British Association of Perinatal Medicine

Optimising Early Maternal Breast Milk for Preterm Infants

A Quality Improvement Toolkit

November 2020

in collaboration with

NNAP
National Neonatal Audit Programme

Contents

Abbreviations

AHSN	Academic Health Sciences Network
BAPM	British Association of Perinatal Medicine
BFI	Baby Friendly Initiative
BNF	British National Formulary
BPD	Bronchopulmonary dysplasia
FIC	Family Integrated Care
HIV	Human Immunodeficiency Virus
HQIP	Healthcare Quality Improvement Programme
HTLV	Human T-lymphotropic Virus
MatNeoSIP	Maternity and Neonatal Safety Improvement Programme
MBM	Maternal Breast Milk
MCQIC-SPSP	Maternity & Children's QI Collaborative-Scottish Patient Safety Programme
MDT	Multidisciplinary Team
NEC	Necrotising enterocolitis
NICE	National Institute for Health and Care Excellence
NNAP	National Neonatal Audit Programme
NSQI	Neonatal Services Quality Indicators
ODN	Operational Delivery Network
PDSA	Plan Do Study Act
QI	Quality Improvement
RCT	Randomised controlled trial
RCPCH	Royal College of Paediatrics and Child Health
ROP	Retinopathy of prematurity
SPC	Statistical process control
SSC	Skin to Skin care
UNICEF	United Nations Children's Fund
WHO	World Health Organisation

Overview

The key focus of this toolkit is supporting the implementation of the five Perinatal Core Elements to optimise early MBM for preterm babies:

Perinatal core elements that support the optimisation of early MBM	
1	**Parents as equal partners in their baby's care:** Parents are empowered to take part in all elements of their baby's care, facilitating strong close and loving attachments
2	**Antenatal education:** Educating families about the value of MBM in prematurity, importance and process of early expressing
3	**Initiation of expressing soon after birth (aim within 2 hours):** With easy access to support, training and equipment
4	**Early Colostrum (ideally within 6 hours of birth and always within 24 hours):** MBM to be the first enteral feed given to baby, wherever possible
5	**Early and regular parental physical contact with their baby:** Delivery room contact, skin-to-skin early and often

This toolkit is aimed at you if you are leading quality improvement around MBM or you are part of an improvement team:

- If you have the resources to undertake a full change management QI project but have little knowledge or experience you may want to read this toolkit in its entirety
- If you have some QI experience from other projects but know a limited amount about improving MBM you may wish to focus on the evidence and success stories resources
- If you know a lot about MBM and supporting mothers but lack QI knowledge you may choose to focus on understanding the QI journey and resources
- If you are tasked with collecting/ understanding or interpreting data and don't know where to start look out for the data tools
- If your QI project team is a mix of all of the above there should be something in this toolkit for everyone to get your project started

This toolkit will provide your team with the following resources:

- The rationale for Maternal Breast Milk QI when you and your team, or those supporting the project at executive level, require to know the evidence for change
- Easy to use QI tools to understand where you are now and what you need to commence your project without any prior QI experience
- Guidance about how to build your team and secure buy-in for your project
- Examples of QI that have been shown to be successful in improving MBM for preterm babies, including improvement stories from high performing units
- Tools to help you measure and understand the impact of your changes
- Examples of how to embed change and sustain momentum including parent experience stories

Introduction

The British Association of Perinatal Medicine (BAPM) aims to improve standards of perinatal care by supporting all those involved in providing this care to optimise their skills and knowledge. A key value of the BAPM is 'working collaboratively' to provide the safest and most effective service for babies and families by delivering high quality perinatal care and provide support for perinatal professionals.

The National Neonatal Audit Programme (NNAP)[1] is commissioned by the Healthcare Quality Improvement Partnership (HQIP), delivered by the Royal College of Paediatrics and Child Health (RCPCH) and funded by NHS England along with the Scottish and Welsh Governments. The NNAP assesses whether babies admitted to neonatal units in the United Kingdom receive consistent high-quality care. It sets evidence-based standards on key clinical outcomes and in turn identifies areas for quality improvement (QI) concerning the delivery and outcomes of neonatal care.

With these shared goals in mind, the BAPM, the NNAP and other key stakeholder organisations in perinatal care are collaborating in a three-year national quality improvement initiative which will target key NNAP measures. This initiative will align with and support other neonatal national quality workstreams such as the Maternity and Neonatal Safety Improvement Programme (MatNeoSIP)[2] in England, and the Maternity and Children Quality Improvement Collaborative-Scottish Patient Safety Programme (MCQIC-SPSP)[3] in Scotland. The work is aligned with the Saving Babies' Lives Care Bundle (SBLCBv2)[4]. Each improvement drive includes a QI toolkit mapped to the BAPM Neonatal Services Quality Indicators (NSQI)[5] and has been developed by clinicians who have demonstrated excellence in the area of focus, led by the multidisciplinary BAPM Quality Steering Group (Appendix 1). Improvement at local and national level as a result of improvement work undertaken will be measured by the NNAP and other stakeholder organisations.

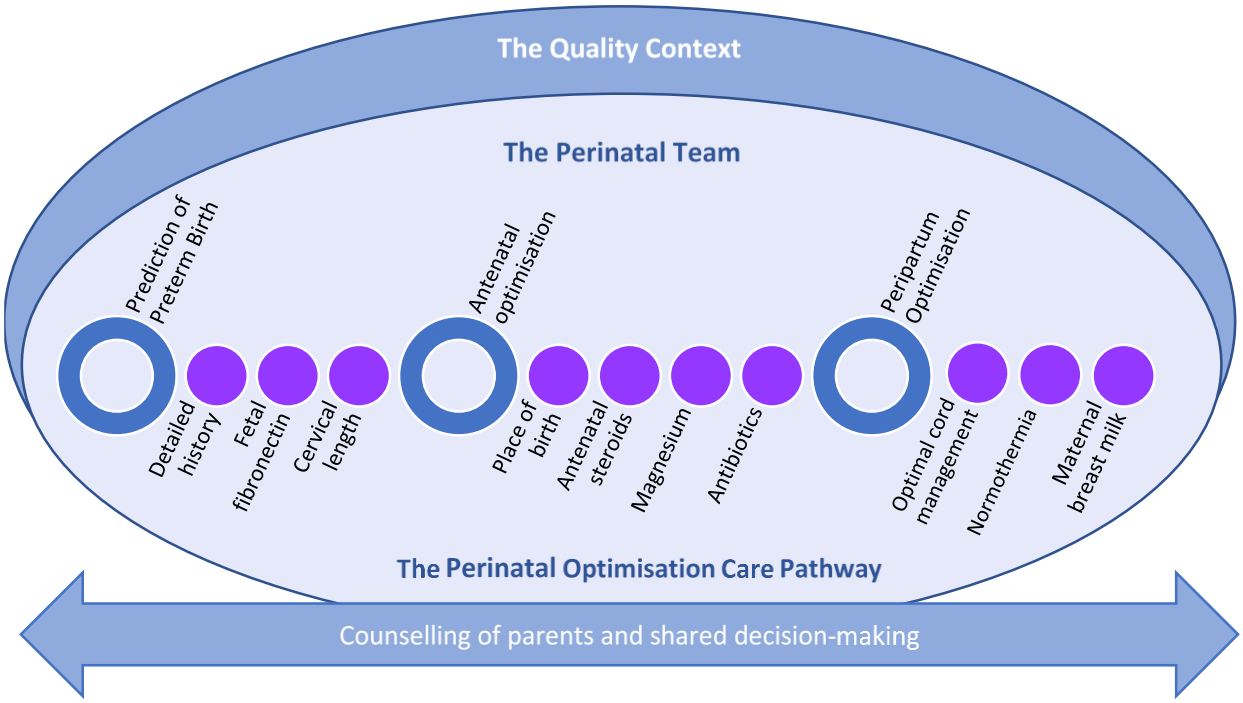
The toolkit has been designed using well-established QI methodology and in accordance with the Royal College of Paediatrics and Child Health 'Quality Improvement in Child Health' Strategic Framework[6]. The toolkit will introduce some basic QI tools and methods that are quick to learn and easy to apply. In addition the BAPM website also offers a range of free QI resources, links to easy to use templates and e-learning, QI tutorials and a forum for shared learning[7]. The toolkit does not intend to replicate any existing local or national QI activity undertaken in the area of focus but to complement these endeavours with a practical step-by-step guide.

The Perinatal Optimisation Care Pathway

Perinatal optimisation refers to the process of reliably delivering evidence-based interventions in the antenatal, intrapartum and neonatal period to improve preterm outcomes. Examples of current perinatal optimisation initiatives, which aim to result in consistent application of a bundle of interventions, are those of the West of England AHSN PERIPrem bundle[8] and the SPSP-MCQIC Preterm Wellbeing Package[3]. The BAPM 'Perinatal Optimisation Care Pathway' refers to these interventions as they occur over time, applies to both the mother and her preterm baby, and aligns with key elements of the above initiatives. The pathway is supported by four BAPM toolkits (Antenatal Optimisation, Optimal Cord Management, Normothermia and Maternal Breast Milk). These toolkits are a focus of the implementation programme led by MatNeoSIP, which supports key recommendations from the Neonatal Critical Care Transformation

Review[9] and the Saving Babies Lives Care Bundle v2[4]. Additional perinatal optimisation interventions such as respiratory management are recognised but are not yet included in this pathway.

Figure 1. The Perinatal Optimisation Care Pathway



This Perinatal Optimisation Care Pathway sits within the remit of the local and network 'Perinatal Team' whose strong teamworking culture, high quality communication habits and pursuit of common goals result in the reliable delivery of these protective interventions. Such implementation success can only occur within a favourable 'Quality Context' where the structure and processes support an optimal environment for delivering quality improvement. Such key contextual features are described in the BAPM Neonatal Service Quality Indicators[5] (Appendix 2). Throughout the pathway high quality communication about risks and benefits of interventions should take place with parents. We can clearly identify the important role that Continuity of Carer plays in supporting women throughout the antenatal journey. In the context of extreme preterm gestations, the principles of the BAPM Perinatal Management of Extreme Preterm Birth Before 27 weeks of Gestation (2019) should be adhered to, including a joint discussion between the parents and both a senior obstetrician and neonatologist, which includes a risk-based assessment of prognosis[10]. For communication guidance, see the appendices to the BAPM Extreme Preterm Birth Framework 'Helping parents to understand extreme preterm birth' and 'Communication Guidance for professionals consulting with families at risk of extreme preterm delivery'.

Early Maternal Breast Milk for Preterm Babies: Context and Objectives

Maternal Breast Milk for preterm babies is an exceptional example of both personalised and precision medicine

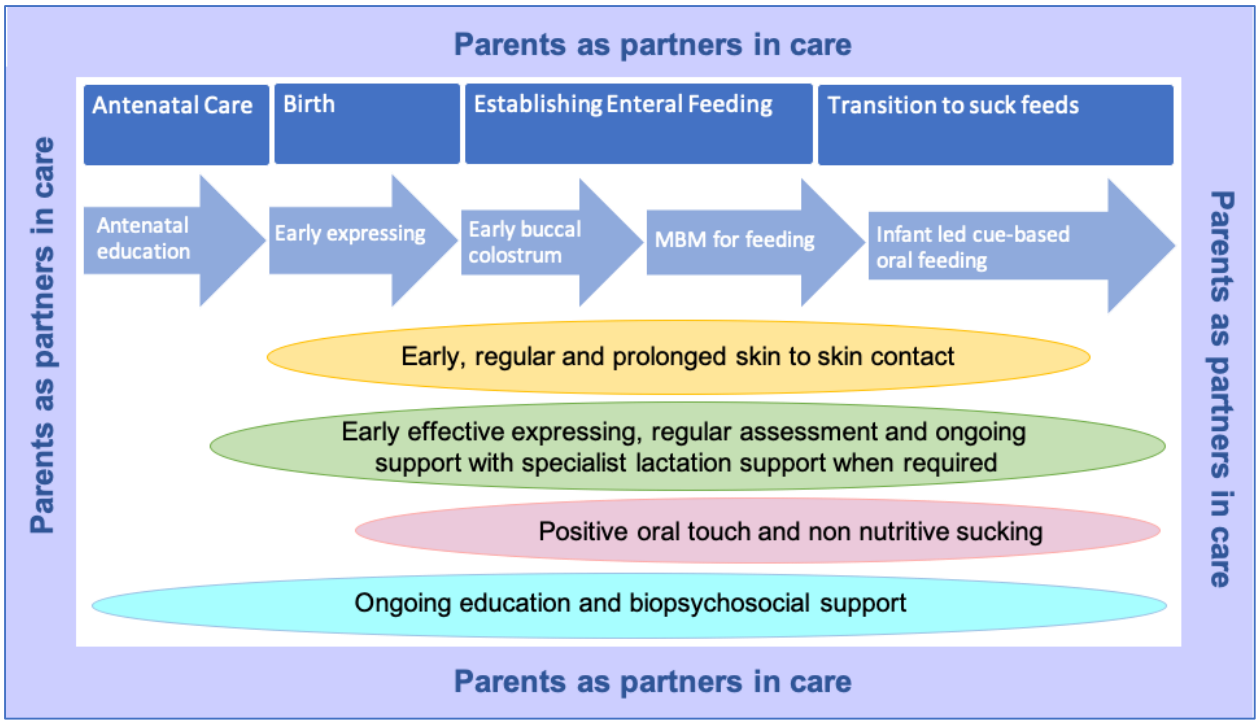
Context

The central focus of this toolkit is babies born at less than 34 weeks gestation, although the contents may also support improved Maternal Breast Milk (MBM) provision for all babies in the first days of life (including later preterm and sick term babies). Establishing and sustaining lactation and transitioning to responsive feeding will be the focus of a subsequent toolkit.

Whilst guidance for safe storage and handling of MBM is vitally important, this is outwith the scope of this QI toolkit (see British Dietetic Association handling breast milk guideline[11])

Initiating, maintaining and supporting longevity of MBM provision for preterm babies is vital, with substantial longterm benefits. The holistic, multidisciplinary and family-centred approach to this cannot be over emphasised, which continues well beyond the perinatal period (Figure 2).

Figure 2. An overview of the MBM journey for preterm babies and their families



Organisational Drivers

1. National Neonatal Audit Programme (NNAP)[1]: Since 2013 the NNAP has reported on the proportion of babies with gestation at birth less than 33 weeks who are receiving any MBM at discharge home[1]. In 2018, 59.6% (3,652 of 6,128 eligible babies) were receiving MBM, either exclusively or with another form of feeding, at the time of their discharge from neonatal care. The

range for regional Operational Delivery Networks (ODNs) varied between 45% and 82%. There has been no sustained improvement in this measure nationally in the last 5 years (60.5% in 2017; 59% in 2016; 58% in 2015)[1].
In 2020 the NNAP is introducing a new measure of MBM feeding at 14 days of life for babies born at less than 32 weeks gestation, emphasising the importance of early MBM and the impact of early action on maternal supply for the optimisation of long-term breastfeeding outcomes.

2. Maternity & Neonatal Safety Improvement Programme (MatNeoSIP)[2]: Optimisation and stabilisation of the very preterm infant is one of the three drivers of this national improvement programme. Strategies to optimise MBM are key elements of this work, including a focus on ensuring that *"all women in threatened preterm labour are informed of the increased benefits of breast milk and breastfeeding for preterm infants",* and 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 MBM for their infants."*

3. Scottish Patient Safety Programme – Maternity and Children Quality Improvement Collaborative (SPSP MCQIC)[3]: The five-year plan for maternity and neonatal care includes the recommendation that *"Parents should be involved in decision-making throughout and involved in practical aspects of care as much as possible. This includes the provision of facilities for overnight accommodation, encouraging kangaroo skin-to-skin care and early support for breastfeeding"*

4. UNICEF Baby Friendly Initiative (BFI)[12]: The Department of Health, England, has asked all maternity units in the country to deliver an accredited, evidence-based infant feeding programme such as the UNICEF BFI[13]. Units across the devolved nations will also be following this initiative to support their infant feeding work.

5. The Welsh government has committed to ensuring that 'breastfeeding is a core component of training' in the All Wales Breastfeeding Five Year Action Plan[14].

6. The Scottish Government "Becoming Breastfeeding Friendly" report calls for evidence based training to enable families to have equitable access to effective infant feeding support[15].

7. The National Institute of Health and Care Excellence (NICE) has defined UNICEF BFI accreditation as a universal minimum standard[16]. Historically neonatal units gained BFI accreditation through their associated maternity unit but since 2015 it is possible to gain specific neonatal accreditation, which is being pursued by units of all levels across the country.

8. Bliss Baby Charter[17] has also been recognised by the Scottish Government and in the Neonatal Critical Care Review in England as driving improvements in parental involvement in their baby's care. The Charter has a specific principle relating to MBM feeding support.

Both the Bliss Baby Charter and the BFI have been recommended by the NNAP as important tools to drive improvement in breastfeeding rates and this toolkit should be used as a **complementary resource** to these wider initiatives, supporting units on their improvement journey.

Early Maternal Breast Milk for Preterm Babies: Rationale

Mothers of vulnerable infants, such as extremely premature infants, encounter a variety of unique breastfeeding barriers and challenges. Despite the known benefits of maximising MBM for very preterm babies, a large proportion of preterm babies in the UK are not fed an exclusive breast milk diet. Breastfeeding for mothers of preterm babies depends on a complex system of multidisciplinary and holistic interventions which focus on individual, structural, cultural and environmental factors. Table 2 describes **10 core elements** that support the optimisation of early MBM supply and transition to breastfeeding for preterm babies.

The objective of this toolkit is to deliver the **five perinatal elements**, colour coded as themes throughout the toolkit. A future toolkit will focus on the second five elements.

Table 1. 10 core elements that support the optimisation of MBM supply and breastfeeding for preterm babies from before birth to discharge from the neonatal unit

Core elements that support the optimisation of early MBM	
1	**Parents as equal partners in their baby's care:** Parents are empowered to take part in all elements of their baby's care, facilitating strong close and loving attachments
2	**Antenatal education:** Educating families about the value of MBM in prematurity, importance and process of early expressing
3	**Initiation of expressing soon after birth (aim within 2 hours):** With easy access to support, training and equipment
4	**Early Colostrum (ideally within 6 hours of birth and always within 24 hours):** MBM to be the first enteral feed given to baby
5	**Early and regular parental physical contact with their baby:** Delivery room contact, skin-to-skin early and often
6	**Positive oral touch and non-nutritive sucking**
7	**Establishing a good milk supply:** Regular expressing assessments and an understanding of optimal expressing
8	**Responding to challenges around lactation and breastfeeding:** Recognition of complex situations, specialist lactation support available
9	**An infant led approach to the transition to responsive feeding:** Recognition of feeding cues and a structured approach
10	**Successful breastfeeding after discharge:** Supporting parental confidence and knowledge

Rationale: evidence supporting benefits of maternal breast milk

MBM is the optimal form of feeding for preterm infants. Specific health benefits for the preterm infant population include lower mortality rates, lower rates of sepsis and necrotising enterocolitis (NEC)[18,19], improved neurodevelopmental outcomes[20], lower rates of bronchopulmonary dysplasia (BPD)[21], retinopathy of prematurity (ROP)[22] and fewer hospitalizations in the first year after discharge compared to formula feeding[23]. The WHO[24] and specialty consensus guidelines across multiple areas of neonatology[25–27] recommend maximising the use of MBM for premature and sick babies. Figure 3 provides a visual summary of key evidence on the positive impact of MBM. This could be used for education and motivation of staff and patients.

Figure 3. The impact of MBM on preterm babies

MBM maternal breast milk; VLBW very low birth weight; ELBW extremely low birth weight; NEC necrotising enterocolitis[18–23,28–32]

Notes:

Donor human milk, when compared to formula usage in situations where no MBM is available, is also associated with reduced NEC rates[33] and can be better tolerated than formula milk[34]. Where it is used in conjunction with effective lactation support, the use of donor milk may possibly increase MBM provision[35]. The evidence for the use of donor human milk as a supplement where MBM is available, but not in sufficient volumes is less clear, and this is an important area for research. Therefore, whilst donor milk does not have all the benefits of MBM it should be considered for the smallest preterm babies where MBM is not available[36].

Contraindications to MBM: There are very few situations in which MBM would be contraindicated for a preterm baby (outside of situations where all enteral intake is contraindicated, and in many of these situations buccal colostrum may still be given safely). These include maternal HTLV lymphoma, infant classical galactosaemia, congenital lactose intolerance and maternal HIV (although guidance in HIV is more nuanced than in the past and MBM can be used if desired in certain circumstances – see most up to date BHIVA guidance[37]). NICE[16] recommends that maternal medication suitability in lactation should be checked with specialist sources, such as the UK Drugs in Lactation Service UKDILAS[38] (an NHS specialist formulary freely searchable online), rather than the British National Formulary (BNF).

Parental mental health and wellbeing: The provision of MBM has a direct impact upon maternal physical and mental health which can be both positive and negative. Immediately after preterm birth mothers may feel traumatised, frightened, exhausted, unwell and isolated from family support systems. At this time, broaching the urgency and frequency of expressing can be challenging to do in an empowering and encouraging way. Expressing is a learned skill, which might feel overwhelming at a time of high anxiety for their baby's health. Mothers can experience lactation support as imposing pressure to express, which competes with other demands upon them including the time to recover from the psychological and physical demands of preterm birth. At worst, this may lead to feelings of intimidation, exacerbation of guilt and inadequacy, disconnection from their baby and an increase in anxiety, depression and even post-traumatic stress reactions.

> Improving MBM outcomes must be done in a way which instead helps parents to feel empowered, supports them to value the unique contribution of their milk and maximises their success, improving their connection to their baby and improving their mental health. Parent representation to this working group has emphasised how it is vital, during perinatal and neonatal care, to acknowledge **"the importance [of MBM] for empowering women rather than expressing being another source of trauma and distress".**
>
> *Genevieve Howell, parent of a preterm baby.*

Rationale: evidence supporting strategies to increase maternal breast milk

The first key step to the establishment of a good maternal milk supply lies in the perinatal period. The volumes of milk mothers can express as early as day 3 or 4 of life are highly correlated with long term breastfeeding outcomes[39–41], supporting the idea that this early period is a critical window.

There are a number of strategies to increase early MBM delivery to very preterm babies with the evidence base ranging from moderate quality to best practice, including consensus expert opinion. A summary of the most relevant or useful evidence can be found below for each of the 'Five Perinatal Core Elements'.

You will be guided through the exploration of these contextual factors in subsequent sections, and may find it useful, as a perinatal team, to work through the interventions, QI techniques and change ideas for each of the elements.

1. Parents as equal partners in their baby's care: Parents are empowered to take part in all elements of their baby's care, facilitating strong close and loving attachments

Family-centred and family-integrated care starts in the perinatal period to ensure that parents are central to their baby's care even when the baby is unwell[13,17]. Whilst there is limited evidence linking the use of FIC with provision of early MBM, there are many studies showing a positive effect of family integrated care (FIC) and parental involvement on breastfeeding at discharge.

Evidence	Reference source
FIC increased any breastfeeding at discharge from 46% to 82% (pilot RCT)	O'Brien 2013[42]
FIC increased "high frequency breastfeeding" (≥6 times a day) at hospital discharge from 63% to 70% (cluster RCT)	O'Brien 2018[43]
Policies promoting early involvement of parents in feeding support were associated with increased MBM feeding at discharge for moderately preterm babies, with an adjusted odds ratio (OR) of 1.9 (multicentre cohort study)	Mitha 2019[44]

2. Antenatal education: Educating families about the value of MBM in prematurity, importance and process of early expressing

This includes both a broad level of education of mothers identified early in pregnancy at increased risk of preterm birth and more targeted 'time-critical' education for families where preterm birth is imminent. Lactation-specific antenatal counselling should cover the specific benefit of MBM for the preterm baby; the vital importance of starting to express as soon as possible after birth; realistic volumes of colostrum expected; and familiarisation with the techniques and equipment involved.

Evidence	Reference source
Lactation-specific antenatal counselling was associated with increased exclusive breastfeeding at discharge (65% vs 24%) and length of full breastfeeding after discharge to a mean 60d vs 21d (case-control study)	Friedman 2004[45]
85% of mothers who had planned to formula feed initiated breast milk expression after lactation specific counselling, with no change in level of anxiety. All were glad that staff helped them with expression (cohort study)	Sisk 2006[46]
All mothers who had planned to formula feed reported no feeling of pressure, coercion or guilt after lactataion specific counselling. All identified positive consequences of expressing (qualitative study)	Miracle 2004[47]

Antenatal Expressing

Where preterm birth is **inevitable** (for example, a mother is awaiting a planned caesarean section; or where spontaneous preterm labour is established and birth is inevitable within the next hour or two),

some units take the pragmatic approach to support mothers to express just before the birth occurs, in parallel with other preparations. There is no evidence on the safety or benefit of antenatal expressing either in this setting or more widely where preterm birth is threatened but not inevitable.

3. Initiation of expressing soon after birth (aim within 2 hours): With easy access to support, training and equipment

Expressing soon after birth requires a multidisciplinary collaborative approach between the midwifery staff, obstetricians and neonatal staff to provide sensitive support and education to the mother at this key time.. When a preterm birth is expected, perinatal team discussions should cover key optimisation interventions. Discussing MBM and early expressing should be a central part of this planning. Similarly, after birth, it is vital that all staff members involved with the mother's care prioritise support for early expressing alongside other elements of postpartum care. For many parents, the first hours after birth will be extremely difficult if their baby has been born very sick - particularly if they haven't been able to see their baby at this point. It's also important to note that many women will be very ill themselves, requiring this element of postnatal care to be handled with extra sensitivity. Many women who are ill themselves wish to initiate expressing and illness alone should not preclude conversations taking place and support for expressing being given.

Evidence on initiation of expressing	Reference source
Expressing within 1h of birth (compared to 1-6h) increased expressed milk yield from 267ml/d to 613ml/d at week three of life (pilot RCT)	Parker 2012[48]
Expressing 1-3h after birth (compared to 3-6h) increased any breastfeeding at discharge from 35% to 62% (RCT)	Parker 2017[49]
Adjusted odds ratio of exclusive formula feeding at discharge was 1.06 for each hour of delay to first expression (cohort study)	Maruyama 2016[50]
Policies promoting initiation of expression within 6h of birth were associated with increased MBM feeding at discharge for very preterm babies, with an adjusted OR 2.2 (multicentre cohort study)	Mitha 2019[51]

There is also evidence related to how to maximise the efficiency of expressing from the first attempt onwards[52]. Frequent and simultaneous pump expression as well as techniques such as massage, warmth and relaxation give mothers the best chance to establish a good milk supply. Ensuring that parents have a realistic understanding of likely colostrum volumes in the post-partum period will prevent distress and discouragement. The mother may not get any drops of colostrum from the first early attempt, but the process of attempting to express will provide valuable stimulation to the breast tissue and hormone pathways to initiate her milk supply.

Evidence on maximising the efficiency of expressing		Reference source
Electric pumps	Double electric pumping from birth yielded a higher volume of milk up to d7 of life than hand expressing (mean 17ml/d compared to 3ml/d on day 1 (RCT) No difference in volumes expressed or longterm breastfeeding outcomes between type or brand of pump (Cochrane review)	Lussier 2015[53] Becker 2016[52]

	Novel electric pump suction pattern (Medela Preemie+) used for first days of baby's life (until yield of 20ml/session achieved, then switched to standard suction patterns) showed increased volume of milk (200ml/d) from d6 of life onwards, compared to standard suction pattern (RCT)	Meier 2012[54]
Simultaneous expression (both breasts at the same time)	Simultaneous expression reduced time spent expressing compared to sequential expressing (8 h/week vs 11 h/week; RCT)	Groh-Wargo 1995[55]
	Simultaneous expression increased milk volume compared to sequential expression (88g/session vs 51g/session; RCT)	Jones 2001[56]
Expressing frequency	*No studies have looked at the expert consensus opinion recommendation of 8-10 times per day* 86% of mothers who expressed ≥5 times/d achieved target yield (defined as 500ml/d by d14), vs 22% of mothers who expressed <5 times/d (cohort study)	Hoban 2018[57]
	Expressing ≥7 times/d was associated with higher yield at 2wks vs <7 times/d (median 622ml/d vs 402ml/d; cohort study)	Morton 2009[58]
Early volume target	The 24h yield on d7 that maximises sensitivity and specificity to predict long term adequate milk supply is 407ml (cohort study)	Ru 2020[59]
	Odds ratio for formula feeding at discharge were 7.1 when d4 milk yield was <153ml/d (cohort study)	Murase 2014[40]
Breast massage and warmth	Breast massage prior to expressing increased volume expressed (125g/session vs 88g/session; RCT)	Jones 2001[56]
	Warming the breast with a microwaveable compress for 20 mins prior to expressing increased volume expressed (45ml/session vs 32ml/session; RCT)	Yigit 2012[60]
Maternal relaxation	Listening to a relaxation-visualisation soundtrack plus/minus looking at photos of their infant during expressing increased yield of expressed milk from d2 of the intervention (on d2, the two intervention groups had yield of 66ml/d and 80ml/day vs control group yield of 35ml/d; RCT)	Keith 2012[61]

4. Early Colostrum (ideally within 6 hours of birth and always within 24 hours): MBM to be the first enteral feed given to baby, whenever possible

The provision of early colostrum to a baby is dependent on getting expressed colostrum to the neonatal unit and administered to the baby. It is reliant on all staff understanding the importance and urgency of early colostrum and the enablers and barriers throughout the service that may affect this process. Based on the available evidence below, neonatal teams should value and prioritise colostrum to be given early as the first feed.

Evidence	Reference source
Buccal colostrum reduced time to full enteral feeds (11.1d vs 15.5d), O2 therapy (12d vs 19d) and ventilator associated pneumonia (3% vs 11%)(RCT)	Abd-Elgawad 2020[62]

Buccal colostrum group showed a trend towards a lower risk of developing NEC (4.7% vs 7.7%). Pooled result not statistically significant (p = 0.08, RR = 0.59, 95% CI = 0.33–1.06). Included studies aimed to start colostrum in the first 24h, 48h or 96h (meta-analysis)	Tao 2020[63]
Buccal colostrum reduced ventilator associated pneumonia (OR 0.39), time to full enteral feed (mean difference -2.7d) and NEC (OR 0.51). Included studies aimed to start colostrum in the first 24h, 48h or 96h (meta-analysis)	Ma 2020[64]
Buccal colostrum is safe and associated with receiving breast milk as the majority of enteral feeds at 6wks of age and at discharge. Median age at first colostrum was 24h (interquartile range 12-43h; cohort study)	Snyder 2017[65]
Buccal colostrum inhibited secretion of proinflammatory cytokines and increased urinary/saliva levels of immune-protective factors and reduced sepsis (50% vs 92%). Protocol was to start colostrum at 48h of age (RCT)	Lee 2015[66]

5. Early and regular parental physical contact with their baby

This intervention is based on the prioritisation of physical contact from the earliest time point after birth onwards, whilst maintaining optimal respiratory and thermal support. Training to ensure staff confidence and skills in maintaining baby safety and stability in the transfer to skin-to-skin care (SSC) is essential.

Delivery Room Contact

The toolkit group recognise that some units, both within the UK[67,68] and internationally[69] are facilitating parent-baby SSC in the delivery room/labour ward prior to transfer to the neonatal unit. Data from these teams seem to reflect this practice can be positive for families, and, based on limited data, can be implemented in these units safely. This practice, if offered, should be done so with multidisciplinary team engagement, planning, training, and structured standard operating procedures regarding safety, equipment, human factors and parental information. Where SSC is not offered, parents should be encouraged to touch their baby in the delivery room.

Evidence	Reference source
Volumes expressed immediately after SSC are higher than expressing in a room away from baby (adjusted mean of 118ml/session compared to 87ml/session) (cohort study)	Acuna-Muga 2014[70]
The number of times the baby is put to the breast without feeding (licking/nuzzling) is predictive of milk weight in the first 10d (observational data reported as part of RCT)	Fewtrell 2016[71]
SSC increases exclusive breastfeeding at discharge or 40 to 41w (RR 1.16) and at 1-3mo follow-up (RR 1.20) (Cochrane review)	Conde-Agudelo 2016[72]
Policies promoting kangaroo care were associated with increased MBM feeding at discharge for very preterm babies (adjusted OR 2.3) and moderately preterm babies (adjusted OR 2.0) (multicentre cohort study)	Mitha 2019[44,51]
60mins of SSC in the delivery suite increased exclusive breastfeeding at discharge from 69% to 86% (non significant trend; study underpowered). Note, infants had received “less invasive surfactant administration” if appropriate before SSC, had intravenous dextrose running and SSC was performed in a room with ambient temperature of 24°C	Mehler 2019[69]

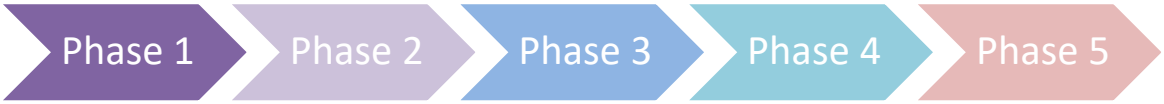
Overview of the Improvement Journey

How to use this toolkit

This improvement activity referred to in this toolkit is not intended to be read as a guideline which mandates a standard improvement journey for all units. Instead it is a practical resource from which units who wish to improve compliance rates of antenatal optimisation measures can select the most suitable interventions for their particular context. For example, there are some units that may achieve high compliance with 'antenatal education' but where this is superficial it may have no impact on time to first expressing and time to receive colostrum. The improvement solution for each unit may be different. Individual units are encouraged to interrogate their own processes in order to understand where and how optimisation measures are applied in their local setting and select interventions which are best suited to their context.

The following table shows the steps that are commonly taken on an improvement journey. Each step is discussed further in subsequent sections.

Table 2. The Improvement Journey



	Approach	Methods and Tools	Outcome
1. Define the problem	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
2. Develop a shared purpose	Form a team of enthusiasts	Engaging a team Engaging stakeholders Optimise context	Establish a shared objective and a culture for change
3. Plan and implement changes	Formulate, prioritise and test solutions	Project Charter QI Methodology	Complete a formalised plan of proposed improvements
4. Test and measure improvement	Test, review and re-test improvements	PDSA Measurement Run chart Statistical Process Control Chart Days between Chart	Determine whether improvement has resulted in change
5. Implement, embed and sustain	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. **Process Measures:**
   - Parental involvement (such as Bliss Baby Charter evidence, BFI audit or Badgernet data on parental involvement in care, presence on ward rounds and early communication with parents)
   - Proportion of mothers who give birth at <34 weeks gestation who received specific antenatal information about the importance of MBM for preterm babies
   - Proportion of mothers who give birth at <34 weeks gestation who were supported to express within 4 hours of birth
   - Time to first availability of MBM
   - Time to first skin to skin contact
   - Frequency of skin to skin contact in the first 24-48 hours after birth

2. **Outcome Measures:**
   - Time to receipt of first MBM feed in babies <34 weeks gestation
   - Percentage of babies <34 weeks gestation having MBM as their first feed
   - Percentage of babies <34 weeks gestation who receive 'any' MBM and 'exclusive' MBM on
     - Day 1 of life
     - Day 14 of life
   - Percentage of babies <34 weeks gestation who receive formula milk in the first 14 days of life

It may also be useful to ask:

a. Are your data both accurate and complete? Do you have missing data?
b. How have your data changed over time?
c. How does this compare with other units in your network?

How did we get here? Brainstorming Barriers and Enablers

Despite the importance of MBM, establishing a full milk supply can be extremely challenging for mothers of very preterm babies for multiple reasons – the breast tissue is not as extensive, co-morbidities and risk factors relating to the prematurity can predispose the mother to suboptimal milk supply, and the mother has to induce and maintain lactation mechanically due to the infant's oral immaturity. These challenges can be even greater for mothers of multiples but can be addressed with high quality perinatal multidisciplinary support which continues throughout the neonatal journey.

Supporting MBM provision and later breastfeeding, is a complex multidisciplinary intervention. Understanding barriers and shaping effective solutions requires input from all team members across maternity and neonatal care: everyone's view is valid and essential. Exploring parental perspective and feedback can be very insightful:

> "Whilst I was laid in bed for 3 days prior to delivery, there was no discussion of expressing at all. After birth, I was left to sleep and was not encouraged to hand express. It was like I wasn't their problem as my baby was too early to be cared for on the unit." *Lindsay Cracknell, parent of a preterm baby.*

It can be useful to brainstorm barriers to each of the five core elements. Some suggestions and examples are shown below. How many of these could apply to your unit? Could you identify other enablers?

Table 3. Barriers and Enablers

Core element	Barriers	Enablers
Parents as equal partners in their baby's care: Parents are empowered to take part in all elements of their baby's care, facilitating strong close and loving attachments	Physical separation of mother and baby. The environment in a neonatal unit can be intimidating for parents making it much harder to build a relationship with their baby. Some units may have access restrictions that can preclude parents being with their baby. Conflicting demands on parent's availability to be with their baby. Lack of staff education about family integrated care.	Family Integrated Care. Framework or similar (for example Bliss[17], UNICEF BFI[12]).
Antenatal education: Educating families about the value of MBM in prematurity, importance and process of early expressing	Preterm birth can lead to information giving being rushed, incomplete, inconsistent and not absorbed fully prior to birth. Maternal health, exhaustion and anxieties can impede understanding. Lack of staff education about the importance of antenatal discussions about MBM.	High quality antenatal counselling and lactation plans for high risk mothers. Parent information leaflet, videos and other resources (see Appendix 4) Checking safety of maternal medications with specialist formulary antenatally.
Initiation of expressing soon after birth (aim within 2 hours): with easy access to support, training and equipment	Staff may not feel they have sufficient time to teach expressing skills. Lack of equipment (eg breast pumps) for use in delivery rooms. Lack of staff knowledge or focus about urgency of initiation of expressing . Lack of resources to empower mothers to express for themselves. The severity of maternal illness both before and after birth.	Perinatal education regarding technique and timing. Provision of "Colostrum kits" Prioritise multi-disciplinary support immediately after birth.

Early Colostrum (ideally within 6 hours of birth and always within 24 hours): MBM to be the first enteral feed given to baby, whenever possible	Staffing resources and/or poor communication between teams to get colostrum to baby. Lack of understanding of neonatal staff that almost all babies can receive buccal colostrum safely. Lack of prioritisation of colostrum in baby's cares.	Staff education programme about the importance of early oral colostrum. Systems to expedite transfer of colostrum to neonatal unit.
Early and regular parental physical contact with their baby: Delivery room physical contact, skin-to-skin contact early and often	Lack of unit experience/ policy/procedure to safely offer delivery room contact. Lack of resources and confidence of all staff to safely support skin-to-skin contact. Lack of awareness of staff of the ongoing benefits of skin-to-skin contact. Parental belief that incubator is safest place for baby.	Delivery room physical contact. Skin-to-skin contact early and often.

Further suggestions for barriers and enablers can be found in the Scottish Improvement Science Collaborating Centre Evidence into Practice: Breastfeeding and kangaroo skin-to-skin care for babies & families in neonatal units[73].

How did we get here? QI tools

There are many tools to help your team understand your current practice and identify how to improve. You do not need to use all of these tools but should explore which of these exercises works best for your team[5] (NSQI 13). All of these tools are explained further and templates available in the BAPM QI Made Easy pages ('Investigating your Current Practice')[74]

1) ***Forcefield analysis*** - this tool balances the positive and negative drivers influencing MBM outcomes 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 4).
2) ***Fishbone diagram*** - cause and effect analysis tool. This is a useful tool for categorising factors which influence MBM outcomes (Figure 5).
3) ***Case review*** - suggest using Bliss Baby Charter, BFI audit tools and consider parent journey reviews to identify where the barriers and facilitators are.
4) ***Process mapping*** - think about the journey that the baby and family take from pregnancy, through delivery through to postpartum care and initial neonatal unit stay and think about the factors within the process, culture and the environment that may contribute (Figure 6).

Figure 4. An example of a forcefield analysis for provision of early exclusive MBM

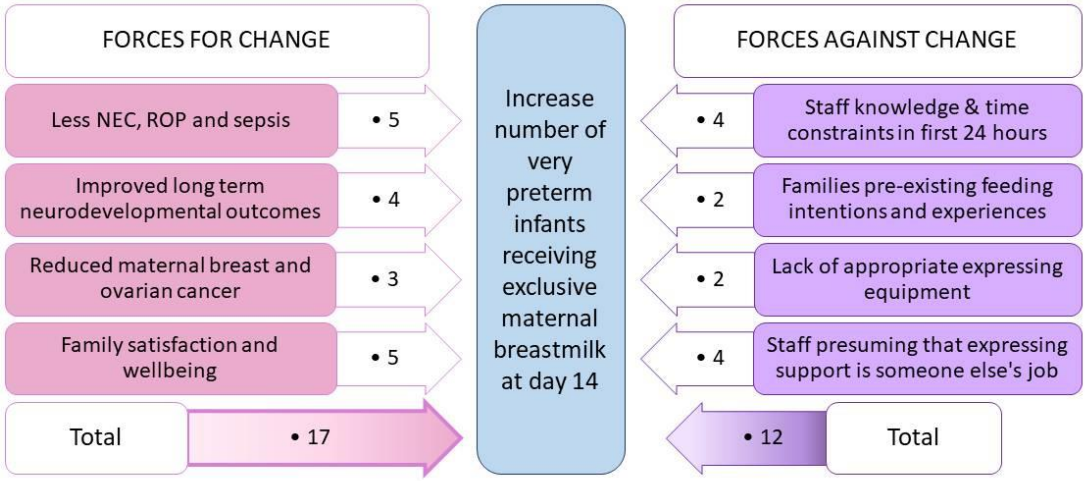
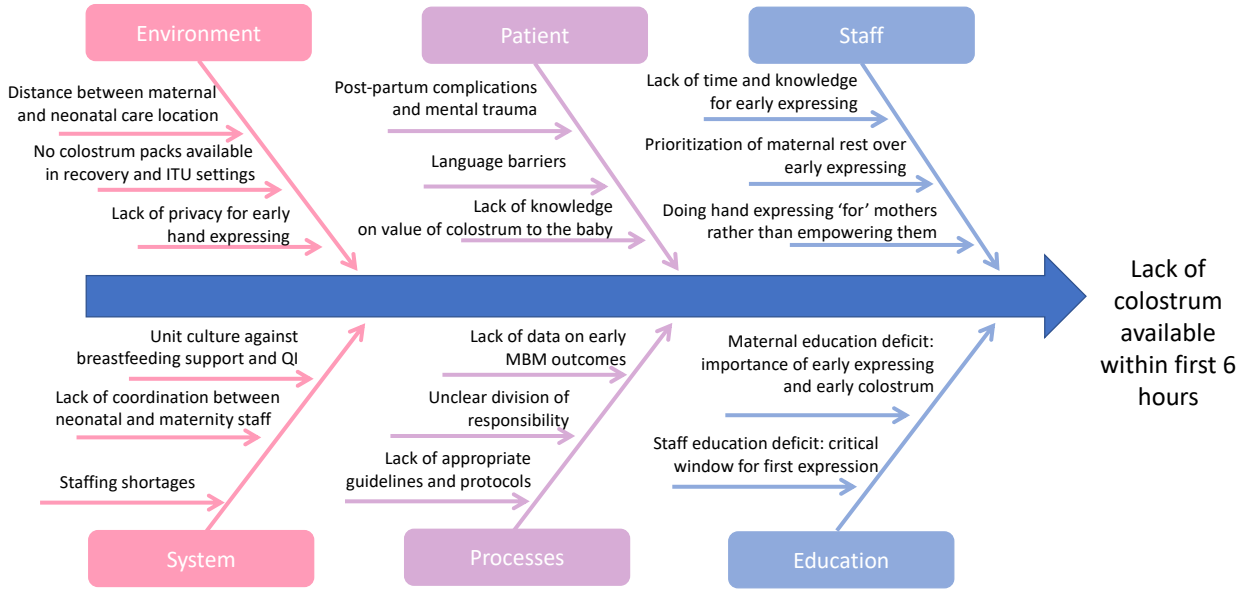
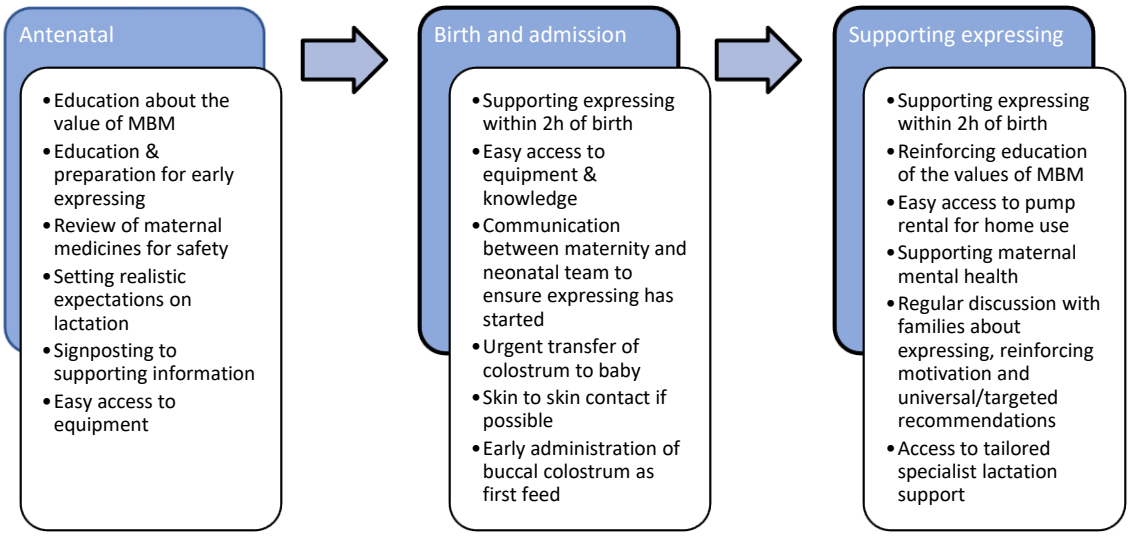


Figure 5. An example of a fishbone diagram for early colostrum delivery



EXAMPLE

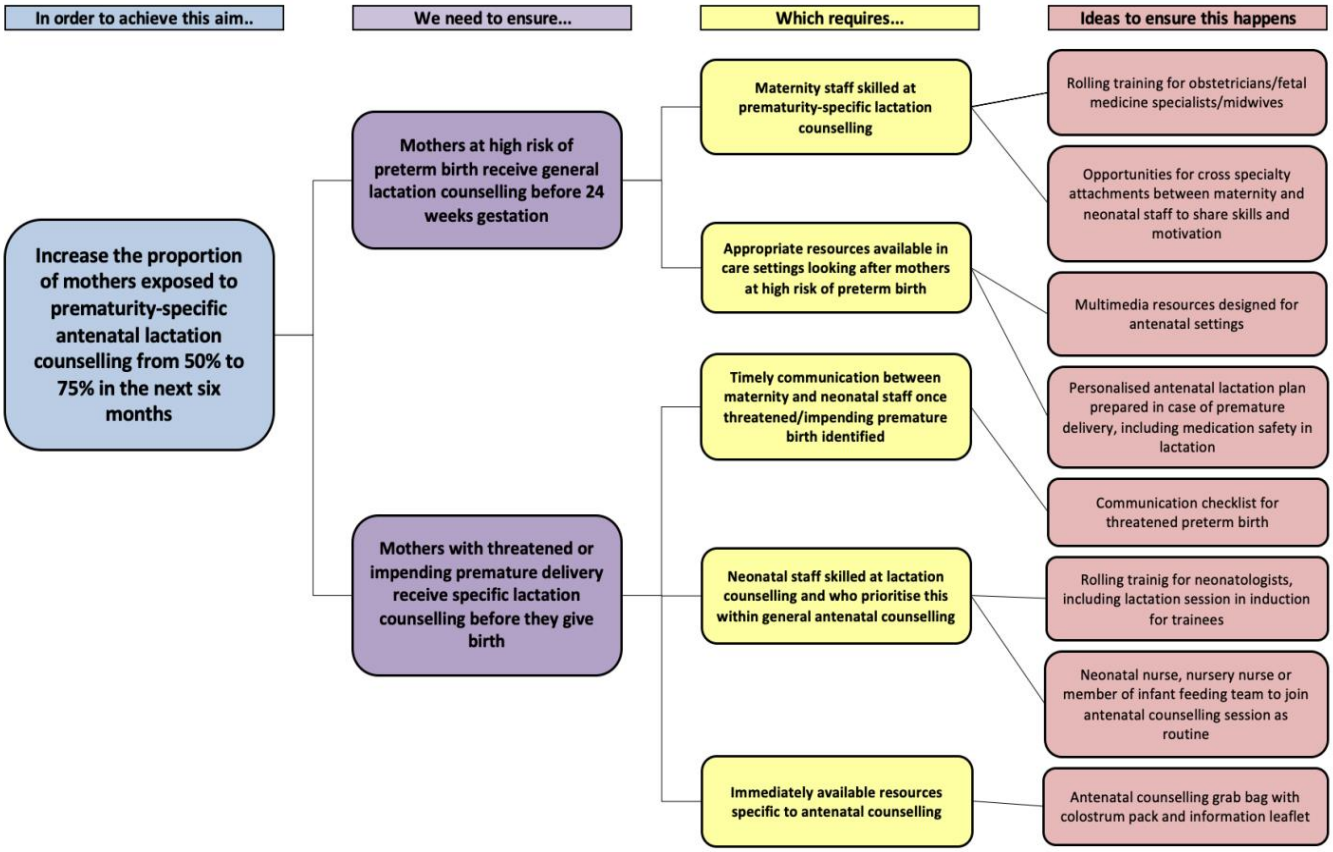
Figure 6. Process mapping for perinatal interventions for maximal MBM provision



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 diagram to apply a clear and organised structure to your project, implementing evidence-based strategies within a multidisciplinary team setting.

Figure 7. An example of a driver diagram for improving practice in antenatal education



Learning from parents and other experts

It can also be helpful to speak to other units about how they have optimised early MBM for preterm babies. High performing units and those who have made significant improvements over time can be identified from NNAP online[1]. Parental input and consultation is vital for QI teams in all aspects of perinatal optimisation, but particularly for teams who are striving to improve early MBM for preterm babies. Users of this toolkit should seek to engage parents from the initiation of the project. Some teams and parents have shared examples below.

Network Collaboration

Working collaboratively across a Network to highlight initiatives around early MBM, develop standard resources, teaching and audit packages. Producing accessible resources for parents and staff in different formats. Leaflets & videos to support and educate on aspects of early MBM. ***Sara Clarke, Network Dietitian, WMNODN***

Parental Perspective

A joined-up approach between SCBU staff and midwives could be beneficial to explain and promote what a mother can do before and after her preterm baby is born. There are so many leaflets - a chat / advice with someone goes a long way. Some people may not understand everything or even read them at all! ***Lindsay Cracknell, parent of baby born at 25 weeks***

Checklists

Using an expressing checklist, such as BFI or local version, helps to ensure that mothers get off to the best start as what happens in the first few hours and days has a big impact in the longer term on milk supply. ***Cathy Budd, Infant Feeding Specialist Nurse***

Perinatal communication

Optimising opportunities for the neonatal team to discuss what benefits early breast milk can make to a premature baby whilst the mother is in a Delivery Suite or Antenatal Ward. For instance at GWH in Swindon we give parents "liquid gold" packs in which benefits are reiterated and syringes supplied to start expressing. ***Tanya Miles, Midwife, Swindon***

Goals

Don't talk about breast feeding, talk about breast milk. Start with small goals to express colostrum, then aim for first 14 days. This gives parents time to explore how they want to feed their baby without feeling pressurised into the whole breast feeding journey ***Sara Clarke, Network Dietitian WMNODN***

Equipment

Having enough electric breast pumps available both on the unit and for mothers to take home has been essential. It emphasises how much we value their milk and takes away the added stress of finding/ buying a pump on the day they have to leave their baby behind. ***Cathy Budd, Infant Feeding Specialist Nurse***

Phase Two: Develop a Shared Purpose

Engaging your multidisciplinary team

One of the key components to any successful project is having an implementation team that are engaged, resilient, enthusiastic and committed to working together to create the right culture for change[5] (NSQI 2, NSQI 15).

> Need to engage the whole team "supporting MBM production is everyone's responsibility"
> ***Sara Clarke, Network Dietitian, WMNODN***

> Short, bespoke half hour sessions with Receptionists and Housekeepers helped us to explain the key elements of involving parents in their baby's care so they were aware of the importance of a welcoming environment and also the benefits of breast milk as they make up all the expressing packs, colostrum packs etc
> ***Cathy Budd, Infant Feeding Specialist Nurse***

Teams should ideally be around 4-8 members and include:

- A Project lead (could be from any part of the multidisciplinary team)
- Multidisciplinary representation including neonatologists/paediatricians, neonatal nurses, midwives, obstetricians, infant feeding team, speech and language therapists, specialist dieticians, peer support workers, other healthcare staff (eg maternity or clinical support workers, nursery nurses)
- Parent representation (NSQI 10)
- People with expertise in QI and data analysis (NSQI 17)

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.
- **What is the culture** like amongst members of the perinatal multidisciplinary team? Are maternity and neonatal teams equally invested in the goal of your MBM QI work?
- **Where** are the areas likely to be affected by any changes – do you need to engage staff from outside of your unit team, for example peer support workers or volunteers?
- **Why** should people want to be involved in your project – 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 often** will you meet?
- **When** are people available and are your time commitments realistic?
- **What else** is going on? Are there existing workstreams with overlapping agendas that could be pulled together to prevent duplication (eg: UNICEF BFI, Bliss Baby Charter). 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 may also be useful 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 early MBM for preterm babies, they are likely to include: neonatologists/paediatricians, neonatal nurses, midwives, obstetricians, labour ward teams, infant feeding teams, speech and language therapists, specialist dieticians, peer support workers, other allied health professionals (e.g. maternity or clinical support workers, nursery nurses, pharmacists). Maternity Voice Partnerships may have a very useful role to play in supporting local teams to design their MBM project. Within the topic of MBM, stakeholder engagement from parent groups and understanding the parent experience is essential.

These groups need to be:

1. **Prioritised**- in terms of the power they have to make your project succeed or fail
2. **Understood**- how are they likely to feel or react to the proposed changes?
3. **Informed**- devise a communication plan to sustain interest and win over doubters. This plan should include modalities of communication (e.g. 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[9].

Phase Three: Plan and Implement Changes

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, will provide direction and a sense of purpose and may give your project increased leverage with management. NHS Improvement[75] and NHS Education for Scotland[76] have examples.

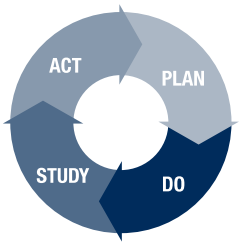
Formulate, prioritise and test solutions

There are a number of methodologies that can be adopted to implement a quality improvement strategy. 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:

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?

Do

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

Study

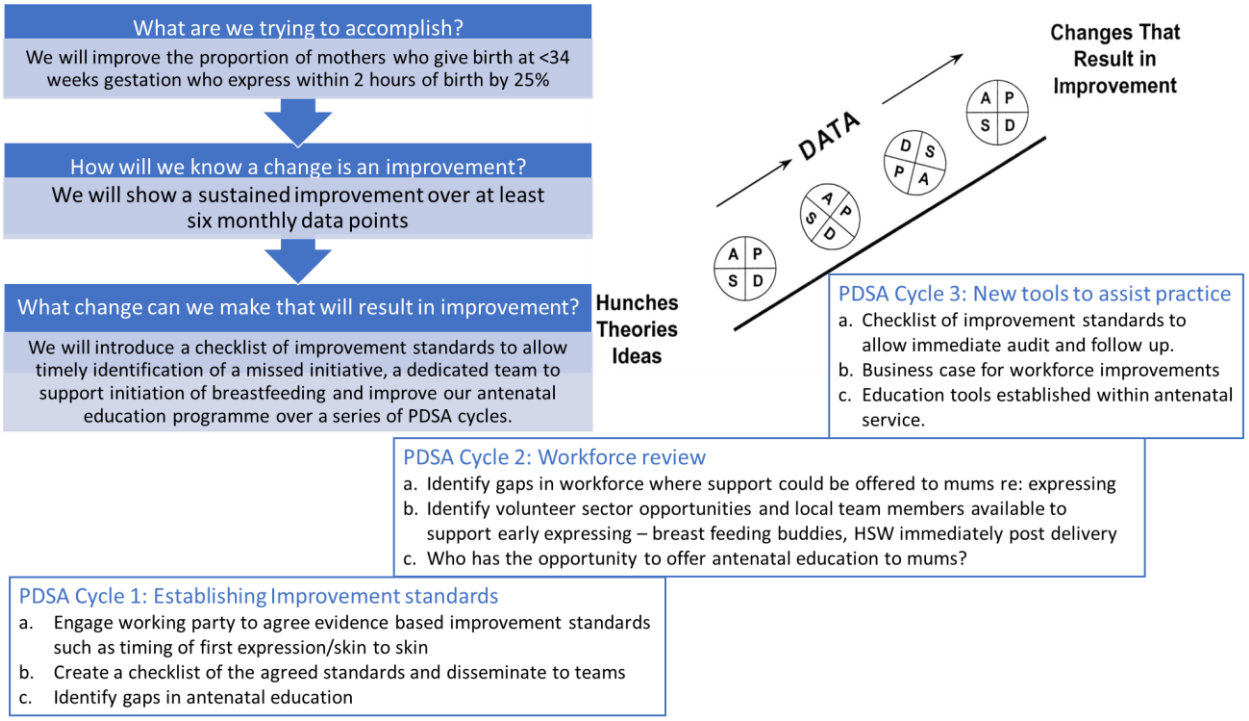
- Use established tools to analyse your data (see Phase 4). Has your change idea resulted in improvement? Is this a real improvement? Does your data suggest your change idea needs modified? Why might this be so? Compare your data to your predictions.

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

Below, the Model for Improvement is used to work through an example of implementation of planned changes to optimise MBM for preterm infants. More information on using the Model for Improvement can be found on the BAPM QI Made Easy pages ('Planning your Change Idea')[74].

Figure 8. Example Model for Improvement to improve time to first expression of MBM



EXAMPLE

Phase Four: Test and Measure Improvement

In this phase, improvements are tested, reviewed and re-tested through a series of PDSA cycles to decide what works and what does not i.e. is the intervention producing the impact that we expected it would?

Measurement Strategy

Measurement is one of the 'weakest links' within improvement and a suboptimal measurement strategy creates significant obstacles to improvement. First and foremost, measurement for improvement needs to be well differentiated from the performance management aspects of data and monitoring that organisations are very 'wedded' to. The focus on 'learning' rather than 'failure' is critical.

It is reasonable to think that once we start measuring something we can 'manage' it better. However, it is paramount that this measurement should be focused on improvement rather than performance management. Using the wrong 'measure' or for the 'wrong purpose' is counterproductive in terms of improvement *"What gets measured gets managed… even when it's pointless to measure and manage it and even if it harms the purpose of the organisation to do so."*[77]

Data collection

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[5]). In terms of actual metrics, any QI work aimed at improving a preterm infant's intake of maternal breast milk ought to focus on the types of measures (see Phase One):

a) Patient outcome measures: reflect the impact on the patient e.g. breastfeeding rates. These are the most meaningful of measures and add 'value' to the patient/family as well as the healthcare professional, the organisation and society at large. These, however, generally take time to show effect and require patience and sustained efforts.

b) Process measures: the way systems and processes work to deliver the desired outcome. These focus on some aspect of the improvement process and could be used for a change idea or primary or secondary driver e.g. number of women who expressed colostrum within 2 hours. These are useful to make sure that interventions planned as part of the QI efforts are happening to plan (compliance with your change ideas). These are also much easier to measure and usually show an effect much earlier compared to the real outcome measures. If process measures are suggesting improvement, our confidence in a positive patient outcome increases.

c) Balancing measures: this is what may be happening elsewhere in the system as a result of the change. These focus on the unintended consequences of a QI intervention e.g. as part of an intervention aimed at increasing breastfeeding rates, maternal stress and anxiety rates for some women may go up if they are finding it difficult to obtain breast milk.

Improvement is a continuous process, and this necessitates regular measurement. This is the only way for us to be sure that a proposed intervention is having the impact that we think it will have. In addition to measuring and monitoring the impact of change ideas through PDSA cycles of learning, we can also

measure outcome, process and balancing measures at a more strategic level in terms of our SMART aim, our primary and secondary drivers.

A detailed overview of measurement strategies is beyond the scope of this toolkit. Some resources from the Institute for Healthcare Improvement[78], ACT Academy[79] and NHS Institute for Innovation and Improvement (video[80] and How-to Guide[81]) are helpful.

Data analysis and display

How will any change be measured, assessed and displayed? Common tools to present and analyse your data include run charts, statistical process control charts and days between charts (see examples below). All require a level of knowledge and skill to collate and interpret correctly. 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 interventions/changes are evaluated and modified as appropriate.

There is growing evidence to highlight that visual display of data on the 'ward' or at the 'frontline' so to say and discussion about measurements using 'huddles' and similar processes is much more effective than traditional meetings. All of the options for analysis detailed below are explained in the BAPM QI Made Easy[74] pages ('Interpreting your Data').

It is important to highlight the value of **run/statistical process control (SPC) charts** (Figures 9 and 10) as a critical tool to 'measure' improvement. It serves well to engage frontline teams in this specific QI work and display it to the relevant teams 'in their face' as this can be very effective in generating meaningful actions and sustained improvement. For in depth understanding of run charts and SPC charts please see the NHS Improvement website[82].

While it is ideal to measure using run/SPC charts and it is important that key members of the improvement team are well versed in their use, the communication of what the measurements are telling us is focussed on who the audience for that information is. The information obtained from our measurement processes should be packaged in different ways and communicated in the most appropriate way to parents, nursing and medical neonatal teams, midwives, maternity support workers, managers, commissioners and so on (for example see Figure 11).

Figure 9. Example of a Run Chart

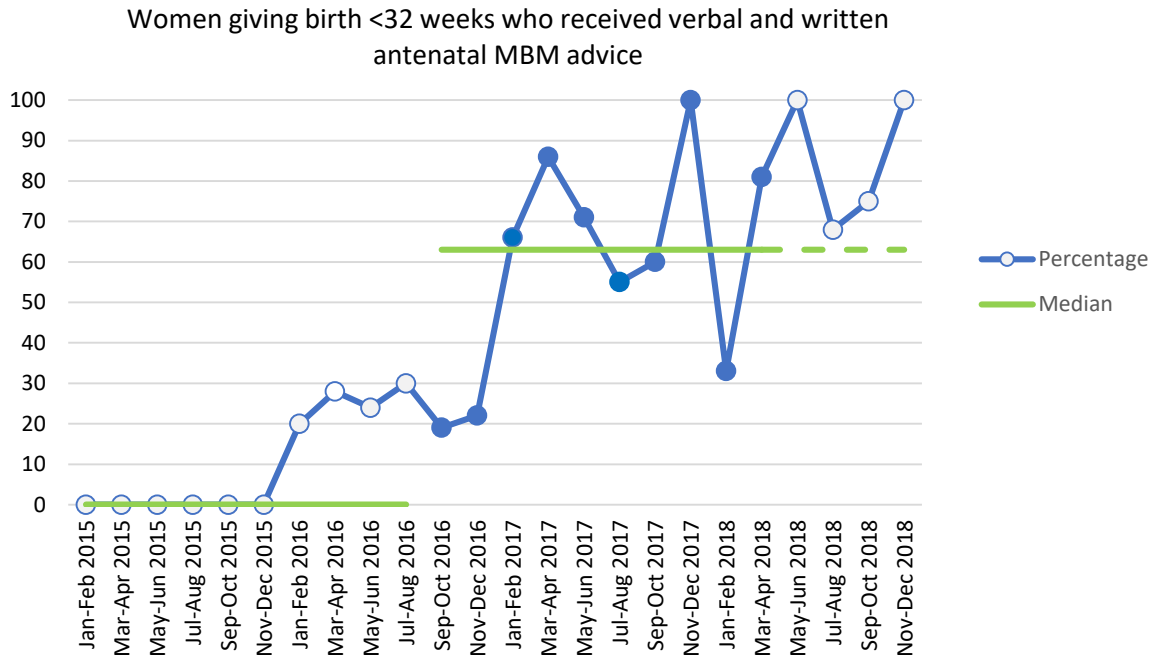


Figure 10. Example of a Statistical Process Control Chart

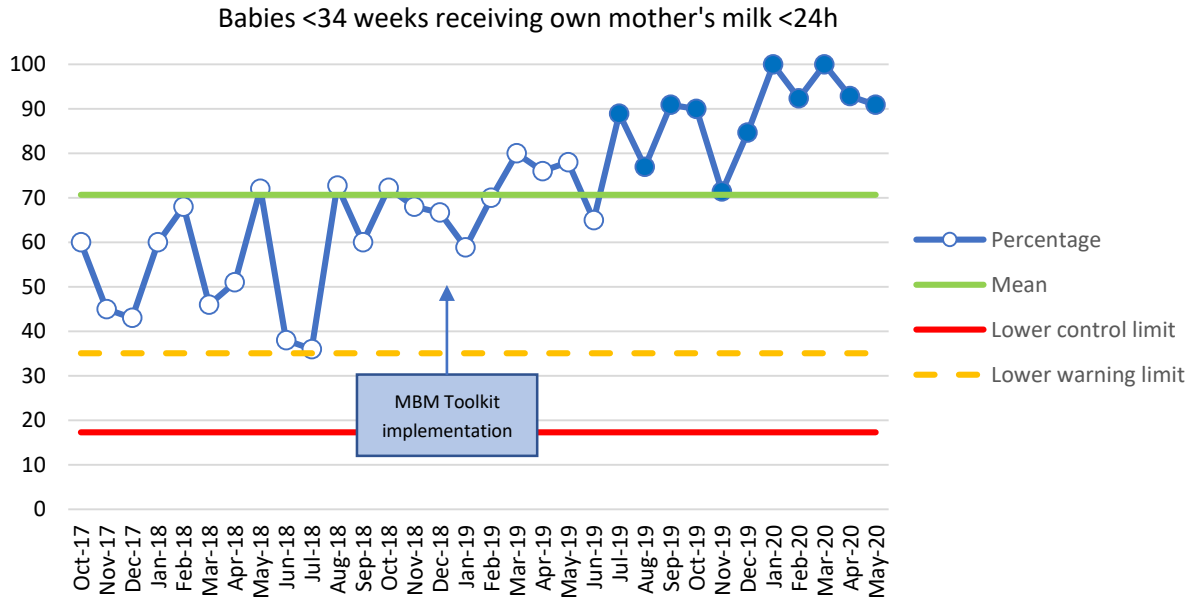
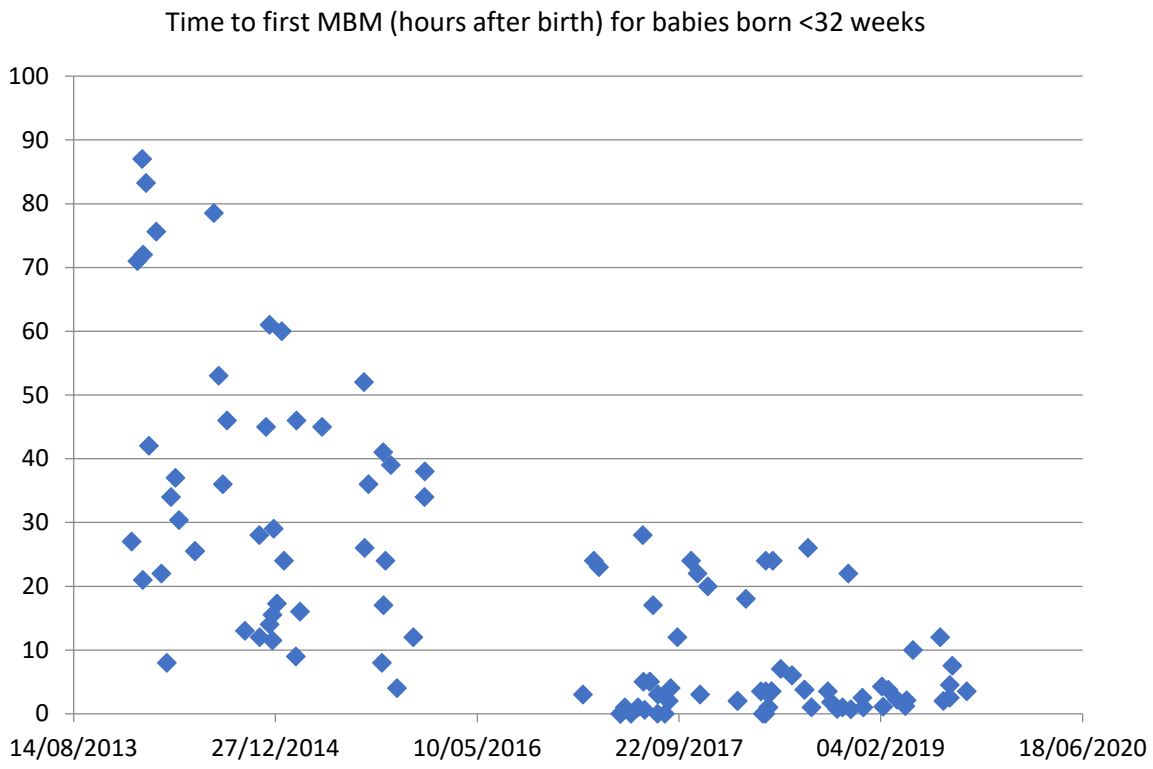


Figure 11. Patient level Data Display Example of QI outcome:

On this chart, each diamond represents a baby – this can be a highly effective way to emphasise the importance of single patient level outcomes.



Phase Five: Implement, Embed and Sustain

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).

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 (NHS Improvement: Sustainability Model and Guide)

Barriers and loss of motivation

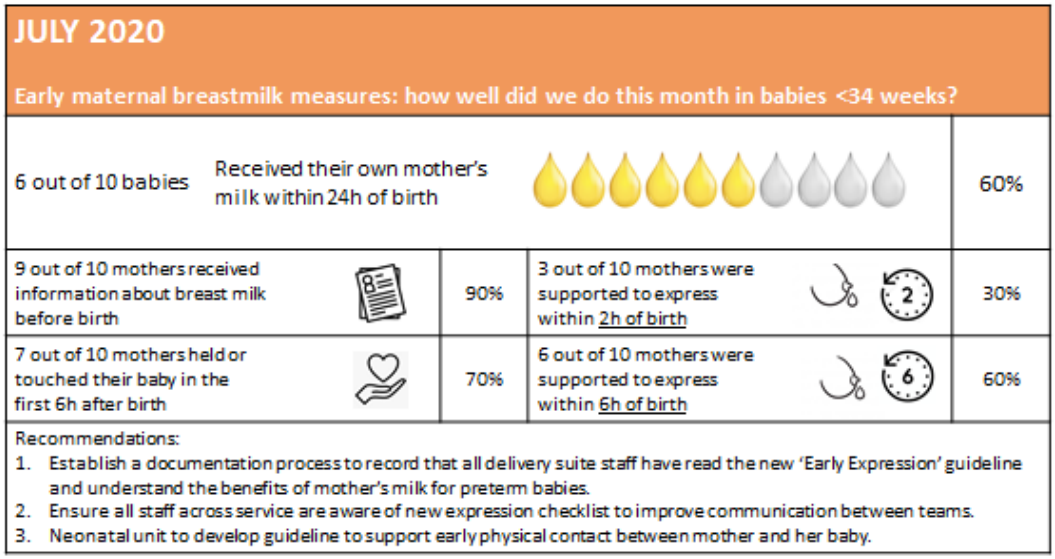
It is not unusual to find the size of a previous improvement lessen over time. It is important to understand why so that solutions can be tailored to the problem. Different approaches will be effective for different people and different situations. The following activities may be useful: talk to key individuals, observe clinical practice in action, use a questionnaire to survey staff, brainstorm with a focus group, use 'improvement huddles'. 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[5]).

> Working towards the Unicef/Baby Friendly Initiative Neonatal accreditation has helped us to focus on a training programme, with one off training days for Nurses and regular MDT training days, run in house using BFI training materials, to help embed the 3 new standards.
>
> ***Cathy Budd, Infant Feeding Specialist Nurse***

Team Feedback

Regular audits of process and outcome measures can convey progress, or highlight which areas need renewed focus and energy. Sharing this data across your whole perinatal team can be very useful, especially if displayed in an accessible, concise and impactful format. See Figure 12 for an example:

Figure 12. Example of staff feedback poster for MBM



JULY 2020

Early maternal breastmilk measures: how well did we do this month in babies <34 weeks?

6 out of 10 babies	Received their own mother's milk within 24h of birth			60%
9 out of 10 mothers received information about breast milk before birth		90%	3 out of 10 mothers were supported to express within 2h of birth	30%
7 out of 10 mothers held or touched their baby in the first 6h after birth		70%	6 out of 10 mothers were supported to express within 6h of birth	60%

Recommendations:
1. Establish a documentation process to record that all delivery suite staff have read the new 'Early Expression' guideline and understand the benefits of mother's milk for preterm babies.
2. Ensure all staff across service are aware of new expression checklist to improve communication between teams.
3. Neonatal unit to develop guideline to support early physical contact between mother and her baby.

Parental Feedback

Never underestimate the power of patient stories to motivate and reinvigorate a team to implement change. Examples are shown here (with thanks to the parent representatives of this working group):

Knowing my daughter had been taken immediately to NICU following a two-minute cuddle on the operating table, the only thing I was able to do for her was provide some drops of liquid gold. In the twenty-four hours between delivery and our first kangaroo cuddle this was the only thing I was able to do for her from my recovery bed. My only means of helping to care for my tiny baby that I had not yet spent any length of time with. I felt lost, bewildered and unsure, but from early pregnancy I knew I wanted to breastfeed. Knowing I still had the chance to do so, and would be helped to express, despite her premature birth, gave me a small glimmer of hope that those experiences hadn't been taken away from us. During our first kangaroo care, she started to root and nuzzle towards the breast. This was one part of our journey that I now knew we didn't have to lose. It was one of the small things I could do to feel useful, to feel like a mother. The medical professionals who helped me achieve this goal, and still be feeding at 26 months, have my eternal gratitude. ***Nicola Williamson, parent of a preterm baby***

After the trauma of premature birth and the unexpected loss of one of my three daughters, expressing gave me a purpose, a focus and a routine that helped me to get through my days hour by hour, and my weeks day by day. It is something that I know now looking back helped me significantly at the time, and gave me the opportunity to work towards and maintain breastfeeding for as long as I wanted. I believe that successfully expressing in the early days contributed towards me developing my relationships and bonds with my daughters in such difficult and traumatic circumstances, which I am very thankful for. There was a dedicated member of staff on the neonatal unit to support mothers with expressing and breastfeeding, who regularly checked in and supported me. ***Genevieve Howell, parent of preterm triplets***

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Appendix 1. Members of the Early Maternal Breast Milk Toolkit Group

Chair: Sarah Bates	Consultant Paediatrician and LNU Neonatologist, Great Western Hospitals NHS Foundation Trust, Swindon BAPM Executive Committee Representative for LNU and SCU PERIPrem Neonatal Operational Clinical Lead
Julie-Clare Becher	Consultant Neonatologist, NHS Lothian, Edinburgh BAPM Quality Collaborative Lead
Gillian Bowker	Infant Feeding Advisor, NHS Greater Glasgow and Clyde
Cathy Budd	Infant feeding Specialist Nurse, North Bristol NHS Trust, Bristol
Sara Clarke	Senior Specialist Neonatal Network Dietitian, West Midlands Neonatal ODN
Lindsay Cracknell	Parent Representative
Aniko Deierl	Consultant Neonatologist, Imperial College NHS Healthcare Trust, London
Kate Dinwiddy	Chief Executive, BAPM
Cora Doherty	Consultant Neonatologist, University Hospital of Wales, Cardiff
Kelly Harvey	Quality Improvement Lead Nurse, North West Neonatal ODN
Marcus Hook	Membership and Finance Coordinator, BAPM
Genevieve Howell	Parent Representative
Minesh Khashu	Consultant Neonatologist and Professor of Perinatal Health, Poole Hospital NHS Foundation Trust
Ilana Levene	Paediatric Trainee, Thames Valley and DPhil Student, University of Oxford
Jo Marks	Professional Lead for Speech and Language Therapy, Manchester
Tanya Miles	Midwife, Great Western Hospitals NHS Foundation Trust, Swindon
Nicola Williamson	Parent Representative

Parent Representatives were recruited with generous assistance from Bliss.

Additional stakeholders involved in consultation:

Lead Maternity Safety Champions, NHS England:

Matthew Jolly, National Clinical Director for Maternity and Women's Health

Jacqueline Dunkley-Bent, Chief Midwifery Officer

Maternity and Neonatal Safety Improvement Programme

Royal College of Obstetrics and Gynaecology

British Intrapartum Care Society

British Maternal and Fetal Medicine Society

UK Preterm Clinical Network

UNICEF BFI

National Infant Feeding Network

Neonatal Nurses Association

Bliss

Appendix 2. BAPM Neonatal Service Quality Indicators

Evidence-based care

NSQI 1 Care Guidelines supported by Audit

Team working and communication

NSQI 2 Team communication

NSQI 3 Staff Safety Culture

NSQI 4 Pathways of Care and Referral for high risk babies

NSQI 5 Collaborative multidisciplinary care for babies with complex conditions

Parental partnership in care

NSQI 6 Family facilities

NSQI 7 Family involvement in care planning and delivery

NSQI 8 Parent information

NSQI 9 Parent feedback

NSQI 10 Parent involvement in service development

Benchmarking

NSQI 11 Other Neonatal Service Standards

NSQI 12 Engagement in National and International Audit and Benchmarking

Patient Safety

NSQI 13 Adverse Event Review

NSQI 14 Death and Serious Adverse Event Review

Quality Improvement

NSQI 15 Structure and Resources for Quality Improvement

NSQI 16 Annual Quality Strategy and Quality Report

Education and Training

NSQI 17 Training for Quality and Patient Safety

NSQI 18 Engagement in shared learning about Quality of Care

Research

NSQI 19 Engagement in Research

Appendix 3. QI tools, standards and guidelines

BAPM Quality Webpages
Specific BAPM resources at www.bapm.org/pages/2-quality
Other QI resources at BAPM QI Signpost: www.bapm.org/resources/category/Quality%20Resources

Institute for Healthcare Improvement
http://www.ihi.org/resources/Pages/default.aspx

UNICEF Baby Friendly Initiative
https://www.unicef.org.uk/babyfriendly/

EFCNI European Foundation for the Care of Newborn Infants
https://www.efcni.org/health-topics/in-hospital/breastfeeding-and-nutrition-of-preterm-babies/

GLANCE Global Alliance for Newborn Care
https://www.glance-network.org/

La Leche League GB
https://www.laleche.org.uk/successfully-breastfeeding-premature-baby/

Maternity and Neonatal Health Safety Collaborative
https://improvement.nhs.uk/resources/maternal-and-neonatal-safety-collaborative/

https://www.england.nhs.uk/wp-content/uploads/2020/08/20190308_Optimisation_v2.1.pdf

Breastfeeding Network
https://www.breastfeedingnetwork.org.uk/

British Dietetic Association handling breast milk guideline
https://www.bda.uk.com/uploads/assets/913a1f78-c805-42c1-8d85e37ca75e0fc0/2019sfuguidelines.pdf

Drugs and Lactation Database (LactMed)
https://www.ncbi.nlm.nih.gov/books/NBK501922/

Appendix 4. Resources

BLISS resources on expressing and maternal milk
https://www.bliss.org.uk/parents/about-your-baby/feeding

Bliss Baby Charter
https://www.bliss.org.uk/health-professionals/bliss-baby-charter
The Bliss Baby Charter is designed to standardise high quality family-centred care across the UK, enabling units to audit their practices and develop meaningful plans to achieve changes that benefit babies and their families. The aim of Principle 6 'Feeding' is that breast milk expression and breastfeeding are actively promoted, and mothers receive appropriate information and practical support to achieve successful lactation. This principle aligns with best practice standards, including those outlined in BFI.

PERIPrem Early Breast Milk for Preterm Babies - Patient Information Leaflet
https://www.weahsn.net/our-work/transforming-services-and-systems/periprem/periprem-bundle-early-breast-milk/

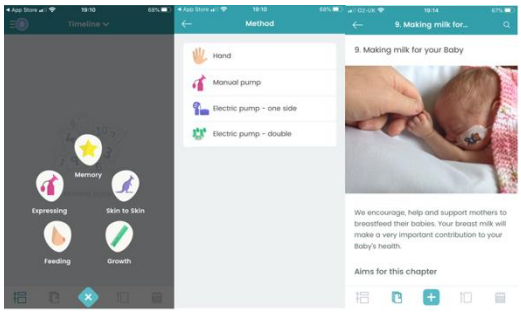
Media produced by West Midlands Neonatal Network

- Buccal colostrum Leaflet: http://swmnodn.org.uk/wp-content/uploads/2020/04/Buccal-Colostrum-leaflets-2020-v1.pdf
- Buccal colostrum guideline: http://swmnodn.org.uk/wp-content/uploads/2017/11/guideline-for-buccal-colostrum-finalsept2017-EF.pdf
- Colostrum poster: http://swmnodn.org.uk/wp-content/uploads/2020/01/Buccal-colostrum-2020.pdf

Edinburgh "Golden Drops": An early expressing initiative to improve first day provision of mother's own milk to preterm babies: https://www.bapm.org/resources/302-qi-storyboard-golden-drops

Scottish Improvement Science Collaborating Centre Evidence into Practice: Breastfeeding and kangaroo skin-to-skin care for babies & families in neonatal units
https://siscc.dundee.ac.uk/wp-content/uploads/2018/05/MCH-Final-Report-v7.pdf

The Integrated Family Delivered Neonatal Care (IFDC) App is a parent supporting mobile application developed by Imperial College NHS Healthcare Trust, available both on IOS and Androids. Parents can log their expressing volumes easily in the diary then discuss with the neonatal team. There is also a chapter on lactation in the parent education materials.



https://www.nhs.uk/apps-library/integrated-family-delivered-neonatal-care-ifdc/

UNICEF Baby Friendly Expressing Assessment Form

https://www.unicef.org.uk/babyfriendly/wp-content/uploads/sites/2/2016/10/Assessment-of-breastmilk-expression-checklist-2017.pdf

a. **Example of BFI audit tools -** Overview of areas covered in UNICEF BFI audit process for mothers with a baby receiving neonatal care
   - The questions are broken down into 3 sections linked with 3 new Neonatal standards
   - Mothers are asked how they were encouraged to get to know their baby in the early days and if they understood why this was important. Early skin to skin contact is also mentioned.
   - Mothers are asked if anyone has explained the importance of their breastmilk to them and then more detail about what expressing support they have had: when, how and then on-going support. There are questions about what help they have had with breastfeeding, how they know that their baby is feeding well and getting enough milk, and if they were able to stay in the hospital before taking baby home along with responsive feeding and how to get support at home.
   - There is also a lot of emphasis on how involved parents have felt in their baby's care: eg decision making, feeling in control and doing the care tasks and if they were made to feel welcome and comfortable and be with their baby at all times.

b. **Example of BFI checklist for early MBM for preterm babies -** (this checklist can be incorporated into stabilisation and Golden Hour checklists) https://www.unicef.org.uk/babyfriendly/wp-content/uploads/sites/2/2016/10/Assessment-of-breastmilk-expression-checklist-2017.pdf