



British Association of  
Perinatal Medicine



# Antenatal Optimisation for Preterm Infants less than 34 weeks

A Quality Improvement Toolkit

Your Improvement Journey

October 2020

in collaboration with

**NNAP**  
National Neonatal  
Audit Programme

## Overview of the Improvement Journey

A project is the way in which you accomplish change and the specific objectives of your improvement journey. The following table shows the steps that are commonly taken on this journey. Each step is discussed further in subsequent sections.



	Approach	Methods and Tools	Outcome
<b>1. Define the problem</b>	Identify the problem and how large it is	Forcefield analysis Fishbone diagram Case review Process mapping Pareto chart Learn from experts Driver diagram	Define the problem, diagnose why the problem occurs and what improvement would look like
<b>2. Develop a shared purpose</b>	Form a team of enthusiasts	Engaging a team Engaging stakeholders Optimise context	Establish a shared objective and a culture for change
<b>3. Plan and implement changes</b>	Formulate, prioritise and test solutions	Project Charter QI Methodology	Complete a formalised plan of proposed improvements
<b>4. Test and measure improvement</b>	Test, review and re-test improvements	PDSA Measurement Run chart Statistical Process Control Chart Days between Chart	Determine whether improvement has resulted in change
<b>5. Implement, embed and sustain</b>	Implement widely and ensure sustainability	Education Communication Motivation Governance	Shared learning and embedding changes into practice

## Phase One: Define the Problem

### Where are we now?

It is important to understand your local data, and to benchmark where possible in the context of regional, national and international standards (NSQI 11,12) observing any changes over recent years. To achieve this your team should understand how to look at your local data, what questions to ask and where to access benchmarking data such as Badgernet National reports and comparison charts, the network data dashboards, [NNAP Online](#) and [Nightingale, Vermont Oxford Network](#) as examples. Finally, being able to convey these data to the wider team clearly and concisely will facilitate a stronger commitment to the implementation of quality improvement interventions.

#### 1. Prediction of preterm birth

Aim: All women who are at risk of preterm birth (including both those in threatened preterm labour and those requiring to be delivered because of maternal or fetal indications), are identified appropriately and in a timely manner using evidence-based methods.

Ask:

- a. What proportion of women with risk factors for preterm birth are appropriate risk-stratified and referred to a preterm birth clinic during their pregnancy?
- b. What proportion of women presenting to assessment units and labour wards in threatened preterm labour who are risk-stratified using an appropriate risk-assessment tool (e.g. QUIPP app: fetal fibronectin +/- cervical length assessment)?
- c. What proportion of women experience in utero transfer for possible preterm labour but do not go on to deliver?

#### 2. Antenatal steroids

Aim: All women giving birth before 34 weeks of gestation, should receive a full course of antenatal steroids no longer than 7 days prior to birth, and ideally completed 24-48 hours before birth

Ask:

- a. What proportion of women in your unit /network achieved this?
- b. What proportion of women in your unit/network giving birth before 34w received no antenatal steroids at all?
- c. What proportion of women in your unit/network giving birth before 34w received an incomplete course of steroids?
- d. What proportion of women in your unit/network giving birth before 34w had more than one complete course of steroids prior to birth?
- e. What proportion of women in your unit/network received a full course of steroids greater than 7 days before birth?
- f. What proportion of women receiving steroids did not give birth before 37w?

#### 3. Magnesium Sulphate

Aim: All women giving birth before 30 weeks of gestation, should receive a loading dose and ideally a minimum of a 4 hour infusion of **antenatal magnesium sulphate** within the 24 hours prior to birth

Ask:

- a. What proportion of women in your unit/network achieved this?
- b. What proportion of women received only a full or partial loading dose without infusion?
- c. What proportion of women received repeated dosing?

#### 4. Antibiotics

Aim: All women in established preterm labour should receive intrapartum antibiotic prophylaxis to prevent early onset neonatal Group B Streptococcal (GBS) infection irrespective of whether they have ruptured amniotic membranes.

Ask:

- a. What proportion of women in your unit/network received appropriate intrapartum prophylaxis against GBS?
- b. What is the prevalence of preterm early onset GBS infection in your unit/network?

### 5. Place of birth

Aim: Singleton infants less than 27 weeks of gestation, multiples less than 28 weeks of gestation and infants where the estimated fetal weight is less than 800g, should be born in a maternity service on the same site as a neonatal intensive care unit (NICU).

Ask:

- a. What proportion of babies born in your unit/network achieved this?
- b. What proportion of babies born in your unit/network required transfer after birth for gestation-appropriate neonatal care?
- c. How many requests for in utero transfer were declined?
  - a. How often was this on account of lack of neonatal care provision?
  - b. How often was this on account of lack of other capacity eg maternity, transport?
- d. How many women were transferred in anticipation of preterm birth but did not deliver within 1w?

### 6. Using [NNAP Online](#) it may also be useful to ask?

- a. Are your data both accurate and complete?
- b. How have your data changed over time?
- c. How does this compare with the UK average?
- d. How does this compare with other units in your network?
- e. How does this compare with other units of similar size and acuity?

### How did we get here?

There are many tools to help your team understand why eligible women may not receive antenatal optimisation measures (NSQI 13). You do not need to use all of these tools but should explore which of these exercises works best for your team. Remember that this is a process which should involve frontline staff as they are best able to describe the barriers and enablers in the system. Include teams outside of maternity teams including for example pharmacists and sonographers.

Resources:

[BAPM QI Made Easy: 'Investigating your Current Practice'](#)  
[NHS Improvement: Project Management](#)

1. **Forcefield analysis**- this tool balances the positive and negative drivers influencing delivery of antenatal optimisation interventions and scores assigned to describe the strength of each force. Study, plan and act to strengthen the weaker positive forces and diminish the resisting forces (Figure 2). A template can be found on the [BAPM Quality Webpages](#).
2. **Pareto Chart**- in categorising the underlying problem, a Pareto chart gives a visual depiction of the frequency of problems in graphical form, allowing you to target the areas that offer the greatest potential for improvement (Figure 3).  
Resource: [NHS Improvement Pareto Chart Tool](#)
3. **Fishbone diagram**- cause and affect analysis tool. This is a useful tool for categorising factors which influence the ability to deliver optimisation measures (Figures 4a and b). A template can be found on the [BAPM Quality Webpages](#).

- Case review** – take the last 10-20 cases where an antenatal optimisation measure was not achieved and using a structured review tool ([Appendix 4](#)) to identify any common themes. Consider reviewing 10 cases where all elements of the bundle were achieved and identify strengths.
- Process mapping**- walk through the journey that a woman takes from the start of preterm labour through to birth and think about the factors within the process and the environment that may contribute (see Figure 1 for ideas). PERIPrem also has a useful process map detailing potential barriers and can be found [here](#).

Figure 2. An example of a forcefield analysis for Place of Birth

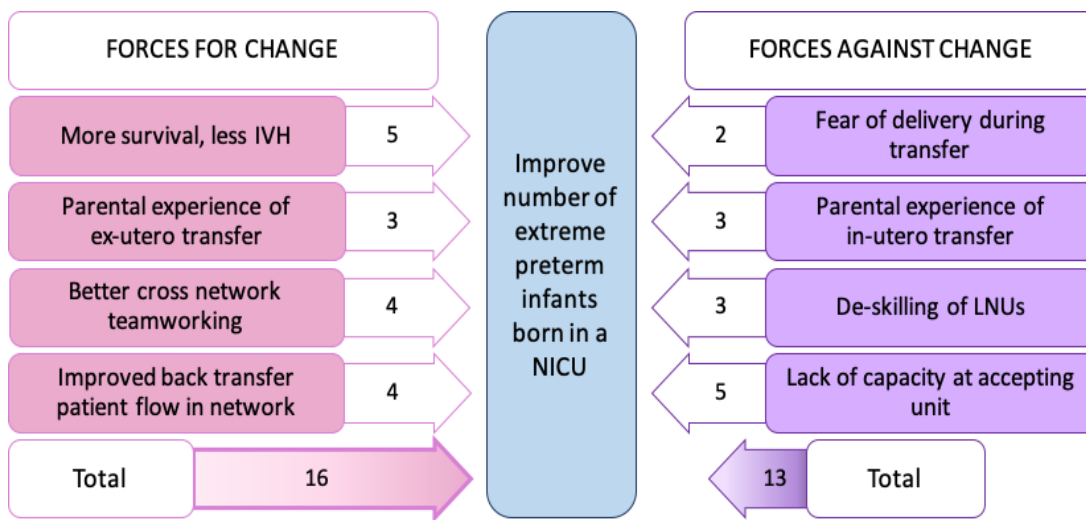
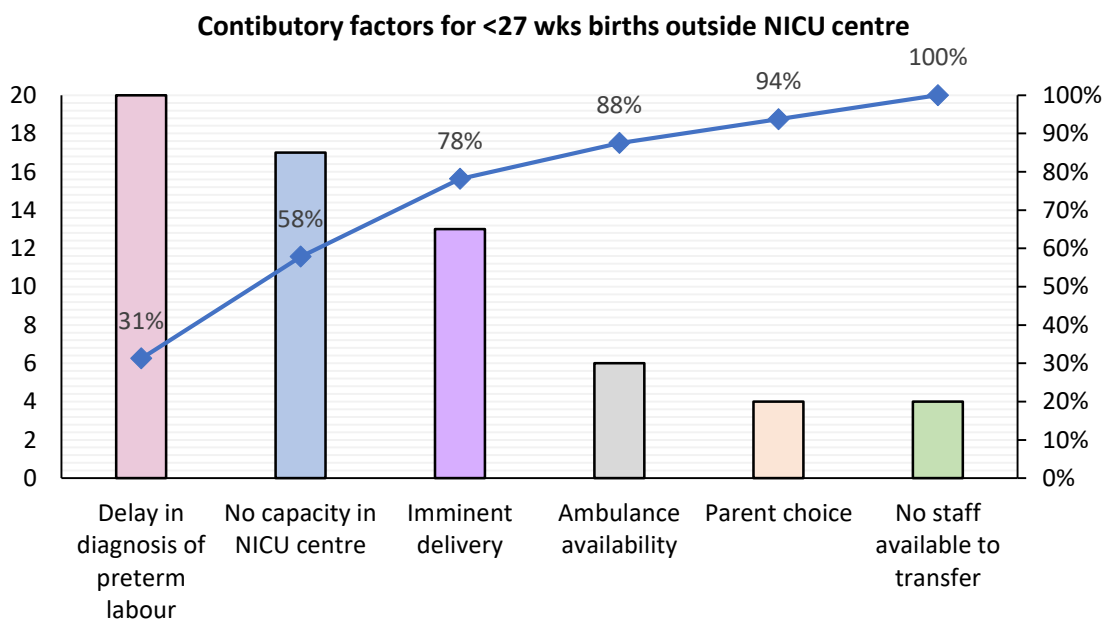
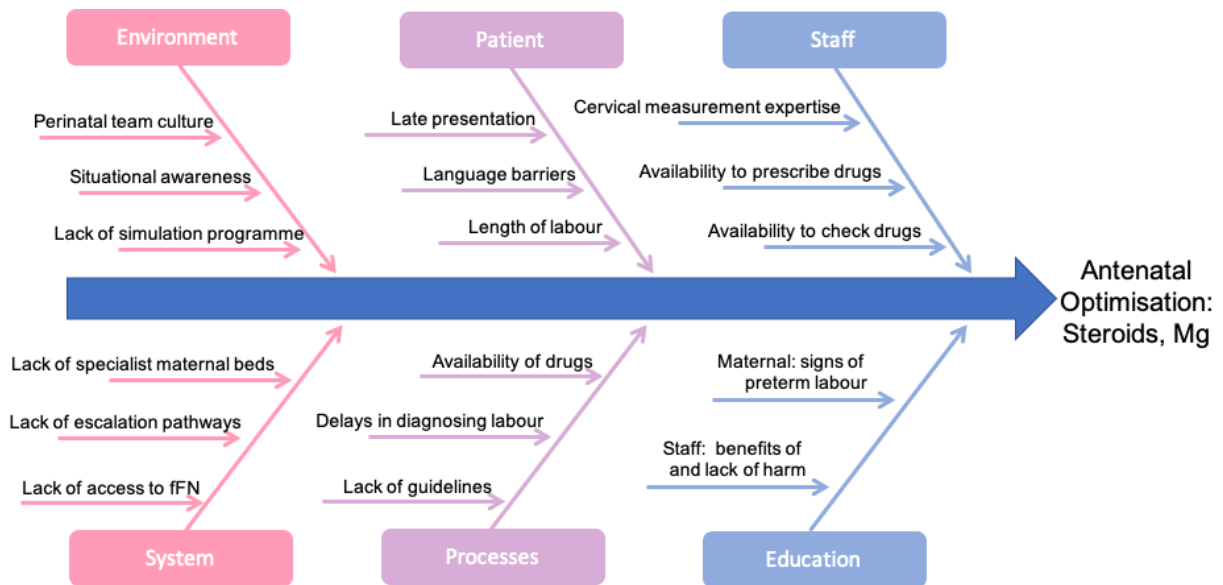


Figure 3. An example of a Pareto chart for Place of Birth



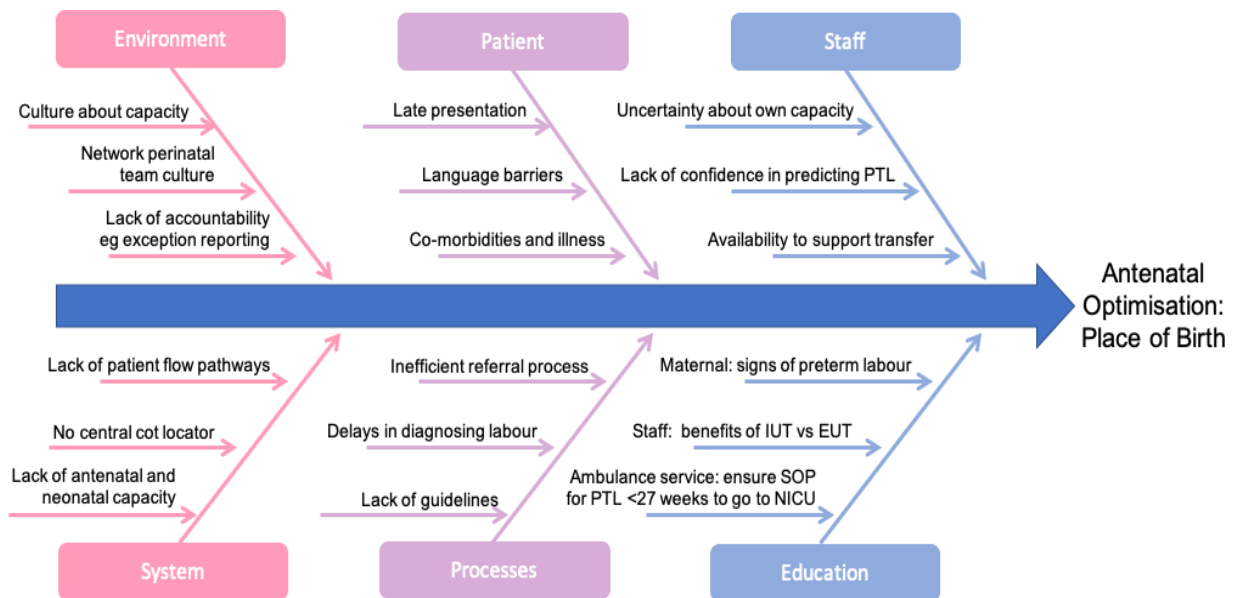
The chart above shows that around 80% of causes can be explained by three factors: a delay in diagnosis at the LNU, a lack of cot capacity at the NICU centre and women presenting too late in established labour. This problem will therefore require local, network and community solutions to solve.

Figure 4a. An example of a fishbone diagram for Antenatal Steroids and Magnesium



EXAMPLE

Figure 4b. An example of a fishbone diagram for Place of Birth



EXAMPLE

### The Improvement Plan

Using one or more of these tools will identify potential areas for improvement and ideas for change. These ideas can be pulled together into a driver to allow you to apply a clear and organised structure to your



project (Figure 5). An example of a comprehensive driver diagram for the optimisation and stabilisation of the very preterm infant has been developed by NHS Improvement and can be found in resources below.

In developing your local driver diagram, both the BAPM and the NNAP strongly recommend that as part of a change programme to improve antenatal optimisation, this is developed with multidisciplinary input and uses evidence-based strategies to develop an effective implementation strategy.

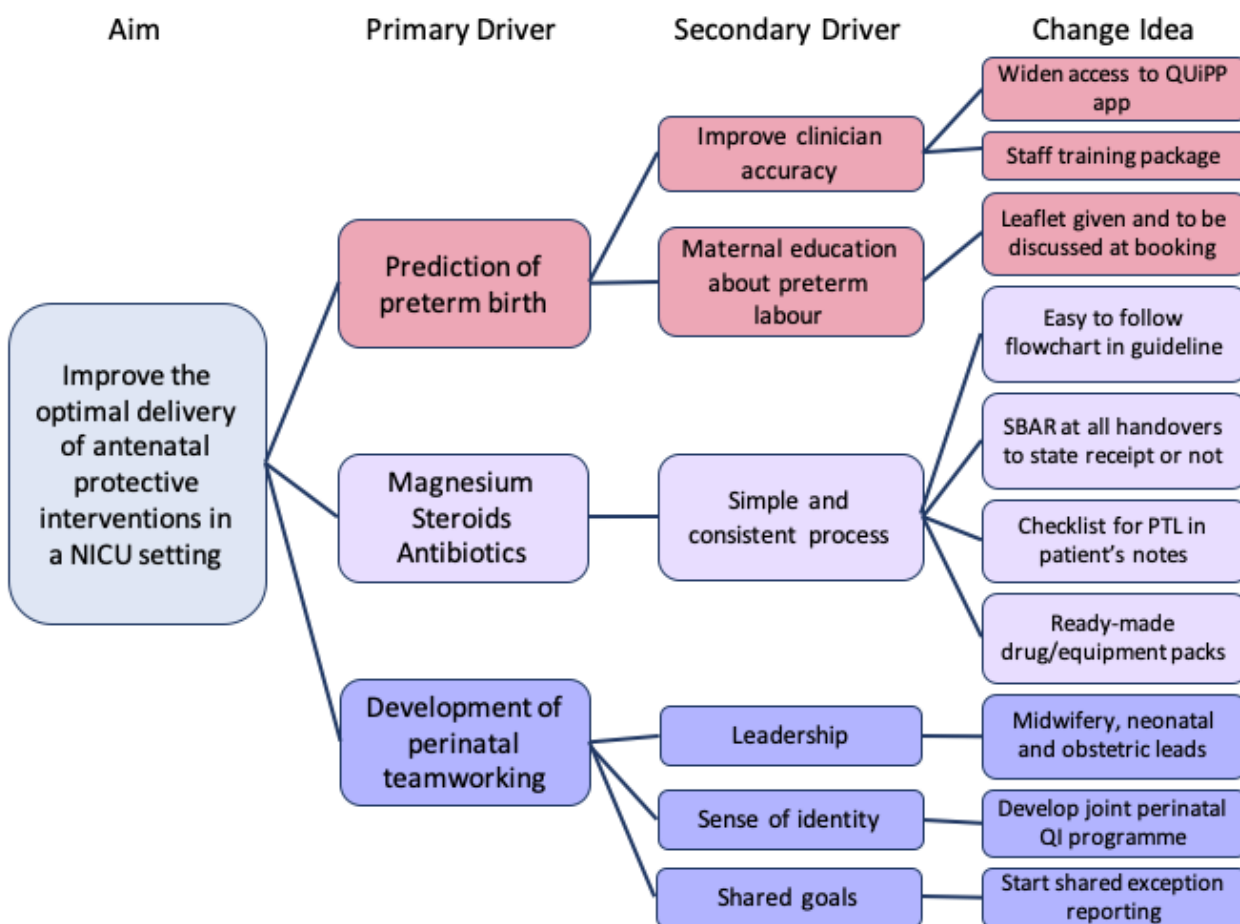
Resources

[NHS Improvement: Project Management](#)

[BAPM Quality Resource Templates](#)

[NHS Improvement Driver Diagram](#)

Figure 5. An example of a driver diagram to improve delivery of the Antenatal Optimisation bundle



EXAMPLE

## Learning from high performers

It can be helpful to speak to other units about how they have tackled low rates of compliance (NSQI 18). High performing units and those who have made significant improvements over time can be identified from [NNAP Online](#). A number have shared their learning below.

### Place of Birth: Lawrence Impey, Consultant Obstetrician Oxford University Hospitals NHS Foundation Trust

The biggest barrier we found was **ignorance of the benefits** of being delivered in a NICU setting, and policy. **Fear of birth during transfer** is also huge but most of the women whose arrival was 'too late for transfer' could quite easily have been transferred. **The 'NICU full' issue** is a major and unnecessary barrier to in utero transfer. Now the request for transfer comes through **ONLY** to the consultant obs on call, and there is a **default policy of acceptance**. The NICU, despite initial major reservations, remain happy about this.

### Steroids: Shona Cowan and Nirmala Mary, Consultant Obstetricians, NHS Lothian

We have 90% compliance for steroids given within a week of birth. We use qualitative fetal fibronectin only, but have **educated consultants and trainees** to avoid giving steroids 'just in case' but only when women develop signs of labour. For iatrogenic preterm birth we now are more careful to time steroids precisely 24 hours before CS.

### Place of Birth: Manju Chandiramani and Tim Watts, NHSE London IUT Guidance Implementation, Guy's and St Thomas' NHS Foundation Trust

Exception reporting of failed in utero transfers showed 55% were preventable. Barriers included:

- **Too difficult:** neonatal and maternity capacity; referral can take hours, most women with threatened labour don't deliver but can block cots
- **Not prioritised:** not what the obstetrician is trained to do, failures viewed as systemic, poor outcomes are not visible to those jointly responsible

We **changed the conversation:**

- **Predictive testing** to focus IUT for high risk delivery
- **Standardised referral pathway**
- **Standardised acceptance process:** 1h from referral
- **Documentation** for investigation of failed transfer

### SE London LMS Preterm Midwife Champions

1. **Your passion is infectious** – bring energy, role model for change
2. **Do the leg work early**– build knowledge, understand the problem, pre-empt the questions
3. **You can't do it alone** – bring your colleagues with you and make them your champions
4. **Engage on all angles** – engage senior support to add weight and help unblock any difficulties so everyone can support your mission
5. **Empower women** – they are your greatest asset in changing people's behaviours
6. **Persistence** – change is hard but with time you will see the difference you're making
7. **Learn and share together**- draw on the support of fellow PReCePT/Preterm midwife champions

### Magnesium: Sam O'Hare, Consultant Neonatologist; Annette Ballard, Lead MW PReCePT, Cambridge

- **Keep it simple:** It was important to leave the dosing protocol exactly the same
- **Make it easy:** A new 'preterm box' was introduced during PReCePT which contained all of the medications, monographs, syringes and giving sets required for an anticipated preterm delivery
- **Engage the entire MDT:** People are more likely to remember to do something if they believe that it is important. Educational sessions for the midwives, obstetricians and neonatologists ensured a whole perinatal team approach. Information and updates were included in the NICU Newsletter, a talk was given at the East Anglian Obstetric Anaesthesia Group conference and an article authored by the PReCePT lead midwife at the Rosie hospital was published in 'The Practising Midwife' journal. All helped to raise the profile of the project and encourage ongoing engagement from the whole team.
- **Create a sense of expectation and duty of care:** the compelling evidence of the benefits of MgSO<sub>4</sub> for neurodevelopment outcomes was widely shared, creating a sense of expectation that women must have access.



## Learning from parents

Parent feedback and experience can be extremely useful in understanding their role in successful implementation of your change strategy (NSQI 9). Parent education, attitudes and beliefs can be important in both preventing and facilitating change. Parents also help you to understand the impact of your change idea and can be impactful voices in helping staff understand the need for change (NSQI 10). We are grateful to the Parent Advisory Group of the North West Neonatal ODN for sharing their experiences with some of the antenatal optimisation measures.

*"I was in hospital for 3d from 24+6, had a positive fetal fibronectin test, regular tightenings throughout, increased pain but I wasn't scanned because it was weekend....When I went down to scan first thing on the Monday morning I only had 0.5 mm of cervix length left and he was delivered not long after at 25+2w. We received the results of X's MRI scan last week and it showed periventricular leukomalacia which was difficult for us. I know that if he would've received the steroids/magnesium then his brain/lungs would have been protected- evidence to support this is overwhelming although I know that every baby is different"*

*"My waters broke at 24w and we came straight to hospital. The doctors gave me steroids to help protect the baby's lungs but by the next day my infection markers and symptoms were a lot worse, and the consultants were exploring delivery options. Over the next few hours I started to improve. The consultants agreed that due to the risk of sepsis, I should stay in hospital until the birth but two days later a new consultant discharged me. At 25w I presented again with signs of sepsis. I was given magnesium but my baby was delivered about an hour later"*

*"I was on hospital bedrest in a hospital with a level 2 unit from 20w. I reached 23+6 and it looked like my baby may need to be delivered, so I was transferred to a hospital with a level 3 unit. Unfortunately the nearest available unit was over an hour's drive away – frustrating as there were three other, closer level 3 units but none of them had available beds or cots"*

*"My experience was that I was not told I was in pre-term labour until a very late stage....I was conscious that staff felt I was time wasting when I attended hospital the first time. I think women do need to be taken more seriously if they are showing signs of early labour. The signs can be subtle but early recognition can help to alleviate maternal anxiety about going into early labour and improve outcomes for the baby"*

*"My first baby was born at 29w... I was only given steroids when I was 8cm dilated which was approximately an hour before she was born. I did attend the hospital with some lower abdominal discomfort 12 hours prior to this and so I feel this was a missed opportunity for steroids to have been given. I attended the maternity day unit 5 days previously for a bloody show. I was given anti-D for being rhesus negative but steroids were not offered. I feel steroids could have at least been discussed but no mention of steroids or signs of pre-term labour were explained. The diagnosis of pre-term labour was made late and I do feel that more needs to be done in the recognition of pre-term labour"*

*"I was proactive in asking for magnesium because I'd read about the benefits. I was given magnesium during labour and am really grateful for this as my baby currently shows no signs of cerebral palsy"*

*"We arrived on labour ward at 13:55 and the first and only dose of Dexamethasone wasn't administered until 18:15. M was born at 23:42 while I was still on the Atosiban drip"*

## Phase Two: Develop a Shared Purpose

### The evolution of the perinatal team

Midwifery, Obstetrics and Neonatal teams all have an important role to play in the safe delivery of care for women in preterm labour and the subsequent care of their baby. This care at times may be delivered in professional silos leading to potential poor communication and missed opportunities for antenatal interventions which may lead to suboptimal outcomes. Developing a strong perinatal team within your workplace will help facilitate communication, understanding and collaboration across departments and allow more cohesive implementation and imbedding of antenatal interventions. Having shared goals, a shared vision and sharing experience ensures your project has momentum and that barriers and enablers can be best appreciated and tackled. The benefits of actively seeking to create a perinatal team are highlighted in this [video](#) developed by the PReCePT2 study<sup>49</sup>.

One of the key components to any successful project is having a team that is engaged, resilient, enthusiastic and committed to working together to create the right culture for change (NSQI 2, NSQI 15). Teams should ideally be around 8-10 members and include:

- An Obstetric lead
- A Midwifery lead
- A Neonatal or Paediatric lead (can be medical or nursing)
- Multidisciplinary representation including neonatologists/paediatricians, neonatal nurses, midwives, obstetricians, labour ward and theatre representatives
- Parent representation (NSQI 10)
- People with QI expertise- essential (NSQI 17)
- Data analyst- essential
- General services manager- ideal but not essential

When forming your team consider:

- **Who** are the most influential people within the maternity/neonatal team? – these may not be the most senior staff members. Consider inviting those who are unsure or oppositional to understand perspective and secure buy in from the outset.
- **Where** are the areas likely to be affected by any changes – consider staff in these areas.
- **Why** should people want to be involved in your project – not everyone understands the impact of the antenatal interventions, take time to share your vision and think how you are going to engage people and maintain their commitment
- **What** is your expectation of team members – what will they be required to do in terms of time and effort? How will you manage team members who do not deliver on tasks/actions?
- **When** are people available and are your time commitments realistic? **How** often are you going to meet? Keep up for momentum for change, short but frequent meetings.
- **What else** is going on? Are there existing workstreams with overlapping agendas that could be pulled together to prevent duplication. Are there other QI projects which may have to take priority?

Find out if your local hospital has a central improvement team who can facilitate projects and provide valuable skills and knowledge in designing and implementing improvement work. Local data analysts are valuable in helping to collect, analyse and display data.

### Stakeholder engagement

#### Who else needs to be involved?

Start by brainstorming the groups of people likely to be affected by the proposed change (NSQI 2). Within the topic of antenatal optimisation, they are likely to include:

- Parent groups
- Senior and junior obstetricians
- Midwives of all grades of seniority
- Senior and junior paediatricians/neonatologists
- Neonatal nurses
- Transport teams
- Theatre staff
- Triage reception staff
- Pharmacists
- Sonographers

These groups need to be:

- **Prioritised**- in terms of the power and time they have to make your project succeed or fail
- **Understood**- how are they likely to feel or react to the proposed changes?
- **Informed**- devise a communication plan to sustain interest and win over doubters. This plan should include modalities of communication (eg presentations, emails, newsletters), frequency (monthly, weekly, daily) and key messages you want to deliver.

### Context

It is a worthwhile activity at this stage to review the context in which you wish to implement your changes. Although the changes you wish to implement have been successful elsewhere, differences in the culture and the context between units may result in variable results. Useful information can be obtained from the results of your Safety Culture Survey which may indicate how well staff feel listened to, how ready your unit is for change, or what might be needed to optimise communication (NSQI 3). The [BAPM Neonatal Service Quality Indicators](#) resource provides a helpful framework for units and networks who wish to optimise their culture for delivering successful quality improvement projects<sup>5</sup>.

## Phase Three: Plan and Implement Changes

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### Project Charter

It can be useful to construct a Project Charter at the start of this phase to detail your proposed improvement, including the resources required and the potential benefits to patients. A Project Charter is a format endorsed by many Trust Improvement Teams and will provide direction and a sense of purpose and may give your project increased leverage with management (NSQI 15).

Resources:

[NHS Improvement: Project Management](#)

[NHS Improvement Project Charter](#)

[NHS Education for Scotland Project Charter](#)

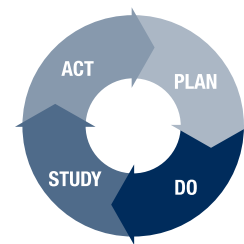
### Formulate, prioritise and test solutions

There are a number of methodologies that can be adopted to implement a quality improvement strategy, for example Lean, Six Sigma and the Model for Improvement which all draw on a similar set of principles tools. No single quality improvement method is better than others; what matters more is having a consistent approach that you are familiar with and skilled in applying. The Model for Improvement is a widely recognised approach within healthcare and is frequently associated with positive outcomes for improvement and will be used here as an illustration.

### The Model for Improvement

Ask yourself:

- What is it you want to achieve?
- How will you know that a change is an improvement?
- What changes can you test that will result in an improvement?



For each change idea, a PDSA cycle can be used:

#### 1. Plan

Which intervention(s) to try first? This may be the intervention most likely to make an impact, the easiest to implement or the one that will best win hearts and minds.

How will this intervention be introduced into clinical practice?

Who and what will be required to make this happen?

Predict what you think the change might be?

#### 2. Do

When and how will this plan be carried out? A timescale is important. Document problems and unexpected observations.

#### 3. Study

Use established tools to analyse your data (see Phase 4). Has your change idea resulted in improvement? Is this a real improvement? Do your data suggest your change idea needs to be modified? Why might this be so? Compare your data to your predictions.

#### 4. Act

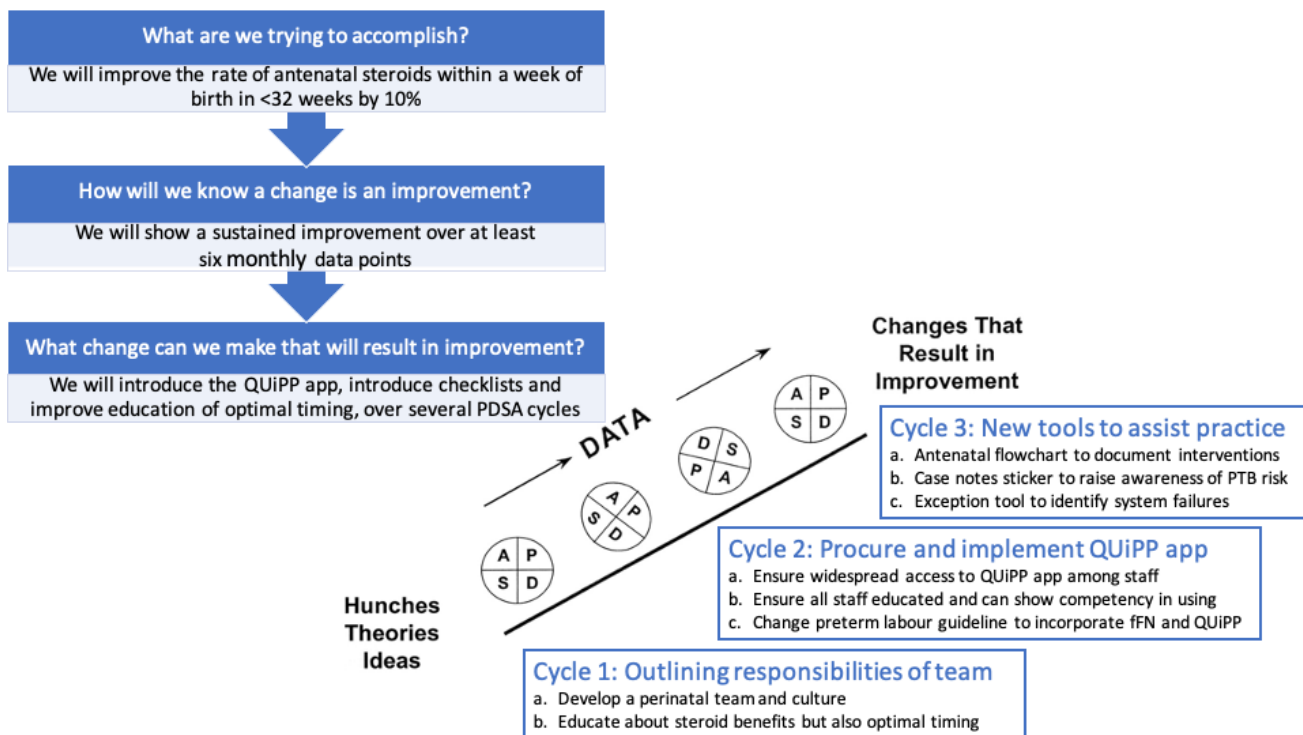
Identify and carry out any modifications needed to this change idea to make it more effective, using further PDSA cycles as needed i.e. Adapt, Adopt or Abandon, Repeat. Start with rapid testing your change on a small scale for example small numbers of patients or a specific subgroup of patients. If effective, increase the numbers or widen to include other groups of patients. Test and repeat with increasing scale until you can show effectiveness throughout your patient group.

Resources:

[BAPM QI Made Easy: 'Planning your Change Idea'](#)

[PReCePT Toolkit](#)

Below, the Model for Improvement is used to work through an example of implementation in delivering antenatal steroids at an optimal time. A template can be found on the [BAPM Quality webpages](#) for your own use.



EXAMPLE

## Phase Four: Test and Measure Improvement

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In this phase, improvements are tested, reviewed and re-tested in order to find a solution.

### Measures

Measuring for improvement is different to the data collected for research or to prove whether clinical interventions work or not. This type of measurement asks the questions 'how do we make it work in our context?' and 'how do we know that a change is an improvement?' It is important that you collect the right data for your project (NSQI 1).

Resources:

[BAPM QI Made Easy: 'Planning and Implementing Change'](#)

[NHS Improvement: Project Management](#)

1. **Outcome measures:** reflect the impact on the patient e.g. mortality, cerebral palsy, IVH, NEC
2. **Process measures:** the way systems and processes work to deliver the desired outcome e.g. number of women receiving antenatal steroids or magnesium; number of extreme preterm infants born in a neonatal intensive care unit; measures of parental satisfaction can help in improving your transfer pathway.
3. **Balancing measures:** this is what may be happening elsewhere in the system as a result of the change. The most important to study are those which may have negative impact on patients or the system e.g.
  - a. **Place of birth:** number of women transferred but who do not give birth; number of women who give birth outside of hospital e.g. during transfer; number of low risk women who are transferred out from their primary choice of place of birth for capacity reasons; measures of labour ward and neonatal unit capacity
  - b. **Antenatal steroids:** number of women who receive antenatal steroids but do not give birth within a week; number of women who receive antenatal steroids but deliver at term
  - c. **Antenatal magnesium:** number of women who receive magnesium but who deliver at term; number of delayed inductions or low risk women transferred out due to lack of labour ward capacity.

### Data analysis and display

How will change be measured, assessed and displayed in your unit or network? Common tools to present and analyse your data include run charts, statistical process control (SPC) charts and days between charts (see examples below). All require a level of knowledge and skill to collate and interpret correctly (NSQI 15). Importantly measurement should not be a 'before and after' audit which is unreliable in measuring true change, but a continuous process over time during which your changes can be evaluated and modified.

Note that you may choose a different type of chart to be understood by your audience. Run charts and statistical process control charts should always be used by the QI project team in understanding data and assessing change, while other charts and tools may be used to prepare your data in a format which is best understood by frontline staff (Example 4). You may need an easy to read key to explain your chart or provide a summary interpretation.

Resources:

[BAPM QI Made Easy: 'Interpreting your Data'](#)

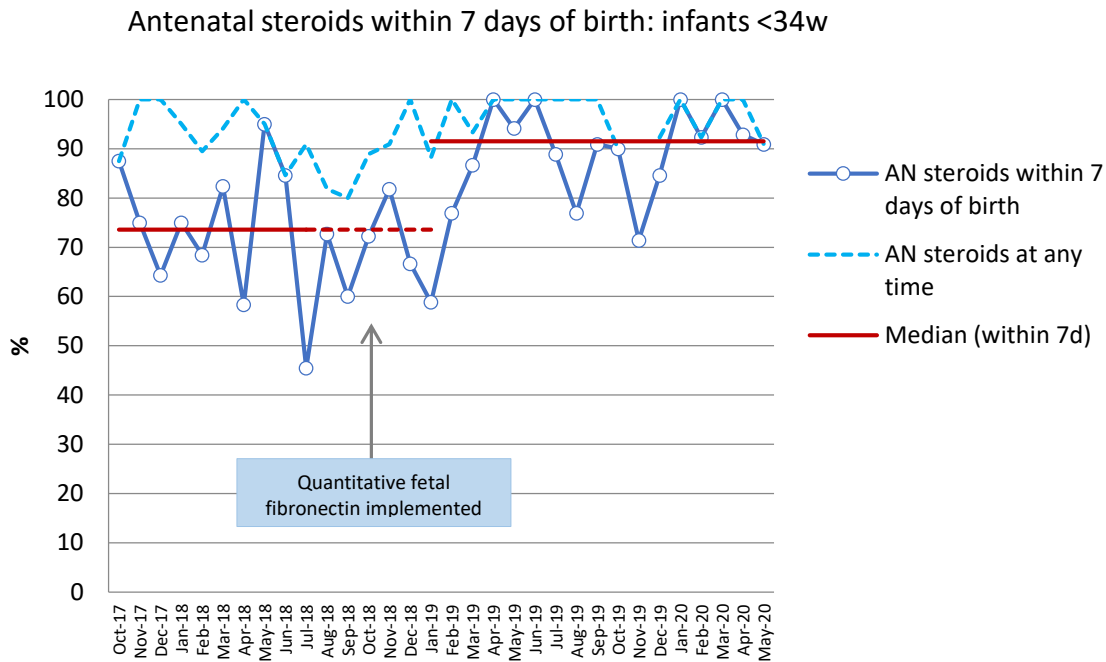
[NHS Improvement Statistical Process Control Charts](#)

[NHS Improvement Making Data Count](#)

[NHS Improvement: Project Management](#)

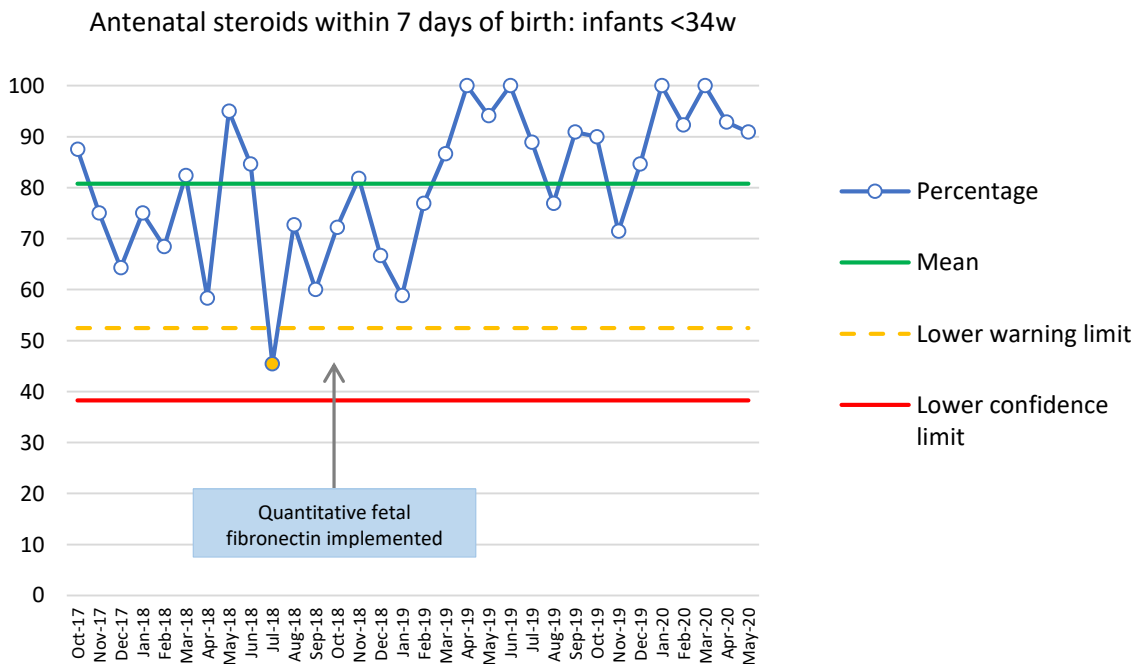


### 1. Example Run Chart



This chart shows that following the implementation of quantitative fetal fibronectin, a shift (with six points above the median) was seen in the proportion of women receiving steroids within 7d, from 74% to 92%. Run charts are relatively easier to understand than statistical process control charts. The live NNAP dashboard on BadgerNet can be used to generate live run charts.

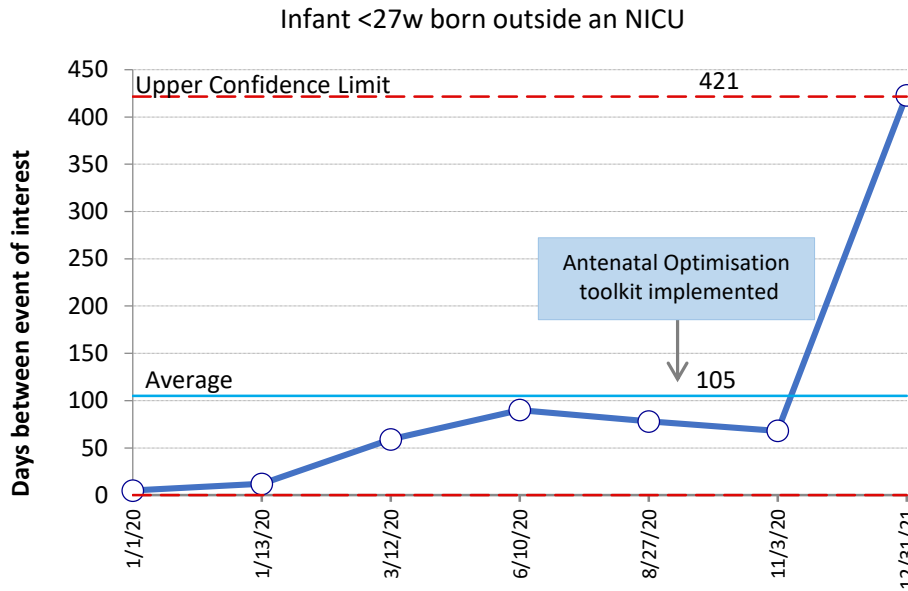
### 2. Example Statistical Process Control Chart



This chart, using identical data to the previous run chart, shows that while there appear to be more points sitting above the mean since quantitative fetal fibronectin was introduced, it is yet too early to say there has been a true shift (that is, 7 points or more above the mean). SPC charts are a better tool for looking at

the stability of your process over time and avoid overinterpretation of change occurring by chance (random variation).

### 3. Example Days between chart







This chart shows that the number of days between the ‘birth of an extreme preterm baby outside a NICU setting’ has increased over time. At the beginning of study this event occurred once every 1-2 months but there has now been a year since the last baby was born outside of a NICU setting.

### 4. Example of feedback targeting frontline staff

Remember your target audience. Graphics and simple messages may be more impactful and less confusing than graphs and charts, although run charts/SPC charts remain essential in understanding the effectiveness of change.

**JULY 2020**

**Antenatal optimisation measures: how well did we do this month?**

2 out of 3 babies (67%)	<b>&lt;27 weeks</b>	Were born in the correct level of unit	
4 out of 5 babies (80%)	<b>&lt;30 weeks</b>	Were exposed to magnesium within the 24h before birth	
7 out of 10 babies (70%)	<b>&lt;34 weeks</b>	Were exposed to steroids between 24h-7d before birth	
6 out of 10 babies (60%)	<b>&lt;34 weeks</b>	Were exposed to <b>all eligible</b> optimisation measures	

Only 6 out of 10 babies were exposed to all antenatal protective interventions. This % has not improved in the last 6 months.

Recommendations:

- Ensure a documentation process to record that all staff:
  - ✓ have read the prediction of the new preterm birth guideline
  - ✓ have been orientated to the new QUIPP app
- Use the delivery room checklist and stickers to identify women who require and who have had steroids and magnesium

## Phase Five: Implement, Embed and Sustain

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This phase involves the wider implementation of improvements such that change becomes embedded in routine practice throughout the system and is sustained with governance arrangements.

### Spread

This can involve formal methods such as *dissemination* that includes presentations, publications, leaflets, learning boards, social media, some of which may have limited reach within your department and may be better disseminated via network/LMS meetings and GIRFT benchmarking mechanisms; or informal methods of *diffusion* where word of mouth, champions and opinion leaders can accelerate your message. Consider carefully what is required for the embedding of changes within your service (NSQI 2, NSQI 18).

### Adverse event and exception reporting

Both the BAPM and the NNAP recommend that neonatal units should report all cases where antenatal optimisation measures are not achieved using local risk reporting mechanisms, including those cases where there was suboptimal timing of interventions (NSQI 13). A trigger list should be developed to inform the process of reporting. The case review tool ([Appendix 4](#)) can be used or adapted for review of such cases. However the network should have oversight of this process to encourage accountability of activity, to ensure learning from peers and to provide scrutiny of patient flow and capacity issues.

#### Exception Reporting for Place of Birth: Karen Mainwaring, Senior Lead Nurse, NWODN

88% of our <27w infants in the last three years have been born in a NICU setting. A strong exception reporting process has supported this. Our data are highlighted in quarterly dashboard reports and our Annual Capacity and Demand Report. What has worked is:

- A clear designation of NICUs, admission criteria and activity allocation by postcode were set following the Making it Better Transformation
- Establishment of exception reporting principles and guidelines for investigation, closure and escalation
- Exceptions are reported weekly with a ten day turnaround for completion of data
- Exceptions are discussed at the Neonatal Steering Group which has helped to bring about a wider change in culture
- Lessons learned about missed opportunities for transfer are shared through the LMS/SCN

We have had some challenges which we have been able to overcome:

- Ensuring the message about the benefit of in utero transfer is heard throughout all of maternity
- Reluctance of some units to transfer babies – support given by ODN Clinical Lead/Lead Nurse
- Nursing and medical staff who were not familiar with this way of working- we improved sharing of information with them
- Initial proforma was not adequate- multiple revisions such that now themes can be collated
- Initial high number of exceptions resulted in high workload, delayed returns, difficulty in tracking- resolved through making it a Neonatal Steering Group Standing item, and working with unit leads.

### Sustainability

The ability of a service to implement and sustain change is dependent on various strengths and weaknesses of any one project. These can be assessed and addressed from the outset of a project and be reviewed regularly throughout the time course to improve the likelihood of sustaining improvement beyond its lifespan. A useful tool to do so is the NHS Sustainability Model (below).

### Barriers and loss of motivation

It is not unusual to find the impact of a previous improvement lessen over time. It is important to understand why so that solutions can be tailored to the problem. Different approaches will be effective for different people and different situations. The following activities may be useful: talk to key individuals, observe clinical practice in action, use a questionnaire to survey staff, brainstorm with a focus group. Education is a key element of overcoming barriers particularly within an interactive forum; using opinion leaders to influence others within your staffing structure; reminder systems to prompt clinicians; and ensuring feedback of data to staff in a format that they find useful; all these can help to reinvigorate and embed your changes for improvement (NSQI 2, NSQI 18).

Resources:

[NHS Improvement: Project Management](#)

[NHS Improvement: Sustainability Model and Guide](#)

[PERIPrem](#)

The following ideas may be helpful in reinvigorating your efforts:

**1. Re-examine your change idea:**

Can it be simplified, can it be streamlined, is it fit for purpose, do frontline staff feel it could be improved? Do you need a checklist or a communication tool? Can you use a stamp to make documentation easier or logos to brand your change idea?

Note: S.T.A.M.P.E.D has been adapted from STEAMED in the QIpp Toolkit in order to prioritise parents. STEAMED, S.T.A.M.P.E.D or any other memory aid can be used to improve delivery of interventions.

### Antenatal Optimisation Bundle Checklist

Patient Addressograph  
Label

Date of presentation:  
Gestation at presentation:  
Single or multiple pregnancy:  
Known GBS   
Are GBS swab results to be chased Y/N

<b>S:</b>	Steroids 1 <sup>st</sup> dose	<input type="checkbox"/>	Date given.....	Time .....
	2 <sup>nd</sup> dose	<input type="checkbox"/>	Date given.....	Time .....
<b>T:</b>	Transfer needed	<input type="checkbox"/>	Date of IUT .....	Time .....
<b>A:</b>	Antibiotics GBS	<input type="checkbox"/>	Date given.....	Time .....
<b>M:</b>	Mg Loading	<input type="checkbox"/>	Date given.....	Time .....
	Infusion	<input type="checkbox"/>	Date started.....	Time .....
<b>P:</b>	Parent discussion	<input type="checkbox"/>	Date seen.....	Time .....
<b>E:</b>	Evaluate for tocolysis	<input type="checkbox"/>	Date given.....	Time .....
<b>D:</b>	Delivery plan made	<input type="checkbox"/>	Monitoring, mode of birth, resuscitation plan	

EXAMPLE



EXAMPLE

## 2. Use impactful parent stories:

Encourage staff to watch the videos on the [PReCePT website](#) in which parents speak of the benefits of magnesium. Or find your own local parent stories to share, like these:

### Vivian, mother of Matti (27w) and Luca (30w)

"When my waters broke with Luca, I was transferred from [the local SCU] where I'd received all my antenatal care to [the local NICU]. During bedrest there I was given steroid injections for Luca's lungs, and on the day I went into labour I was given antibiotics as I had Group B strep, and I got magnesium sulphate to protect Luca's brain. After birth he got my expressed breast milk and caffeine. He is thriving every day and turning into a beautiful human being.

When I went into labour with Matti this time I was assessed in [a local LNU] and again was transferred straight away to [the local NICU]. Again I received steroids, antibiotics and magnesium. I know he is in the best place, receiving the best care and that this move gave him the best chance of survival."

### Ketan and Yogini, parents of Kira (23w)

"With specialist intervention using a scan of my wife's cervix and fetal fibronectin, we were able to save our daughter. We used a stitch to gain another 2 weeks of pregnancy to help her development. During the days leading up to her delivery, the consultant timed when to deliver her while managing the risk of infection. She timed the steroids and magnesium which was vital to saving our daughter and having a successful vaginal delivery at 23w. Today our daughter is 38 weeks old and we are expecting her home in the next week. She has no long-term health concerns and melts us with her little smile."



EXAMPLE

### 3. Use lessons from high performers about how they managed their challenges

#### Mandish Dhanjal, North West London

“We have sustained an implementation rate of over 95% in magnesium administration. It was not easy and yes there were obstacles! What worked was having local obstetric leads who nominated themselves and were just as passionate as the regional team. This passion was invigorated by regular meetings where we planned our approach, tracked improvement, discussed any issues, and provided central and peer to peer support. Issues with consistently underperforming units required a direct approach from the regional and Imperial College Health Partners leads and involved meeting with clinicians, identifying and resolving issues experienced. Sometimes this required a change in local lead. The local leads were instrumental in ensuring the dissemination of learning to all members of the maternity team. They also checked any missed cases which were all discussed at regional meetings to identify areas which could be improved and offering guidance as to how to approach giving feedback to our local clinicians. We regularly celebrate our small victories and now this preventative treatment is part of business as usual.”

### 4. Re-market your message so that the benefit to babies is clearly conveyed. [PERIPrem](#) has excellent resources and information you can use or modify to get your message across<sup>7</sup>.

Steroids have far more important roles than maturing the fetal lung....

- they reduce the number of babies dying by a third...
- they halve the risk of severe brain bleeds...
- they halve the risk of the serious gut disease, NEC...



Best timing is between 24h-7d before birth. Think life, think healthy life.

Photo of Cormac, now a healthy preterm survivor, courtesy of his mother



If all babies < 30 weeks were exposed to magnesium before birth, then over 200 babies each year could grow up healthier and free from cerebral palsy.

Having cerebral palsy means:

- 1 out of 3 children is unable to walk
- 1 out of 4 children is unable to talk
- 1 out of 4 children has epilepsy
- 3 out of 4 children experience pain
- 1 out of 2 children has learning difficulties

Photo of Cormac, a healthy preterm survivor, courtesy of his mother



## 5. Use incentivisation to engage senior leadership

In England, frontline midwifery, obstetric and neonatal safety champions have been appointed in every Trust, working closely with their Board safety champion to support full implementation of the range of improvement initiatives aimed at achieving the national ambition. Barriers to implementing initiatives which will improve the safety and outcomes of women and babies should be escalated to the Board safety champion as part of a two-way feedback system. Implementation of key safety initiatives have been included in the NHS Standard Contract as well as being incentivised financially through the [Maternity Incentive Scheme](#).

The Maternity Incentive Scheme rewards Trusts who meet ten maternity safety actions, one of which relates to Element 5 of the SBLCBv2 (preterm birth reduction and optimising care when preterm delivery cannot be prevented including optimal place of birth, antenatal steroids and magnesium). If Trusts can demonstrate progress against all ten of the safety actions they qualify for a minimum rebate of their contribution to the incentive fund, calculated at 10% of their maternity premia.

Highlighting the cost benefit to Trusts through implementing key interventions in Antenatal Optimisation may help to engage senior leaders. These individuals may be instrumental in helping you break down both the high and low-level barriers which are preventing successful implementation.