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TITLE: Magnesium Sulfate for Pre-eclampsia and for Neuroprotection in Pre- Term Births < 30 Weeks

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Processed by:

1. Scope

All women in maternity and all clinicians in maternity.

The decision to use magnesium sulfate can only be made by an Obstetric Consultant, Registrar or Anaesthetist and prescribed by a doctor on the Medication Chart.

All women requiring magnesium sulfate are under the responsibility of the Obstetric team.

2. Definitions

BBA	Baby born before arrival
CTG	Cardiotocography
DBP	Diastolic blood pressure
DIC	Disseminated intravascular coagulation
ED	Emergency department
HDU	High dependency unit
ICU	Intensive care unit
MFM	Maternal Fetal Medicine
MVSC	Maternal vital signs chart
PPROM	Premature pre labour rupture of membranes
SBP	Systolic blood pressure
SMO	Senior medical officer
SOMANZ	Society of Obstetric Medicine of Australian and New Zealand

3. Statement / Purpose

This guideline establishes the use of magnesium sulfate for women accessing maternity services within Lakes District Health Board (Lakes DHB).

Magnesium Sulfate is of proven benefit for the prevention and treatment of eclampsia at any gestation and for neuroprotection in infants born < 30 weeks gestation.

This guideline covers the indications for its use and a protocol for its administration. For women with severe pre-eclampsia/eclampsia, this guideline should be used alongside the Lakes Maternity Pre-eclampsia/Eclampsia guideline (see [associated documents](#)).

4. Guideline Management Principles and Goals

4.1 Eclamptic fit (antenatal, intrapartum or postnatal)

Considered an obstetric emergency situation. Magnesium sulfate is of proven benefit in the management of eclampsia, reducing the risk of recurrent seizures when compared to other anticonvulsants (Duley, 2010a, b).

It is the anticonvulsant of choice and should be administered as soon as possible once venous access is obtained (or by intramuscular injection if venous access is not possible).

It **should not be delayed** awaiting transfer to higher level care unit (external transfers, or internal within Lakes DHB).

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4.2 Severe pre-eclampsia/imminent eclampsia (antenatal, intrapartum or postnatal)

Magnesium sulfate has also been shown to reduce the risk of eclamptic convulsions in women with severe pre-eclampsia (Altman, 2002) more than halving the risk of seizure (risk ratio 0.41, 95% CI 0.29 to 0.58; 6 trials, 11 444 women) (Duley, 2010c).

Prophylactic therapy during and after birth should be considered in women with severe pre-eclampsia, especially if neurological symptoms or signs are present.

The decision to give magnesium for women with severe pre- eclampsia should be made on an individual basis, and involve discussion with the on call obstetric Consultant.

4.3 Imminent preterm delivery < 30 weeks gestation

Australian and New Zealand National Clinical Practice Guidelines were published in March 2010 (The Antenatal Magnesium Sulfate for Neuroprotection Guideline Development Panel, 2010). They recommend consideration of the antenatal use of magnesium sulfate in women at risk of imminent* preterm birth < 30 weeks regardless of plurality (number of babies in utero), parity, reason for early delivery, anticipated mode of delivery and whether or not antenatal corticosteroids have been used.

The decision to give magnesium for women at risk of **imminent*** preterm birth should be made on an individual basis and involve discussion with the on call obstetric Consultant.

***Imminent delivery is defined** as when early delivery is planned or definitely expected within 24 hours (if birth is planned commence magnesium sulfate as close to four hours before birth as possible). Do not delay starting magnesium sulfate in eligible women who may deliver within a few hours - the sooner the better and there is benefit even if a full 4 hours is not given.

If urgent delivery is necessary because of actual or imminent maternal or fetal compromise e.g. severe fetal distress or antepartum haemorrhage, birth should **NOT** be delayed to administer magnesium sulfate.

5. Indications for Magnesium Sulfate in Obstetrics

5.1 Eclamptic fit (antenatal, intrapartum or postnatal)

Signs and/or symptoms of imminent fitting:

- Visual or auditory aura
- Severe headache
- Restlessness and confusion
- Hyperreflexia with clonus

5.2 Severe pre-eclampsia/imminent eclampsia (antenatal, intrapartum or postnatal)

Signs and/or symptoms of severe pre-eclampsia:

- Persistent severe hypertension (SBP \geq 160 or, DBP \geq 110)
- Oliguria less than 80 mL/4 hours
- Progressive renal insufficiency (serum creatinine > 90 μ mol/L or doubling of serum creatinine concentration in the absence of other renal disease, urine output of 80mL/4hrs)
- Pulmonary oedema

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- Impaired liver dysfunction not responding to treatment and not accounted for by alternative diagnosis – elevated liver transaminases (AST and ALT_ - at least twice the upper limit of normal +/- right upper quadrant or epigastric abdominal pain (may be referred to upper back). Thrombocytopenia < 100 or falling platelets, DIC)
- HELLP syndrome: A variant of severe pre-eclampsia (elements include **H**aemolysis, **E**levated **L**iver enzymes and **L**ow **P**latelet count). In a woman with pre-eclampsia, the presence of any of the following is an indicator of HELLP:
 - Maternal platelet count of less than $100 \times 10^9/L$
 - Elevated transaminases (elevated blood concentrations of liver enzymes to twice normal concentration)
 - Microangiopathic haemolytic anaemia with red cell fragments on blood film
- Eclampsia

5.3 Imminent preterm delivery < 30 weeks gestation

This includes planned delivery due to maternal or fetal compromise (when delay will not further compromise mother or fetus) e.g. fetal growth restriction, pre-eclampsia, severe maternal cardiac or respiratory disease. Imminent delivery also includes women in progressive preterm labour i.e. advanced cervical dilatation (> 3cm), NOT simply threatened preterm labour with a positive fetal fibronectin or PPRM with no contractions or cervical dilatation.

6. Counselling and Patient Information

Lakes DHB are using the information provided by the WISH Project (see [supporting evidence](#)), which is looking at ways to improve uptake of magnesium sulfate in eligible women.

Practitioners should be aware that counselling about neonatal prognosis in an emergency situation is often difficult.

An introduction similar to the following may be helpful:

“Babies born preterm are at increased risk of developmental problems including cerebral palsy. There is good evidence that magnesium sulfate reduces this risk. Here is an information sheet that explains more”.

7. Precautions with Magnesium Sulfate

Special precautions must be taken with the following conditions:

- Myasthenia Gravis or other neuromuscular disorder
- Cardiac disease - arrhythmia or cardiomyopathy
- Current drug therapy such as aminoglycoside (Gentamicin)
- Paralyzing anaesthetic agents
- Renal impairment (with urine output < 30 mL/hr and/or creatinine > 80 $\mu\text{mol/L}$) or renal failure. In these patients, toxicity is a major risk. Give loading dose as usual. Maintenance dose should be discussed with obstetric physician on call, who may recommend reducing the infusion rate to 0.5 g/hr (SOMANZ, 2018). Magnesium levels should be taken 4 hours after starting infusion, to monitor for toxicity. An alternative anticonvulsant e.g. phenytoin, may be more appropriate

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8. Administration of Magnesium Sulfate

8.1 Intravenous (IV) magnesium sulfate

Premixed magnesium sulfate is the optimal preparation

- Loading dose
Presentation: **Each 50mL bag contains 5g of magnesium sulfate**
Administer 4g of magnesium sulfate by intravenous infusion over 20 minutes.
[How to prepare a loading dose - See Appendix A](#)
- Maintenance dose
Presentation: **Each 250mL bag contains 25g of magnesium sulfate**
Administer at a rate of 1g per hour of magnesium sulfate
[How to prepare maintenance dose - See Appendix B](#)
- If premixed magnesium sulfate is not available:
Presentation: **Each 5mL ampoule contains 2.47g of magnesium sulfate**
[How to prepare magnesium sulfate in maternity if premixed is not available - See Appendix C](#)

8.2 For severe pre-eclampsia/eclampsia

Continue for at least 24 - 48 hours after delivery (stopping maintenance infusion should be discussed with on call obstetric consultant).

8.3 For neuroprotection

Continue until delivery or 24 hours (whichever is sooner). Timing of administration should aim to be as close as possible to total duration of use of four hours. Ongoing infusion is NOT required post-natally when administered for neuroprotection only.

If after 24 hours, delivery does not appear likely within the next six hours then the infusion should be stopped.

8.4 Magnesium sulfate for recurrent seizures

Further seizures should be discussed with the on call Obstetric Consultant and Anaesthetist SMO as appropriate (see Pre-eclampsia/Eclampsia guideline)

- A further **2 g** bolus of magnesium sulfate should be given intravenous infusion
- Use a premixed bag of 5 g/50 mL
- Consideration could be given to increasing the infusion level to 1.5 – 2g/hour with appropriate monitoring for toxicity including magnesium levels, after discussion with the on call obstetric Consultant/Anaesthetist.

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9. Observation and Management Whilst on Magnesium Sulfate

Magnesium sulfate is excreted by the kidneys and is a smooth muscle relaxant. With normal renal function, the recommended loading and maintenance doses should not cause toxicity and so routine serum magnesium levels are not required. However, close maternal observation is necessary.

9.1 Observations and management required

- BP every 5 minutes during loading dose, hourly thereafter
- fluid restriction 80-85 mL/hour for severe pre-eclampsia
- Urine output should be >100 mL over 4 hours
- Fluid Balance – hourly
- Reflexes (patella or bicep) – hourly
- Respiratory rate/SpO₂ – hourly
- Continuous CTG

Infusion can be continued at standard rate provided that:

- Reflexes (patella or bicep) are present
- Urine output remains > 100 mL/4hrs. Respiratory rate does not fall below 12 per minute (if respiratory rate < 12 but PaO₂ is normal and reflexes present this is unlikely to be caused by magnesium toxicity and more likely to be related to opioid analgesia)

Note: in cases of severe pre-eclampsia additional observations and management are required (see *Pre-eclampsia/Eclampsia guideline*)

Continuous electronic fetal monitoring is strongly recommended during magnesium infusion. Interpretation of the cardiotocography (CTG) should take into account the reduced variability that may be seen with magnesium infusions.

See Appendix C and Appendix D

9.2 Place of administration & staffing

The administration of magnesium sulfate, **should not** be delayed awaiting transfer to an ICU, ED or higher level maternity facility.

For severe pre-eclampsia, at any gestation

This is considered an obstetric emergency situation. The loading dose should be given as soon as possible in the Rotorua Birthing Unit.

If in Taupo Maternity, ring the emergency bell and if time allows transfer women through to Taupo ED in the first instance to administer the loading dose there. Consult with Obstetric consultant on call.

In the absence of a maternity high dependency unit (HDU) at Lakes DHB, a woman requiring magnesium sulfate to manage severe pre-eclampsia antenatally or intrapartum, **HDU level care** with more advanced monitoring in the Rotorua birthing unit, (with one to one midwife and HDU level nursing care) is required.

Ongoing management (postnatally) of women with severe pre-eclampsia receiving magnesium sulfate for seizure prevention/treatment should be in the Intensive Care Unit (ICU) at Lakes DHB or transferred (if appropriate) to a tertiary hospital. One to one care is required.

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For neuroprotection of the infant < 30 weeks gestation

This should be in the Rotorua Birthing unit where appropriate monitoring can occur and with one-to-one midwifery care (this includes women receiving magnesium sulfate prior to a pre labour caesarean section).

If in Taupo, transfer woman through to ED where appropriate monitoring can occur, to administer the loading dose of magnesium sulfate. Midwife to remain in ED with the woman to also monitor & interpret the CTG, prior to transferring to a high level facility.

Magnesium sulfate administration for neuroprotection does not need to be continued postnatally.

Documentation

- Record the indication in the clinical record
- Use the National Medication chart to prescribe Magnesium sulfate
- Use a fluid balance chart
- If in ICU (or providing HDU level care) use the ICU chart
- Otherwise use the Maternity Early Warning Score (MEWS)

In-utero transfers

If in-utero transfer is deemed safe and necessary after SBARR consultation with on call Obstetric Consultant:

The women's blood pressure and condition should be stabilised and thoroughly assessed before a decision is made to transfer

If pre-term birth is likely to be imminent after the transfer and the gestational age is 23+0 weeks and < 34+6 weeks, give the first dose of steroids

For neuroprotection of the infant < 30 weeks gestation

If pre-term birth is planned or expected within 24 hours and gestational age is <30 weeks administer the loading dose of magnesium sulfate prior to leaving. The maintenance dose can be commenced awaiting transport, and then re-commenced at destination hospital.

For severe pre-eclampsia, at any gestation

Should the women require magnesium sulfate to manage severe pre-eclampsia, the maintenance dose should be commenced immediately following the loading dose and continue en route. Consideration should be given to appropriateness of transfer, and mode of transfer (whichever is quickest). If transfer is deemed required, a critical care trained nurse (or paramedic) should accompany the patient and midwife (if not yet birthed)

Observations en route with magnesium sulfate maintenance infusion

Every 15 minutes observe: Blood pressure, Respiratory rate, HR, oxygen saturations, level of consciousness, fetal heart.

Document on maternal vital signs chart. (MVSC)

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Medical Equipment for Transit

- Transfer monitor with pulse oximetry
- Oxygen & mask
- Maternity transfer bag
- Sonicaid
- Antidote: calcium gluconate (10 mL of calcium gluconate 10% solution) & administration instructions

10. Magnesium Sulfate Levels

Magnesium levels do not require to be measured routinely. If measured (Lu, 2000)

Therapeutic levels	1.8 - 3.0 mmol/l
Loss of tendon reflexes	3.5 - 5.0 mmol/l
Respiratory paralysis	5.0 - 6.5 mmol/l
Cardiac arrest	> 12.5 mmol/l

Indications for measuring magnesium levels include:

- Altered renal function (urine output < 25 mL/hour, creatinine > 90); take levels 4 hours after starting infusion
- Signs of toxicity such as drowsiness, loss of deep tendon reflexes, respiratory depression RR < 12 breaths/min
- Unexplained clinical symptoms or signs
- Further seizures

11. Magnesium Antidote

If loss of deep tendon reflexes and/or respiratory depression is observed:

1. STOP magnesium infusion;
2. Call obstetric and anaesthetic registrar;
3. Send blood for urgent magnesium levels;
4. Administer 1 g of calcium gluconate intravenously (10 mL of calcium gluconate 10% solution) over 5 minutes. **Rate should not exceed 2 mL/min of undiluted solution.**
5. Antidote kept in the Emergency Magnesium Sulfate box in birthing unit dispensary in Rotorua and Taupo Maternity Unit.

12. Repeat doses of Magnesium Sulfate

For the vast majority of women receiving magnesium sulfate for the management of severe pre-eclampsia/eclampsia delivery should be planned within 24 hours of commencing the infusion.

Continue magnesium sulfate for 24 hours following birth or 24 hours after the last seizure, whichever is the later.

Stopping maintenance infusion should be discussed with the on call obstetric Consultant.

For women receiving magnesium sulfate for neuroprotection of the infant, in the event that birth does not occur and preterm birth at < 30 weeks gestation again appears imminent (planned or

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definitely expected within 24 hours), a repeat dose of magnesium sulfate (loading and maintenance) may be considered but must be discussed with the on call obstetric Consultant.

13. Supporting Evidence

- Altman, D., Carroli, G., Duley, L., Farrell, B., Moodley, J., Neilson, J., & Smith, D. (2002). Magpie Trial Collaboration Group. Do women with pre-eclampsia, and their babies, benefit from magnesium sulfate? The Magpie Trial: a randomised placebo-controlled trial. *Lancet*, 359(9321), 1877-1890
- [Crowther, C. A., Middleton, P. F., Bain, E., Ashwood, P., Bubner, T., Flenady, V., ... & McIntyre, S. \(2013\). Working to improve survival and health for babies born very preterm: the WISH project protocol. *BMC pregnancy and childbirth*, 13\(1\), 239.](#)
- Doyle, L. W., Crowther, C. A., Middleton, P., Marret, S., & Rouse, D. (2009). Magnesium sulfate for women at risk of preterm birth for neuroprotection of the fetus. *Cochrane Database Syst Rev*, 1(1).
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- Lu, J. F., & Nightingale, C. H. (2000). Magnesium sulfate in eclampsia and pre-eclampsia. *Clinical pharmacokinetics*, 38(4), 305-314.
- Antenatal Magnesium Sulfate for Neuroprotection Guideline Development Panel. (2010). *Antenatal Magnesium Sulfate Prior to Preterm Birth for Neuroprotection of the Fetus, Infant, and Child 2010: National Clinical Practice Guidelines*. Australian Research Centre for Health of Women and Babies, the University of Adelaide
- The Society of Obstetric Medicine of Australian and New Zealand. Guideline for the management of hypertensive disorders if pregnancy 2014. Accessed 28 December 2018. Available at <https://www.somanz.org/documents/HTPregnancyGuidelineJuly2014.pdf>
- New Zealand Formulary (NZF). Magnesium sulfate, NZF v79 Jan 2019. Available from: www.nzf.org.nz (Accessed December 2018)
- Ministry of Health Diagnosis and Treatment of Hypertension and Pre-eclampsia in Pregnancy in NZ. A clinical practice guideline. Released 2018 <https://www.health.govt.nz/publication/diagnosis-and-treatment-hypertension-and-pre-eclampsia-pregnancy-new-zealand-clinical-practice>

Adapted from Women’s Health, Auckland District Health board – Magnesium Sulfate for Pre-eclampsia & for Neuroprotection in the Pre-term Births <30 weeks guideline.

14. Associated Documents

- Lakes DHB Pre-eclampsia/Eclampsia guideline
- Lakes DHB Preterm Labour (PTL) – Management of Threatened and Active PTL
- Magnesium Sulfate Maternity Administration Instructions - Appendix

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- Magnesium Sulfate Maternity Observations & Management - Appendix
- Rupture of Membranes in Pregnancy

15. Disclaimer

No guideline can cover all variations required for specific circumstances. It is the responsibility of the health care practitioners using this Lakes DHB guideline to adapt it for safe use within their own institution, recognise the need for specialist help, and call for it without delay, when an individual patient falls outside of the boundaries of this guideline.

16. Corrections and Amendments

The next scheduled review of this document is as per the document classification table (page 1). However, if the reader notices any errors or believes that the document should be reviewed **before** the scheduled date, they should contact the owner or [Document Control](#) without delay.

Prepared by: Kathleen Metz – Clinical midwife educator

Authorised by: Maternity CQI

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MAGNESIUM SULFATE (MgSO₄)

Maternity Administration Instructions

(pre-eclampsia, eclampsia, neuroprotection)

Loading Dose Magnesium Sulfate 4g over 20 minutes

1.	Get a Baxter EvoIQ Pump & Premixed MgSO ₄
2.	Turn on the EvoIQ pump. Connect and prime IV tubing with 5g/50ml premixed bag of IV MgSO ₄ and place into EvoIQ pump.
3.	Select the Maternity profile & "Magnesium Maternity"
4.	Select "Load" 5g/50ml
5.	Confirm default rate 120ml/h
6.	Confirm default VTBI 40ml over 20mins
7.	Default rate will show 120 ml/h and 5g/h with a VTBI 40ml and time of 20min <i>This delivers a 4g loading dose in 20 minutes</i>
8.	Press the green button to commence infusing 
9.	Infusion pump will beep to alert end of infusion (40ml /4g) KVO running Press STOP 
10.	Discard remaining bag & tubing
11.	Complete medication chart under Doctor prescription

Please note: If transferring to another facility.

Complete **MgSO₄ loading dose** before leaving.

MgSO₄ Maintenance dose please refer to Magnesium Sulfate for Pre-eclampsia & for Neuroprotection in pre-term births <30 weeks guideline

Observe for signs of MAGNESIUM TOXICITY (see observation & management guide)

- Respiratory rate <12 breaths per minute
 - Loss of patellar or bicep reflexes
 - Urinary output <100mls over 4 hours
- (if respiratory rate <12 but PaO₂ is normal and reflexes are present this is unlikely to be caused by magnesium toxicity and more likely to be related to opioid analgesia)

If loss of deep tendon reflexes and /or respiratory depression is observed:

- STOP infusion
- CALL FOR URGENT Obstetric review from Registrar or Consultant
- Maintain Airway, Breathing, Circulation
- Administer Oxygen at 8-12 litres / minutes
- Send Blood for urgent magnesium levels

ADMINISTER ANTIDOTE: Calcium Gluconate 1g (10mls of 10% soln) slowly over 5 minutes. Rate should not exceed 2ml/min of undiluted solution

APPENDIX A –

Maternity Administration Instructions: **Maintenance Dose Magnesium Sulfate 4g over 20 minutes**

Magnesium Sulfate for Pre-eclampsia and for Neuroprotection in Pre- Term Births < 30 Weeks EDMS# 2396297





MAGNESIUM SULFATE (MgSO₄)

Maternity Administration Instructions

(pre-eclampsia, eclampsia, neuroprotection)

Maintenance Dose Magnesium Sulfate 1g per hour

1.	Get a Baxter EvoIQ Pump & Premixed MgSO ₄
2.	Turn on the EvoIQ pump Connect and prime IV tubing with 25g/250ml premixed bag of IV MgSO ₄ and place into EvoIQ pump.
3.	Select the Maternity profile & "Magnesium Maternity"
4.	Select "Maintenance"
5.	Confirm concentration as 25g/250ml
6.	Default rate will show 1 g/h and 10 ml/h
7.	Set the VTBI as 250ml
8.	Default rate will show 10ml/h and 1g/h with a VTBI 250ml and time of 25h <i>This delivers magnesium at 1 g/hr.</i>
9.	Press the green button to commence infusing 
10.	Infusion pump will beep to alert end of infusion (250ml) KVO running  Press STOP
11.	Discard remaining bag & tubing
12.	Complete medication chart under Doctor prescription

Please note: If transferring to another facility.

Complete **MgSO₄ loading dose** before leaving.

MgSO₄ Maintenance dose please refer to Magnesium Sulfate for Pre-eclampsia & for Neuroprotection in pre-term births <30 weeks guideline

Observe for signs of MAGNESIUM TOXICITY (see observation & management guide)

- Respiratory rate <12 breaths per minute
 - Loss of patellar or bicep reflexes
 - Urinary output <100mls over 4 hours
- (if respiratory rate <12 but PaO₂ is normal and reflexes are present this is unlikely to be caused by magnesium toxicity and more likely to be related to opioid analgesia)

If loss of deep tendon reflexes and /or respiratory depression is observed:

- STOP infusion
- CALL FOR URGENT Obstetric review from Registrar or Consultant
- Maintain Airway, Breathing, Circulation
- Administer Oxygen at 8-12 litres / minutes
- Send Blood for urgent magnesium levels
- ADMINISTER ANTIDOTE: Calcium Gluconate 1g (10mls of 10% soln) slowly over 5 minutes. Rate should not exceed 2ml/min of undiluted solution

MAGNESIUM SULFATE (MgSO₄)

APPENDIX B –

Maternity Administration Instructions: **Maintenance Dose Magnesium Sulfate 1g per hour**

Magnesium Sulfate for Pre-eclampsia and for Neuroprotection in Pre- Term Births < 30 Weeks EDMS#2396297

Maternity Administration Instructions

(pre-eclampsia, eclampsia, neuroprotection)

If pre-mixed Magnesium Sulfate is NOT available
(PREMIXED $MgSO_4$ IS THE PREFERRED PREPARTATION)

LOADING DOSE 4g over 20 minutes: administer IV via syringe driver

1.	Get syringe driver from clinical equipment pool (CEP)
2.	Draw 8mls (4g) of 49.3% $MgSO_4$ (need 2 ampoules) into a 50ml syringe
3.	Add 30mls of Normal saline = total of 38mls
4.	Set VTBI 38mls
5.	Set rate at 114mls per hour
6.	This delivers a 4g $MgSO_4$ loading dose in 20 minutes
7.	Doctor authorization – prescribed on Medication Chart

Please note: If transferring to another facility.

Complete **$MgSO_4$ loading dose** before leaving.

$MgSO_4$ Maintenance dose please refer to Magnesium Sulfate for Pre-eclampsia & for Neuroprotection in pre-term births <30 weeks guideline

MAINTENANCE INFUSION 1g per hour administer IV via syringe driver

1.	Prime your mainline with Hartmans solution and infuse via the Baxter EvoIQ Pump at 78mls/hr
2.	Draw 50mls (~25g) of $MgSO_4$ 49.3% (10 ampoules) into a 50ml syringe
3.	Attach $MgSO_4$ infusion to the mainline infusion.
4.	Using syringe driver infuse $MgSO_4$
5.	Set rate at 2mls/hr
6.	Set VTBI at 50mls
7.	This delivers $MgSO_4$ 1g per hour over 25 hours
8.	Doctor authorization – prescribed on Medication Chart
9.	For severe pre-eclampsia/eclampsia continue for at least 24 hours (stopping maintenance infusion should be discussed with on call obstetric Consultant)

Observe for signs of **MAGNESIUM TOXICITY** (see observation & management guide)

- **Respiratory rate <12 breaths per minute**
- **Loss of patellar or bicep reflexes**
- **Urinary output <100mls over 4 hours**
(if respiratory rate <12 but PaO_2 is normal and reflexes are present this is unlikely to be caused by magnesium toxicity and more likely to be related to opioid analgesia)

If loss of deep tendon reflexes and /or respiratory depression is observed:

- **STOP infusion**
- **CALL FOR URGENT Obstetric review from Registrar or Consultant**
- **Maintain Airway, Breathing , Circulation**
- **Administer Oxygen at 8-12 litres / minutes**
- **Send Blood for urgent magnesium levels**
- **ADMINISTER ANTIDOTE: Calcium Gluconate 1g (10mls of 10% soln) slowly over 5 minutes. Rate should not exceed 2ml/min of undiluted solution**

MAGNESIUM SULFATE ($MgSO_4$)

APPENDIX C –

Maternity Administration Instructions: If pre-mixed Magnesium Sulfate is NOT available - 4g over 20 minutes
Magnesium Sulfate for Pre-eclampsia and for Neuroprotection in Pre- Term Births < 30 Weeks EDMS#2396297

Observations & Management in Maternity

(pre-eclampsia, eclampsia, neuroprotection)

Note:

- in cases of severe pre-eclampsia additional observations and management are required (see Pre-eclampsia & eclampsia guideline).
- For intra-uterine transfers see the Magnesium Sulfate for Pre-eclampsia & for Neuroprotection in pre-term births <30 weeks guideline

Loading dose Observations:

- One to one care in birthing unit (or ICU with midwife for birth)
- Full set of maternal observations prior to commencing
- **BP** every **5** minutes
- Maternal **HR, RR, prior** to loading dose, at **10 minutes** & at **end** of loading dose
- **Reflexes** (patella or bicep) **prior** to loading dose
- **Continuous** Oxygen Saturation monitoring (SpO₂)
- **Continuous** fetal monitoring - CTG (if antenatal)
- **80-85 ml/hour fluid restriction total for severe pre-eclampsia.**
- Urine output should be greater than **100mls over 4 hours**
- Complete fluid balance chart, monitoring and recording input and output

Continuous electronic fetal monitoring is strongly recommended during magnesium infusion. Interpretation of the CTG should take into account the reduced variability that may be seen with magnesium infusions.

Documentation

- Record the indication in the clinical record
- Use the National Medication chart to prescribe
- Use a fluid balance chart
- Use MEWS – (documenting observations on maternal vital signs chart)
- If in ICU use ICU chart

APPENDIX D –

Observations and Management in Maternity:

Magnesium Sulfate for Pre-eclampsia and for Neuroprotection in Pre- Term Births < 30 Weeks EDMS#2396297

MAGNESIUM SULFATE (MgSO₄)

Observations & Management in Maternity

(pre-eclampsia, eclampsia, neuroprotection)

Note:

- in cases of severe pre-eclampsia additional observations and management are required (see Pre-eclampsia & eclampsia guideline).
- For intra-uterine transfers see the Magnesium Sulfate for Pre-eclampsia & for Neuroprotection in pre-term births <30 weeks guideline

Maintenance dose Observations:

- One to one care in birthing unit (or ICU with midwife for birth)
- **80-85 ml/hour fluid restriction total for severe pre-eclampsia.**
- Full set of maternal observations prior to commencing & 4 hourly if stable
- Complete fluid balance chart, monitoring and recording input and output **hourly**
- **BP** hourly
- **Respiratory rate** hourly
- **Reflexes** (patella or bicep) hourly
- **Oxygen Saturation** (SpO₂) hourly
- **Continuous** fetal monitoring - CTG (if antenatal)
- Urine output should be greater than **100mls over 4 hours**

Continuous electronic fetal monitoring is strongly recommended during magnesium infusion. Interpretation of the CTG should take into account the reduced variability that may be seen with magnesium infusions.

Infusion can be continued at standard rate provided that:

- Reflexes (patella or bicep) are present
- Urine output remains > 100ml/4hrs.
- Respiratory rate does not fall below 12 per minute (if respiratory rate <12 but PaO₂ is normal and reflexes are present this is unlikely to be caused by magnesium toxicity and more likely to be related to opioid analgesia)
- For severe pre-eclampsia/eclampsia continue for at least 24 hours (stopping maintenance infusion should be discussed with on call obstetric Consultant)

Documentation

- Record the indication in the clinical record
- Use the National Medication chart to prescribe
- Use a fluid balance chart
- Use MEWS – (documenting observations on maternal vital signs chart)
- If in ICU use ICU chart

APPENDIX D –

Observations and Management in Maternity:

Magnesium Sulfate for Pre-eclampsia and for Neuroprotection in Pre- Term Births < 30 Weeks EDMS#2396297