influenced by[1,12,20,21]: o Culture, genetics, environment o Previous experiences o Pre-birth expectations for childbirth o Psychological and physiological responses to childbirth o Clinical circumstances (e.g. induced labour, assisted birth[22]) o Involvement in decision-making o Quality of relationship with clinicians (e.g. midwifery caseload[9,10]) • Feeling unsupported may increase unanticipated use of pharmacological analgesia, and feelings of guilt and failure[1]
Assessment	• Measurement of labour pain intensity is complex and subjective[21] o There is no objective method or validated tool to assess labour pain[12] o Pain intensity scales may be numerical or categorical[12] • Early assessment and support during early labour (e.g. phone contact) increases satisfaction and reduces rates of epidural[23] • Understanding the woman's views about labour pain informs individualised pain assessment and experience[1] o If a woman prefers less intervention, working with non-pharmacological strategies may be more important than eliminating pain[8] o If expecting pain to be relieved, or there is fear of pain, pharmacological methods may be more important[24,25] • Ask about the woman's perception of[25]: o Labour sensations and level of satisfaction o Management strategies compared to intentions and preferences
Recommendation	• Support women in their choices and preferences[1,25] o Promote a flexible approach to available pain management options [1] o Utilise the woman's birth plan if available • Support autonomy through positive language and encouragement[23] • Sensitively discuss labour sensation and pain in the context of purposeful, normal physiological event to enhance self-efficacy and lessen fear[5,21] • Reassess the woman's pain and satisfaction as indicated (e.g. changing clinical circumstances, stage of labour)[12]

3 Non-pharmacological strategies

Table 3. Support for non-pharmacological strategies

Aspect	Consideration
Context	• Many non-pharmacological strategies offer benefits, with no or few side effects[26] • Some self-initiated strategies may be outside the multidisciplinary healthcare team's scope of practice, including: o Strategies set by independent or complementary health practitioners or therapists (e.g. aromatherapy, acupressure, hypnotherapy) o Culture, family traditions (e.g. Bush medicine) • Combining several strategies alongside pharmacological agents (if used) may increase overall pain management effectiveness[5,27]
Physiological models	• Theoretical models suggest the body's physiological processes can be altered in response to pain[5]: o Gate control theory—competing stimuli block pain transmission o Diffuse noxious inhibitory control—other sensations trigger neurotransmitter release o Central nervous system (CNS) activation—thought and mental training trigger response from amygdala and limbic system • Individual strategies may have elements of multiple theoretical models

3.1 Non-pharmacological options

There are a range of safe and commonly used strategies. Antenatal information and practice prior to labour may improve effectiveness.[12]

Table 4. Non-pharmacological options

Theory/Therapy		Consideration
CNS activation	**Breathing**	• Focused breathing (e.g. Lamaze method) reduces pain and anxiety[28]
	Aromatherapy	• Reduces anxiety and labour pain intensity[26,29] • Increased sense of calmness and wellbeing[29,30] • Insufficient evidence to recommend specific essential oils and/or method of administration[29] o Women commonly self-initiate use of essences or oils (e.g. lavender)[5,26,31] o Consider the impact on the baby's sensitive olfactory system during initial extrauterine adaptation (e.g. room diffusers may be overwhelming)[5]
	Relaxation	• Reduces pain intensity particularly in the latent phase and increased satisfaction with pain relief[32]
	Music	• Lowers anxiety and pain intensity in early labour[32,33]
	Mindfulness	• Increases a woman's sense of autonomy[32]
	Hypnosis	• Associated with a reduction in overall use of analgesia (except epidural) with no increase in adverse events[30,34]
	Yoga	• Reduces pain[26] and increases satisfaction[32] • May shorten length of labour[26]
Neurotransmitter release	**Distraction**	• Distractive strategies reduce pain (e.g. virtual reality, chewing gum)[35]
	Sterile water injections	• Safe intervention associated with reduced pain[30,36] o 30–50% reduction in back pain for up to 90 minutes post injection[36] o Variation in techniques exist (e.g. single, paired, four—four injection technique for back pain has longer duration[37]) o Two people administering injections at the same time may reduce administration pain[38]
	Acupuncture	• May reduce pain and use of pharmacological options, whilst increasing maternal satisfaction[39]
	Acupressure	• May reduce labour pain intensity[39,26] • May shorten length of labour[26]
Gate control	**Massage and touch**	• Reduces severity of pain and anxiety in first stage labour[26,28,40] • Increased sense of autonomy and overall satisfaction[40]
	Water and warmth	• Superficial heat from hot packs, moist towels, heated silica packs, shower and bath—to avoid burns: o Test heat on caregiver's skin o If using hot pack, apply one or two layers of cloth between woman's skin and pack[30] o Avoid if neuraxial analgesia administered • Warm showers relieve labour pain, release tension and ease backache[40], encourage relaxation and mobilisation[30] • Perineal warm compresses in second stage are associated with reduced pain, increased birth satisfaction[30]and fewer third and fourth degree tears[41] o Refer to Queensland Clinical Guidelines: Perineal care[42] • Refer to Section3.1.2 Water immersion
	Movement, positioning, birth ball	• Provide space and equipment to support use of active positioning and movement • Promotes comfort, relaxation, mobility, active birth positioning, increase pelvic dimensions and builds confidence to manage pain[43] • Less pain reported in the first stage of labour with use of birth ball[30]
	TENS	• Transcutaneous electrical nerve stimulation (TENS) • Refer to Table 5. TENS therapy

3.1.1 TENS therapy

Table 5. TENS therapy

Aspect	Consideration
Access	• Availability according to local protocol o Woman may be required to bring their own TENS unit or hire privately
Benefits[44,45]:	• Reduces labour pain and delays need for pharmacological strategies • May reduce length of labour • Promotes release of endorphins and serotonin and reduces catecholamines • Non-invasive method • Easy to apply • No impact on woman's mobility • No known adverse effects on baby
Cautions[44,45]:	• Avoid use if: o Previous history of pacemaker or spinal metal rods o Showering or bathing o Limited sensation (e.g. neuraxial analgesia) • Avoid applying electrodes over damaged skin • Do not use hot packs directly over the electrodes
Application and use	• Follow directions of manufacturer and/or local protocols • Most effective when two pairs of electrodes are placed at the paravertebral regions aligned with thoracic vertebra 10–11 and sacral vertebra 2–4[45,46] • A variety of TENS technologies are available, some may have several program options (e.g. labour option)[45] o Using low voltage currents (e.g. frequency: 80–100 Hertz) and higher pulse widths (e.g. 220–350 microseconds[46]) are effective o The woman titrates the intensity according to her pain o Some TENS units have a boost option for application during contractions • Reapplication of gel may be required depending on the type of equipment

3.1.2 Water immersion

This guideline discusses water immersion during labour for pain management. For waterbirth, refer to Queensland Clinical Guidelines: *Normal birth.*[6]

Table 6. Water immersion

Aspect	Consideration
Context	• Water immersion during established labour is an effective strategy for pain relief for healthy women[47] o Women report both psychological and physiological relief[48] • Clinical outcomes for women using water immersion (low risk pregnancy at term) include[47,49,50]: o No greater adverse outcomes o Slight reduction in use of neuraxial analgesia o Less need for augmentation (labour may slow but overall is associated with shorter labour[51] o No difference in mode of birth o Reduces labour pain intensity[48,52] o Increases maternal satisfaction with birth experience[48,53] o Increases sense of autonomy and relaxation[48,53]
Assessment	• Develop/follow local protocols to support water immersion in labour • Perform an individualised assessment using clinical judgement to balance risk factors and the needs and safety of each woman[54] including: o Ability to enter and exit the bath with minimal assistance o Availability of resources (human and equipment) to assist exiting the water (if this becomes necessary) o Timing of opioid administration (e.g. avoid immersion if administered less than four hours previously[55]) o Recommended antibiotic regime has been commenced prior to immersion, when: ▪ Group B Streptococcus positive [refer to Queensland Clinical Guidelines: *Early onset Group B Streptococcal disease*[56]] ▪ Term prelabour rupture of membrane more than 18 hours [refer to Queensland Clinical Guidelines: *Term prelabour rupture of membranes*[57]]
Water management	• Fill water to level of maternal breast or axilla when sitting • Maintain water temperature according to local protocols • Monitor water quality continuously and change water if debris present
Care during water immersion	• Continuous support from caregivers skilled in water immersion o Follow local facility recommendations for training[50] • Baseline assessment of maternal and fetal condition prior to entering water • Additional observations: o Temperature hourly during first stage o If continuous electronic fetal monitoring (CEFM), use waterproof telemetry equipment[50] o Whilst vaginal examination (VE) may be carried out in the water[50] encouraging the woman to leave bath will enable thorough assessment • Encourage regular fluid intake to maintain hydration[6] • Prepare for unintended water birth[50] (e.g. rapid birth or maternal decision) o Ensure a second caregiver is immediately available o Refer to Queensland Clinical Guidelines: *Normal birth*[6]
Exiting the bath	• If water birth not intended, allow adequate time to exit the bath • Follow local protocols, criteria may include[50]: o Fetal heart rate (FHR) abnormalities on auscultation or CEFM o Liquor stained with meconium/blood o Maternal temperature elevated: equal or greater than 38ºC, or 37.5 ºC on two consecutive occasions • Refer or consult as indicated
Perineal care	• Conflicting evidence about effect on perineal trauma o Refer to Queensland Clinical Guideline: *Perineal care*[42]

4 Pharmacological options

4.1 Nitrous oxide and oxygen

Table 7. Nitrous oxide and oxygen

Aspect	Considerations
Context	• Mild inhaled analgesic[58], assists relaxation, reduces anxiety, may increase woman's sense of autonomy[59,60] o Rapid onset and offset (approximately 50 seconds to reach full effect)[59,61] • Rapidly crosses the placenta, however no changes in Apgar score or neonatal nursery admission[12,58,60,61]
Cautions	• If COVID-19 suspected or confirmed o Refer to Queensland Clinical Guideline: *Maternity care for mothers and babies during the COVID-19 pandemic*[62]] • Sedation may be exacerbated by the use of systemic opioids[63] • Contraindications exist (e.g. pernicious anaemia[59]) however in well women and for short term labour analgesia, complications are unlikely*
Dosage and administration	• Suitable for all stages of active labour[59] • Self-administered intermittently by demand flow mask or mouthpiece[59] o Entonox® nitrous oxide and oxygen 50:50 mix, or o Flow mixer: nitrous oxide and oxygen from 30:70 up to 70:30 mix o No difference in women's satisfaction—Entonox® or flow mixer[58] o Titrate to individual effect and sensitivity[58,64] • Offer support with breathing technique and timing for effective, intermittent administration[60,65] o Commence with onset of contraction (or 30 seconds prior) o Advise to breathe deeply at normal rate, exhaling into mask or mouthpiece (minimises exposure of others) until contraction eases
Care during use	• Aim to achieve greater comfort, relaxed state, and minimal side effects (e.g. nausea, vomiting, dizziness, light-headedness)[48] • Offer antiemetics if indicated • The woman holds the mask/mouthpiece to reduce the risk of oversedation[65] • Able to remain mobile[65] • Monitor sedation and respiratory effort during use[65] • Can be combined with other analgesia and strategies[59] (e.g. TENS or water immersion[66]) • If overdose indicated by unconsciousness or decreased respiratory effort immediately cease and apply supplemental oxygen o Implement local emergency call protocols as required
Occupational health and safety	• Prolonged occupational exposure may cause health issues for clinicians (e.g. reduced fertility, disrupted vitamin B_{12} synthesis)[17,63] • Use: o In rooms with adequate air ventilation[63,67,68] o Approved equipment to maximise safety for women and staff including filters, demand valve, scavenger systems to capture exhalation[64,68]
Comparison to other pharmacological options	• When compared to other pharmacological options: o Provides less analgesic effectiveness than neuraxial analgesia[69] • Greater user satisfaction and more effective pain relief at 120 minutes when compared to opioid (pethidine)[70,71]

**Consult a pharmacopeia for complete drug information*

4.2 Systemic opioids

Table 8. Systemic opioids

Aspect	Consideration
Context[12]	• In Australia, practice is varied and use of systemic opioids is declining[12] • Response to opioids is variable and many women continue to experience moderate to severe pain following administration[72] • Aim is to manage pain with the lowest dose to minimise side effects • Administration route (intramuscular (IM), intravenous (IV), subcutaneous (SC)) and pattern (repeated or once only) results in highly variable absorptions rates and effects[73] • Effects on the newborn remain unclear[72]
Action	• Acts on receptors in the central nervous system to lessen neurotransmitter excitatory response to pain[12]
Cautions	• If the woman has substance use disorder, consider maternal and neonatal impacts and discuss alternate analgesia options o Refer to Queensland Clinical Guidelines: *Perinatal substance use: maternal*[74] and o *Perinatal substance use: neonatal*[75]] • Can potentiate the action of other drugs (e.g. nitrous oxide and oxygen) that cause maternal CNS and respiratory depression[76] • If reduced blood volume (e.g. antepartum haemorrhage), increased risk of hypotension and respiratory depression • Opioids readily cross into the placenta and may cause changes in the fetal heart rate (e.g. decreased variability)[65] o Refer to Queensland Clinical Guideline: *Intrapartum fetal surveillance*[77] • Interval from administration to the time of birth may impact neonatal outcomes (e.g. less than four[78] to five hours[79]), (low level evidence)[72] o Refer to Queensland Clinical Guideline: *Neonatal resuscitation*[80] o Consider direct supervision of baby during skin to skin contact and support breastfeeding initiation[81,82] o Refer to Queensland Clinical Guideline: *Establishing breastfeeding*[82]
Opioid of choice	• The opioid of choice for pain management during labour is unclear[72] • Follow local protocols for preferred prescribing • Refer to: o Table 9. Morphine dosage and administration o Table 10. Fentanyl dosage and administration o Table 11. Remifentanil via patient controlled analgesic device o Pethidine is not a preferred opioid[3], when compared to other opioids due to higher rates of neonatal nursery admission[81], and altered neuro-behaviour up to 60 hours following birth[81]
Side effects	• Maternal dysphoria, sedation and drowsiness[73]: o May feel dissociation from pain, rather than analgesic effect o May impact capacity to fully engage in care and decision-making[72] o Nausea, vomiting[73] o Delayed gastric emptying, urinary retention[12] o Rash, pruritus[73] o Hypoventilation and desaturations[73]

4.2.1 Morphine

Table 9. Morphine dosage and administration

Aspect	Consideration
Local protocols	• Follow preferred dosage, route, preparation and administration
Dosage	• 5–10 mg
Route	• Intramuscular injection
Expected response	• Analgesia peaks at 30–60 minutes following administration • Duration of action 1–3 hours
Additional care	• Consider co-administration of an anti-emetic • Routine intrapartum observations including: o Level of sedation (increased sedation almost always precedes respiratory depression[12]) • Monitor effectiveness of pain relief
Comparison with other	• Morphine preferred to pethidine due to: o Greater user satisfaction[72] o Less vomiting[72] o Shorter half life[83]

Consult a pharmacopeia for complete drug information

4.2.2 Fentanyl

Table 10. Fentanyl dosage and administration

Aspect	Consideration
Local protocols	• Follow preferred dosage, route, preparation and administration
Administration options[81]:	• Single injection subcutaneously or via subcutaneous cannula • Intermittent doses via subcutaneous cannula: o Cannula (e.g. 24 gauge) inserted in the sub clavicular or upper pectoral region o Avoids need for pumps and administration devices, allows intermittent injection without repeated skin punctures o Reduces total dose when compared to IV administration • If neuraxial analgesia is contraindicated, unachievable or unwanted, and remifentanil PCA is not available, can be administered via PCA according to local protocols*
Single injection	• 100–150 micrograms subcutaneous injection
Subcutaneous cannula	• Initial 200 microgram bolus, then after one hour[81]: o 50 microgram every 15 minutes up to a maximum of 650 micrograms (if required)
Duration of action	• 1–2 hours
Additional care	• Monitor effectiveness of pain relief and side effects o If nausea, consider an anti-emetic • Routine intrapartum observations including level of sedation[12]
Comparison with other	• Fentanyl 100 times more potent than morphine[84] • Fentanyl preferred to pethidine[81,85] o Greater user satisfaction o Less nausea o Less sedation o Safer in renal impairment o Shorter labour o Fewer admissions to nursery o No adverse neonatal effects noted when cord bloods examined[86] o Less difficulty with breastfeeding

*Consult a pharmacopeia for complete drug information

4.2.3 Remifentanil

Table 11. Remifentanil via patient controlled analgesic device

Aspect	Consideration
Indications	• A potent analgesic[87] only administered via patient controlled analgesia (PCA) device, during active labour when epidural is contraindicated, unachievable or unwanted[88] *
Safety considerations	• Requires[89]: o Anaesthetic assessment prior to use o Protocols for device setup and management o Staff trained in administration and management • Concomitant use of other analgesics (e.g. opioids, sedatives, nitrous oxide and oxygen) not recommended unless prescribed by an anaesthetist[89]
Dosage and administration	• Administer via dedicated IV access and (PCA) device[89] • Follow local protocols for: o Recommended dose and lock out periods o Concomitant anti-emetic, naloxone and oxygen prescriptions o Device management, training, assignment of responsibility for care and escalation procedures
Additional care	• One to one continuous midwifery care[12,84] • Baseline maternal and fetal observations prior to commencement[12] • Commence CEFM[12] • Continuous oxygen saturation (SpO_2 monitoring—maintain above 95%[12,88] • Routine intrapartum observations every 30 minutes o Refer to Queensland Clinical Guideline: *Normal birth*[6] • Review effectiveness of pain relief • Clinical surveillance for decreased respiratory rate, hypotension, vomiting, muscle rigidity, pruritus and sedation[88,89] o Increasing sedation is the best early clinical sign of respiratory depression[12]
Comparisons with other pharmacological strategies	• Approximately 200 times more potent than morphine[87] • Compared to other opioids, remifentanil users experienced[87]: o Greater satisfaction o Less pain (at one and two hours after administration) o Less requirement for additional analgesia o Less nausea and vomiting o Less changes in FHR patterns o No difference in neonatal outcomes • Compared to neuraxial analgesia, remifentanil users experienced[87]: o Less satisfaction with pain relief o More nausea and vomiting o Increased incidence of maternal desaturations

*This indication is not specified on the Queensland Health List of Approved Medicines (LAM). Consult a pharmacopeia for complete drug information

4.3 Neuraxial analgesia

Table 12. Neuraxial analgesia considerations

Aspect	Consideration
Context	• A variety of techniques may be available, depending on clinical maternity service capability level[90] and resources including: o Epidural, spinal, or combined spinal epidural (CSE)[91] • Epidurals offer effective, reliable and flexible labour analgesia[22,91] • Women prefer information and discussion about epidural risks, benefits and procedure during the antenatal period to support decision making[92] o Refer to Queensland Clinical Guideline: *Managing labour and birth*[14]
Consult anaesthetic team	• All forms of neuraxial analgesia require anaesthetic consultation o If pre-existing co-morbidities, antenatal consultation may benefit[92] o If difficult neuraxial placement is anticipated, consider early insertion along with neuraxial ultrasound[12] • Individualise assessment[65]: o Identify contraindications and alternatives o Discuss benefits and risks, including impacts of co-existing medical conditions o Consider the requirement for additional screening (e.g. platelet count) o Review the woman's birth plan and expectations following insertion (e.g. impact on motor function[93])
Common side effects during labour*[22]:	• Hypotension • Shivering • Itchiness • Urinary retention • Motor blockage • Fever
Effect on perinatal outcomes	• Increased o Duration of labour (first and second stage)[12] o Risk of instrumental vaginal birth, particularly in nulliparous women[65,94] • Increased incidence of a maternal fever following epidural[22,94,95] and greater use of antibiotics[96,97] o The cause of fever is unknown[69] and a high index of suspicion for infection is required o Association of epidural-induced hyperthermia to neonatal brain injury is unknown[95] • Inconsistent evidence regarding[96,98,99]: o Neonatal infection o Admission to neonatal unit o Apgar score • Impact on breastfeeding initiation and maintenance unknown[100,101]
Comparison to opioid analgesia in labour	• When compared to opioid analgesia, women with epidural analgesia experience[22]: o Greater user satisfaction o Less need for additional pain relief o Less nausea and vomiting o Less respiratory depression requiring oxygen o More hypotension o More maternal fevers o More urinary retention o More use of oxytocin for labour augmentation o Increased length of labour o More instrumental birth

**Consult a pharmacopeia for complete drug information*

4.3.1 Care during neuraxial analgesia use

Table 13. Intrapartum care of a woman with neuraxial analgesia

Aspect	Consideration
Safety considerations	• Close midwifery care o One to one midwifery care for insertion and a minimum of 30 minutes following completion of an epidural procedure[65] • Pregnancy related physiological changes and complications, may delay the recognition of complications associated with neuraxial procedures (e.g. local anaesthetic (LA) toxicity[102], epidural haematoma, migration of the catheter[12]) o Implement local emergency protocols as required • Resuscitation equipment includes vasopressors and IV lipid emulsion[65] • Avoid all other opioids or sedatives unless prescribed by an anaesthetist
Prior to epidural insertion	• Secure large bore IV access, commence IV fluids[22,65] • Follow local protocols for pathology (e.g. full blood count, group and hold) • Baseline maternal and fetal observations[65], commence/continue CEFM[77] • Encourage voiding (or note time of last void) and discuss a post-epidural bladder management plan[103] o Refer to Section 4.3.2: Bladder management
Dosage and administration	• Suitable at any stage of labour[12] o No significant differences in clinical outcomes for early versus late initiation (nine RCTs, n=15,752)[104] • Follow local protocols for preferred prescribing, administration and documentation (e.g. pump checks, demand and delivery rates) • Combined low concentration LA and opioids provide superior analgesia and results in shorter duration of second stage labour, fewer assisted births, greater ambulation and less urinary retention[12] • The choice of medications and dosages may reduce incidence of side effects without compromising safety[105] • Additional medications can be administered through the epidural if necessary (e.g. instrumental birth or emergency caesarean)
Supportive care	• Discuss the woman's plans and support normal birth strategies following neuraxial analgesia[92,106] o Refer to Queensland Clinical Guidelines: *Normal birth*[6] • Follow local protocols to support active positioning/mobility after an individual mobility assessment, including[65,73]: o Bilateral straight leg raises against resistance o Supervised stepping on a step stool with either leg and taking a step o Satisfactory trial of walking with a clinician o Always accompany when repositioning (to a weight bearing position) or mobilising[73] • If immobile, incorporate pressure injury prevention strategies
Observations	• Follow local protocol • During establishment of neuraxial analgesia and after intermittent bolus—five minutely blood pressure, CEFM, observe for early signs of complications (e.g. agitation, circumoral numbness[102]) • Following establishment, ongoing intrapartum observations every 30 minutes, and in addition[65]: o Sedation, motor weakness, back pain, check catheter site o Sensory assessment of block height o Side effects (e.g. pruritis)
Second stage	• Continue epidural analgesia until after birth—early discontinuation results in inadequate analgesia and decreased maternal satisfaction[107] • Support the woman in a position of comfort to provide greater satisfaction[108] (e.g. lying down in a lateral position rather than supine) o Upright positions in second stage following neuraxial analgesia are not shown to reduce instrumental birth[108] • Refer to Queensland Clinical Guideline: *Perineal care*[42] for pushing methods

4.3.2 Bladder management

Table 14. Post-epidural bladder management

Aspect	Good practice points
Context	• Routine indwelling urinary catheterisation (IDC) is common following neuraxial analgesia to minimise:[103,109] o Intrapartum and post-partum urinary retention o Bladder over distention injury o Delay in fetal descent due to obstruction by a distended bladder • Hospital acquired urinary tract infections (UTI) associated with IDCs are common health care related infections[110] • No difference between intermittent and continuous catheterisation for rates of[111]: o UTI o Postnatal urinary retention o Postpartum haemorrhage
Preferred management	• Follow local protocols • Consider[103]: o Woman's preference o Estimated number of intermittent catheterisations (e.g. parity, stage and progress of labour, time for medication effects to resolve) o Factors impeding ability to palpate bladder (e.g. obesity[103]) o Requirement for hourly urine measurement (e.g. pre-eclampsia)
IDC	• Plan time for removal, considering[112]: o Time for effect of neuraxial analgesics to wear off o Factors that may increase risk of voiding dysfunction (e.g. prolonged labour, assisted birth, perineal swelling)[112]
If intermittent catheterisation	• May be offered when only two episodes are anticipated[112] • Assessment and catheterisation is required approximately two hourly[103] • Consider using male length intermittent catheter to reach bladder in the event of elongated urethra during labour
If no catheter	• If no catheterisation: o Support to void within one hour of epidural insertion, and then at least every two hours[65,103] o If unable to void, palpate abdomen to identify bladder distention[65,103] • If distended or unable to void after four hours[65], recommend catheterisation
Recommendation	• Implement a bladder management plan within one hour of epidural insertion[103]

4.3.3 Discontinuing the epidural

Table 15. Discontinuing the epidural

Aspect	Consideration
Timing	• Following birth continued neuraxial analgesia may be required (e.g. perineal repair) • Refer to Queensland Clinical Guideline: *Venous thromboembolism (VTE) prophylaxis in pregnancy and the puererium*[113]
Documentation	• Document removal date, time and condition of catheter tip (e.g. intact)[65] o Notify anaesthetic team if tip is incomplete
Observation following removal	• Continue to monitor motor function and proprioception for the first 24 hours according to local protocol, including: o Assess motor function prior to mobilisation due to increased risk of falls[65] o Notify anaesthetist is block persists after six hours, or new or increasing weakness or sensations • Monitor for and provide information to the woman about, possible complications (e.g. urinary retention, headache)[65]

5 Woman's satisfaction with pain management

Table 16. Satisfaction with pain management

Aspect	Consideration
Context[114]:	• Reviewing the woman's emotional needs postnatally includes discussing her labour and birth experience, including pain management • Improved postnatal psychological functioning is found when expectations and experience are matched about labour and birth, and/or there is an understanding of the care experience
Recommendation[114]:	• Following birth, review the woman's experience and level of satisfaction with pain management strategies • If the woman expresses dissatisfaction, consider further follow up (e.g. a formal debrief with clinicians involved) • Feedback from women on satisfaction with labour pain management informs maternity systems review

References

1. Thomson G, Feeley C, Moran VH, Downe S, Oladapo OT. Women's experiences of pharmacological and non-pharmacological pain relief methods for labour and childbirth: a qualitative systematic review. Reproductive Health 2019;16(1):71-91.
2. Lam KK, Leung MKM, Irwin MG. Labour analgesia: update and literature review. Hong Kong Medical Journal 2020;26(5):413-20.
3. World Health Organization. WHO recommendations intrapartum care for a positive childbirth experience. [Internet]. 2018 [cited 2022 May 18]. Available from: http://who.int.
4. Queensland Clinical Guidelines. Standard care. Guideline No. MN22.50-V2-R27. [Internet]. Queensland Health. 2022. [cited 2022 December 14]. Available from: http://www.health.qld.gov.au
5. Bonapace J, Gagné G-P, Chaillet N, Gagnon R, Hébert E, Buckley S. No. 355-Physiologic basis of pain in labour and delivery: an evidence-based approach to its management. Journal of Obstetrics and Gynaecology Canada 2018;40(2):227-45.
6. Queensland Clinical Guidelines. Normal birth. Guideline No. MN22.25-V4-R27. [Internet]. Queensland Health. 2017. [cited 2022 December 24]. Available from: http://www.health.qld.gov.au
7. Bohren MA, Berger BO, Munthe-Kaas H, Tunçalp Ö, Bohren MA. Perceptions and experiences of labour companionship: a qualitative evidence synthesis. Cochrane Database Systematic Reviews. Chichester, UK: John Wiley & Sons, Ltd; 2019. p. CD012449-CD.
8. Donate-Manzanares M, Rodríguez-Cano T, Rodríguez-Almagro J, Hernández-Martínez A, Santos-Hernández G, Beato-Fernández L. Mixed-method study of women's assessment and experience of childbirth care. Journal of Advanced Nursing 2021;77(10):4195-210.
9. Sandall J, Soltani H, Gates S, Shennan A, Devane D. Midwife-led continuity models versus other models of care for childbearing women. Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2016.
10. Hildingsson I, Rubertsson C, Karlström A, Haines H. A known midwife can make a difference for women with fear of childbirth- birth outcome and women's experiences of intrapartum care. Sexual & Reproductive Healthcare 2019;21:33-8.
11. Fenwick J, Toohill J, Gamble J, Creedy DK, Buist A, Turkstra E, et al. Effects of a midwife psycho-education intervention to reduce childbirth fear on women's birth outcomes and postpartum psychological wellbeing. BioMedCentral Pregnancy and Childbirth 2015;15(1):284.
12. Schug SA, Palmer GM, Scott DA, Alcock M, Halliwell R, Mott JF. Acute pain management: scientific evidence, fifth edition (2020). [Internet]. Melbourne: Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine; 2020 [cited 2022 May 4]. Available from: https://www.anzca.edu.au.
13. Fox H, Topp SM, Lindsay D, Callander E. A cascade of interventions: a classification tree analysis of the determinants of primary cesareans in Australian public hospitals. [Internet]. 2021 [cited 2022 March 10]; 48(2):209-20 DOI:10.1111/birt.12530.
14. Queensland Clinical Guidelines. Managing labour and birth. Guideline No. C23.75-1-V1-R28. [Internet]. Queensland Health. 2023. [cited 2023 February 15]. Available from: http://www.health.qld.gov.au
15. Veringa-Skiba IK, de Bruin EI, van Steensel FJA, Bögels SM. Fear of childbirth, nonurgent obstetric interventions, and newborn outcomes: a randomized controlled trial comparing mindfulness-based childbirth and parenting with enhanced care as usual. Birth 2022;49(1):40-51.
16. O'Connell MA, Khashan AS, Leahy-Warren P, Stewart F, O'Neill SM. Interventions for fear of childbirth including tocophobia. Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2021.
17. Vallejo MC, Zakowski MI. Pro-con debate: nitrous oxide for labor analgesia. BioMed Research International 2019;2019:4618798.
18. Pearson F, Sheridan N, Pierce JMT. Estimate of the total carbon footprint and component carbon sources of different modes of labour analgesia. Anaesthesia 2022;77(4):486-8.
19. Seglenieks R, Wong A, Pearson F, McGain F. Discrepancy between procurement and clinical use of nitrous oxide: waste not, want not. British Journal of Anaesthesia. [Internet]. 2022 [cited 2022 October 7]; 128(1):e32-e4. Available from: https://www.sciencedirect.com.
20. Tan A, Wilson AN, Eghrari D, Clark H, Tse WC, Bohren MA, et al. Outcomes to measure the effects of pharmacological interventions for pain management for women during labour and birth: a review of systematic reviews and randomised trials. British Journal Obstetrics and Gynaecology 2022;129(6):845-54.
21. Whitburn LY, Jones LE, Davey MA, McDonald S. The nature of labour pain: an updated review of the literature. Women Birth 2019;32(1):28-38.
22. Anim-Somuah M, Smyth RMD, Cyna AM, Cuthbert A. Epidural versus non-epidural or no analgesia for pain management in labour. Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2018.
23. Kobayashi S, Hanada N, Matsuzaki M, Takehara K, Ota E, Sasaki H, et al. Assessment and support during early labour for improving birth outcomes. Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2017.
24. Allen J, Jenkinson B, Tracy SK, Hartz DL, Tracy M, Kildea S. Women's unmet needs in early labour: qualitative analysis of free-text survey responses in the M@NGO trial of caseload midwifery. Midwifery. [Internet]. 2020 [cited 2022 March 10]; 88:102751 DOI:10.1016/j.midw.2020.102751.
25. Kuipers Y, van Beeck E. Predictors associated with low-risk women's pre-labour intention for intrapartum pain relief: a cross-sectional study. International Journal of Nursing Studies Advances 2022;4:100070.
26. Hu Y, Lu H, Huang J, Zang Y. Efficacy and safety of non-pharmacological interventions for labour pain management: a systematic review and Bayesian network meta-analysis. Journal of Clinical Nursing 2021;30(23-24):3398-414.
27. Gallo RBS, Santana LS, Marcolin AC, Duarte G, Quintana SM. Sequential application of non-pharmacological interventions reduces the severity of labour pain, delays use of pharmacological analgesia, and improves some obstetric outcomes: a randomised trial. Journal of Physiotherapy 2018;64(1):33-40.
28. Weljale BS. Effectiveness of back massage vs breathing exercises on labour pain and anxiety among primigravida mothers during first stage of labour in pravara rural hospital, Loni (Bk). Indian Journal of Public Health Research & Development 2021;12(2):75-9.
29. Chen S-F, Wang C-H, Chan P-T, Chiang H-W, Hu T-M, Tam K-W, et al. Labour pain control by aromatherapy: a meta-analysis of randomised controlled trials. Women and Birth 2019;32(4):327-35.
30. Caughey AB. Nonpharmacologic approaches to management of labor pain. UpToDate Inc. Waltham MA; 2021.
31. Hatami Rad R. Effect of aromatherapy with lavender on labor pain: a literature review. Disease and Diagnosis, 2021;10(3):123-8.
32. Smith CA, Levett KM, Collins CT, Armour M, Dahlen HG, Suganuma M, et al. Relaxation techniques for pain management in labour. Cochrane Database of Systematic Reviews. Chichester, UK: John Wiley & Sons, Ltd; 2018. p. CD009514-CD.
33. Chuang CH, Chen PC, Lee CS, Chen CH, Tu YK, Wu SC. Music intervention for pain and anxiety management of the primiparous women during labour: a systematic review and meta-analysis. Journal of Advanced Nursing 2019;75(4):723-33.
34. Madden K, Middleton P, Cyna AM, Matthewson M, Jones L. Hypnosis for pain management during labour and childbirth. Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2016.

35. Ebrahimian A, Bilandi RR, Bilandi MRR, Sabzeh Z. Comparison of the effectiveness of virtual reality and chewing mint gum on labor pain and anxiety: a randomized controlled trial. BioMedCentral Pregnancy and Childbirth 2022;22(1):49.
36. Lee N, Gao Y, Collins SL, Mårtensson LB, Randall W, Rowe T-M, et al. Caesarean delivery rates and analgesia effectiveness following injections of sterile water for back pain in labour: a multicentre, randomised placebo controlled trial. EClinicalMedicine. [Internet]. 2020 [cited 2022 February 28]; 25:100447 DOI:10.1016/j.eclinm.2020.100447.
37. Lee N, Leiser B, Halter-Wehrli Y, Mårtensson LB, Gao Y, Kildea S. A comparison of two versus four sterile water injections for the relief of back pain in labour: a multicentre randomised equivalence trial. Women and Birth 2022.
38. Farnham T. Reviewing pain management options for patients in active labor. Nursing2022 2020;50(6).
39. Smith CA, Collins CT, Levett KM, Armour M, Dahlen HG, Tan AL, et al. Acupuncture or acupressure for pain management during labour. Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2020.
40. Smith CA, Levett KM, Collins CT, Dahlen HG, Ee CC, Suganuma M, et al. Massage, reflexology and other manual methods for pain management in labour. Cochrane Database of Systematic Reviews. Chichester, UK: John Wiley & Sons, Ltd; 2018. p. CD009290-CD.
41. Aasheim V, Nilsen ABV, Reinar LM, Lukasse M. Perineal techniques during the second stage of labour for reducing perineal trauma. Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2017.
42. Queensland Clinical Guidelines. Perineal care. Guideline No. MN18.30-V3-R23. [Internet]. Queensland Health. 2020. [cited 2022, December 5]. Available from: http://www.health.qld.gov.au
43. Yeung MPS, Tsang KWK, Yip BHK, Tam WH, Ip WY, Hau FWL, et al. Birth ball for pregnant women in labour research protocol: a multi-centre randomised controlled trial. BioMedCentral Pregnancy Childbirth. [Internet]. 2019 [cited 2022 May 12]; 19(1):153 DOI:10.1186/s12884-019-2305-8.
44. Santana LS, Gallo RBS, Ferreira CHJ, Duarte G, Quintana SM, Marcolin AC. Transcutaneous electrical nerve stimulation (TENS) reduces pain and postpones the need for pharmacological analgesia during labour: a randomised trial. Journal of Physiotherapy. [Internet]. 2016 [cited 2022 February 28]; 62(1):29-34.
45. Njogu A, Qin S, Chen Y, Hu L, Luo Y. The effects of transcutaneous electrical nerve stimulation during the first stage of labor: a randomized controlled trial. BioMedCentral Pregnancy Childbirth 2021;21(1):164.
46. Báez-Suárez A, Martín-Castillo E, García-Andújar J, García-Hernández JÁ, Quintana-Montesdeoca MP, Loro-Ferrer JF. Evaluation of different doses of transcutaneous nerve stimulation for pain relief during labour: a randomized controlled trial. Trials 2018;19(1).
47. Burns E, Feeley C, Hall PJ, Vanderlaan J. Systematic review and meta-analysis to examine intrapartum interventions, and maternal and neonatal outcomes following immersion in water during labour and waterbirth. British Medical Journal Open. [Internet]. 2022 [cited 2022 November 14]; 12(7):e056517 DOI:10.1136/bmjopen-2021-056517.
48. Feeley C, Cooper M, Burns E. A systematic meta-thematic synthesis to examine the views and experiences of women following water immersion during labour and waterbirth. Journal of Advanced Nursing 2021;77(7):2942-56.
49. Cluett ER, Burns E, Cuthbert A, Cluett ER. Immersion in water during labour and birth. Cochrane Database of Systematic Reviews. Chichester, UK: John Wiley & Sons, Ltd; 2018. p. CD000111-CD.
50. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Water immersion during labour and birth. College Statement C-Obs 24. [Interent]. 2021 [cited 2022, June 15]. Available from: https://www.ranzcog.edu.au/.
51. American College of Obstetricians and Gynecologists. Committee opinion. Immersion in water during labor and delivery. No. 679. Obstetrics & Gynecology. [Internet]. 2016 (reaffirmed 2021) [cited 2022 June 23]; 133(2):e164. Available from: https://www.acog.org.
52. Maude RM, Kim M. Getting into the water: a prospective observational study of water immersion for labour and birth at a New Zealand District Health Board. BioMedCentral Pregnancy and Childbirth. [Internet]. 2020 [cited 2022 February 28]; 20(1):312 DOI:10.1186/s12884-020-03007-6.
53. Milosevic S, Channon S, Hughes J, Hunter B, Nolan M, Milton R, et al. Factors influencing water immersion during labour: qualitative case studies of six maternity units in the United Kingdom. BioMedCentral Pregnancy and Childbirth. [Internet]. 2020 [cited 2022 February 28]; 20(1):719 DOI:10.1186/s12884-020-03416-7.
54. Australian College of Midwives. Position statement on the use of water immersion for labour and birth. [Internet]. 2013 [cited 2022 September19]. Available from: https://www.midwives.org.au.
55. Lewis L, Hauck YL, Butt J, Hornbuckle J. Obstetric and neonatal outcomes for women intending to use immersion in water for labour and birth in Western Australia (2015–2016): a retrospective audit of clinical outcomes. Australian & New Zealand Journal of Obstetrics & Gynaecology 2018;58(5):539-47.
56. Queensland Clinical Guidelines. Early onset group B streptococcal disease. Guideline No. MN16.20-V4-R21. [Internet]. Queensland Health. 2020. [cited 2022 February 28]. Available from: http://www.health.qld.gov.au
57. Queensland Clinical Guidelines. Term prelabour rupture of membranes (PROM). Guideline No. MN18.47-V1-R23. [Internet]. Queensland Health. 2018. [cited 2022 July 13]. Available from: http://www.health.qld.gov.au
58. Klomp T, van Poppel M, Jones L, Lazet J, Di Nisio M, Lagro-Janssen AL. Inhaled analgesia for pain management in labour. Cochrane Database of Systematic Reviews. 2012. p. Cd009351.
59. Collins M. Nitrous oxide utility in labor and birth: a multipurpose modality. The Journal of Perinatal & Neonatal Nursing 2017;31(2):137-44.
60. Hoffman S, Sidebottom A, Wrede J, Kreiger R, Watkins A, Taghon J. Association of self-administered nitrous oxide for labor analgesia with maternal and neonatal process and outcome measures. Journal of Obstetric, Gynecologic & Neonatal Nursing 2021;50(2):154-66.
61. Likis FE, Andrews JC, Collins MR, Lewis RM, Seroogy JJ, Starr SA, et al. Nitrous oxide for the management of labor pain:a systematic review. Anesthesia & Analgesia 2014;118(1).
62. Queensland Clinical Guidelines. Maternity care for mothers and babies during COVID-19 pandemic. Guideline No. MN21.63-V9-R26. [Internet]. Queensland Health. 2021. [cited 2022 January 18]. Available from: http://www.health.qld.gov.au
63. Therapeutic Goods Administration. Australian product information. Entonox (nitrous oxide/oxygen). [Internet]. 2019 [cited 2020 April 20]. Available from: http://www.tga.gov.au.
64. The American College of Obstetrics and Gynecologists. Practice bulletin no. 177: Obstetric analgesia and anesthesia. Obstetrics & Gynecology 2017;129(4).
65. Hale S, Hill CM, Hermann M, Kinzig A, Lawrence C, McCaughin N, et al. Analgesia and anesthesia in the intrapartum period. Nursing for women's health. [Internet]. 2020 [cited 2022 October 19]; 24(1):e1-e60 DOI:10.1016/j.nwh.2019.12.002.
66. Czech I, Fuchs P, Fuchs A, Lorek M, Tobolska-Lorek D, Drosdzol-Cop A, et al. Pharmacological and non-pharmacological methods of labour pain relief-establishment of effectiveness and comparison. International Journal of Environmental Research and Public Health. [Internet]. 2018 [cited 2022 June 22]; 15:2793 DOI:10.3390/ijerph15122792.
67. Risk Management Technologies. Entonox: Safety data sheet #042. ChemAlert. [Internet]. 2021 [cited 2022 January 18]. Available from: http://www.rmtglobal.com.
68. BOC Group Limited. Entonox the essential guide. [Internet]. 2015 [cited 2022 January 22]. Available from: https://www.bochealthcare.co.uk.
69. Richardson MG, Lopez BM, Baysinger CL, Shotwell MS, Chestnut DH. Nitrous oxide during labor: maternal satisfaction does not depend exclusively on analgesic effectiveness. Anesthesthic Analgesia 2017;124(2):548-53.

70. Mobaraki N, Yousefian M, Seifi S, Sakaki M. A randomized controlled trial comparing use of enthonox with pethidine for pain relief in primigravid women during the active phase of labor. Anesthesiology and pain medicine. [Internet]. 2016 [cited 2022 April 27]; 6(4):e37420-e DOI:10.5812/aapm.37420
71. Chantrasiri R, Wanapirak C, Tongsong T. Entonox® versus pethidine in labor pain relief: a randomized controlled trial. International Journal of Environmental Research and Public Health. [Internet]. 2021 [cited 2022 December 5]; 18(23):12571 DOI:10.3390/ijerph182312571.
72. Smith LA, Burns E, Cuthbert A. Parenteral opioids for maternal pain management in labour. Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2018.
73. Chestnut DH, Wong CA, Tsen LC, Ngan Kee WD, Beilin Y, Mhyre JM, et al. Chestnut's obstetric anesthesia : principles and practice. Sixth edition. ed: Elsevier; 2020.
74. Queensland Clinical Guidelines. Perinatal substance use: maternal. Guideline No. MN21.37-V2-R26. [Internet]. Queensland Health. 2021. [cited 2022 July 5]. Available from: http://www.health.qld.gov.au
75. Queensland Clinical Guidelines. Perinatal substance use: neonatal. Guideline No. MN21.38-V3-R21. [Internet]. Queensland Health. 2021. [cited 2022 July 5]. Available from: http://www.health.qld.gov.au
76. Australian Medicines Handbook. Opioids. [Internet] 2022 [cited 2022 July 5]. Available from: http://amhonline.amh.net.au.
77. Queensland Clinical Guidelines. Intrapartum fetal surveillance. Guideline No. MN19.15-V7-R24. [Internet]. Queensland Health. 2019. [cited 2022 June 29]. Available from: http://www.health.qld.gov.au
78. Australian Resuscitation Council. ANZCOR Guideline 13.2 - Planning for newborn resuscitation and identification of the newborn at risk. [Internet]. April 2021 [cited 2023 February 13]. Available from: http://resus.org.au.
79. Ranatunga M, Doctor TN. Dose-delivery time interval of morphine in labour and its impact on the likelihood of adverse neonatal outcomes. International Journal of Pediatric Research. [Internet]. 2021 [cited 2023 February 8]; 7. Available from: https://doi.org/10.23937/2469-5769/1510084.
80. Queensland Clinical Guidelines. Resuscitation of the newborn baby. Guideline No. MN22.5-V6-R27. [Internet]. Queensland Health. 2022. [cited 2022 July 13]. Available from: http://www.health.qld.gov.au
81. Fleet J, Belan I, Jones MJ, Ullah S, Cyna AM. A comparison of fentanyl with pethidine for pain relief during childbirth: a randomised controlled trial. British Journal of Obstetrics and Gynaecology 2015;122(7):983-92.
82. Queensland Clinical Guidelines. Establishing breastfeeding. Guideline No. MN21.19-V4-R26. [Internet]. Queensland Health. 2021. [cited 2023 February 13]. Available from: http://www.health.qld.gov.au
83. Robinson C, Howie LA. Non-neuraxial analgesia in labour. Anaesthesia & Intensive Care Medicine 2019;20(7):367-70.
84. Phillips SN, Fernando R, Girard T. Parenteral opioid analgesia: does it still have a role? Best Practice & Research Clinical Anaesthesiology 2017;31(1):3-14.
85. Fleet J-A, Jones M, Belan I. Taking the alternative route: women's experience of intranasal fentanyl, subcutaneous fentanyl or intramuscular pethidine for labour analgesia. Midwifery 2017;53:15-9.
86. Fleet JA, Belan I, Gordon AL, Cyna AM. Fentanyl concentration in maternal and umbilical cord plasma following intranasal or subcutaneous administration in labour. International Journal of Obstetric Anesthesia 2020;42:34-8.
87. Weibel S, Jelting Y, Afshari A, Pace NL, Eberhart LHJ, Jokinen J, et al. Patient-controlled analgesia with remifentanil versus alternative parenteral methods for painmanagement in labour. Cochrane Database of Systematic Reviews. England; 2017.
88. Zhang P, Yu Z, Zhai M, Cui J, Wang J. Effect and safety of remifentanil patient-controlled analgesia compared with epidural analgesia in labor: an updated meta-analysis of randomized controlled trials. Gynecologic and Obstetric Investigation 2021;86(3):231-8.
89. Alpharpharm Pty Limited. Australian product information. Remifentanil alphapharm. [Internet]. 2020 [cited 2022 May 4]. Available from: https://apps.medicines.org.au.
90. Queensland Health. Maternity services - CSCF v3.2. [Internet]. 2014 [cited 2022 December 5]. Available from: http://www.health.qld.gov.au.
91. Meng ML, Smiley R. Modern neuraxial anesthesia for labor and delivery. F1000Res. [Internet]. 2017 [cited 2022 July 26]; 6:1211 DOI:10.12688/f1000research.11130.1.
92. Borrelli S, Evans K, Pallotti P, Evans C, Eldridge J, Spiby H. Mixed-methods systematic review: childbearing women's views, experiences, and decision-making related to epidural analgesia in labour. Journal of Advanced Nursing 2020;76(12):3273-92.
93. Chu A, Ma S, Datta S. Analgesia in labour and delivery. Obstetrics, Gynaecology & Reproductive Medicine 2021;31(6):175-81.
94. Newnham EC, Moran PS, Begley CM, Carroll M, Daly D. Comparison of labour and birth outcomes between nulliparous women who used epidural analgesia in labour and those who did not: a prospective cohort study. Women and Birth. [Internet]. 2021 [cited 09/01/September 2021]; 34(5):e435-e41. Available from: https://doi.org/10.1016/j.wombi.2020.09.001.
95. Morton S, Kua J, Mullington CJ. Epidural analgesia, intrapartum hyperthermia, and neonatal brain injury: a systematic review and meta-analysis. British Journal of Anaesthesia 2021;126(2):500-15.
96. Jansen S, Lopriore E, Naaktgeboren C, Sueters M, Limpens J, van Leeuwen E, et al. Epidural-related fever and maternal and neonatal morbidity: a systematic review and meta-analysis. Neonatology 2020;117(3):259-70.
97. Lim G, Facco FL, Nathan N, Waters JH, Wong CA, Eltzschig HK. A review of the impact of obstetric anesthesia on maternal and neonatal outcomes. Anesthesiology 2018;129(1):192-215.
98. Jia L, Cao H, Guo Y, Shen Y, Zhang X, Feng Z, et al. Evaluation of epidural analgesia use during labor and infection in full-term neonates delivered vaginally. Journal of American Medical Association. [Internet]. 2021 [cited 2022 June 26]; 4(9):e2123757. Available from: https://doi.org/10.1001/jamanetworkopen.2021.23757.
99. Sert ÜY, Uzunlar Ö, Kadıoğlu N, Candar T, Üstün YE. Inflammatory and oxidative alterations of water immersion and epidural analgesia during the labor. Medical Science and Discovery 2020;7(8):598-602.
100. French CA, Cong X, Chung KS. Labor epidural analgesia and breastfeeding: a systematic review. Journal of Human Lacatation 2016;32(3):507-20.
101. Heesen P, Halpern SH, Beilin Y, Mauri PA, Eidelman LA, Heesen M, et al. Labor neuraxial analgesia and breastfeeding: an updated systematic review. Journal of Clinical Anesthesia. [Internet]. 2021 [cited 2022 April 27]; 68. Available from: https://doi.org/10.1016/j.jclinane.2020.110105.
102. Mock ND, Griggs KM, Mileto LA. Local anesthetic systemic toxicity during labor, birth, and immediate postpartum: clinical review. The American Journal of Maternal Child Nursing 2021;46(6):330-8.
103. Hiller A, Farrington M, Forman J, McNulty H, Cullen L. Evidence-based nurse-driven algorithm for intrapartum bladder care. Journal of Perianesthesia Nursing, 2017;32(5):483-9.
104. Sng BL, Leong WL, Zeng Y, Siddiqui FJ, Assam PN, Lim Y, et al. Early versus late initiation of epidural analgesia for labour. Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2014.
105. Cheng Q, Bi X, Zhang W, Lu Y, Tian H. Dexmedetomidine versus sufentanil with high- or low-concentration ropivacaine for labor epidural analgesia: a randomized trial. Journal of Obstetrics & Gynaecology Research 2019;45(11):2193-201.

106. Aune I, Brøtmet S, Grytskog KH, Sperstad EB. Epidurals during normal labour and birth — midwives' attitudes and experiences. Women and Birth. [Internet]. 2021 [cited 2022 Octover 10]; 34(4):e384-e9. Available from: https://www.sciencedirect.com/.
107. Torvaldsen S. Discontinuation of epidural analgesia late in labour for reducing the adverse delivery outcomes associated with epidural analgesia. Roberts CL, Bell JC, Raynes-Greenow CH, Torvaldsen S. Cochrane Database of Systematic Reviews. 2004.
108. Walker KF, Kibuka M, Thornton JG, Jones NW. Maternal position in the second stage of labour for women with epidural anaesthesia. Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2018.
109. Cao D, Rao L, Yuan J, Zhang D, Lu B. Prevalence and risk factors of overt postpartum urinary retention among primiparous women after vaginal delivery: a case-control study. British Medical Journal Pregnancy and Childbirth 2022;22(1):26.
110. Dempsey A, Krening C, Vorgic L. Multisite randomized controlled trial of bladder management in labor with epidural analgesia/anesthesia. Journal of Obstetric, Gynecologic & Neonatal Nursing 2020;49(6):564-70.
111. Li M, Xing X, Yao L, Wang X, He W, Wang M, et al. The effect of bladder catheterization on the incidence of urinary tract infection in laboring women with epidural analgesia: a meta-analysis of randomized controlled trials. International Urogynecology Journal 2019;30(9):1419-27.
112. Velinor A. Urinary catheterisation in labour. British Journal of Midwifery 2015;23(1):11-5.
113. Queensland Clinical Guidelines. Venous thromboembolism (VTE) in pregnancy and the puerperium. Guideline No. MN20.9-V7-R25. [Internet]. Queensland Health. 2020. [cited 2022 June 29]. Available from: http://www.health.qld.gov.au
114. Michels A, Kruske S, Thompson R. Women's postnatal psychological functioning: the role of satisfaction with intrapartum care and the birth experience. Journal of Reproductive & Infant Psychology 2013;31(2):172-82.

Acknowledgements

Queensland Clinical Guidelines gratefully acknowledge the contribution of Queensland clinicians and other stakeholders who participated throughout the guideline development process particularly:

Working Party Clinical Leads

Dr Karen Baker, Staff Specialist, Obstetrics and Gynaecology, Royal Brisbane and Women's Hospital
Professor Victoria Eley, Obstetric Anaesthetist, Royal Brisbane and Women's Hospital
Ms Catherine Martin, Clinical Midwifery Consultant, Rockhampton Base Hospital

QCG Program Officer

Ms Janene Rattray, Clinical Nurse/Midwifery Consultant

Working Party Members

Ms Katie Allen, Consumer Representative, Lamaze Australia
Dr Simon Arnold, Rural Obstetrics and Gynaecology Clinical Lead, Darling Downs Region
Ms Josephine Bell, Registered Midwife, Stanthorpe Hospital
Dr Elize Bolton, Clinical Director, Bundaberg Hospital
Mrs Anne Bousfield, Clinical Midwifery Consultant, South West Hospital and Health Service
Ms Rachelle Chee, Lecturer, Central Queensland University
Mrs Victoria De Araujo, Clinical Facilitator, Gold Coast University Hospital
Mrs Leanne Ferris, Midwifery Educator, Hervey Bay Hospital
Ms Carla Finch, Consumer Representative, Maternity Choices Australia
Ms Jennifer Fry, Clinical Midwife, Beaudesert Hospital
Dr Leigh Grant, Senior Medical officer, Rockhampton Hospital
Ms Tina Gray, Midwifery Educator, Central Queensland Hospital and Health Services
Dr Sheridan Guyatt, Physiotherapist, Mothers', Women's and Pelvic Health Team, Mater Health
Mrs Annie Hampson, Clinical Midwife, Royal Brisbane and Women's Hospital
Miss Ashleigh Hobbs, Registered Midwife, Logan Hospital
Ms Janelle Laws, Nurse/Midwifery Educator, Metro North Hospital and Health Service
Dr Sarah Janssens, Obstetrician and Gynaecologist, Mater Mothers' Hospital
Ms Andrea Kelley, Clinical Nurse Consultant, Royal Brisbane and Women's Hospital
Ms Jasmine Kirk, Registered Midwife, Sunshine Coast University Hospital
Mr Karl Kizur, Pharmacist, Townsville University Hospital
Dr Julie Lee, Staff Specialist Anaesthetist, Royal Brisbane and Women's Hospital
Dr Nigel Lee, Midwifery Researcher, University of Queensland
Dr Simon Maffey, Anaesthetist - Deputy Director of Obstetric Anaesthesia, Mater Health Services
Mrs Brittany Millar, Registered Nurse/Midwife, Townsville University Hospital
Ms Remai Mitchell, Registered Midwife, Centre for Children's Health Research
Mrs Marcia Morris, Clinical Nurse Consultant, Royal Brisbane and Women's Hospital
Miss Lavania Naidoo, Clinical Midwife, Gold Coast University Hospital
Ms Kate O'Sullivan, Clinical Midwife, Royal Brisbane and Women's Hospital
Mrs Amy Shepherd, Clinical Educator - Maternity, Northwest Private Hospital
Dr Valerie Slavin, Midwifery Navigator and Researcher, Gold Coast University Hospital
Dr Makarla Stead, Anaesthetist, Royal Brisbane and Women's Hospital
Mrs Cathryn Stead, Registered Nurse/Midwife, Caboolture Hospital
Mrs Elizabeth Upton, Clinical Pharmacist, Sunshine Coast University Hospital
Ms Nicole Utley, Clinical Midwife, Royal Brisbane and Women's Hospital
Dr Divya Viswanathan, Registrar, Royal Brisbane and Women's Hospital
Miss Melissa Zarb, Registered Midwife, Redland Hospital

Queensland Clinical Guidelines Team

Professor Rebecca Kimble, Director
Ms Jacinta Lee, Manager
Ms Stephanie Sutherns, Clinical Nurse Consultant
Ms Cara Cox, Clinical Nurse Consultant
Ms Emily Holmes, Clinical Nurse Consultant
Ms Janene Rattray, Clinical Nurse Consultant
Steering Committee

Funding

This clinical guideline was funded by Healthcare Improvement Unit, Queensland Health