Queensland Clinical Guidelines

Translating evidence into best clinical practice

Maternity and Neonatal **Clinical Guideline**

Guideline Supplement: Neonatal seizures

Queensland Government

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1 Introduction

This document is a supplement to the Queensland Clinical Guideline *Neonatal seizures.* It provides supplementary information regarding guideline development, makes summary recommendations, suggests measures to assist implementation and quality activities and summarises changes (if any) to the guideline since original publication. Refer to the guideline for abbreviations, definitions, flow charts and acknowledgements.

1.1 Funding

The development of this guideline was funded by Queensland Health Healthcare Innovation and Research Branch. Consumer representatives were paid a standard fee. Other Working party members participated on a voluntary basis.

1.2 Conflict of interest

Declarations of conflict of interest were sought from working party members as per the Queensland Clinical Guidelines *Conflict of Interest* statement. No conflict of interest was identified.

1.3 Guideline review

Queensland clinical guidelines are reviewed every 5 years or earlier if significant new evidence emerges. Table 1 provides a summary of changes made to the guidelines since original publication.

Table 1. Summary of change

Publication date *Endorsed by:*	**Identifier**	**Summary of major change**
October 2011 *QCG Steering Committee* *Statewide Maternity and Neonatal Clinical Network (QLD)*	MN11.23-V1-R16	First publication
April 2017 *QCG Steering Committee* *Statewide Maternity and Neonatal Clinical Network (QLD)*	MN17.23.V2.R22	Full review. • Initial and subsequent investigations differentiated • Additional antiepileptic drug information: o Levetiracetam o Topiramate o Pyridoxine • Additional information regarding management of suspected meningitis as a cause of seizures

2 Methodology

Queensland Clinical Guidelines (QCG) follows a rigorous process of guideline development. This process was endorsed by the Queensland Health Patient Safety and Quality Executive Committee in December 2009. The guidelines are best described as 'evidence informed consensus guidelines' and draw from the evidence base of existing national and international guidelines and the expert opinion of the working party.

2.1 Topic identification

The topic was identified as a priority by the Statewide Maternity and Neonatal Clinical Network at a forum in 2009.

2.2 Scope

The scope of the guideline was determined using the PICO Framework (Population, Intervention, Comparison, and Outcome) as outlined in Table 2.

Table 2. PICO Framework

PICO	
Population	Neonates with seizures
Intervention	Diagnosis and management of seizures
Comparison	
Outcome	Recognition of seizure activity Accurate diagnosis Best practice management

2.3 Clinical questions

The following clinical questions were generated to inform the guideline scope and purpose:

- What causes seizures in neonates?
- How are seizures best diagnosed?
- What investigations will assist with diagnosis?
- What is best practice treatment and management?
- What parent support is required?
- What follow-up care is required?

2.4 Exclusions

The following exclusions were identified in the guideline scope:

- Management beyond the neonatal period
- Follow-up care

2.5 Search strategy

A search of the literature was conducted during July and August 2016 The QCG search strategy is an iterative process that is repeated and amended as guideline development evolves and the draft guideline is refined, additional areas of interest emerge, areas of contention requiring more extensive review are identified or new evidence is identified. All guidelines are developed using a basic search strategy. This involves both a formal and informal approach.

Table 3. Basic search strategy

Step		Consideration
1.	Review clinical guidelines developed by other reputable groups relevant to the clinical speciality	• This may include national and/or international guideline writers, professional organisations, government organisations, state based groups. • This assists the guideline writer to identify: o The scope and breadth of what others have found useful for clinicians and informs the scope and clinical question development o Identify resources commonly found in guidelines such as flowcharts, audit criteria and levels of evidence o Identify common search and key terms o Identify common and key references
2.	Undertake a foundation search using key search terms	• Construct a search using common search and key terms identified during Step 1 above • Search the following databases o PubMed o CINAHL o Medline o Cochrane Central Register of Controlled Trials o EBSCO o Embase • Studies published in English less than or equal to 5 years previous are reviewed in the first instance. Other years may be searched as are relevant to the topic • Save and document the search • Add other databases as relevant to the clinical area
3.	Develop search word list for each clinical question	• This may require the development of clinical sub-questions beyond those identified in the initial scope. • Using the foundation search performed at Step 2 as the baseline search framework, refine the search using the specific terms developed for the clinical question • Save and document the search strategy undertaken for each clinical question
4.	Other search strategies	• Search the reference lists of reports and articles for additional studies • Access other sources for relevant literature o Known resource sites o Internet search engines o Relevant text books

2.5.1 Keywords

The following keywords were used in the basic search strategy: newborn, baby, infant, preterm, premature; seizures, convulsion, fit, epilepsy, spasms, electroencephalogram, EEG, clonic, tonic, myoclonic, subtle, neurological, neurodevelopmental medication, drugs, antiepileptic drugs.
Other keywords may have been used for specific aspects of the guideline.

2.6 Consultation

Major consultative and development processes occurred between November 2016 and February 2017. These are outlined in Table 4.

Table 4. Major guideline development processes

Process	Activity
Clinical lead	• The nominated Clinical Lead was approved by QCG Steering Committee
Consumer participation	• Consumer participation was invited from a range of consumer focused organisations who had previously accepted an invitation for on-going involvement with QCG
Working party	• An EOI for working party membership was distributed via email to Queensland clinicians and stakeholders (~1000) in October 2016 • The working party was recruited from responses received • Working party members who participated in the working party consultation processes are acknowledged in the guideline • Working party consultation occurred in a virtual group via email
Statewide consultation	• Consultation was invited from Queensland clinicians and stakeholders (~1000) during October 2016– November 2016–March 2017 • Feedback was received primarily via email • All feedback was compiled and provided to the clinical lead and working party members for review and comment

2.7 Endorsement

The guideline was endorsed by the:

- Queensland Clinical Guidelines Steering Committee in April 2017
- Statewide Maternity and Neonatal Clinical Network [Queensland] in April 2017

2.8 Publication

The guideline and guideline supplement were published on the QCG website in May 2017.

The guideline can be cited as:

Queensland Clinical Guidelines *Neonatal seizures*. Guideline No. MN17.23-V2-R22. Queensland Health.2017. Available from: http://www.health.qld.gov.au/qcg/.

The guideline supplement can be cited as:

Queensland Clinical Guidelines. Supplement: *Neonatal seizures* Guideline No. MN17.23-V2-R22. Queensland Health. 2017. Available from: http://www.health.qld.gov.au/qcg/.

The guideline flowcharts can be cited as:

Queensland Clinical Guidelines. Flowchart: *Neonatal seizures: assessment and management* Flowchart No. F17.23-1-V1-R21. Queensland Health. 2017. Available from: http://www.health.qld.gov.au/qcg/.

Queensland Clinical Guidelines. Flowchart: *Neonatal seizures: investigations* Flowchart No. F17.23-2-V1-R21. Queensland Health. 2017. Available from: http://www.health.qld.gov.au/qcg/.

Queensland Clinical Guidelines. Flowchart: *Neonatal seizures: abnormal movements* in newborn Flowchart No. F17.23-3-V1-R21. Queensland Health. 2017. Available from: http://www.health.qld.gov.au/qcg/.

3 Levels of evidence

The levels of evidence identified [in the National Health and Medical Research Council (NHMRC), Levels of evidence and grades for recommendations for developers of guidelines (2009) were used to inform the summary recommendations]. Levels of evidence are outlined in Table 5. Summary recommendations are outlined in Table 6.

Note that the 'consensus' definition* in Table 4 is different from that proposed by the NHMRC and instead relates to forms of evidence not identified in the NHMRC's level of evidence and/or the clinical experience of the guideline's clinical lead and working party.

Table 5. Levels of evidence

Levels of evidence	
I	Evidence obtained from a systematic review of all relevant randomised controlled trials.
II	Evidence obtained from at least one properly designed randomised controlled trial**.**
III-1	Evidence obtained from well-designed pseudo randomised controlled trials (alternate allocation or some other method).
III-2	Evidence obtained from comparative studies including systematic review of such studies with concurrent controls and allocation not randomised (cohort studies), case control studies or interrupted time series with a control group**.**
III-3	Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without parallel control group.
IV	Evidence obtained from case series, either post-test or pre-test and post-test.
Consensus*	Opinions based on respected authorities, descriptive studies or reports of expert committees or clinical experience of the working party.

3.1 Summary recommendations

Summary recommendations and levels of evidence are outlined in Table 5.

Table 6. Summary recommendations

Recommendation		Grading of evidence
1	Treat seizures which are clinically apparent and last more than 3 minutes or when there are more than two briefer seizures	Consensus
2	Administer phenobarbital as the first line treatment for neonatal seizures	Consensus
3	Confirm clinical seizures in the neonatal period by continuous electroencephalogram preferably with synchronised video recording	Consensus
4	Identify and treat known causes of seizures in the neonate (such as hypoglycaemia)	Consensus

4 Implementation

This guideline is applicable to all Queensland public and private maternity facilities. It can be downloaded in Portable Document Format (PDF) from www.health.qld.gov.au/qcg

4.1 Guideline resources

The following guideline components are provided on the website as separate resources:

- Flowchart: *Neonatal seizures—assessment and management*
- Flowchart: *Neonatal seizures—investigations*
- Flowchart: *Neonatal seizures—abnormal movements in newborn baby*
- Education resource: *Neonatal seizures*
- Knowledge assessment: *Neonatal seizures*
- Parent information: *Seizures in newborn babies*

4.2 Suggested resources

During the development process stakeholders identified additional resources with potential to complement and enhance guideline implementation and application. The following resources have not been sourced or developed by QCG but are suggested as complimentary to the guideline:

- Charts/forms for recording neonatal seizures

4.3 Implementation measures

Suggested activities to assist implementation of the guideline are outlined below.

4.3.1 QCG measures

- Notify Chief Executive Officers and relevant stakeholders
- Monitor emerging new evidence to ensure guideline reflects contemporaneous practice
- Capture user feedback
- Record and manage change requests
- Review guideline in 2022

4.3.2 Hospital and Health Service measures

Initiate, promote and support local systems and processes to integrate the guideline into clinical practice, including:

- Hospital and Health Service (HHS) Executive endorse the guidelines and their use in the HHS and communicate this to staff
- Promote the introduction of the guideline to relevant health care professionals
- Support education and training opportunities relevant to the guideline and service capabilities
- Align clinical care with guideline recommendations
- Undertake relevant implementation activities as outlined in the *Guideline implementation checklist* available at www.health.qld.gov.au/qcg

4.4 Quality measures

Auditing of guideline recommendations and content assists with identifying quality of care issues and provides evidence of compliance with the National Safety and Quality Health Service (NSQHS) Standards.[1] Suggested audit and quality measures are identified in Table 7. NSQHS Standard 1.

Table 7. NSQHS Standard 1

NSQHS Standard 1: Governance for Safety and Quality in Health Service Organisations	
Clinical Practice: Care provided by the clinical workforce is guided by current best practice	
Criterion 1.7:	**Actions required:**
Developing and/or applying clinical guidelines or pathways that are supported by the best available evidence	1.7.1 Agreed and documented clinical guidelines and/or pathways are available to the clinical workforce
	1.7.2 The use of agreed clinical guidelines by the clinical workforce is monitored

The following clinical quality measures are suggested:

Table 8. Clinical quality measures

No	Audit criteria	Guideline Section
1.	Clinically apparent seizures that last more than 3 minutes or more than two briefer serial seizures or seizures identified in EEG are treated	Section 6 Drug therapy Table 13 Principles
2.	Phenobarbital is administered as the first line treatment for neonatal seizures	Section 6 Drug therapy Table 14 Phenobarbital
3.	Clinical seizures in the neonatal period are confirmed by electroencephalogram preferably with synchronised video recording	Section 4.2 Subsequent investigations Table 10 Section 5.1.1 Continuing care Table 12
4.	Known causes of seizures in the neonate (such as hypoglycaemia) are identified and treated	Section 5.1 Observation and monitoring Table 11 Initial assessment and management

4.5 Areas for future research

During development the following areas where identified as having limited or poor quality evidence to inform clinical decision making. Further research in these areas may be useful.

- Medication or medication combinations that are most effective in achieving seizure control and what their optimal treatment doses are.

4.6 Safety and quality

Implementation of this guideline provides evidence of compliance with the NSQHS and Australian Council on Healthcare Standards (ACHS) EQuIP National accreditation programs.[1,2]

Table 9. NSQHS/EQuIP National Criteria

NSQHS/EQuIPNational Criteria	Actions required	☑ Evidence of compliance
Standard 1: Governance for Safety and Quality in Health Service Organisations		
Clinical practice 1.7 Developing and/or applying clinical guidelines or pathways that are supported by the best available evidence	1.7.1 Agreed and documented clinical guidelines and/or pathways are available to the clinical workforce	☑ Queensland Clinical Guidelines is funded by Queensland Health to develop clinical guidelines relevant to the service line to guide safe patient care across Queensland ☑ The guideline provides evidence-based and best practice recommendations for care ☑ The guideline is endorsed for use in Queensland Health facilities. ☑ A desktop icon is available on every Queensland Health computer desktop to provide quick and easy access to the guideline
Performance and skills management 1.12 Ensuring that systems are in place for ongoing safety and quality education and training	1.12.1 The clinical and relevant non-clinical workforce have access to ongoing safety and quality education and training for identified professional and personal development	☑ The guideline has accompanying educational resources to support ongoing safety and quality education for identified professional and personal development. The resources are freely available on the internet http://www.health.qld.gov.au/qcg
Standard 2: Partnering with Consumers		
Consumer partnership in designing care 2.5 Partnering with consumers and/or carers to design the way care is delivered to better meet patient needs and preferences	2.5.1 Consumers and/or carers participate in the design and redesign of health services	☑ Consumer consultation was sought and obtained during the development of the guideline. Refer to the acknowledgement section of the guideline for details
Standard 9: Recognising clinical deterioration and escalating care		
Establishing recognition and response systems 9.1 Developing, implementing and regularly reviewing the effectiveness of governance arrangements and the policies, procedures and/or protocols that are consistent with the requirements of the National Consensus Statement.	9.1.2 Policies, procedures and/or protocols for the organisation are implemented in areas such as: • Measurement and documentation of observations • Escalation of care • Establishment of a rapid response system • Communication about clinical deterioration	☑ The guideline is consistent with National Consensus statement recommendations

NSQHS/EQuIPNational Criteria	Actions required	☑ Evidence of compliance
EQuIPNational		
Standard 12 Provision of care		
Criterion 1: Assessment and care planning 12.1 Ensuring assessment is comprehensive and based upon current professional standards and evidence based practice	12.1.1 Guidelines are available and accessible by staff to assess physical, spiritual, cultural, physiological and social health promotion needs	☑ Assessment and care appropriate to the cohort of patients is identified in the guideline ☑ The guideline is based on the best available evidence

5 References

1. Australian Commission on Safety and Quality in Healthcare. National Safety and Quality Health Service Standards. 2012 [cited 2016, October]. Available from: http://www.safetyandquality.gov.au/.

2. The Australian Council on Healthcare Standards. EQuIPNational Guidelines. 2012 [cited 2016 October]. Available from: http://www.achs.org.au/programs-services/.