

# Driver diagram and change package

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

Evidenced by (i) a reduction in the proportion of babies admitted to neonatal units with hypothermia (temperature  $<36.5^{\circ}\text{C}$ ) (ii) Proportion of babies delivered in appropriate care setting for gestation

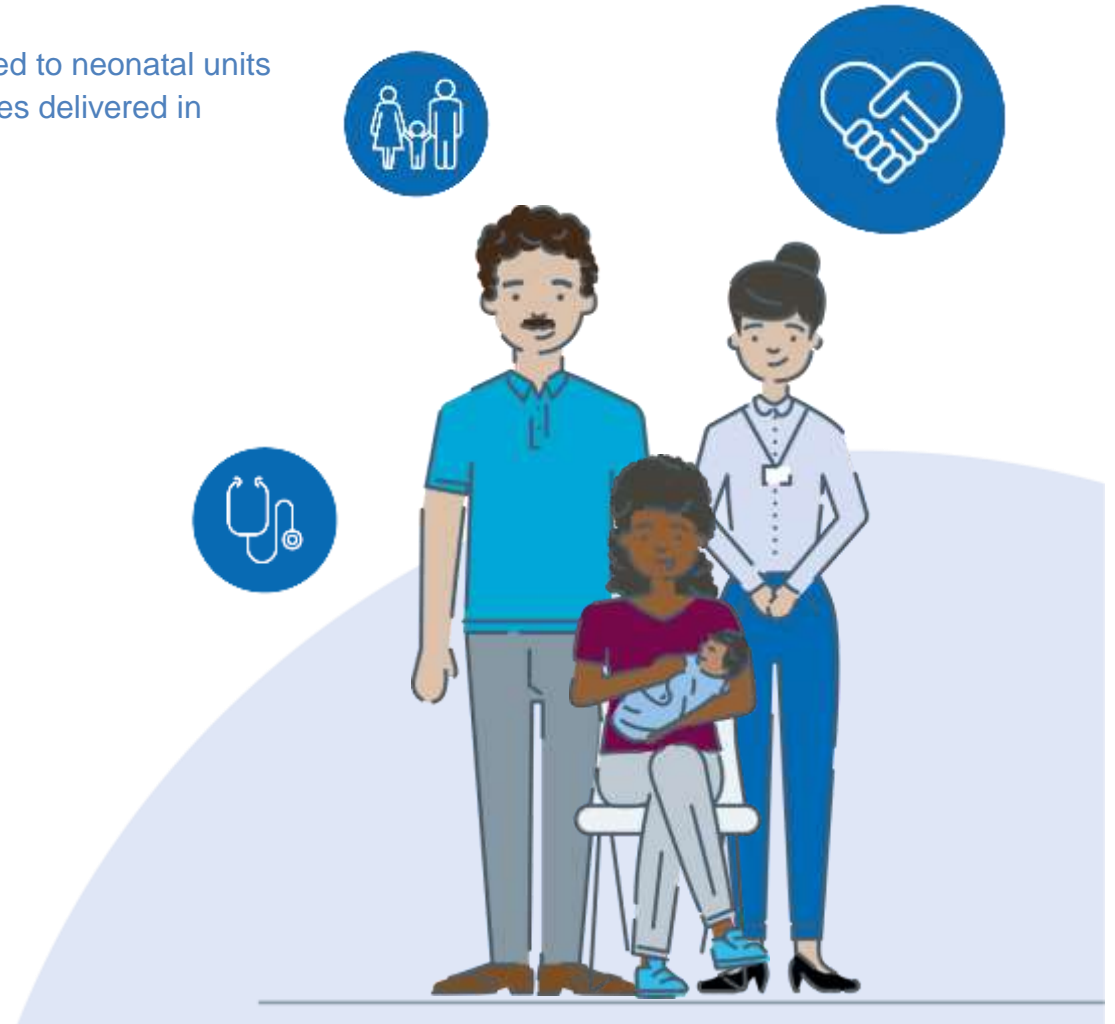
### National maternal and neonatal health safety collaborative

*A driver diagram is used to conceptualise an issue and to determine its system components which will then create a pathway to achieve the goal.*

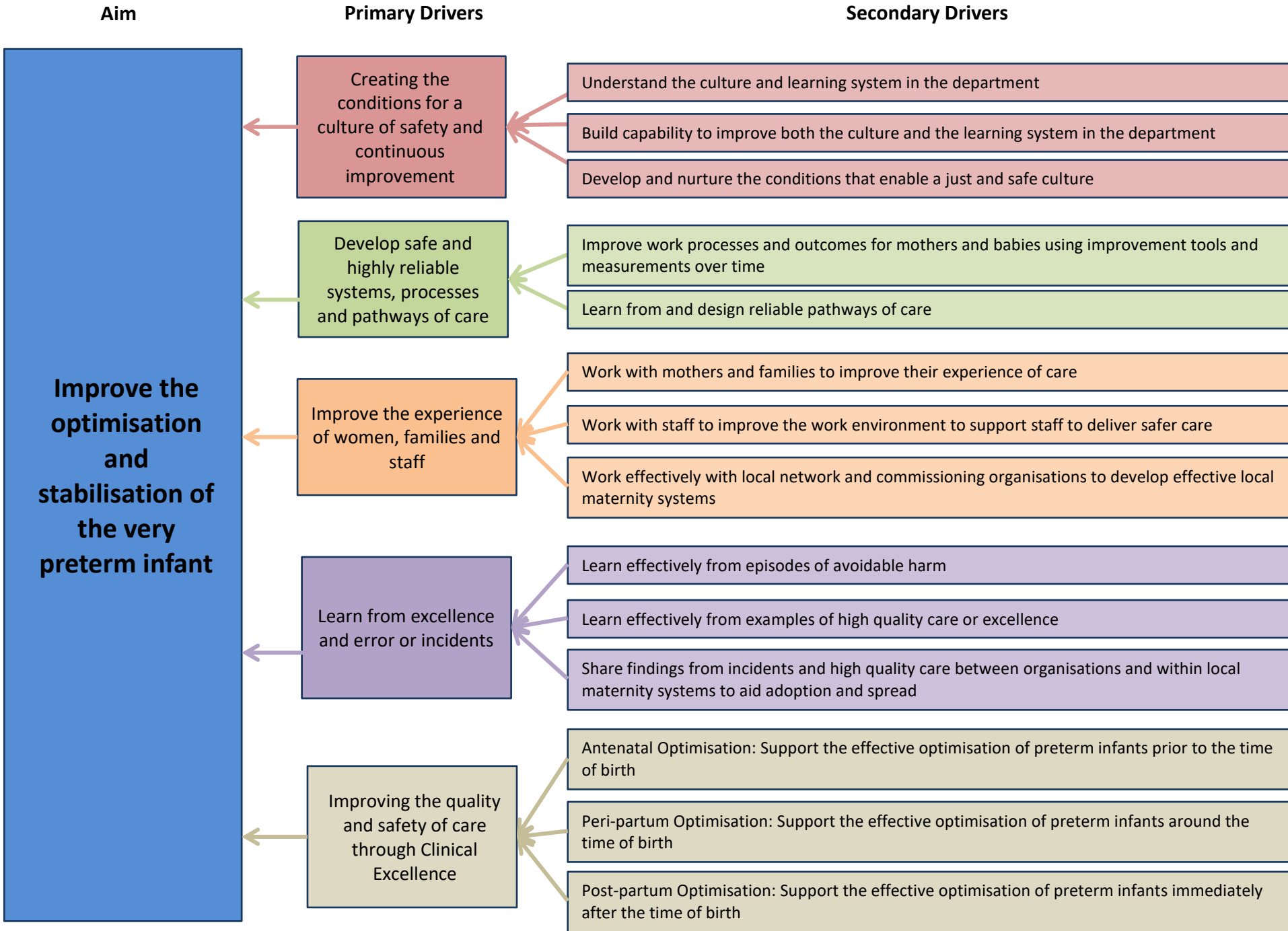
*Primary Drivers are system components which will contribute to moving the primary outcome.*

*Secondary drivers are elements of the associated primary driver. They contain change concepts that can be used to create projects that will affect the primary driver.*

*Minimum dataset and other suggested additional measures are at the back of this document.*



collaboration trust respect innovation courage compassion



**Creating the conditions for a culture of safety and continuous improvement**

<b>Secondary drivers</b>	<b>Change concepts and change ideas for PDSA testing</b>
Understand the culture and learning system in the department	<ul style="list-style-type: none"> <li>• Raise awareness of safety culture within the department / organisation</li> <li>• Undertake an assessment of local safety culture to gain an understanding of the departmental culture and learning system i.e. how learning is systematically used to continually improve, and repeat surveys at intervals to evidence change</li> <li>• Share findings and debrief with staff</li> <li>• Undertake informal listening exercises with staff to add to the understanding of the local culture and learning system</li> <li>• Seek the opinion of women and their families</li> </ul>
Build capability to improve both the culture and the learning system in the department	<ul style="list-style-type: none"> <li>• Raise awareness of improvement science as a means to systematically enable improvement and change i.e. to understand 'how' to implement evidence based practice</li> <li>• Build capability of improvement science , including human factors with a critical mass of staff</li> <li>• Ensure teams use improvement science to test ideas of change before implementation and spread</li> <li>• As part of the local improvement plan, use the findings from the safety culture assessments and listening events to develop and test changes to improve the safety culture</li> <li>• Ensure leaders act as the guardians of the learning system and support teamwork and psychological safety, and the process of learning into improvement on a continuous cycle</li> <li>• Leaders, managers and team members to use learning boards to communicate and share the process of improvement</li> <li>• Build on the work of your board level maternity safety champion and improvement leads, with all staff acting as safety champions</li> <li>• Develop a departmental improvement infrastructure; a virtual or real space, where improvement leads and others supporting improvement work can meet, have safety improvement conversations, where the improvement plan is reviewed and improvement activity is planned and reviewed regularly.</li> <li>• Build safety and improvement conversations in staff IPRs to help focus on the knowledge, skills and behaviours required to nurture a safety culture and continuous learning, including leadership for safety</li> <li>• Ensure measurement over time is used to communicate the progress of improvement projects</li> <li>• Develop a resource of improvement ideas, case studies and tools that will provide further opportunities to build capability through staff knowledge, skills and behaviours</li> <li>• Raise awareness amongst all staff of the cultural aims of the department and the plan to achieve them</li> <li>• Communicate improvement success and failures within the department and MNHSC Local Learning System local learning system</li> <li>• Ensure that patient safety and development of the learning system is everyone's responsibility</li> </ul>
Develop and nurture the conditions that enable a just and safety culture	<ul style="list-style-type: none"> <li>• Develop a shared vision and ambition for the department</li> <li>• Develop teams to work more effectively; ensure shared understanding and anticipation of needs and problems and agreed methods to manage these, including how to resolve conflict</li> <li>• Develop transparency and sharing between the workforce and leadership teams by publically sharing data relating to the safety and reliability of care, decision making and the process of improvement and learning</li> <li>• Create an environment where people feel confident, comfortable and have opportunities to raise concerns that will be actioned and can ask questions without redress</li> <li>• Individuals held to act in a safe and respectful manner and given the training and support to do so</li> <li>• Leaders at all levels to visibly prioritise safety and role model behaviours</li> <li>• Leaders at all levels to engage with the improvement leads and projects by visiting the site/s to regularly monitor, and review the progress; via learning boards, improvement walk rounds, drop ins and listening events</li> <li>• Leaders to understand the progress of improvement projects and to facilitate the removal of barriers where relevant.</li> <li>• Teams should agree to a common set of behaviours and expectations, and for any deviation to be identified and challenged</li> <li>• Teams should use standardised communication tools such as SBAR in team handovers and at transition points of care</li> <li>• Teams to use briefings or huddles to anticipate potential safety issues and agree how to monitor and respond</li> <li>• Teams use debriefs to learn from excellence and harm, after clinical interventions and at the end of shifts</li> <li>• Teams understand situational awareness and use it to improve safety in the working day and during high risk interventions</li> </ul>

<b>Develop safe and highly reliable systems, processes and pathways of care</b>	
<b>Secondary drivers</b>	<b>Change concepts and change ideas for PSDA testing</b>
Improve work processes and outcomes for mothers and babies using improvement tools and measurements over time	<ul style="list-style-type: none"> <li>• Develop a local measurement plan that aligns with the local improvement aim(s) and the MNHSC national driver diagram</li> <li>• Identify project measures that monitor the effects of the changes being made by the improvement team over time, and enable learning as part of a PSDA cycle</li> <li>• Collect and share project measures with department staff, women and families using an agreed method; learning boards, safety crosses and web based platforms</li> <li>• Ensure data accurately records women's status and movement through the care process is captured and used to inform learning</li> </ul>
Learn from and design reliable pathways of care	<ul style="list-style-type: none"> <li>• Apply best evidence and reduce unwarranted variation with the goal of failure free operation over time. To ensure all women and babies are consistently provided with safe reliable high quality care</li> <li>• Process map the whole pathway of care in order to understand the current process steps and their potential complexities, but also to establish any duplication and processes which do not add value to the pathway. These will form the basis of change ideas for PSDA testing</li> <li>• Reduce any other 'waste' using lean principles to streamline the processes and pathway of care</li> <li>• Undertake demand and capacity modelling to improve flow and inform a redesign approach through the maternity and neonatal service</li> <li>• From learning above, simplify the pathway to reduce duplication and waste and activities which do not add value to the woman, family or the organisation</li> <li>• Design and develop pathways of care by working in partnership with women and the wider multidisciplinary team and test this by using the model for improvement approach</li> </ul>

<b>Improve the experience of women, families and staff</b>	
<b>Secondary drivers</b>	<b>Change concepts and change ideas for PDSA testing</b>
Work with mothers and families to improve their experience of care	<ul style="list-style-type: none"> <li>• Using a range of approaches to better understand the perspectives and experiences of women and their families; surveys, listening events and focus groups</li> <li>• Engage with couples and families to co design and make improvements to pathways and processes</li> <li>• Engage with project team members to ensure that women and their families are part of the process to redesign and review new processes and pathways</li> <li>• Undertake with women and their families an informal assessment/ listening event of the local culture in relation to the improvement aim</li> <li>• Work with women to Improve awareness, identification and management of improvement project aim</li> </ul>
Work with staff to improve the work environment to support staff to deliver safer care	<ul style="list-style-type: none"> <li>• Canvass staff opinion, what could be done better, what do we do well, what change ideas could we test</li> <li>• Undertake with staff an informal assessment/ listening event of the local culture in relation to the project aim.</li> <li>• Provide staff with the opportunity and a range of ways that they can be involved in the project.</li> <li>• Work with staff to Identify and acquire physical resources, educational needs and identify links with outside organisations required by staff to be able to make improvements</li> <li>• Engage with staff in peer organisations via the Learning system to share learning</li> <li>• Work with all the project team members to ensure that staff are part of the process to redesign and review new processes and pathways</li> </ul>

<b>Learn from excellence and error or incidents</b>	
<b>Secondary drivers</b>	<b>Change concepts and change ideas for PDSA testing</b>
Increase learning from episodes of avoidable harm via robust investigation and system learning	<ul style="list-style-type: none"> <li>Engage staff within the team and risk/governance departments to map the current process for reporting, investigating and learning</li> <li>Work with key stakeholders to develop a reliable reporting processes that align with national guidance and enables all staff to record episodes of harm at all times of day/out of hours</li> <li>Regular review of investigations to ensure multidisciplinary team involvement and compliance with national guidance</li> <li>Agree standards/training requirements for staff undertaking investigations (competency framework)</li> <li>Develop a register of all staff who have received the appropriate training to undertake investigations</li> <li>Ensure all investigations and action plans consider and seek to address underlying system and human factors</li> <li>Ensure there is an ability to develop learning from multiple incidents and other qualitative sources of safety reporting</li> <li>Develop a standardised approach for communicating with women and families</li> <li>Ensure all women and families are offered choice and are adequately supported and prepared to participate in any local reviews.</li> <li>Develop reliable processes and fail-safe mechanisms for ensuring investigations are carried out on time</li> <li>Develop reliable processes for communication and sharing learning with the multidisciplinary team</li> <li>Ensure regular review to assess whether learning has been embedded and sustained over time</li> <li>Agree approach for examining trends and measuring safety</li> <li>Agree approach for presenting/displaying learning from incidents over time</li> </ul>
Increase learning from examples of high quality care or excellence	<ul style="list-style-type: none"> <li>Develop reliable reporting processes so all staff are able to record examples of high quality care at all times of day/out of hours</li> <li>Develop effective and timely feedback loops to acknowledge best practice and support staff in identifying the factors which contributed to the delivery of high quality care</li> <li>Develop a reliable process for exploring the underlying the conditions, systemic and human factors which contributed to an event being well managed</li> <li>Ensure all staff groups are communicated with and understand the reason and need for change</li> <li>Ensure all staff, where appropriate are able to access peer support, coaching and/or mentoring to make the changes necessary to improve care provided to women &amp; babies</li> <li>Agree approach for disseminating and sharing learning from episodes of high quality care</li> </ul>
Increase learning from incidents and high quality care between organisations and within local maternity systems	<ul style="list-style-type: none"> <li>Agree communication processes within local learning system</li> <li>Agree methods for measuring organisational/system learning</li> <li>Ensure communities of practice include representation from service users</li> <li>Agree processes for communication and engagement with local maternity voice partnerships</li> </ul>

Improving the quality and safety of care through Clinical Excellence	
Secondary drivers	Change concepts and change ideas for PDSA testing
Antenatal Optimisation: Support the effective optimisation of preterm infants prior to the time of birth	<ul style="list-style-type: none"> <li>• Ensure all women in threatened pre-term labour (less than 34 weeks gestation) receive a full course of antenatal corticosteroids (where appropriate)</li> <li>• Ensure all women in threatened pre-term labour (less than 30 weeks gestation) receive an infusion of Magnesium Sulphate (where appropriate)</li> <li>• Ensure all women in threatened preterm labour are informed of the increased benefits of breast milk and breastfeeding for preterm infants.</li> <li>• ensure that appropriate information and equipment is available prior to delivery to support timely expressing within four hours of delivery for women who choose to provide breastmilk for their infants</li> <li>• Develop a consistent approach for ensuring all obstetric and neonatal staff provide women with counselling and appropriate information regarding the need for in-utero transfer</li> </ul>
Peri-partum Optimisation: Support the effective optimisation of preterm infants around the time of birth	<ul style="list-style-type: none"> <li>• Ensure all preterm babies receive effective care at the time of birth</li> <li>• Communication/discussion with the maternity and neonatal team to consider the role and potential for delayed cord clamping/cord stripping to allow for placental transfusion</li> <li>• Ensure ongoing monitoring of the delivery environment which is free from draughts and has an ambient room temperature of 25-28°C (aim ≥26°C if &lt;28 weeks gestation)</li> <li>• Ensure the delivery of infants &lt;32 weeks gestation into a plastic/polyethylene wrap or bag (feet first), using an external radiant heat source and apply wool hat</li> <li>• Ensure all babies receive optimum care immediately after birth before transfer to the neonatal unit</li> <li>• Promote respiratory stabilisation at delivery with PEEP in air to 30% oxygen with oxygen titrated against saturation</li> <li>• Promote the maintenance of PEEP (where required) with minimal interruption of less than 10 sec between birth and the application of definitive non-invasive ventilatory support (in infants not requiring intubation)</li> <li>• Promote the administration of surfactant within 2 min for those of intubation in infants requiring intubation</li> <li>• Timely communication with parents regarding the condition of the infant and planned care for their baby.</li> </ul>
Post-partum Optimisation: Support the effective optimisation of preterm infants immediately after the time of birth	<ul style="list-style-type: none"> <li>• Develop plans of care that prevent neonatal hypothermia (temperature &lt;36.5°C)</li> <li>• Assess babies for risk of hypoglycaemia</li> <li>• Detect and manage suspected sepsis, which promotes the administration of antibiotic treatment within 1 hour of the decision to give the plan being made</li> <li>• Ensure women and families are informed of the benefits of breast milk and breastfeeding</li> <li>• Ensure all mothers are provided with support to begin expressing within 4-6 hours of delivery</li> <li>• Standardise the approach for ensuring where possible, parental/infant interaction prior to transfer to the NNU</li> <li>• Transfer the infant into a humidified, double walled and pre-warmed incubator (35 to 37°C)</li> <li>• Ensure all infants are cared for in a plastic bag/wrap during weighing and until temperature is stable. This may include during line insertion</li> <li>• Ensure the first temperature is being measured and recorded within 1 hour of birth and that temperature is maintained at &gt;36.5 degrees centigrade</li> </ul>

Minimum dataset Mandatory collection via MatNeo Improvement portal		
Primary Driver	Secondary Driver	Metric
Creating the conditions for a culture of safety and continuous improvement	Understand the culture and learning system in the department	<ul style="list-style-type: none"> <li>Proportion of staff undertaking a culture survey</li> </ul>
	Build capability to improve both the culture and the learning system in the department	<ul style="list-style-type: none"> <li>Number of staff received training in: <i>Insert subject</i></li> </ul>
	Develop and nurture the conditions that enable a just and safety culture	<ul style="list-style-type: none"> <li>Number of cultural components implemented</li> </ul>
Improve the experience of women families and staff	Work with mothers and families to improve their experience of care	<ul style="list-style-type: none"> <li>Proportion of improvement projects that women are involved with</li> </ul>
	Work with staff to improve the work environment to support staff to deliver safer care	<ul style="list-style-type: none"> <li>Proportion of projects where there is full multidisciplinary team involvement beyond the improvement leads</li> </ul>
Develop safe and highly reliable systems, processes and pathways of care	Develop a collaborative measurement plan that measures improvement and demonstrates impact over time	<ul style="list-style-type: none"> <li>Proportion of improvement projects reporting measures</li> </ul>
	Learn from and design reliable processes and pathways of care	<ul style="list-style-type: none"> <li>Proportion of pathways reliably implemented</li> </ul>
Learn from excellence and error or incidents	Increase learning from episodes of avoidable harm via robust investigation and system learning	<ul style="list-style-type: none"> <li>Number of harm incidents /number of learning activities post harm</li> </ul>
	Increase learning from examples of high quality care or excellence	<ul style="list-style-type: none"> <li>Number of excellence incidents/ number of learning activities post harm</li> </ul>
	Increase learning from incidents and high quality care between organisations and within local maternity systems	<ul style="list-style-type: none"> <li>Number of incidents shared external to the organisation</li> </ul>
Implement the clinical interventions that achieve the intended outcome	Antenatal Optimisation: Support the effective optimisation of preterm infants prior to the time of birth	<ul style="list-style-type: none"> <li><b>Proportion of babies delivered in appropriate care setting for gestation*</b></li> <li>Proportion of babies (less than 34 weeks) receiving a full course of antenatal corticosteroids prior to birth</li> <li>Proportion of babies (less than 30 weeks) receiving a full course of magnesium sulphate within 48 hours prior to birth</li> </ul>
	Peri-partum Optimisation: Support the effective optimisation of preterm infants around the time of birth	<ul style="list-style-type: none"> <li>Proportion of babies less than 34 weeks who receive delayed cord clamping at the time of delivery</li> </ul>
	Post-partum Optimisation: Support the effective optimisation of preterm infants immediately after the time of birth	<ul style="list-style-type: none"> <li><b>Proportion of babies admitted to NNU with hypothermia (temperature &lt;36.5°C)*</b></li> </ul>

\*metric in bold, indicate metric(s) that support the aim statement for each clinical driver



Additional Metrics		
Suggested additional collection via Life QI		
Primary Driver	Secondary Driver	Metric
Creating the conditions for a culture of safety and continuous improvement	Understand the culture and how we learn in this department	<ul style="list-style-type: none"> <li>Number of listening events held</li> <li>Number of actionable changes tested</li> </ul>
	Build capability to improve both the culture and the learning system in the department	<ul style="list-style-type: none"> <li>Number of safety walk rounds/board rounds completed</li> <li>Number of staff trained in safety culture awareness</li> <li>Number of improvement projects</li> <li>Progression of mean trust progress assessment scale</li> <li>Number of staff using improvement methodology</li> <li>Number of projects where senior/exec/board leadership is actively involved</li> <li>Number of staff who have had safety and quality improvement as part of their PDR/CPD plan</li> <li>Proportion of projects that share data over time through the learning board</li> </ul>
	Develop and nurture the conditions that enable a just and safety culture	<ul style="list-style-type: none"> <li>Number of staff trained in team working for safety</li> <li>Number of huddles with multidisciplinary team present</li> <li>Number of safety walk rounds/board rounds completed</li> <li>Proportion of times that safety briefing occurs</li> <li>Proportion of times that safety de brief occurs</li> <li>Number of times SBAR is used</li> </ul>
Improve the experience of women families and staff	Work with mothers and families to improve their experience of care	<ul style="list-style-type: none"> <li>Proportion of women and their families invited to contribute to the project</li> <li>Number of occasions progress is reported to women and their families</li> </ul>
	Work with staff to improve the work environment to support staff to deliver safer care	<ul style="list-style-type: none"> <li>Number of staff engagement events held</li> <li>Proportion of staff that report being part of the project or know how to contribute if they wanted</li> <li>Number of occasions progress communicated to staff</li> <li>Proportion of staff trained in*improvement project aim</li> </ul>
Develop safe and highly reliable systems, processes and pathways of care	Develop a collaborative measurement plan that measures improvement and demonstrates impact over time	<ul style="list-style-type: none"> <li>Number of occasions that project measures are collected</li> <li>Number of occasions that project measures are uploaded as required to national or local system</li> <li>Number of occasion in a month that measures are shared with wider team</li> </ul>
	Learn from and design reliable processes and pathways of care	<ul style="list-style-type: none"> <li>Number of occasions a process in the testing phase * is implemented accurately</li> <li>Number of new processes that are tested for reliability</li> <li>Number of pathways mapped</li> <li>Number of projects achieving reliability</li> </ul>
Learn from excellence and error or incidents	Increase learning from episodes of avoidable harm via robust investigation and system learning	<ul style="list-style-type: none"> <li>Proportion of occasions care/intervention is omitted within the pathway</li> <li>Number of occasions dissatisfaction is reported by women or their families</li> <li>Number of occasions that staff report harm</li> <li>Proportion of staff trained to report harm</li> <li>Number of harm investigations that are investigated</li> <li>Number of near misses reported</li> </ul>
	Increase learning from examples of high quality care or excellence	<ul style="list-style-type: none"> <li>Number of times women report satisfaction/excellence within the pathway</li> <li>Number of episodes of excellence reported by staff in relation to the pathway</li> <li>Proportion of staff informed/trained how to report excellence</li> <li>Proportion of excellence episodes that are investigated</li> </ul>
	Increase learning from incidents and high quality care between organisations and within local maternity systems	<ul style="list-style-type: none"> <li>Number of times learning is shared outside the trust</li> </ul>

Additional Metrics		
Suggested additional collection via Life QI		
Primary Driver	Secondary Driver	Metric
Implement clinical interventions that achieve the intended outcome	Antenatal Optimisation: Support the effective optimisation of preterm infants prior to the time of birth	<ul style="list-style-type: none"> <li>Number of women transferred in-utero as proportion of all women who should have been transferred</li> <li>% of eligible women transferred in-utero No of babies requiring ex-utero transfer (<i>N:B: International comparison suggests only 10 % of babies should deliver without transfer</i>)</li> <li>Proportion of women who received fetal fibronectin or transvaginal USS to detect those at increased risk of delivery.</li> <li>Proportion of fetal fibronectin results which provided a false positive/false negative result</li> <li>Proportion of women &lt; 34 weeks receiving full course of antenatal corticosteroids prior to birth</li> <li>Proportion of women &lt; 34 weeks receiving at least one dose of antenatal corticosteroids prior to birth</li> <li>Proportion of babies receiving magnesium sulphate prior to birth according to local policy</li> <li>Proportion of eligible women who receive antenatal counselling regarding the benefits of breast milk</li> </ul>
	Peri-partum Optimisation: Support the effective optimisation of preterm infants around the time of birth	<ul style="list-style-type: none"> <li>Proportion of eligible babies which received delayed cord clamping</li> <li>Proportion of delivery suite environments which maintained temperatures between 25-28°C</li> <li>Proportion of eligible babies who were delivered into a polythene bag</li> </ul>
	Post-partum Optimisation: Support the effective optimisation of preterm infants immediately after the time of birth	<ul style="list-style-type: none"> <li>Number of women who begin expressing within 6 hours following delivery</li> <li>IVAB administered within one hour of the decision to treat</li> <li>Number of preterm babies (&lt;1500g) receiving any human milk</li> <li>Proportion of preterm babies (&lt;1500g) suckling from the breast at discharge</li> <li>Proportion of babies who received the appropriate blood sugar measurement</li> <li>Proportion of eligible babies who received IV infusion of Dextrose within one hour following delivery</li> <li>Proportion of eligible babies who were cared for in a polythene bag during weighting and line insertion</li> <li>Proportion of babies who have a documented temperature within one hour following birth</li> </ul>

<b>Change Packages, Case studies and resources</b>		
<b>Primary Driver</b>	<b>Secondary Driver</b>	
Implement clinical interventions that achieve the intended outcome	Antenatal Optimisation: Support the effective optimisation of preterm infants prior to the time of birth	<ul style="list-style-type: none"> <li>• PreCept</li> <li>• East of England 'First hour of care' bundle</li> <li>• East of England NEC care bundle</li> </ul>
	Peri-partum Optimisation: Support the effective optimisation of preterm infants around the time of birth	<ul style="list-style-type: none"> <li>• East of England 'First hour of care' bundle</li> <li>• East of England NEC care bundle</li> </ul>
	Post-partum Optimisation: Support the effective optimisation of preterm infants immediately after the time of birth	<ul style="list-style-type: none"> <li>• East of England 'First hour of care' bundle</li> <li>• East of England NEC care bundle</li> </ul>