

Preventing Cerebral Palsy in Preterm Labour (PReCePT) Webinar

Tuesday 6 March 2018

 @WEAHSN

Welcome and Introductions

- Deborah Evans, Managing Director, West of England Academic Health Science Network (WEAHSN)
- Dr. Karen Luyt, Consultant in Neonatal Medicine and Consultant Senior Lecturer Neonatal Neuroscience, University of Bristol
- Hannah Bailey, Head of Quality and Improvement, Avon and Wiltshire Mental Health Partnership NHS Trust
- Dr. Emma Treloar, Consultant Obstetrician, University Hospitals Bristol NHS Foundation Trust
- Dr. Tony Kelly, National Clinical Director for National Maternal and Neonatal Health Safety Collaborative, NHS Improvement
- Ann Remmers, Patient Safety Programme Director, WEAHSN

PReCePT

Reducing Cerebral Palsy through improving uptake of Magnesium Sulphate in Preterm Deliveries



Karen Luyt
Consultant Senior Lecturer
Neonatal Medicine
UHBristol and University of Bristol

Background

Magnesium
Sulphate as brain
protection for
preterm babies



Preterm Birth and Cerebral Palsy

- Preterm birth is the major risk factor for CP
- 10% of very low birth weight babies develop CP

Cerebral Palsy

- Average Health Care costs per individual: ~ £800,000
- The cost to the individual and their family is unquantifiable.
- Until recently no intervention available to prevent CP in preterm babies

**Magnesium sulphate for women at risk of preterm birth for
neuroprotection of the fetus (Review)**

Doyle LW, Crowther CA, Middleton P, Marret S, Rouse D



This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2010, Issue 1

<http://www.thecochranelibrary.com>

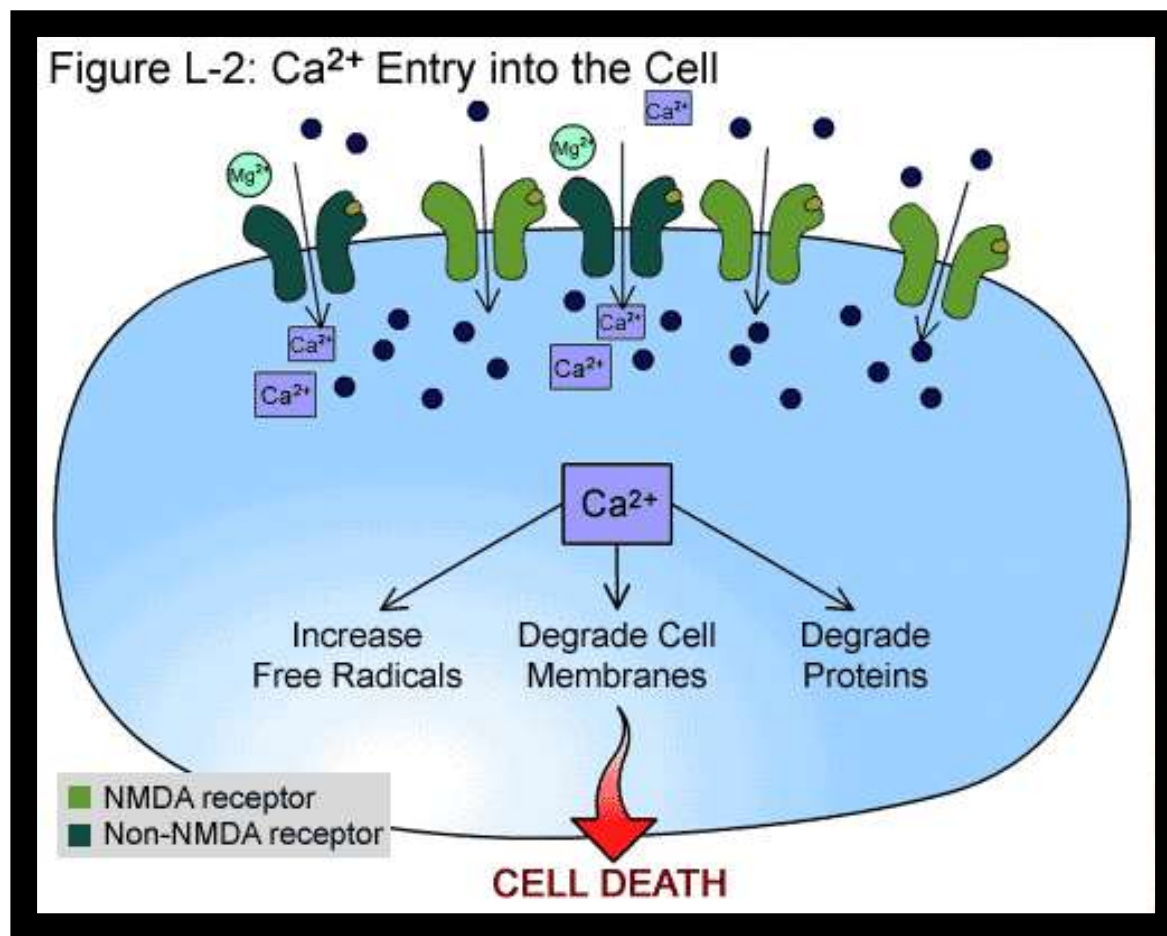
MgSO₄ : Cerebral Palsy

Outcome: 4 Cerebral palsy

Study or subgroup	Magnesium n/N	No magnesium n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
I Neuroprotective intent: any CP					
Crowther 2003	36/629	42/626		29.0 %	0.85 [0.55, 1.31]
Marret 2006	22/352	30/336		21.1 %	0.70 [0.41, 1.19]
Mittendorf 2002	3/30	0/29		0.3 %	6.77 [0.37, 125.65]
Rouse 2008	41/1188	74/1256		49.5 %	0.59 [0.40, 0.85]
Subtotal (95% CI)	2199	2247		100.0 %	0.71 [0.55, 0.91]

MgSO₄: Mechanism of Action

Rapidly crosses the placenta and enters the brain within minutes



MgSO₄ : Cerebral Palsy

RESEARCH

www.AJOG.org

OBSTETRICS

Magnesium sulfate therapy for the prevention of cerebral palsy in preterm infants: a decision-analytic and economic analysis

Alison G. Cahill, MD, MSCI; Anthony O. Odibo, MD, MSCE; Molly J. Stout, MD; William A. Grobman, MD, MBA; George A. Macones, MD; Aaron B. Caughey, MD, PhD

Am J Obstet Gynecol 2011;205:542.e1-7.

MgSO₄ given at <32 weeks is cost-effective

MgSO₄ : Cerebral Palsy

Highest Level Evidence - Individual Participant Meta-analysis



RESEARCH ARTICLE

Assessing the neuroprotective benefits for babies of antenatal magnesium sulphate: An individual participant data meta-analysis

Caroline A. Crowther^{1,2+}, Philippa F. Middleton^{2,3}, Merryn Voysey⁴, Lisa Askie⁵, Lelia Duley⁶, Peter G. Pryde⁷, Stéphane Marret^{8,9}, Lex W. Doyle^{10,11,12}, for the AMICABLE Group[†]

Key Findings:

- **Number Needed to Treat = 42 to prevent 1 case of CP**
- **Reduction of All grades CP (32%)**
- **Reduction of moderate/severe (37%) and severe CP (46%)**
- **Effective even if given 0-4 hours before delivery**
- **4g loading dose + 1g/hr maintenance effective**
- **No risk to mother. No risk of respiratory depression for baby.**

NICE Guidance



Magnesium sulfate for neuroprotection

1. Offer intravenous magnesium sulfate for neuroprotection of the baby to women between **24⁺⁰** and **29⁺⁶** weeks of pregnancy who are:
 - in established preterm labour **or**
 - having a planned preterm birth within 24 hours.
2. Consider intravenous magnesium sulfate for neuroprotection of the baby for women between 30⁺⁰ and 33⁺⁶ weeks of pregnancy. 3. Give a 4 g intravenous bolus of magnesium sulfate over 15 minutes, followed by an intravenous infusion of 1 g per hour until the birth or for 24 hours (whichever is sooner).
3. For women on magnesium sulfate, monitor for clinical signs of magnesium toxicity at least every 4 hours.



Preventing cerebral palsy in preterm labour: a multiorganisational quality improvement approach to the adoption and spread of magnesium sulphate for neuroprotection

Anna Burhouse,¹ Charlotte Lea,² Stephen Ray,¹ Hannah Bailey,³ Ruth Davies,⁴ Hannah Harding,² Rachel Howard,⁵ Sharon Jordan,⁶ Noshin Menzies,¹ Sarah White,¹ Kathryn Phillips,¹ Karent Luyt⁷

PReCePT1



- Adoption and spread to 4 WE units.
- Perinatal Approach (Maternal and Neonatal).
- Measurement: Developed the MgSO₄ metric in BadgerNET + VON Data (2012, 2013) used for baseline.
- Central Team: QI Coach (AHSN), Clinical Lead (UHBristol – Neonatologist; K Luyt), Patient Reps (PPI), Project Management, Communications Team.
- Unit Level: Midwife Champion + Neonatal Champion.
- QI Methodology refined in each unit.
- More than 600 staff trained (“Tea Trolley training”).
- Quantitative and Qualitative Evaluation.
- Uptake increased from 20% to 88% in 6 months.

PRReCePT1

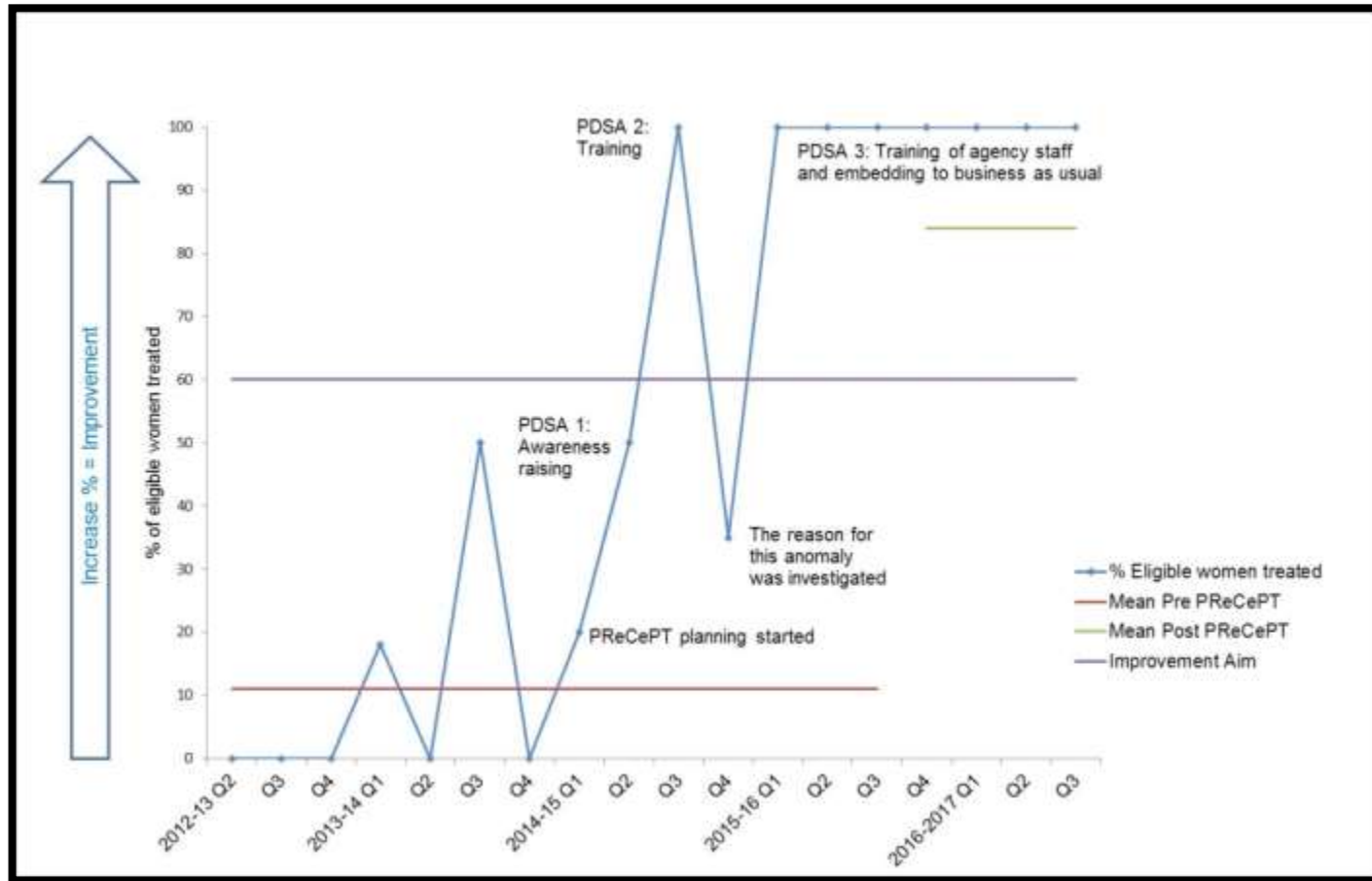


Figure 1 An example of local data collection to support Plan, Do, Study, Act (PDSA) cycles from one of the PReCePT sites. % of eligible women treated by PReCePT.



National Neonatal Audit Programme 2017 Annual Report on 2016 data

Published September 2017

Commissioned by the Healthcare Quality Improvement Partnership

Royal College of Paediatrics and Child Health,
National Neonatal Audit Programme

Neonatal Data Analysis Unit (NDAU),
Imperial College, London

RCPCH

Royal College of
Paediatrics and Child Health
Leading the way in children's health

**MgSO₄ NNAP metric,
developed by PReCePT
Clinical Lead**



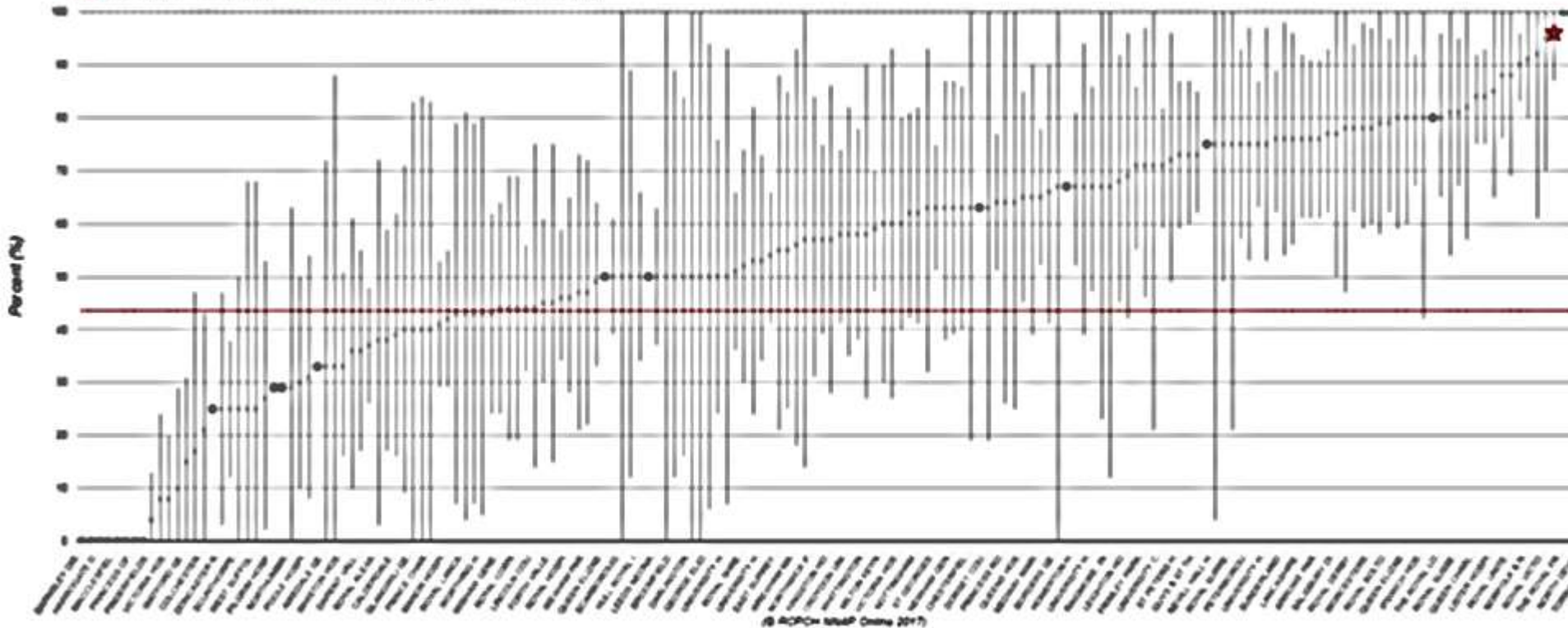
National Benchmarking



Influence of PReCePT1 –all 5 units in top 10th centile

Proportion of mothers who received magnesium sulphate in the 24 hours prior to delivery among those who delivered their babies (admitted to a NNAP participating unit) at less than 30 weeks of gestational age (2016)

Selected units All units National Rate of Compliance NNAP standard

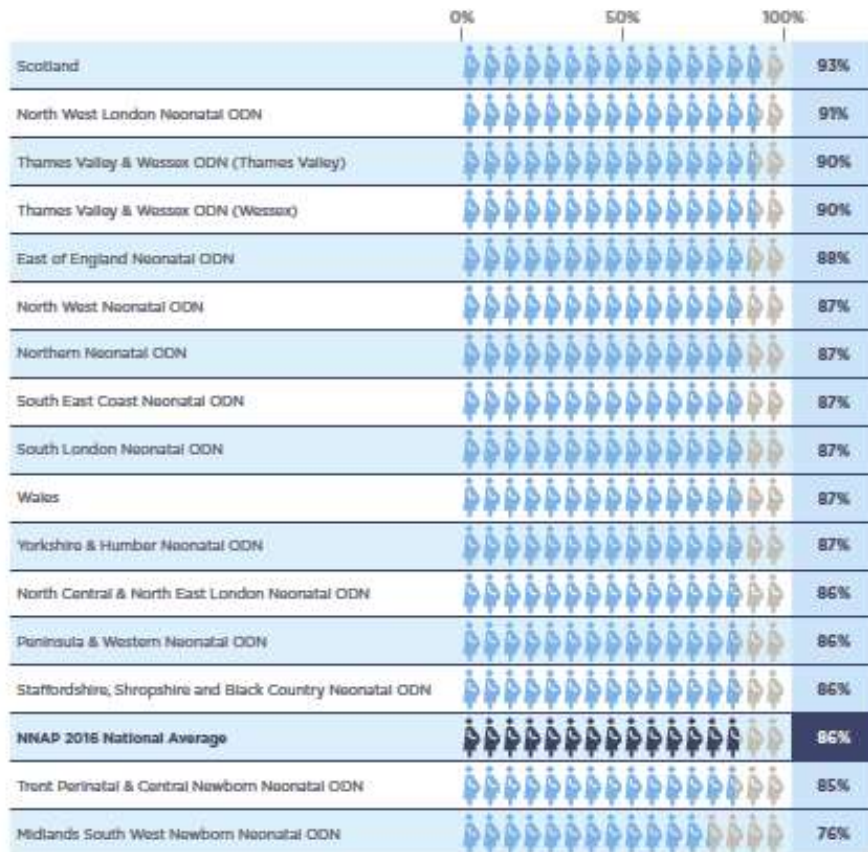


National Average = 43%

*St Michael's (UH Bristol) = 96%

Antenatal Steroids vs. MgSO₄

Antenatal steroids: Percentage of mothers who delivered their babies between 24 and 34 weeks gestation and received any dose of antenatal steroids.



Magnesium sulphate: Percentage of mothers who delivered their babies at less than 30 weeks gestation and received Magnesium sulphate 24 hours prior to delivery.

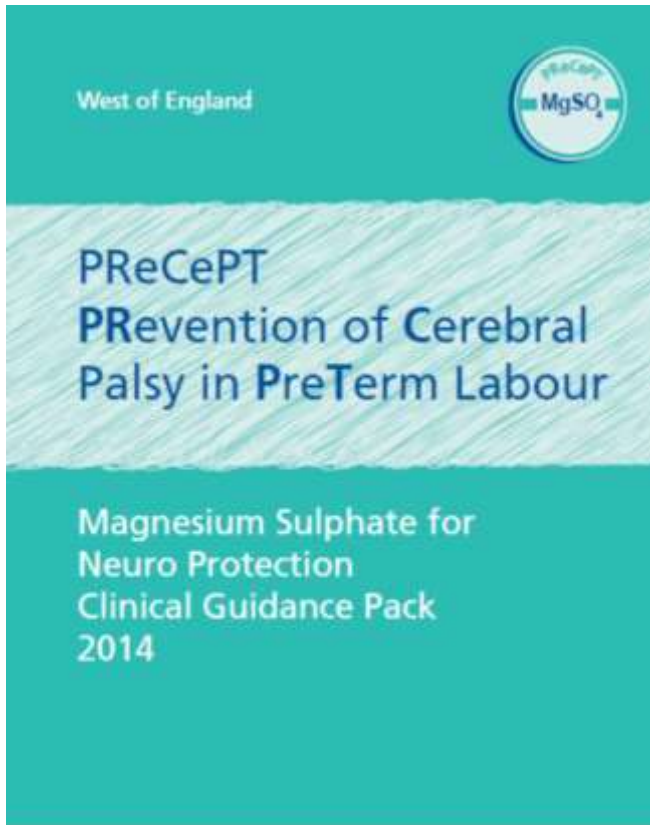


PReCePT3 Aims

- To improve compliance with NICE Guidance NG25 and increase the proportion of eligible women offered MgSO₄ in England.
- Long Term: Reduction in the incidence of cerebral palsy in babies born before 30 weeks gestation.

Project overview

PReCePT QI Package



Prevention of Cerebral Palsy in PreTerm Labour

PReCePT

Preterm births are increasing
More premature babies than ever before are surviving, but the number with cerebral palsy continues to increase

Cerebral palsy affects around 2.5 in every 1,000 babies*
locally this means about 75 babies per year

Just under half are born prematurely

1 in 5 unable to walk, 1 in 4 unable to talk, 1 in 4 not sleeping, 1 in 4 experience pain, 1 in 2 face intellectual impairment

[MgSO₄]

Magnesium Sulphate

Proven to be effective at reducing risk of developing cerebral palsy in babies born before 30 weeks

Offers neuroprotection reducing the risk of harm to a baby's brain

Less than £1.00 per treatment

On average about only 30% of eligible mothers receive MgSO₄

By around 50%

If we treated all mothers of at-risk babies, we could prevent 5 babies per year from developing cerebral palsy in the West of England

Proven to be effective at reducing risk of developing cerebral palsy in babies born before 30 weeks

By around 50%

On average about only 30% of eligible mothers receive MgSO₄

Contact **WEAHNS** for more information
www.weahns.net | 0117 900 2604

The West of England Academic Health Science Network (WEAHNS) is a collaboration between members of NHS and universities and IAHN membership working with a wide range of partners to accelerate the speed of innovation, evidence based practice to improve health and care quality. The Network covers both the West of England, Somerset, Devon and the South West. Early stage innovation, sponsored and supported.

Public and Patient Involvement

- Strong PPI in planning and governance of project
 - Co-production of project materials
 - Two public representatives as core members of project steering group
- Links with BLISS
(The Premature Baby Charity)

Bliss
for babies born
premature or sick



Patient Information Leaflet



South West of England



Is every woman offered magnesium sulphate?

Magnesium sulphate is not suitable for all women. It may be offered to women who are up to 30 weeks pregnant and who are likely to give birth within the next 24 hours. Your doctor and midwife will discuss this with you and answer any questions that you may have.

Magnesium sulphate needs to be given at some time within the 24 hours before giving birth for it to have full effect, but it still may have some benefit if given at any time before birth. If your baby needs to be born urgently (within the hour) then giving magnesium sulphate may not be an option.



Do I have to have magnesium sulphate if I am going to have my baby early?

Treatment is not compulsory and you can decide not to have it, but it is a good idea to make sure you understand how magnesium sulphate may protect your baby and as well as the effects it may have on you before you make your decision.

You can talk to your doctor and midwife for more information on magnesium sulphate, premature labour and what this means for your baby. It is important that you feel that you have all of the information you need to make the right decisions for you and your baby.

Where can I get more information on premature birth and what this means for my baby?

You can ask the midwives if they can arrange for you to meet with a neonatologist (a newborn baby doctor) who can answer your questions about what you can expect to happen after your baby is born. You may also be able to visit the Neonatal Intensive Care Unit to see where your baby will be cared for.

Bliss, the special care baby charity, provides a wealth of information and support for premature and sick babies and their families. Please visit their website bliss.org.uk or call the Bliss family helpline, on **0500 618140** (Monday to Friday 9.00am-9.00pm, freephone from landlines).

For callers who are deaf or hard of hearing, it is easy to access the Helpline via Text Relay by calling **018001 0500 618140**.

Bliss is a member of Language Line, the telephone interpreting service that has access to qualified interpreters in over 170 languages.

Bliss

for babies born too soon,
too small, too sick

If you need this leaflet in a large text please ask a member of staff.

June 2014

Bliss has not funded this project.

Having a baby before 30 weeks: magnesium sulphate as protection against cerebral palsy



West of England
Academic Health
Science Network

NHS

What is this leaflet about?

This leaflet gives information about magnesium sulphate, it may be offered to women who have to give birth to their baby earlier than 30 weeks as it can protect some babies against developing cerebral palsy. This leaflet is for all parents who may have a chance of their baby being born before 30 weeks of pregnancy.

Every year over 8,500 women in the UK give birth very early because of complications with their pregnancy. About one percent of babies every year are born before 30 weeks and are considered very premature.



What does it mean if my baby is born early?

Being told that you might give birth early can be a confusing and worrying time for you and your family. Your doctors and midwives will talk to you about the risks of early birth and they can help you to make decisions about your baby's care.

A small number of premature babies can develop long term problems which can affect their brain resulting in cerebral palsy or problems with sight and hearing.

What is cerebral palsy?

Cerebral palsy is a general term describing conditions that cause problems with movement. It is caused by harm to the brain during development, and there is a higher risk of this when a baby has been born prematurely. Cerebral palsy will affect children in different ways and to different degrees. It can often take time to work out how a child is affected and babies who are born early will need to have regular check-ups to monitor their development.

About one in ten babies who are born before 30 weeks develop a form of cerebral palsy.

What can be done to prevent cerebral palsy?

Unfortunately, we don't know how to stop all babies developing cerebral palsy or how to cure it. However, we do know that giving magnesium sulphate to women can decrease the risk that their baby will develop cerebral palsy. Magnesium sulphate is a neuroprotector, which means that it can offer some protection to a baby's brain, when we know that there is a strong chance that the baby may be born early.

What are the risks of taking magnesium sulphate?

Women who are given magnesium sulphate may experience some short-term effects. The most likely side effect is feeling nauseous and/or vomiting and headaches. However, you will be monitored for the less likely side effects, such as low blood pressure or problems with your breathing. Some women experience soreness in their arm where the drug is administered.

There are no increased risks to a premature baby when the mother is given magnesium sulphate. In fact we know that the baby is likely to benefit from it and be less likely to develop cerebral palsy.

How will I get magnesium sulphate?

The doctor or midwife will put an intravenous drip in your arm. The first dose will be given to you as a single amount over 10-20 minutes and then a second dose is given to you over a 24 hour period. You will be monitored closely throughout. If you do not have your baby within the next 24 hours, the doctor may consider giving you another dose of magnesium sulphate.

Does magnesium sulphate stop all babies getting cerebral palsy?

No, despite our best efforts, some babies will still go on to develop cerebral palsy, even though their mothers have been given magnesium sulphate.

Research has shown that magnesium sulphate is very effective at reducing the risk of infants born before 30 weeks of developing cerebral palsy by around 50%.

Whilst cerebral palsy cannot be cured, there is lots of support from specialist teams to help those affected by the condition.

Posters

Thinking steroids?



think
magnesium
sulphate,
think
reduction in
cerebral
palsy



When preterm labour has been diagnosed or planned, remember magnesium sulphate may prevent cerebral palsy in pre-term babies.

Offer magnesium sulphate to all women 30 weeks gestation or less who are at risk of pre-term birth (except when birth is urgent) including when Caesarean section is planned.

PReCePT Magnesium Sulphate Quick Reference



Magnesium sulphate:

To be offered to all women if 30 weeks or less and at risk of early preterm birth, except when birth is urgent (birth should not be delayed to administer MgSO₄)

Regimen:

- Administer 4g IV loading dose then 1g/hour IV maintenance dose (loading dose alone may still be beneficial if gives birth before maintenance dose commenced)
- Continue for 24 hours or until birth (which ever comes first)
- Monitor maternal reflexes, observations and urine output as per local guidelines for MgSO₄
- If transfer is necessary magnesium sulphate should be given prior to transport. Continue maintenance dose until ambulance arrives, but do not administer during transfer. Assess on arrival at tertiary unit for recommencement of maintenance dose.

PReCePT Magnet: Instructions



What is the PReCePT Magnet for?

This PReCePT Magnet system acts as prompt and alert to clinicians that a mother of 30 weeks gestation or less has been admitted to the maternity unit (Assessment Unit/triage or Labour ward). The PReCePT Magnet will be used to prompt obstetricians and midwives to administer magnesium sulphate to women who they suspect will give birth prematurely, with the aim of reducing the risk of their infant developing cerebral palsy.

It is designed to enhance the West of England Magnesium Sulphate pathway

Why are we using the PReCePT Magnet?

The PReCePT Magnet will act as a reminder for the clinical team involved in the care of women in pre-term labour (or women at the first sign of birth before 30 weeks), to consider administering Magnesium Sulphate for neuroprotection as per the West of England Magnesium Sulphate pathway.

How do we use the PReCePT Magnet?

- Mother is admitted in suspected preterm labour
- Mother's name is written on the whiteboard (in the Assessment Unit, triage, antenatal ward or labour ward) and if she is 30 weeks gestation or less, then the PReCePT Magnet should be placed on the board next to her name by lead clinician
- The PReCePT Magnet triggers administration of Magnesium Sulphate (if appropriate) and also the use of the Preterm Labour Initial Management Proforma.
- Pro-forma is attached securely into the mother's yellow maternity notes.

Room	Patient	Doctor	Time
1	Patient A	Dr B	9:20am
2	Patient B	Dr B	10:47am
3	Patient C	Dr C	1:30pm
4			
5			
6			





PReCePT DRIVER DIAGRAM

Primary Drivers:

System components which will contribute to moving the aim

Secondary Drivers:

Elements of the associated primary driver.

They can be used to create projects or change packages that will affect the primary driver

Aims / Primary

To increase the numbers of eligible women offered Magnesium Sulphate to prevent cerebral palsy in preterm babies from 43% to 86% (to match antenatal steroid uptake) between 2018 and 2020.

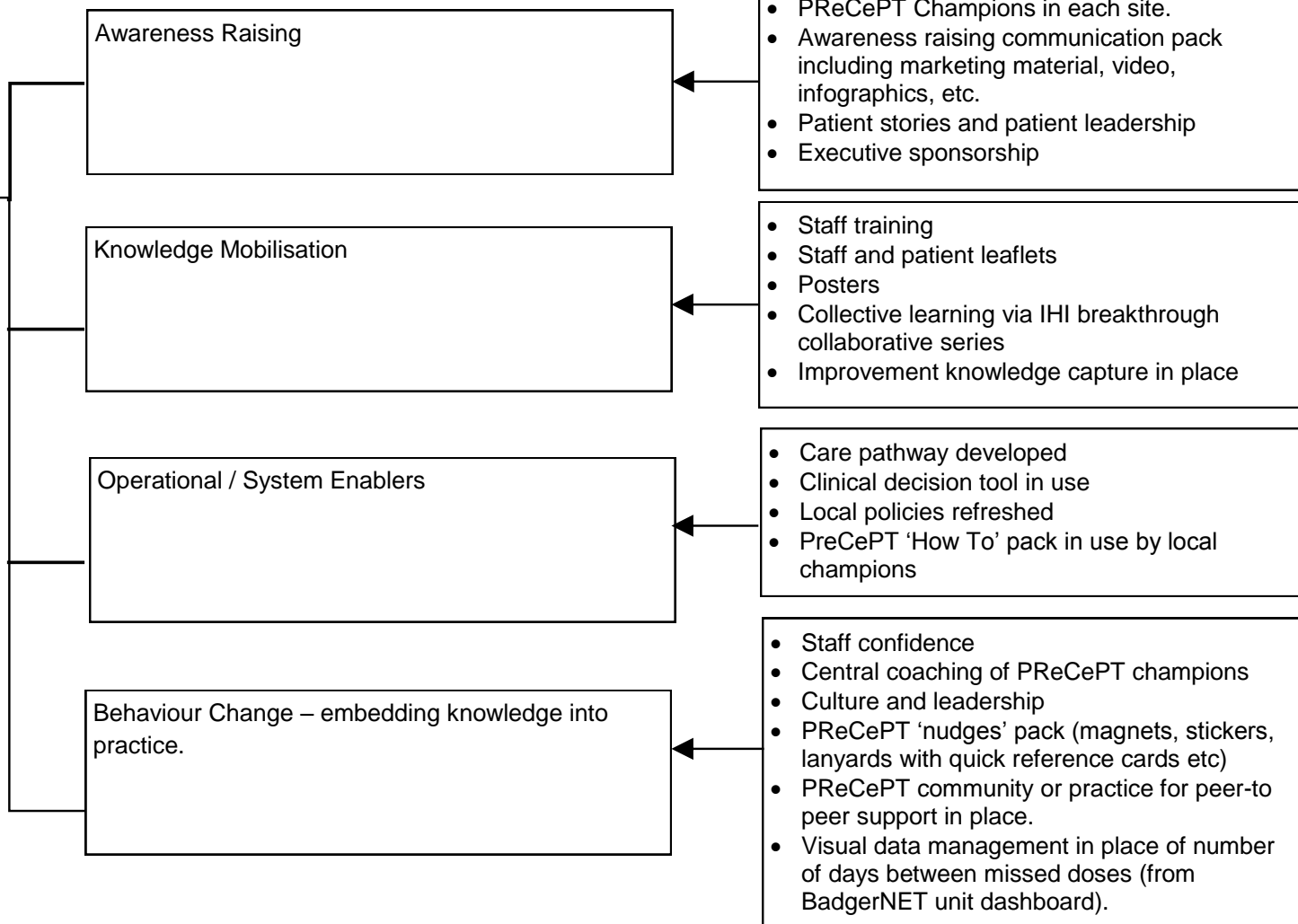
Measures:

Aim Measure:

Primary Driver - Outcome Measure (s):

MgSO₄ Uptake

Secondary Drivers - Process measure(s):



Project Strategy

- Deploy the PReCePT QI package in each unit in England.
- Each unit will have a Midwife Champion; lead training and implementation.
- Each AHSN region/Neonatal ODN/Maternity Network will have a Neonatal Clinical Champion.
- Strong focus on the Perinatal Quality Improvement community of practice (Obstetric and Neonatal).
- Routinely collect data for outcome measures (BadgerNET) + Badger Dashboard for monthly run charts (visual data management).

Evaluation



Builds on Success.....

- Proven evidence based intervention – NICE guidance
- PPI and co-production at every stage
- PReCePT1 Qualitative Evaluation
- PReCePT1 – Effect sustained
- Use of robust routinely collected data (BadgerNet)
- Added value by using network approach to National dissemination (AHSNs, NHS-I, Clinical Delivery Networks)



**THE COCHRANE
COLLABORATION®**

PReCePT3



To give every eligible mother in preterm labour the choice

To enable every baby to reach their full potential

Midwife Perspective (Hannah Bailey)

- What we learnt
- Main challenges
- Support from West of England AHSN

Midwife Perspective (Hannah Bailey)

Q&A

Obstetrician Perspective (Dr. Emma Treloar)

- What we learnt
- Main challenges
- Support from West of England AHSN

Obstetrician Perspective (Dr. Emma Treloar)

Q&A

Alignment with national programme

Tony Kelly
National Clinical Director, M&NHSC

National maternal and neonatal health safety collaborative



What is the aim of the collaborative?

To improve the safety and outcomes of maternal and neonatal care by reducing unwarranted variation and provide a high quality healthcare experience for all women, babies and families across maternity care settings in England”

What is within the scope of the collaborative?

Yes

- All maternity services in England
- All care settings
- All components of the pathway (conception to puerperium) through a safety lens

No

- The entire LMS agenda!
- Elements of care outside of the influence of clinical teams
- (limited influence on improvement in maternal mortality)

How are the waves structured?

Wave 1

April 2017 – March 2018

- Establish national network of all maternity units in England
- 44 organisations to form first national learning set
- Supported at national level to enable local delivery
- Develop local learning systems at LMS level (to meet once a quarter)

Wave 2

April 2018 – March 2019

- Further 46 Trusts across England to form second national learning set
- Supported at national and local level
- Wave 1 and 2 organisations to provide local leadership

Wave 3

April 2019 – March 2020

- Remaining 46 Trusts across England to form third national learning set
- Supported at national and local level
- Will join first and second wave organisations in LLS (if not already)

How are the meetings structured?

National Event

Progress and shared learning from all organisations

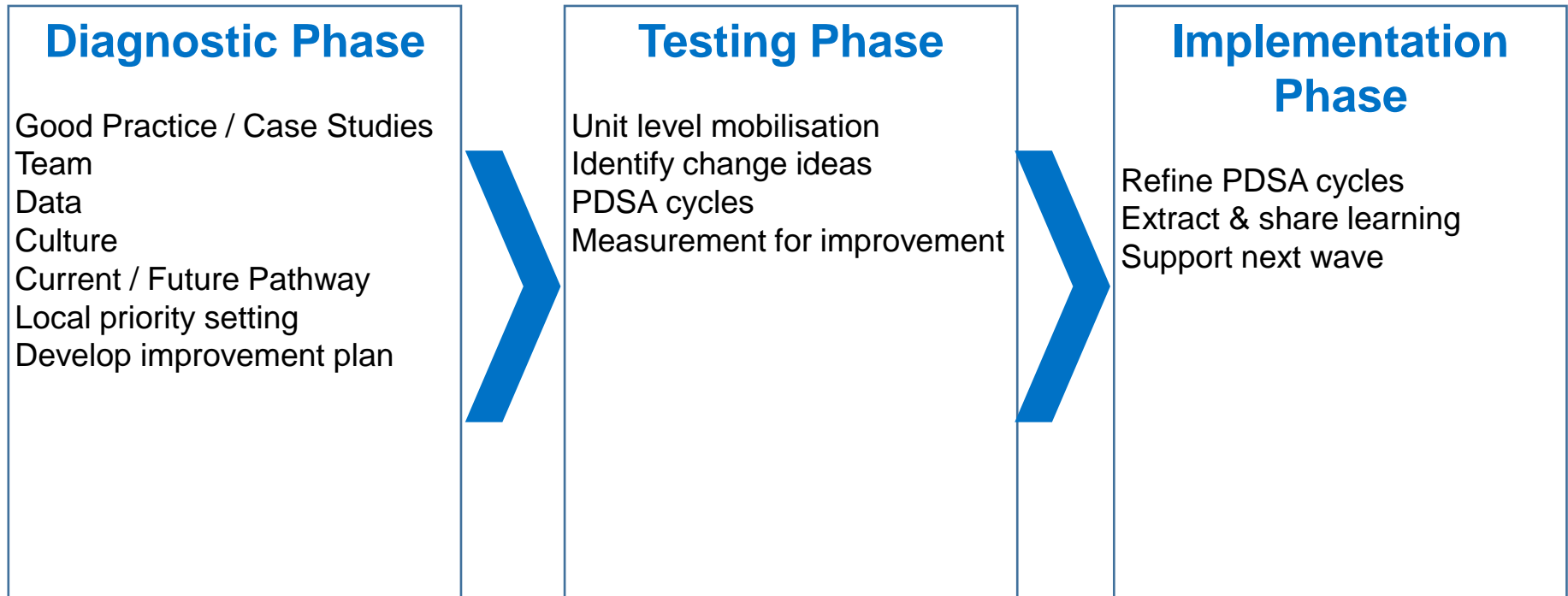
National Learning Set

- 3 x 3-day learning meetings for local improvement leads
- Tailored unit level support by central programme team

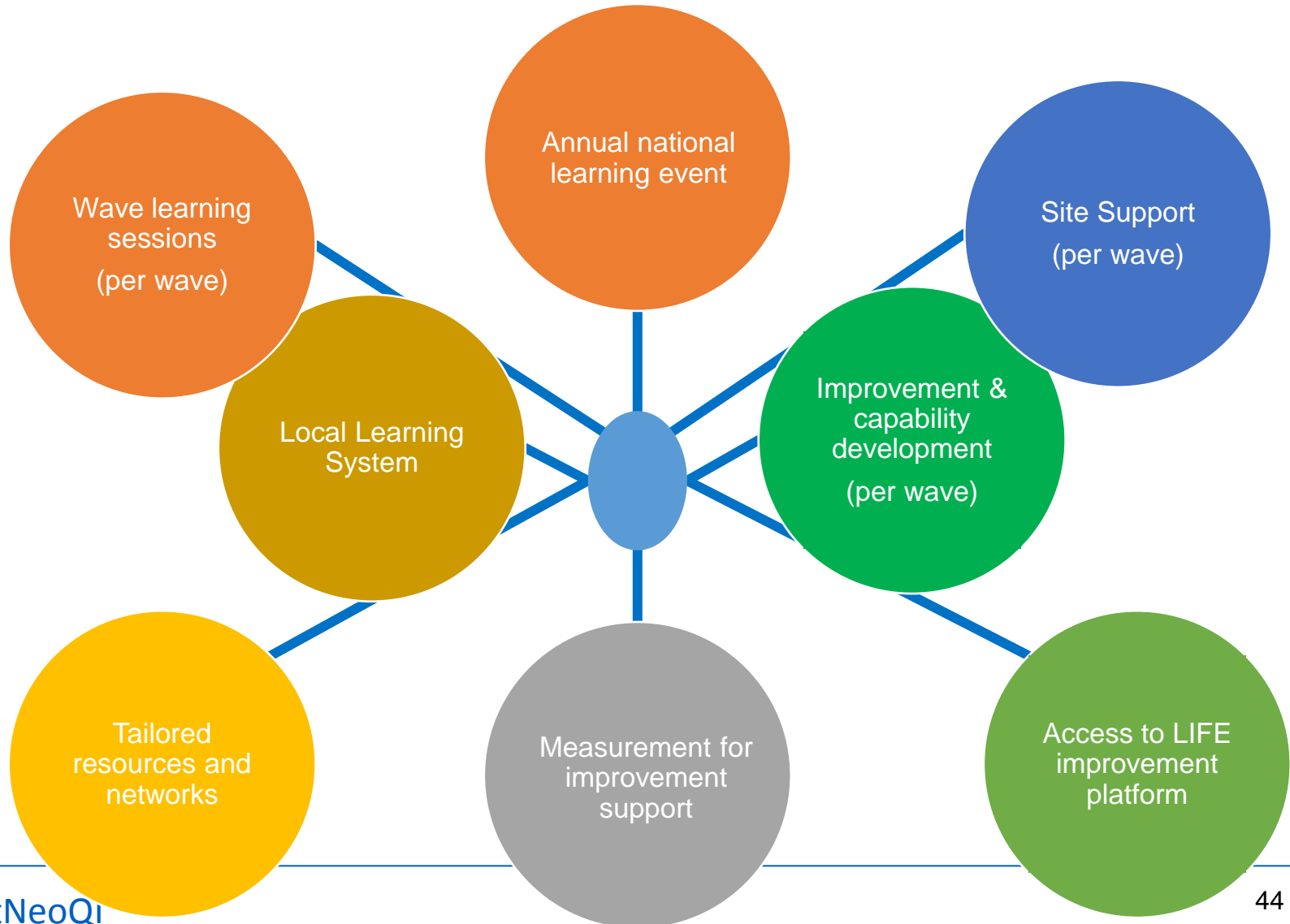
Regional Meetings

- Quarterly Local Learning Systems
- Supported by all network organisations
- Bring together all organisations including commissioners and parents/families

Activity of an individual unit

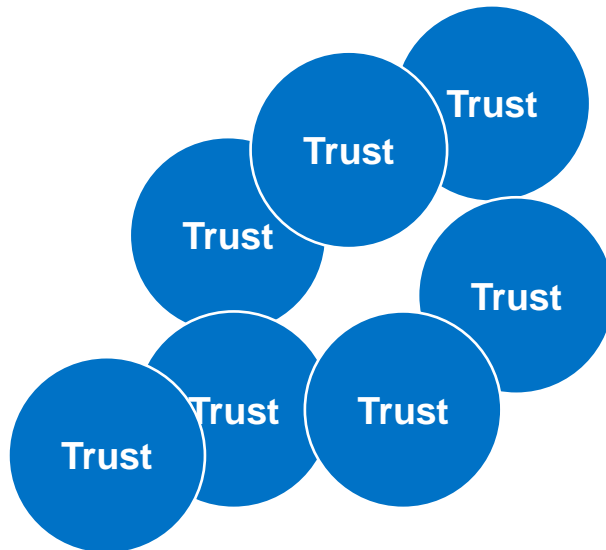


What additional support do organisations in the national learning set receive?

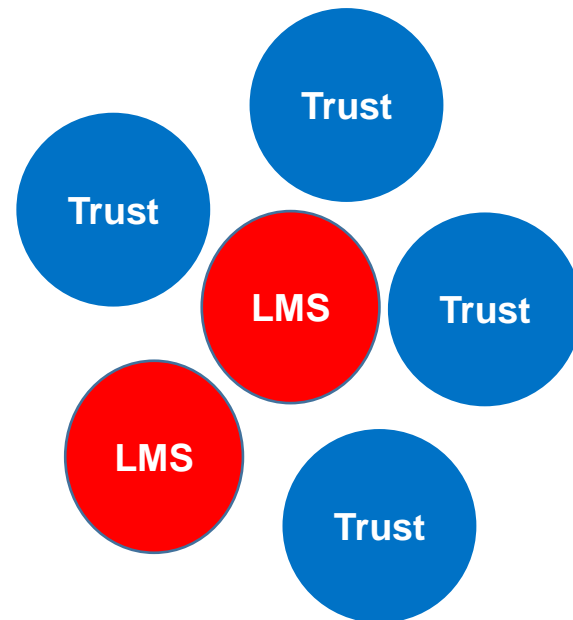


How is the collaborative structured?

National Learning Set (Trust Improvement)

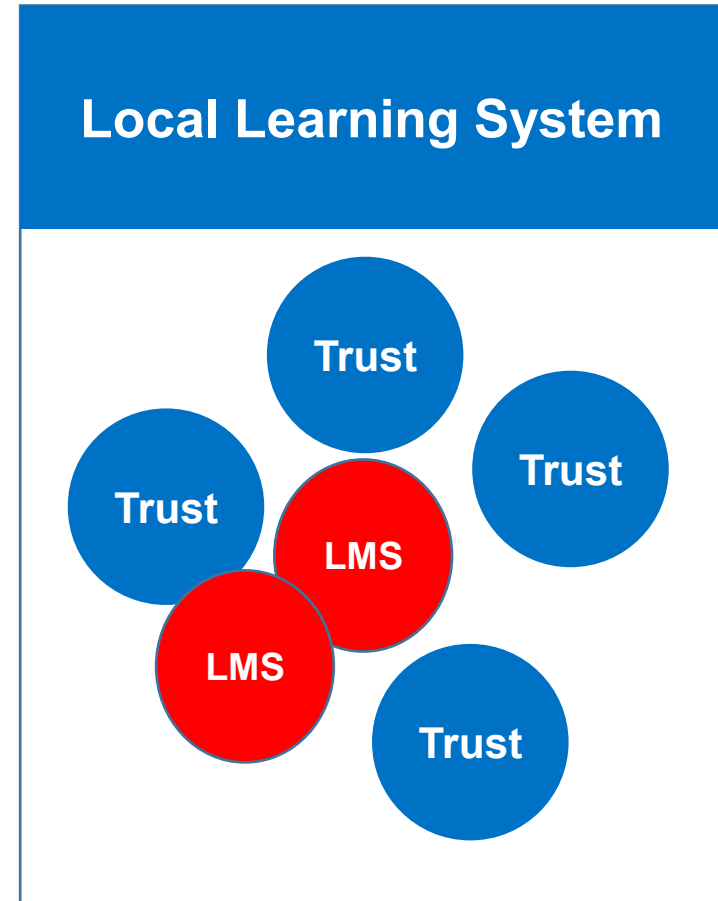


Local Learning Systems (Trust & System Improvement)

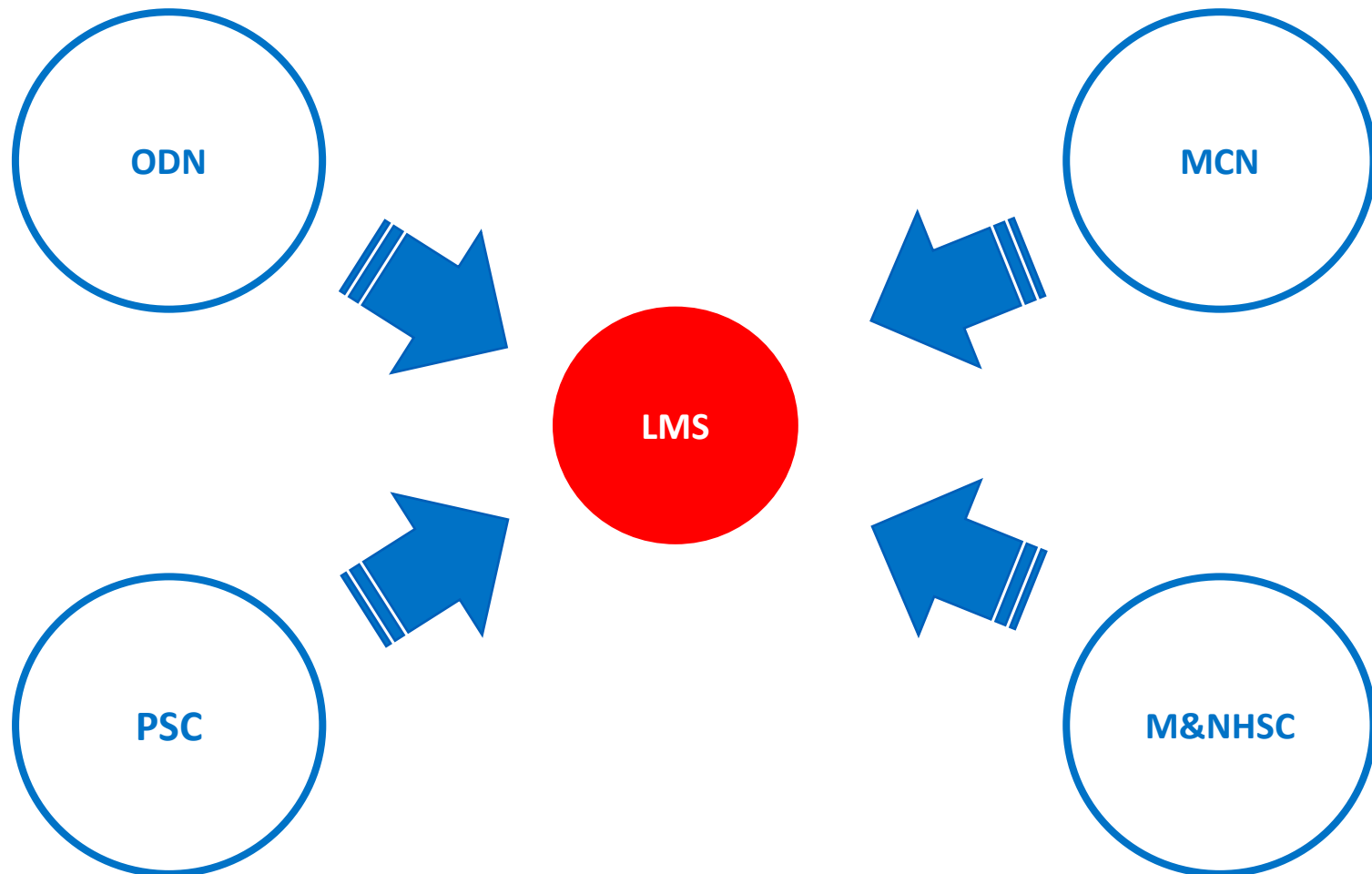


How can we work together to support the LMS?

- Local Learning Systems will be the Improvement community aligned to support each LMS
- Waves and stakeholders will share and learn from each other
- groups to meet **four** times per year
- All providers and other key stakeholders to be included from the outset
- Opportunity for system level improvement / scale up within each LMS
- Operating model needs to be sensitive to current local activity and network / LMS maturity



How can we change the way we provide support?



What should a local learning system provide?

- A forum for local improvement to thrive
- An opportunity for all network partners to work collaboratively
- Effective collaboration between local partners
- Opportunities for system level improvement
- An opportunity for increasing local improvement capability
- A sustainability solution for maternal and neonatal improvement

What should not be part of a local learning system?

- A greater emphasis on strategy than delivery
- A focus on performance rather than improvement
- The entire ambition of the LMS agenda

Aim

To improve outcomes and reduce unwarranted variation by providing a safe, high quality healthcare experience for all women, babies and families across maternity care settings in England.

Reduce the rate of stillbirths, neonatal death and brain injuries occurring during or soon after birth by 20% by 2020

Primary Drivers

Improve the proportion of smoke free pregnancies

Improve the optimisation and stabilisation of the very preterm infant

Improve the detection and management of diabetes in pregnancy

Improve the detection and management of neonatal hypoglycaemia

Improve the early recognition and management of deterioration during labour & early post partum period

Secondary Drivers

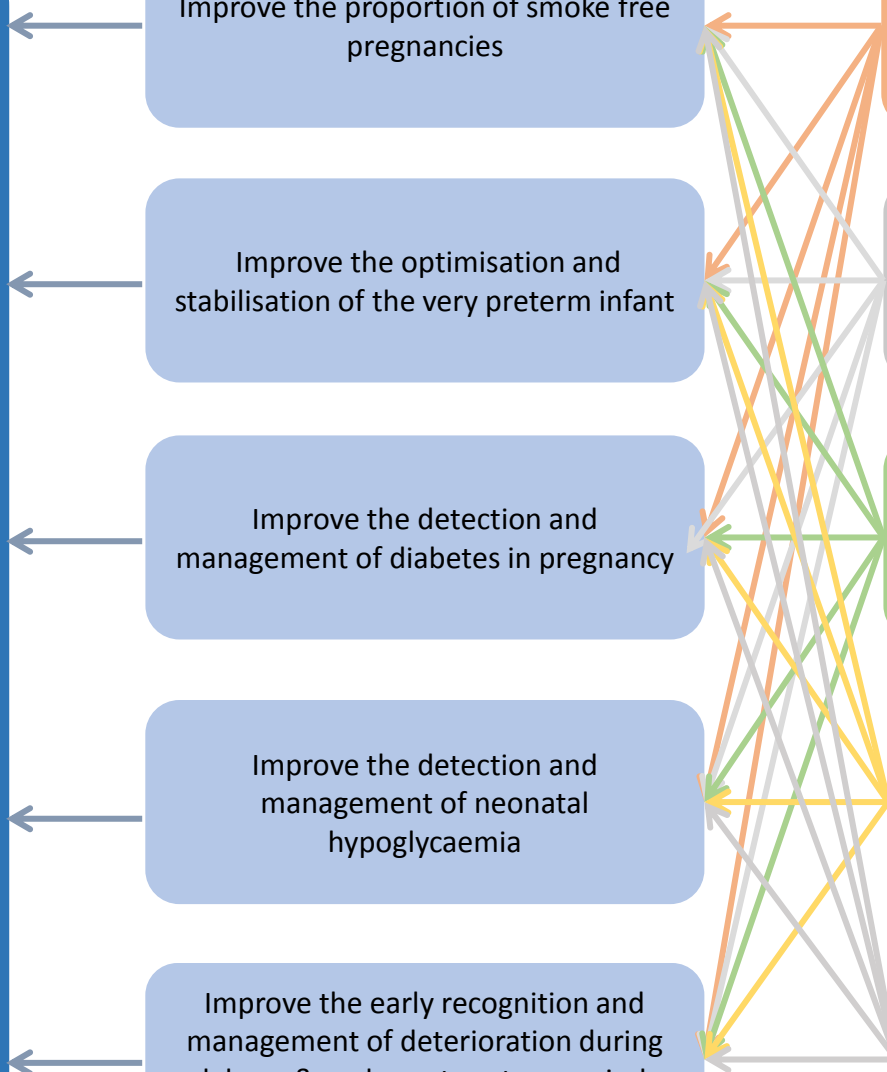
Creating the conditions for a culture of safety and continuous improvement

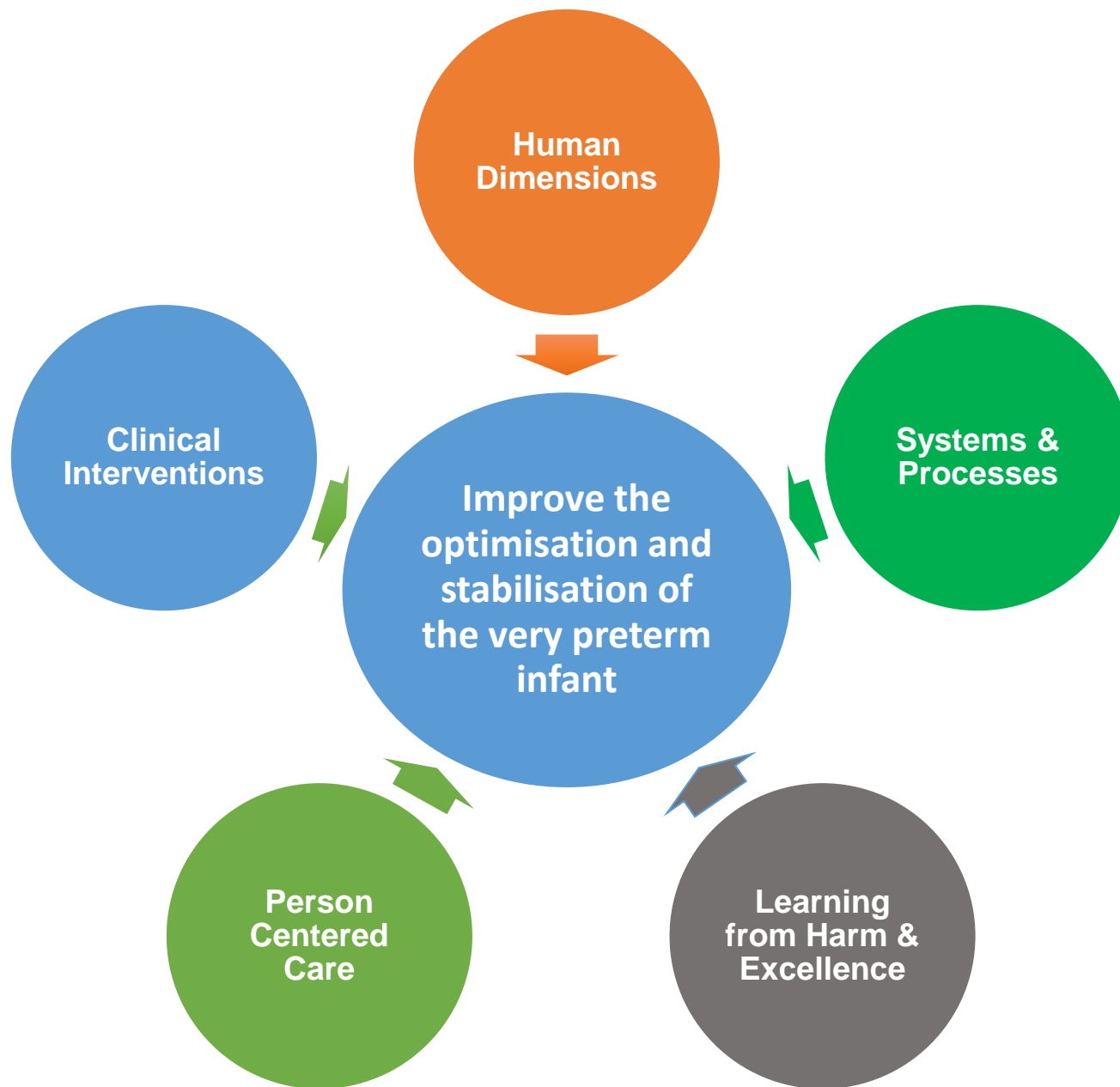
Develop safe and highly reliable systems, processes and pathways of care

Improve the experience of mothers, families and staff

Learn from excellence and harm

Improving the quality and safety of care through Clinical Excellence





Aim

Primary drivers

**Improve the
optimisation
and stabilisation
of the very
preterm infant**

Antenatal Optimisation: Support the effective optimisation of preterm infants prior to the time of birth

Peri-partum Optimisation: Support the effective optimisation of preterm infants around the time of birth

Post-partum Optimisation: Support the effective optimisation of preterm infants immediately after the time of birth

Secondary Driver	Key change concepts and change ideas for PDSA testing
<p>Antenatal Optimisation: Support the effective optimisation of preterm infants prior to the time of birth</p>	<ol style="list-style-type: none"> 1. Ensure all women in threatened pre-term labour (less than 34 weeks gestation) receive a full course of antenatal corticosteroids (where appropriate) 2. Ensure all women in threatened pre-term labour (less than 30 weeks gestation) receive an infusion of Magnesium Sulphate (where appropriate) 3. Ensure all women in threatened preterm labour are informed of the increased benefits of breast milk and breastfeeding for preterm infants. 4. ensure that appropriate information and equipment is available prior to delivery to support timely expressing within four hours of delivery for women who choose to provide breastmilk for their infants 5. Develop a consistent approach for ensuring all obstetric and neonatal staff provide women with counselling and appropriate information regarding the need for in-utero transfer

What is the ambition of the collaborative?

By 2020 each Trust, local maternity system and network should have:

- significant capability (& capacity) for improvement
- detailed knowledge of local cultural issues
- developed a locally sensitive improvement plan
- made significant improvement to local service quality and safety
- data to share with their board, staff and commissioners that reflect these improvements

...to create the conditions for a safety culture and a national maternal and neonatal learning system

Thank you

@MatneoQI

@tonykellyuk

#MatNeoQI

www.improvement.nhs.uk



Support to Patient Safety Collaboratives for Implementation (Ann Remmers)

National Coordination Role

- Supporting the PSCs to deliver PReCePT through their regional networks
- Clinical leadership – national profile, advice on evaluation, support to regional clinical leads
- Providing a toolkit and webinars for local adaption
- Public contributor involvement
- Any national reporting required which is additional to quarterly AHSN reporting
- National communications
- Commissioning a national evaluation, learning the lessons for future AHSN programmes

Support to Patient Safety Collaboratives for Implementation (Ann Remmers)

Q&A

Connect with us



@weahsn

