

Maternity and  
Neonatal

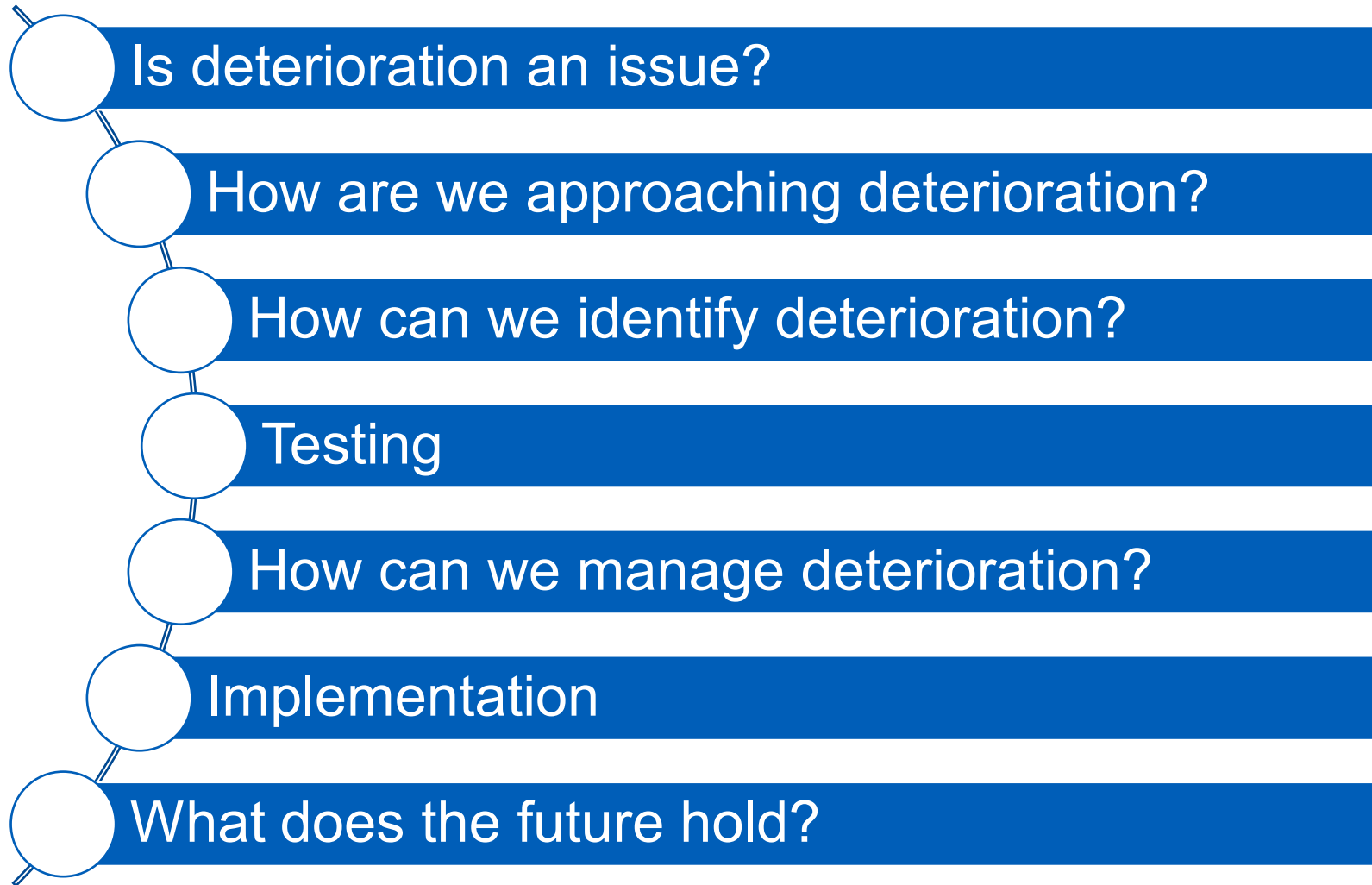
# Early Recognition and Management of Deterioration of Women and Babies

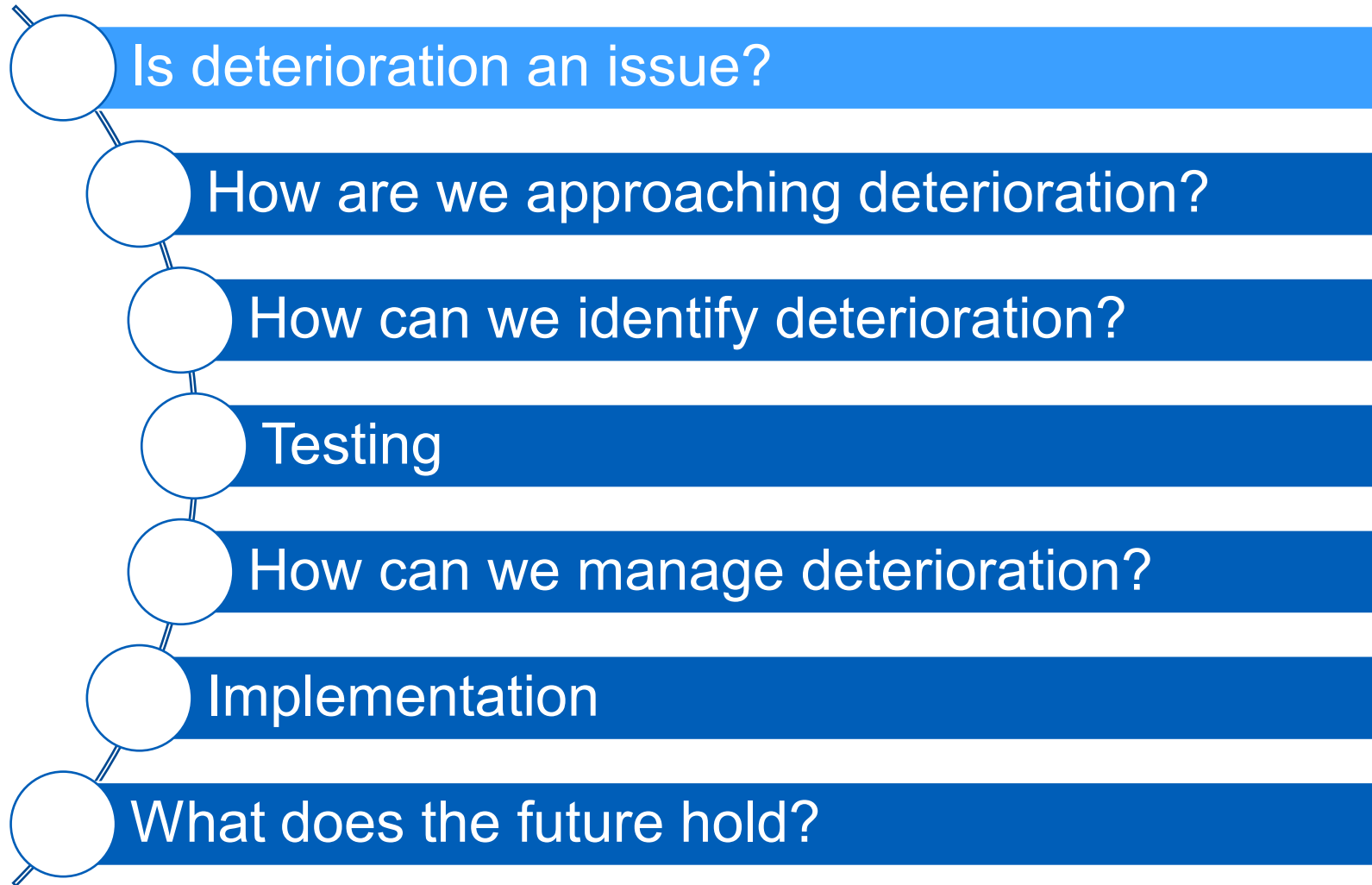
 @PTSafetyNHS / @MatNeoSIP

[www.england.nhs.uk](http://www.england.nhs.uk)

Delivered by:  
*The***AHSN***Network*

Led by:  
**NHS England**





## Is deterioration an issue?

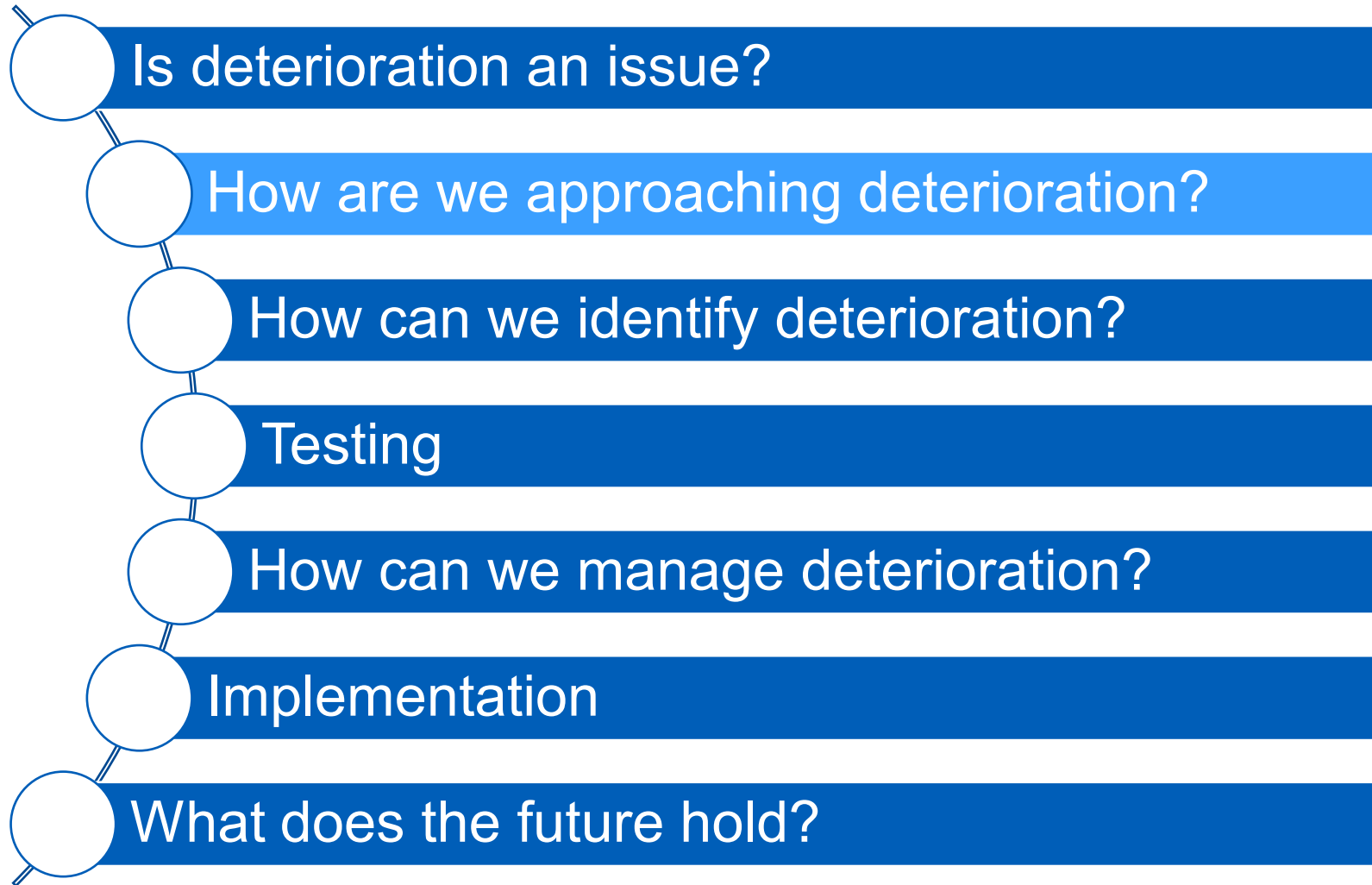
- Failure to identify, escalate and respond appropriately
- Miscommunication and a lack of standardised processes
- Failures to recognise, manage and communicate risks
- Care provided to pregnant women and babies occurs in a wide range of clinical settings



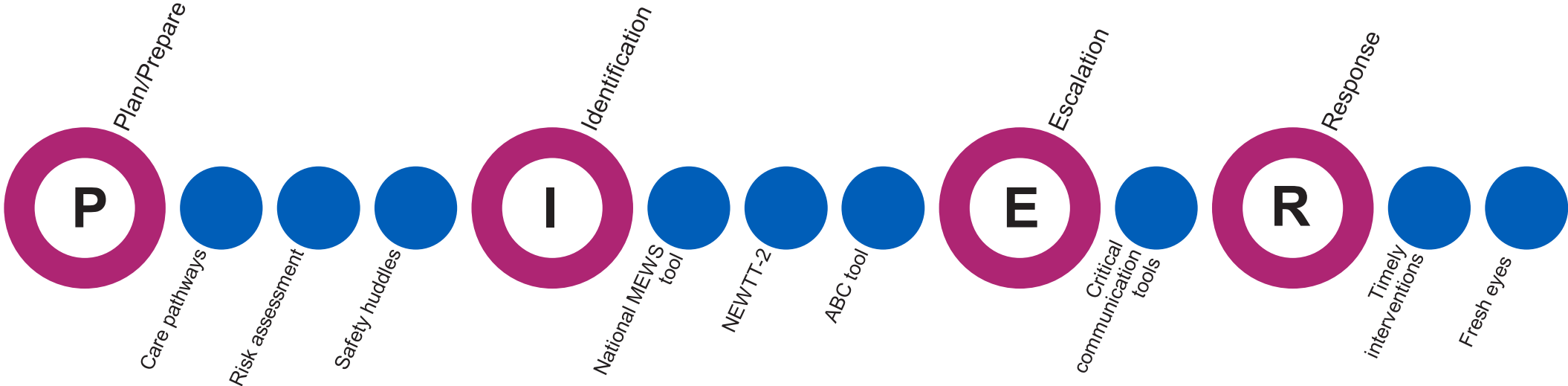
## Why does deterioration continue to be an issue?

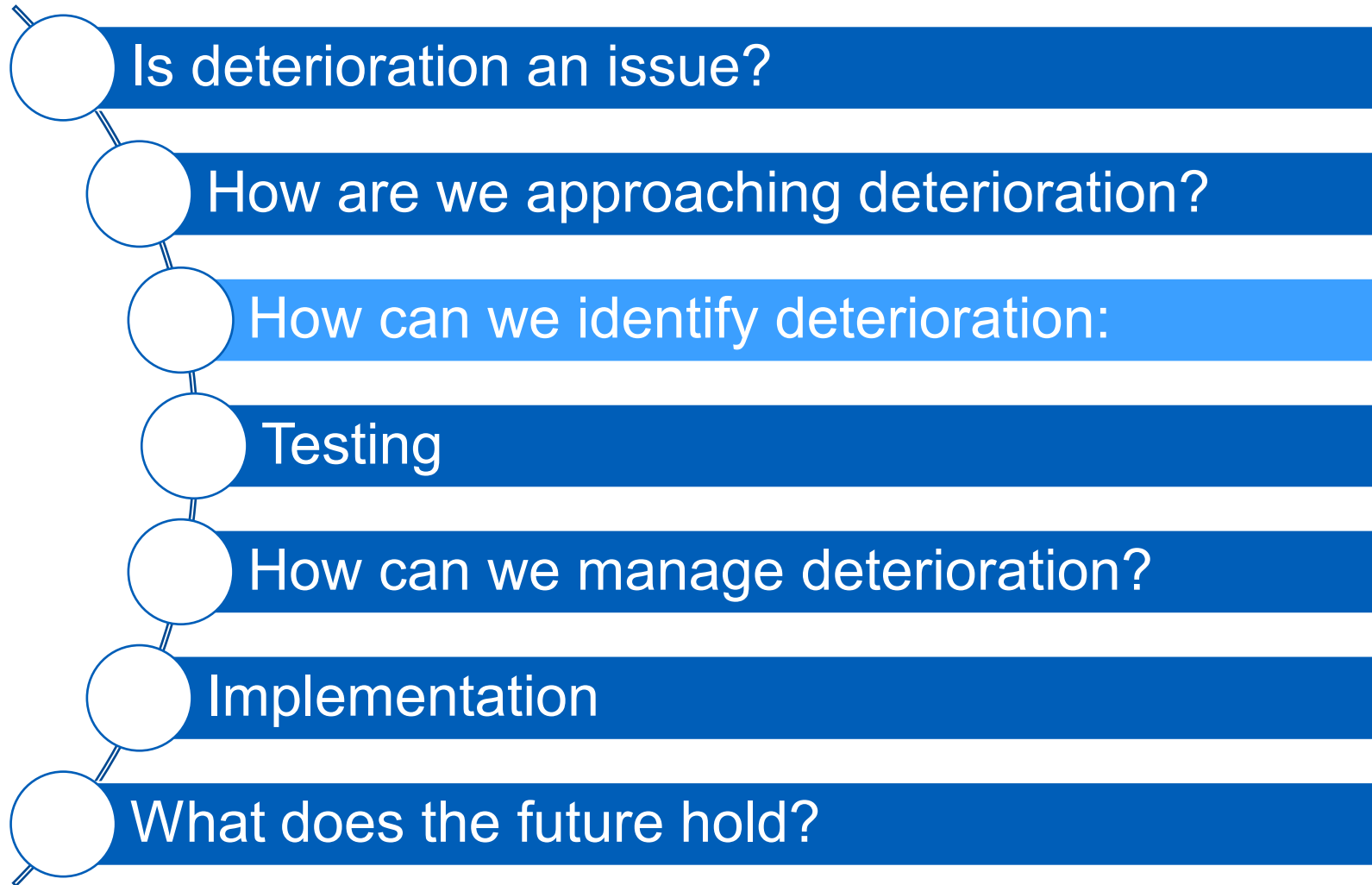
- We often try to fix the 'wrong' thing
- We have failed to fully acknowledge the impact of culture
- There has been no national standard tool/pathway
- There is a very weak evidence base





# How are we approaching deterioration?







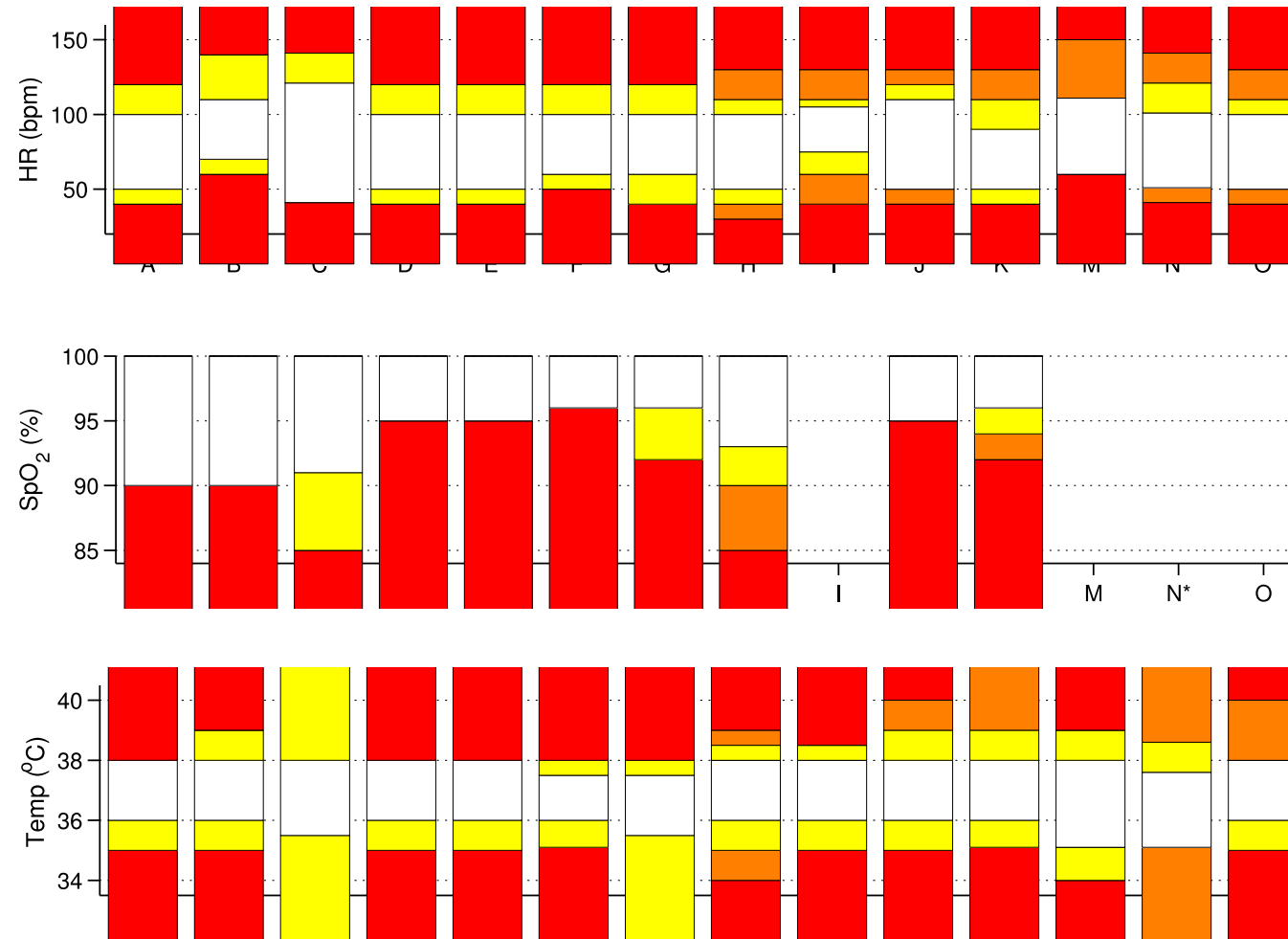
## Design ambitions: MEWS

- Sensitivity vs specificity
- Keep central identification of deterioration to pure physiology
- Avoid including subjective components in score - include these concerns within the escalation pathway
- Set upper and lower limits of normal against population values, not arbitrary or at treatment levels
- Aim to use total score not single element alerting
- Avoid personalisation
- One tool from conception to 4 weeks post natal
- The tool follows the pregnant woman wherever she is cared for

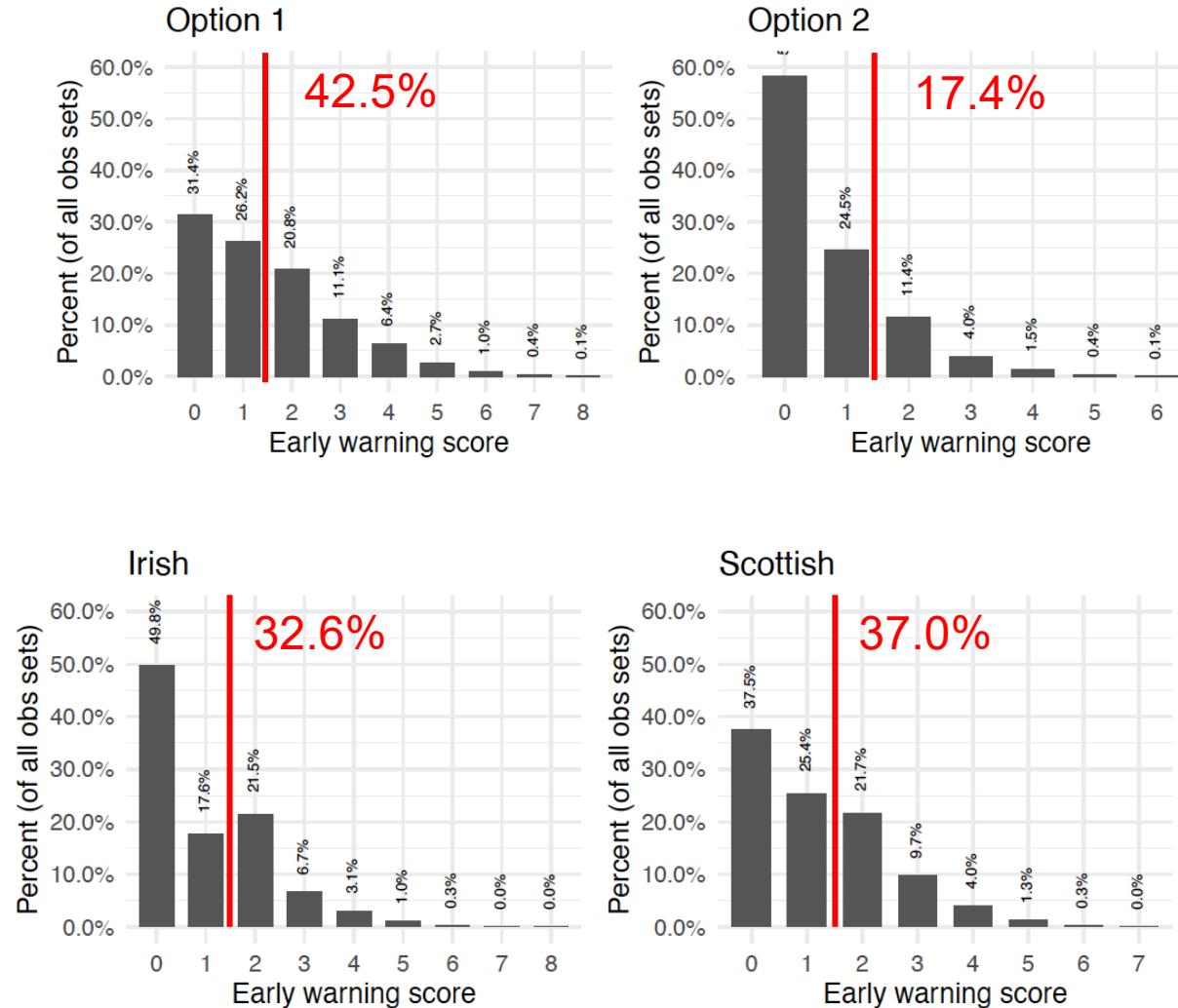
## Design processes: **MEWS**

- Developed cut-offs based on population data and centile modelling
- Refined included list of additional concerns
- Used standardised consensus building techniques for developing cut-offs for a graduated escalation response process
- Undertook further modelling to adapt the tool to allow for optimal performance in the post natal period
- Have finalised initial usability testing and about to start alongside testing

# Physiology variation in MEWS

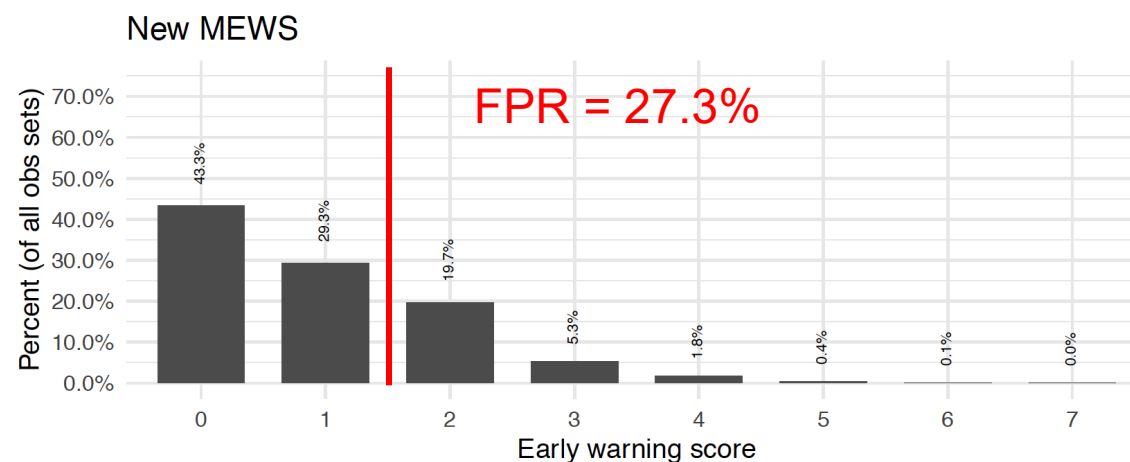
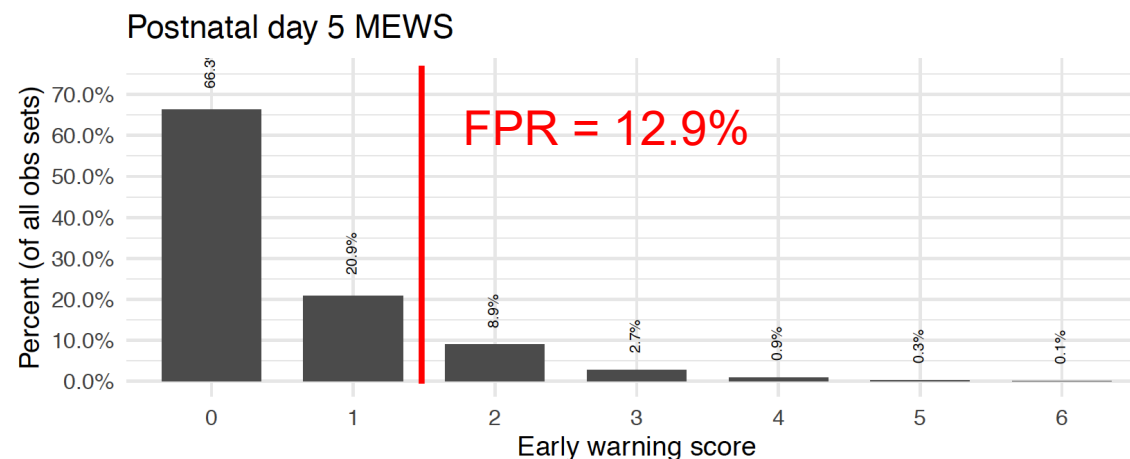


# False positive rates based on **all observations** for all women (18-40 weeks)



- Both the Scottish & Irish tools base the need for escalation effectively around a score of 2 or above.
- Using this premise, we have indicated the proportion of **normal** women who would trigger on this basis (the false-positive rate) for **all observations**.

# False positive rates based on **all observations** for all women (up to 16 days post natal)



**NEWS-2**  
FPR = 21.8%

# Design processes: MEWS

		Score				
		2	1	0	1	2
Vital Sign	Respirations Breaths/min	<=6	7-8	9-21	22-24	>=25
	SpO <sub>2</sub> Oxygen saturation (%)	<=92	93-94	>=95	-	-
	Temperature °C	<=35.6	35.7-36.1	36.2-37.2	37.3-37.4	>=37.5
	Pulse Beats/min	<=62	63-70	71-112	113-121	>=122
	Pulse (from 48 hours post birth) Beats/min	<=50	51-57	58-98	99-107	>=108
	Systolic blood pressure mmHg	<=93	94-100	101-135	136-144	>=145
	Diastolic blood pressure mmHg	<=56	57-61	62-88	89-96	>=97

# Maternal Deterioration

## Maternity Early Warning Score (MEWS)

Hospital sticker with patient details



MEWS score	0	1	2	A score for each vital sign is required at each entry					
DATE TIME									DATE TIME
Respirations Breaths/min	>=25								>=25
	22-24								22-24
	18-21								18-21
	13-17								13-17
	<=6								<=6
SpO <sub>2</sub> Oxygen saturation (%)	>=95								>=95
	<=92								<=92
Temperature °C	>=37.5								>=37.5
	37.3-37.4								37.3-37.4
	36.8-37.2								36.8-37.2
	35.7-36.7								35.7-36.7
	<=35.6								<=35.6
Pulse Beats/min	>=131								>=131
	122-130								122-130
	113-121								113-121
	99-112								99-112
	<=62								<=62
Pulse - from 48 hours post birth ONLY Beats/min	>=108								>=108
	99-107								99-107
	85-98								85-98
	58-70								58-70
	<=57								<=57
Systolic blood pressure mmHg	>=175								>=175
	160-174								160-174
	145-159								145-159
	136-144								136-144
	121-135								121-135
	111-120								111-120
	101-110								101-110
	94-100								94-100
	77-93								77-93
	<=60								<=60
Diastolic blood pressure mmHg	>=118								>=118
	97-109								97-109
	89-96								89-96
	80-88								80-88
	70-79								70-79
	62-69								62-69
	<=56								<=56
MEWS TOTAL									MEWS TOTAL
<b>Additional concerns</b> - Please see overview for additional concern table. If one or more additional concern is present, consider escalation and review.									
Healthcare professional concerned									
Woman/family concerned									
Increased pain (analgesic requirement)									
Significant vaginal bleeding									
Reduced urine output									
Altered level of consciousness/responsiveness									
Other									
Monitoring frequency					Monitoring				
Escalation of care YES/NO					Escalation:				
Initials					Initials				
Refer to back page for thresholds and triggers									

## Maternity Early Warning Score (MEWS)

Taking the total MEWS score generated, escalate according to the threshold and trigger table.

Vital Sign	Score	Score				
		2	1	0	1	2
Respirations Breaths/min	<=6	7-8	9-21	22-24	>=25	
SpO <sub>2</sub> Oxygen saturation (%)	<=92	93-94	>=95	-	-	
Temperature °C	<=35.6	35.7-36.1	36.2-37.2	37.3-37.4	>=37.5	
Pulse Beats/min	<=62	63-70	71-112	113-121	>=122	
Pulse (from 48 hours post birth) Beats/min	<=50	51-57	58-98	99-107	>=108	
Systolic blood pressure mmHg	<=93	94-100	101-135	136-144	>=145	
Diastolic blood pressure mmHg	<=56	57-61	62-88	89-96	>=97	

Additional concerns	
<p>If one or more of these additional concerns are present, consider:</p> <ol style="list-style-type: none"> <li>Increasing the frequency of observations to a minimum of every 30 minutes</li> <li>Escalate in line with a low-medium level of concern even if MEWS less than 2</li> <li>Where MEWS is greater than 2 raising the level of concern to the next category.</li> </ol>	<p>Healthcare professional concerned</p> <p>Woman/family concerned</p> <p>Increased pain (+/- or analgesic requirement)</p> <p>Significant vaginal bleeding</p> <p>Reduced urine output</p> <p>Decreased level of consciousness/responsiveness</p> <p>Other</p>

Thresholds and triggers				
<ul style="list-style-type: none"> <li>The grade of medical team member indicated as the primary contact for each level of clinical concern is a guide and may need to be adapted depending on the local skill mix within that care setting or organisation</li> <li>It is also advised that early input from anaesthetic team members is also considered when escalation is indicated</li> </ul>				
Level of concern	Low	Low-medium	Medium	High
MEWS	0-1	2-4	5-7	8 or more
Primary escalation & response (Use SBAR framework)		Review by midwife in charge	Urgent review by midwife in charge	Immediate review by midwife in charge
Medical review timing		Within 30 minutes	Within 15 minutes	Immediate
Minimal vital signs recording until medical review/ongoing plan	Continue with current observation frequency	Reassess observations within 30 minutes & document ongoing plan	Reassess observations within 15 minutes & document ongoing plan	Continuous observations
Secondary contact		ST3+ or equivalent	Consultant or equivalent	Clinical outreach team or equivalent
<ul style="list-style-type: none"> <li>When the primary team member(s) contacted is unable to attend or fails to attend within the expected time for the level of clinical concern, escalation to the secondary contact is required</li> <li>The secondary contact would be expected to attend within the initial medical review timing, calculated from the documented time of primary escalation</li> <li>The section <b>pulse (from 48 hours after birth)</b> cut-offs should be used for all women from 48 hours after birth. The time and date from which these values should be used should be entered on the front of the chart.</li> </ul>				

## Design ambitions: **NEWTT2**

- Build on learning since initial framework
- Reflect design principles in MEWS/NEWS to support consistency
- Respond to needs of clinical community



## Design processes: **NEWTT2**

- Effective identification of at-risk groups
- Risks associated with mode of birth
  - ✓ Infants at risk of early onset infection
  - ✓ Infants at risk of hypoglycaemia
  - ✓ Early onset jaundice
  - ✓ Early deterioration
  - ✓ Maternal medications
- Guidance for effective and structured escalation and response

# Neonatal Deterioration

## Newborn Early Warning Track and Trigger (NEWTT 2)

Hospital sticker with patient details



NEWTT2 score		0	1	2	A score for each vital sign is required at each entry	
ANY critical (PURPLE) observation = immediate escalation. Consider 2222						
Reason for observations		Signed		Print name & GMC/NMC No.		
Frequency & duration						
Date						
Time						
Temperature °C	39.0					2
	38.0					2
	37.0					1
	36.0					0
Temperature alert: Thermal control measure, = Amber score of 1) if any other triggers or no better in 30 minutes						
Respirations Breaths/min	80					2
	70					1
	60					1
	50					0
	40					0
Grunting present?						
Heart rate Beats/min	180					2
	170					2
	160					1
	150					1
	140					0
Colour	SpO2 <90% (or very pale / Blue)					1
	SpO2 90-94%					0
	SpO2 ≥95% (or Pink / Normal)					0
	Unrousable / Floppy / Seizure					1
	Lethargic / Irritable / Poor tone					1
Feeds	Responsive / Good tone					0
	Not feeding					2
	Feeding reluctantly					1
	Feeding well					0
	High parental concern					2
Glucose	Some parental concern					1
	No parental concern					0
	< 1.0 mmol/l					2
	1.0 - 1.9 mmol/l					1
	2.0 - 2.5 mmol/l					0
Glucose when measured - should be considered in any baby feeding reluctantly/poorly, or other observations suggest unwell						
NEWTT2 TOTAL				TOTAL		
Monitoring / Escalating				Monitoring / Escalating		
Escalation of care YES/NO				Escalation of care YES/NO		
Initials				Initials		
Refer to back page for thresholds and triggers						

## Newborn Early Warning Trigger & Track 2 (NEWTT2)

National Patient Safety Improvement Programmes



**How to use the NEWTT2 trigger and track tool to determine the level and timelines of escalation**

**Calculate and document** the total NEWTT2 score for a set of observations by adding together the individual scores (0-2) for every individual observation entered in a single column of the chart.

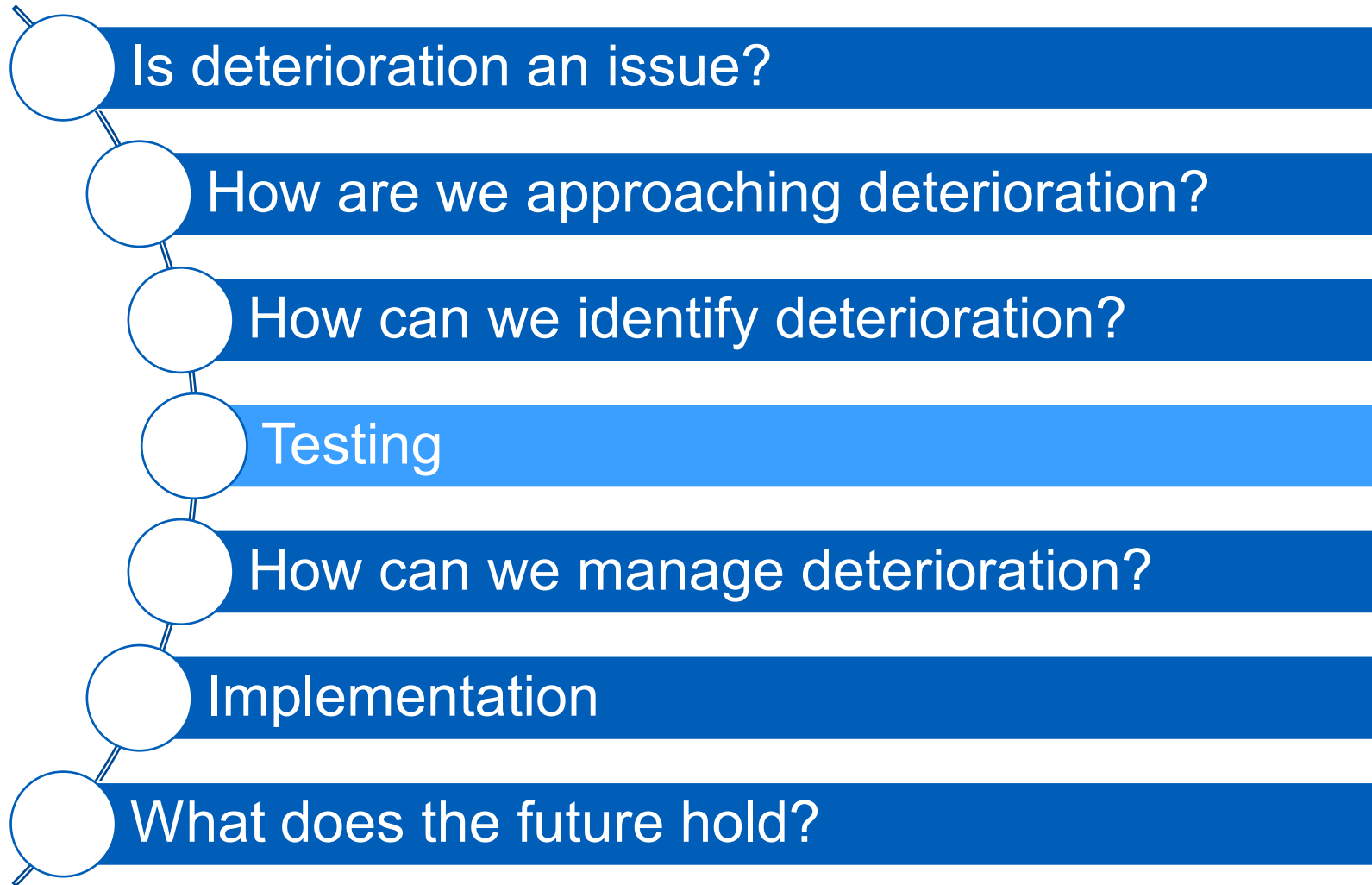
**Check the total** against the NEWTT2 escalation tool and follow instructions in the escalation table for that set of observations.

**Healthcare professional concern** can initiate a neonatal review at any time regardless of the zone colour of an observation or total score.

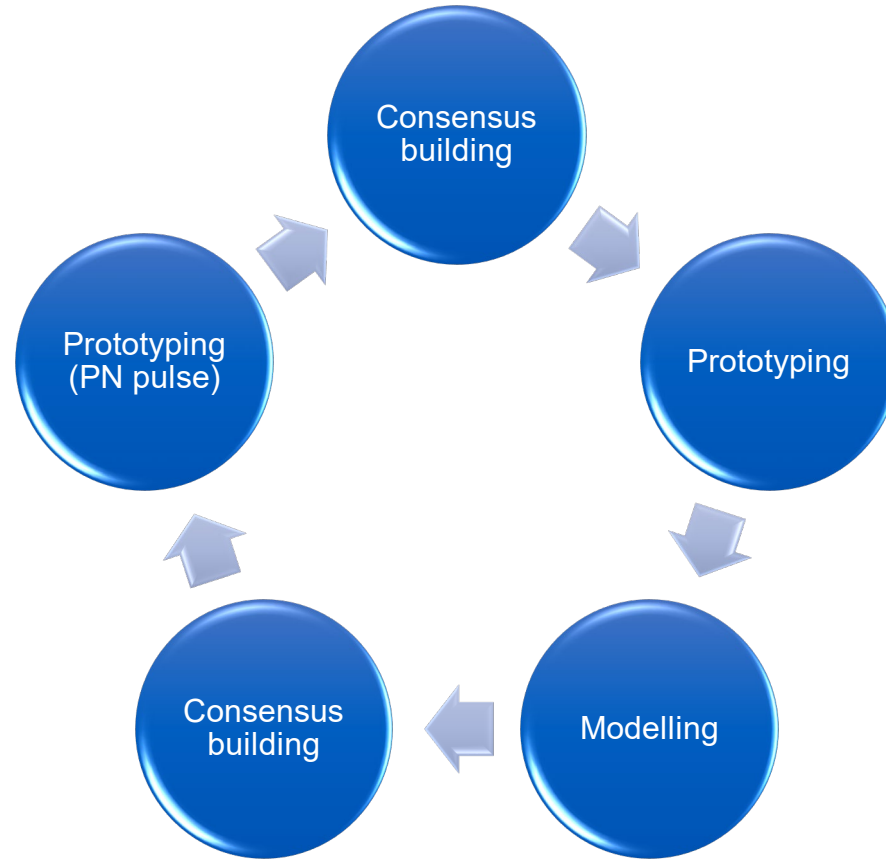
**For a score of zero continue routine care**

Thresholds and Triggers					
<ul style="list-style-type: none"> <li>The grade of team member indicated as the primary contact for each level of clinical concern is a guide and may need to be adapted depending on the local skill mix within that care setting or organisation.</li> </ul>					
	Score 1	Score 2-3	Score 4-5	Score ≥6	Any critical observation
Inform shift leader - Consider SpO2 +/- blood glucose if not done already					
Primary escalation and response (use SBAR framework)	Repeat observations in <1 hour.	Refer to paediatric/neonatal Tier 1 doctor/ANPP.	Refer to paediatric/neonatal Tier 1 doctor/ANPP.	Refer to paediatric/neonatal Tier 1 doctor/ANPP. The Tier 2 doctor/ANPP should be informed.	Refer to paediatric/neonatal Tier 1 doctor/ANPP AND Tier 2 doctor/ANPP.
Review timings	Escalate as for score 2-3 if the repeat score remains 1.	Request a review within 1 hour.	Request a review within 15 minutes.	Request immediate review.	Immediate review and consider neonatal emergency call (2222).
Take steps to manage/address any obvious concerns/problems					
Secondary contact	If no review within expected time frame, escalate to Tier 2 doctor/ANPP and inform shift leader.			If no review within expected time frame, escalate to consultant and inform shift leader.	
<ul style="list-style-type: none"> <li>When the primary team member(s) contacted is unable to attend or fails to attend within the expected time for the level of clinical concern, escalation to the secondary contact is required</li> <li>The secondary contact would be expected to attend within the initial review timing, calculated from the documented time of primary escalation.</li> </ul>					

SBAR Handover	
<b>S</b>	Situation
<b>B</b>	Background
<b>A</b>	Assessment
<b>R</b>	Recommendation
Document all actions and discussions in patient record	



# Testing the tools



# Testing the tools

## Phase 1 Navigating the tool

Testing of the tool in this phase is designed to ensure a broad range of healthcare professionals find the language used within the tool is consistent and navigates the user as intended.

## Phase 2 Using the tool in practice settings

To maintain safe practice Phase 2 testing will happen in parallel to the use of existing tools. In this phase the aim is to understand how interactions between the healthcare professional and the tool perform.

At the end of each phase relevant stakeholder groups informed of results and feedback and adjustments made where needed.



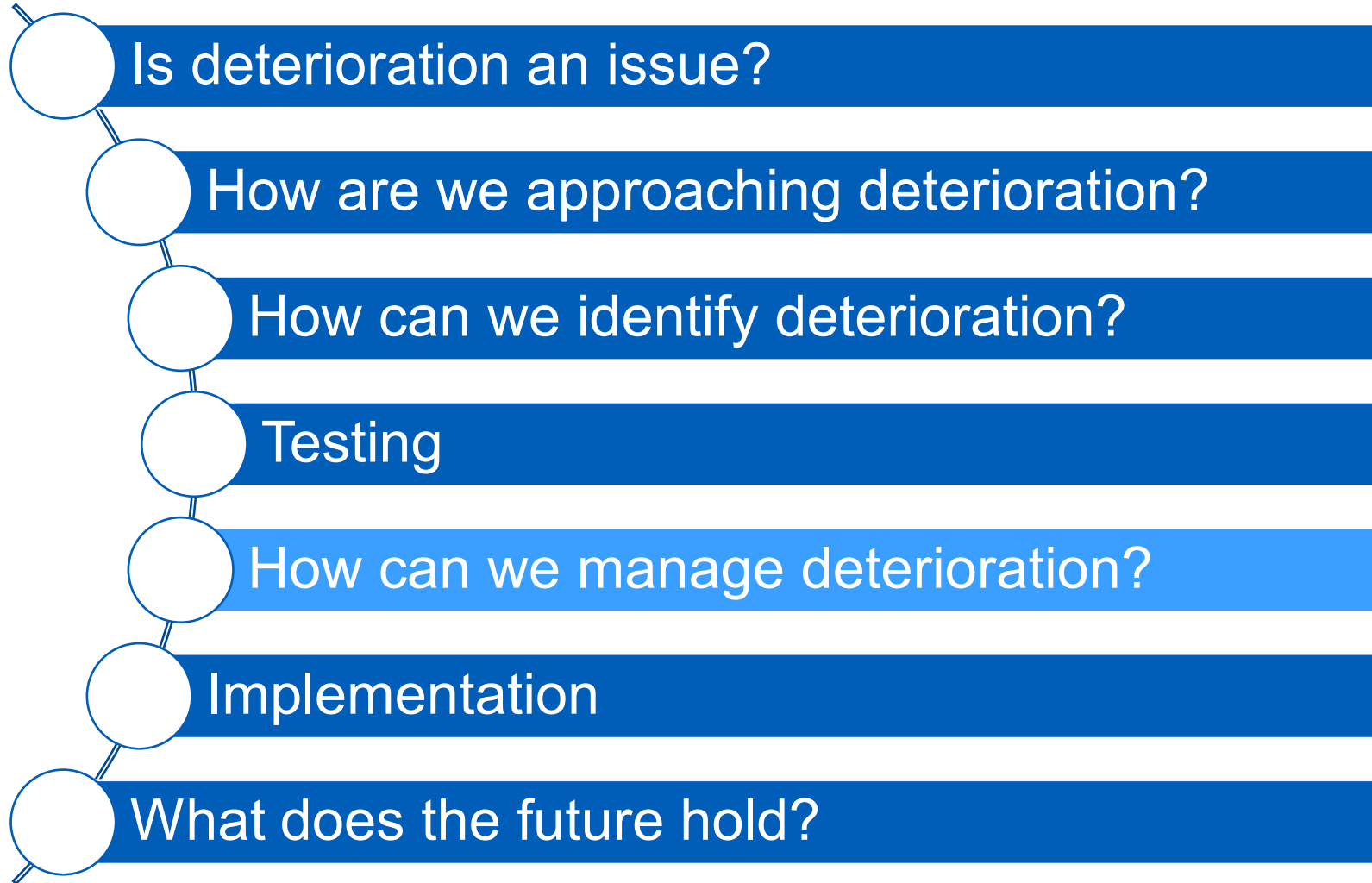
**Buckinghamshire  
Healthcare NHS  
Trust**



**Oxford University  
Hospitals NHS  
Foundation Trust**



**Thank You!**



# How can we predict, prevent and prepare?

- MEWS (& ABC) have elements of real time risk assessment built in (e.g. additional concerns)
- NEWTT2 is used selectively hence risk assessment built into which babies we monitor with tool
- Need to think about how we can combine risks assessments in the future to prevent multiple tools/processes (evolution of the partogram)



# How can we optimise escalation & response?

**We don't talk about communication:  
why technology alone cannot save  
clinically deteriorating patients**

---

Milisa Manojlovich <sup>1</sup>, Sarah L Krein <sup>2,3</sup>

- Urgency
- Relationship quality (Trust)
- Patient acuity/workload
- Hierarchy
- Language ('hint & hope')

# How can we optimise escalation & response?

each baby counts +  
learn & support



Royal College  
of Midwives



Royal College of  
Obstetricians &  
Gynaecologists

## TEACH OR TREAT

## IDENTIFY COMMUNICATE ACT

As a department, we are promoting learning conversations. If clinical concerns are escalated to you, please use TEACH or TREAT to frame your response.

### TEACH

Reassuringly explain to colleagues and women why you think there is no need for clinical concern and action to be taken.

### TREAT

Take action, provide the appropriate response in the appropriate time frame.



## STILL CONCERNED? ESCALATE FURTHER



# How can we optimise escalation & response?



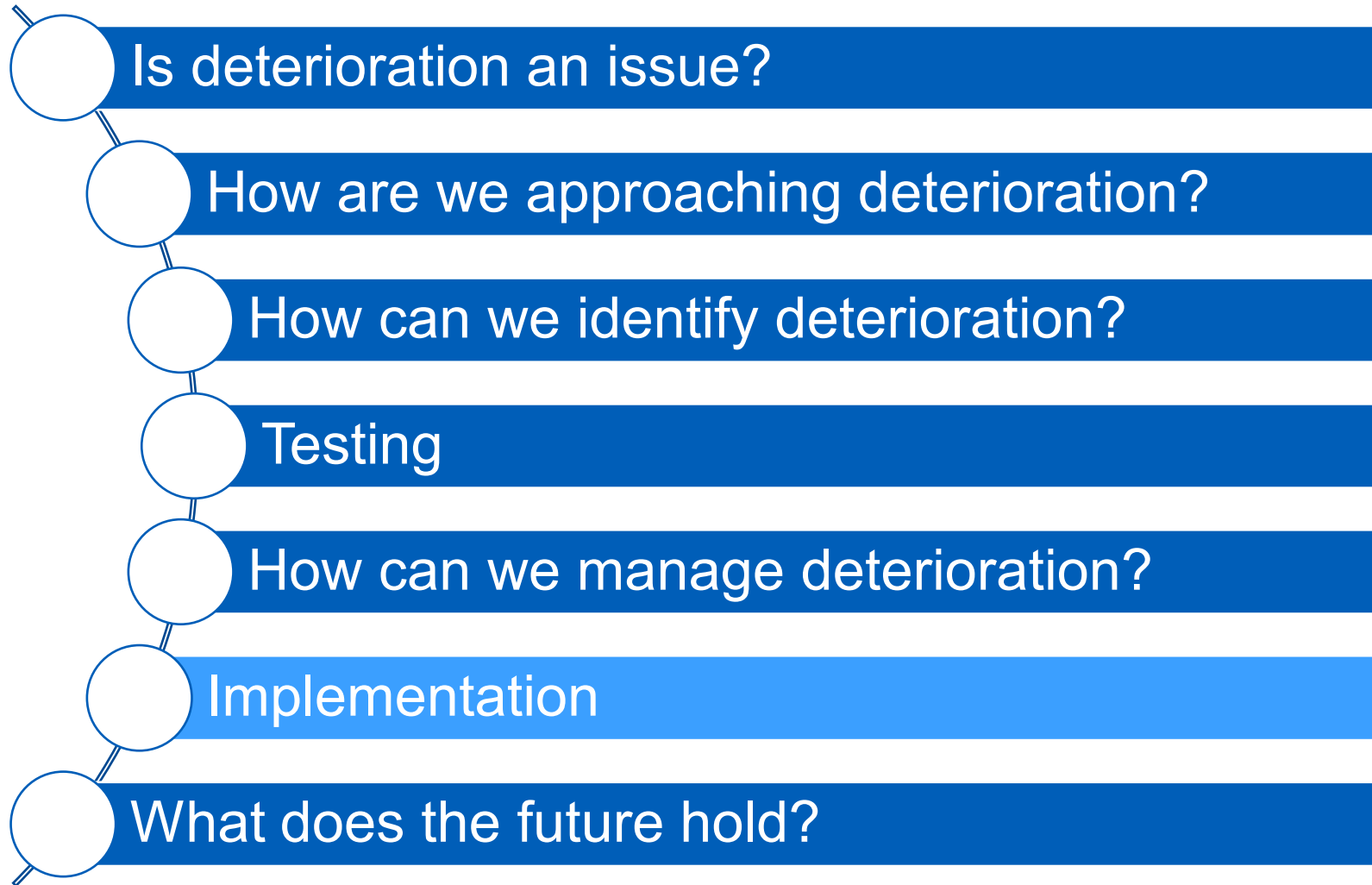
## Welcome to iDecide

Helping you understand your options in childbirth and supporting you to make those choices.

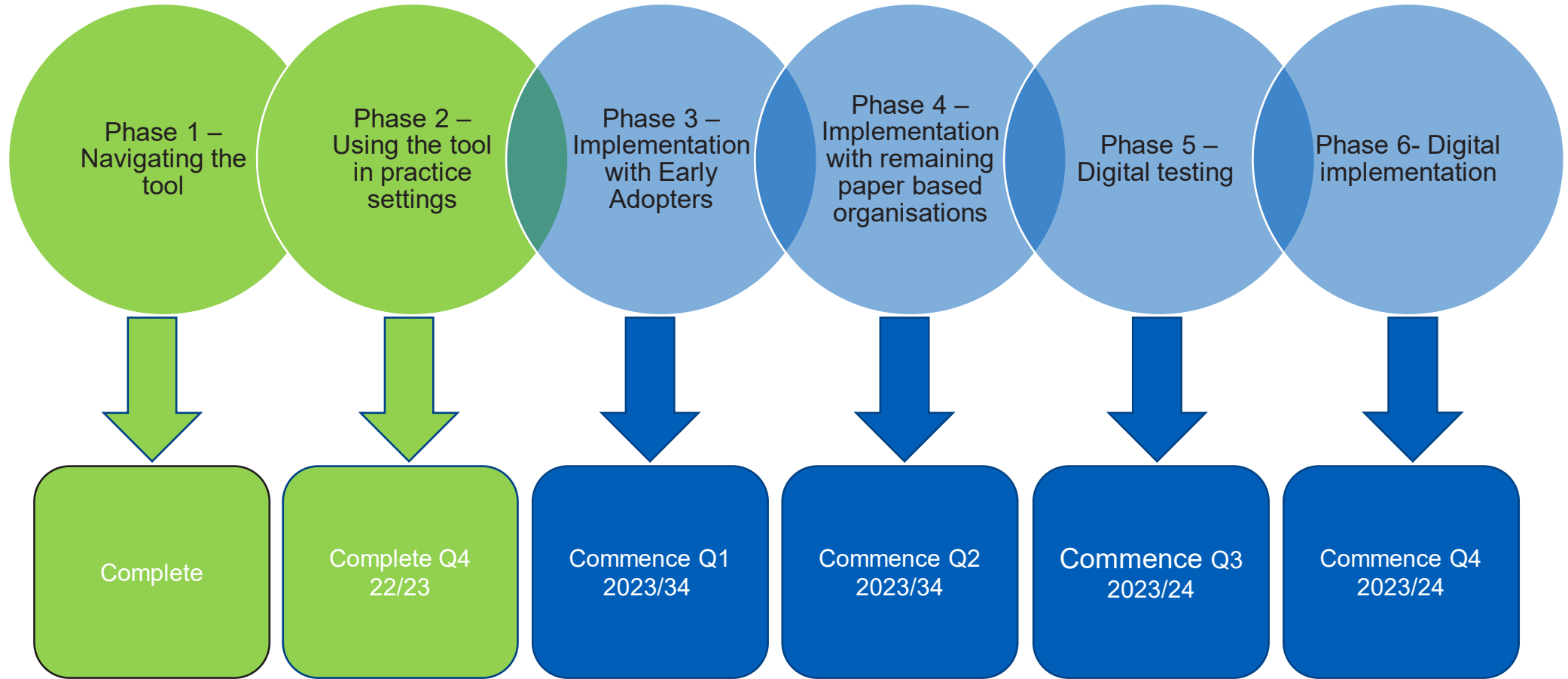




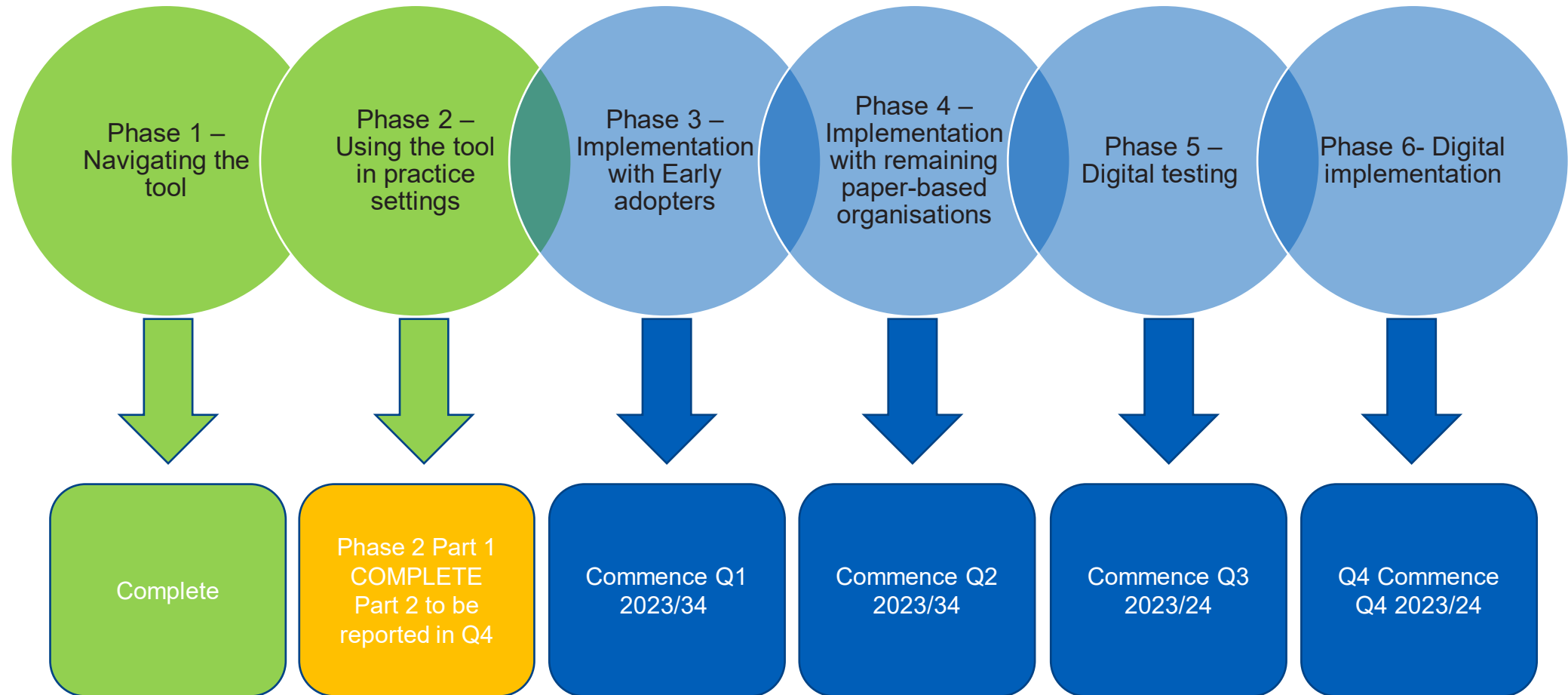
- Do you understand the barriers to effective escalation in your own teams?
- Do you facilitate/block effective escalation?
- Are the workarounds you use or know of create universal safe care?
- Do you feel able to challenge the behaviours that inhibit safe care?

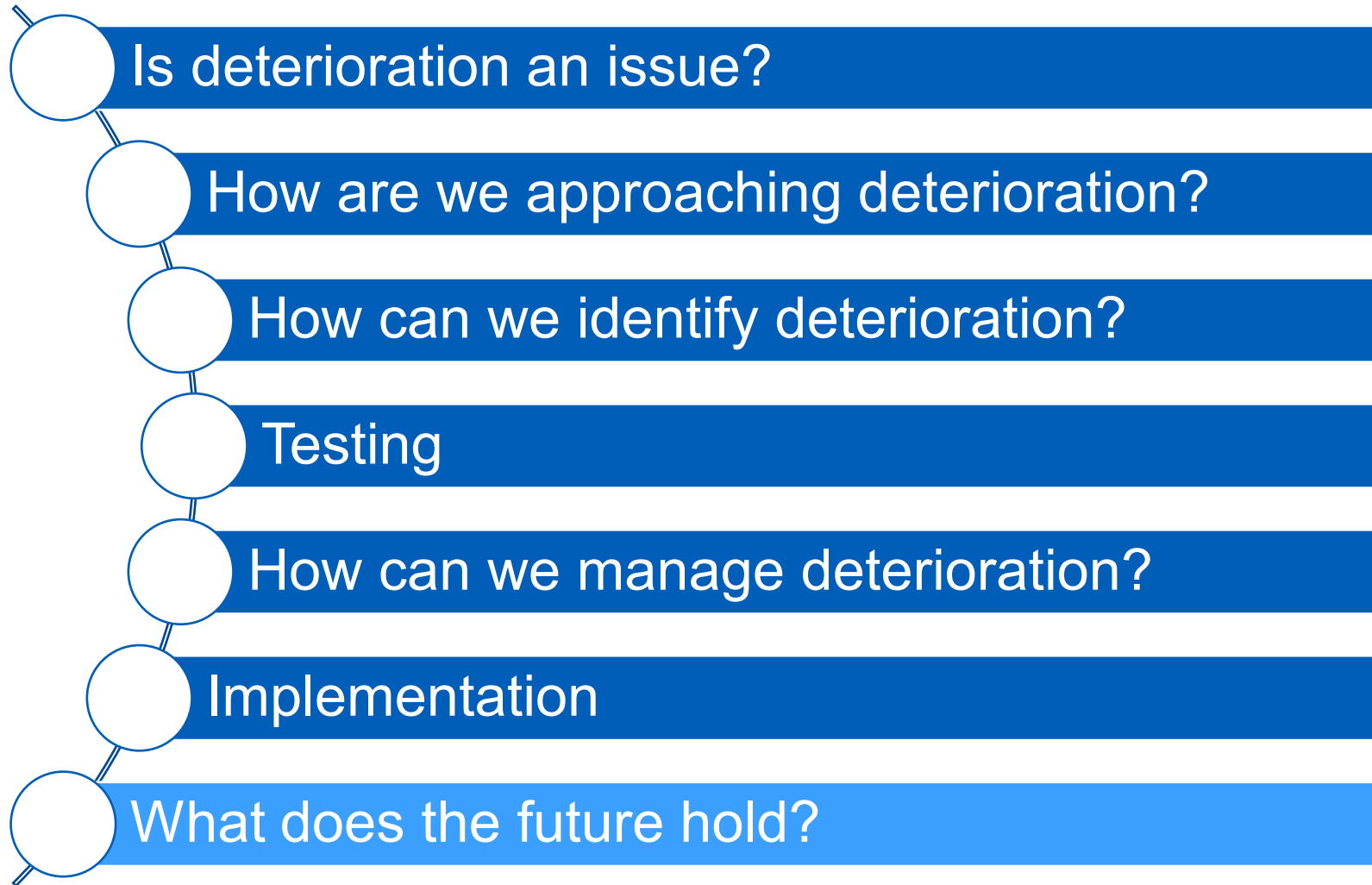


# Phases NEWTT2



# Phases MEWS

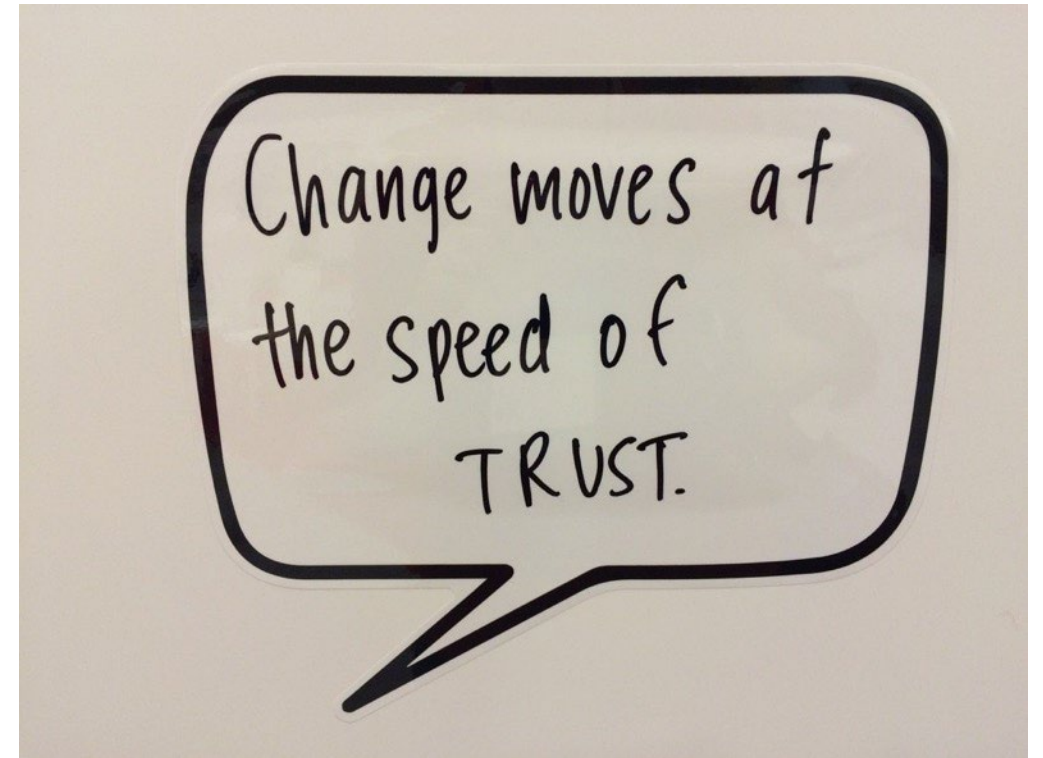






## What challenges do we face?

- Building Trust
- Adoption and training
- Validation of the tool
- Measuring the benefits
- Evaluating the impact
- Digitalisation
- Alignment - BSOTS



Thank you

@tonykellyuk

@RutterHannah

@MatNeoSIP



Ref: Kumar F, Kemp J, Edwards C, *et al*  
Pregnancy physiology pattern prediction study (4P study): protocol of an observational cohort study collecting vital sign information to inform the development of an accurate centile-based obstetric early warning score  
*BMJ Open* 2017;7:e016034. doi: 10.1136/bmjopen-2017-016034

