



The Challenge and Uncertainty of Paediatric Sepsis Recognition

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Healthcare at its best
with people at our heart



Tertiary Specialist Children's Hospital



- GNCH PICU 12 beds
2 regionally funded HDU beds
- FRH Cardiac PICU 10 beds,
6 HDU beds
- NECTAR Transport Team
- No Paediatric Critical Care
Outreach Team



Paediatric Sepsis: What should we do differently tomorrow?

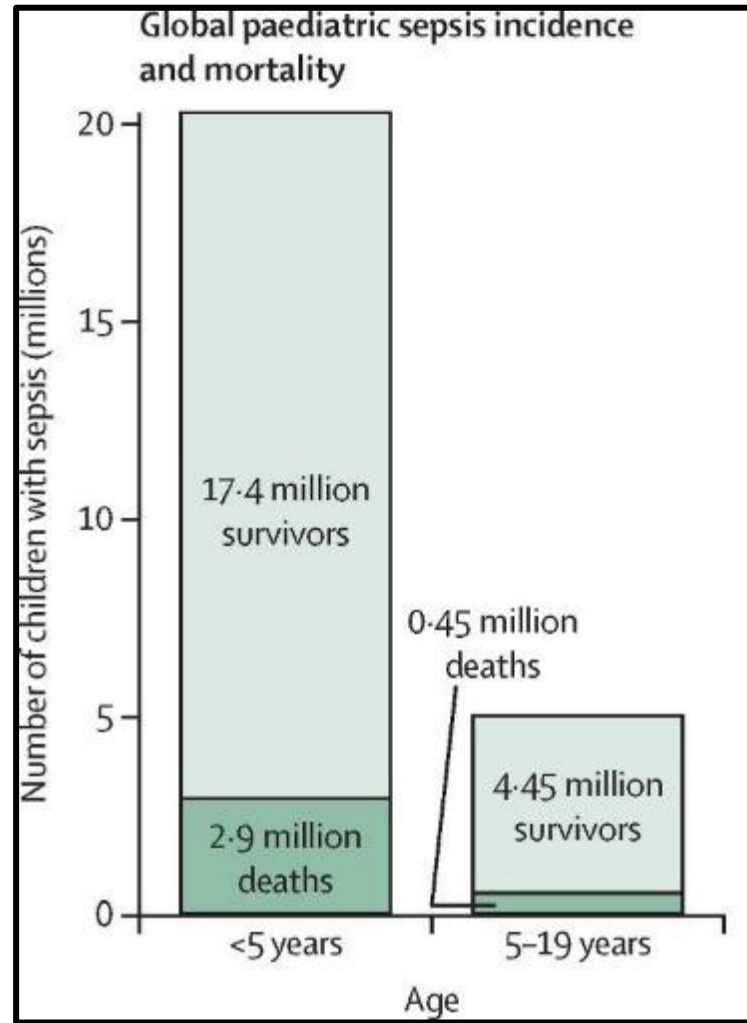
- **Paediatric Sepsis**
- **Recognition of Deterioration**
 - system changes PEWS
- **Escalation**
 - Staff and families

-



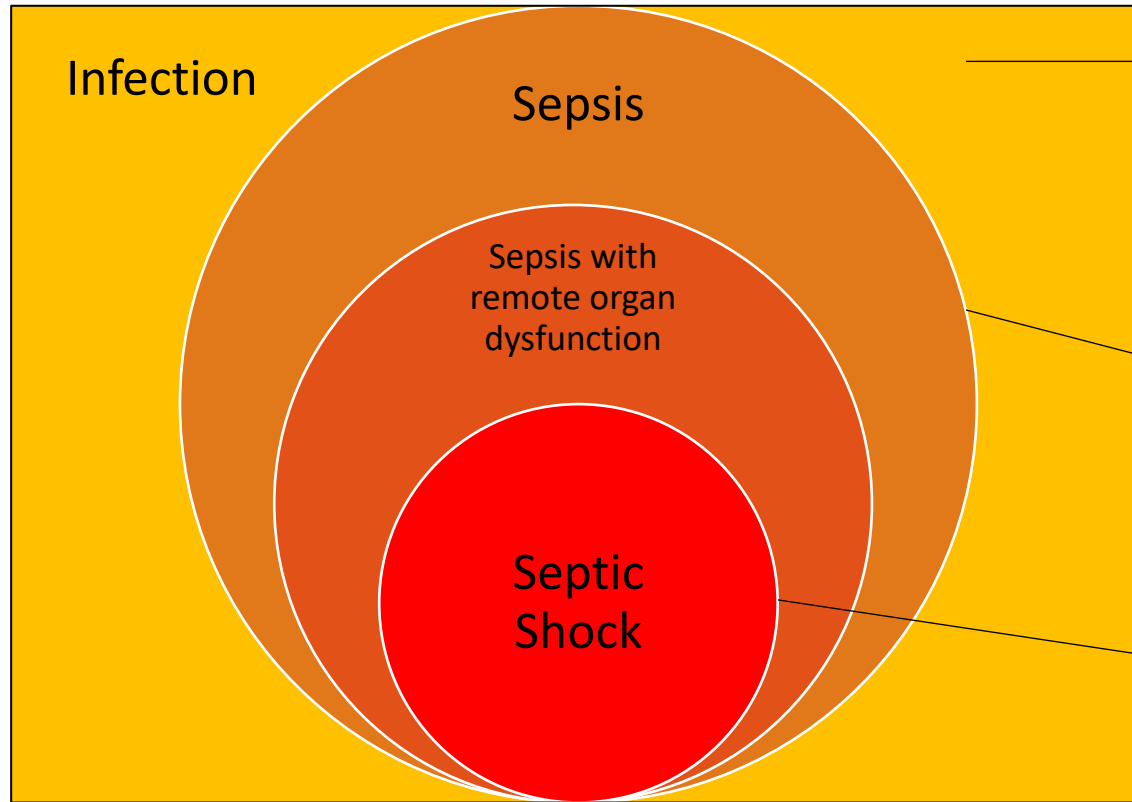
Paediatric Sepsis







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Febrile children in
PED
5-10% severe
bacterial infection

Febrile children in
PED
1% sepsis

PICU
sepsis makes up
10% admissions
25% mortality

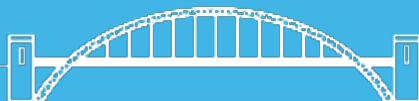


Recognition of sepsis is difficult

Sepsis is a time critical diagnosis
Children higher diagnostic uncertainty
And high compensation mechanisms

Challenge of early recognition of deterioration

Failure of recognition and escalation, not failure of treatment



Surviving Sepsis Campaign International Guidelines

2026 updates

- No evidence for screening tool
- Use established clinical protocols = PEWS





PEWS Evidence

Open access

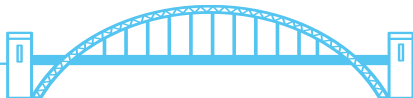
Original research

BMJ Open Performance of seven different paediatric early warning scores to predict critical care admission in febrile children presenting to the emergency department: a retrospective cohort study

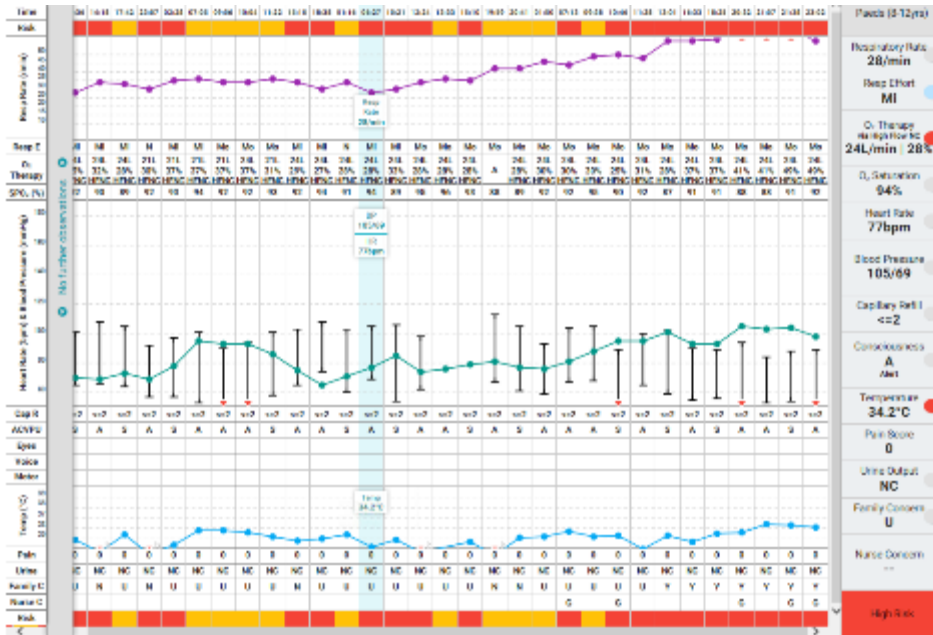
Sam T Romaine ¹, Gerri Sefton,² Emma Lim,³ Ruud G Nijman,⁴
Jolanta Bernatoniene,⁵ Simon Clark,⁶ Luregn J Schlapbach,^{7,8} Philip Pallmann ⁹,
Enitan D Carrol^{1,10}

11 449 febrile children,
134 (1.2%) were admitted to CC within 48 hours of
ED presentation,
606 (5.3%) had a hospital LOS >48 hours.
10 (0.09%) children died, 5 (0.04%) were sepsis-
related.

All 7 PEWS demonstrated excellent discrimination
Critical Care admission (range AUC 0.91–0.95)
sepsis-related mortality (range AUC 0.95–0.99),

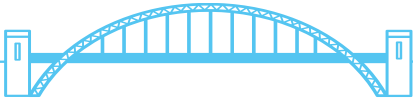


Variance Matters

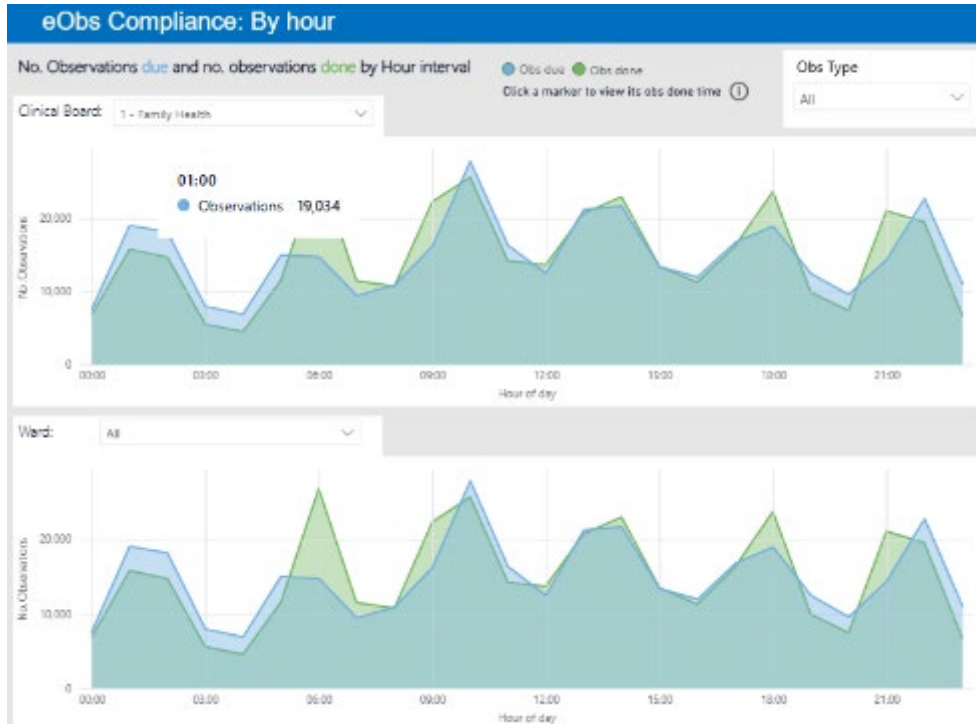


Physiological Parameters	High (3)	Med (2)	Low (1)	Nor (0)	Low (1)	Med (2)	High (3)	
Respiratory Rate	≤ 10		11-15	16-30	31-40	41-50	≥ 51	Reset
Oxygen Saturation	≤ 85	86-88	89-91	≥ 92				Reset
Heart Rate	≤ 53		54-70	54-59	121-140	141-59	≥ 60	Reset
Systolic Blood Pressure	≤ 80		81-90	91-120	121-140		≥ 141	Reset
GCS	≤ 8			≥ 9				Reset
Temperature	≤ 34.5		34.6-35.9	34.6-35.7	38.1-35.7		≥ 35.8	Reset

Colour blindness



Data is power



- Families don't want to be disturbed overnight
- Patients maybe upset and then it's hard to record full sets of observations

Solution

- Having PEWS posters displayed on the ward and around every bed space:

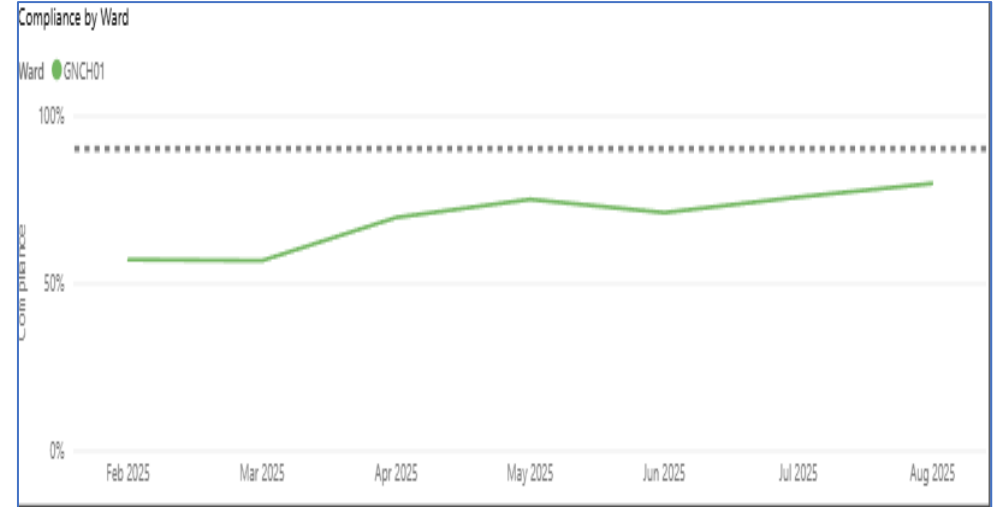


Failure or recognition

Incomplete sets of observations

- BP in children technically difficult
- Fever phobia





What changed?

- Nurse in Charges 3 times a day oversee electronic board
- Gradual change in culture
- Focussed education for medical teams on variances



Following Trust PEWS Policy

Increase in E-Obs compliance over trust target 85% helped the ward receive a silver **ACE Accreditation** in July 2025



Recognition of Deterioration

Requires

- Monitoring observation compliance
- Use of variance to personalise observations
- Family/carer concern embedded

Quality Improvement needs

- PEWS Police (leadership)
- Identify specific improvements at ward-based level



Timely Escalation

Staff

Family Concern/Martha's Rule



Escalation

- When to escalate
- Who to escalate
- In hours/out of hours
- For Families
- For Staff



Figure 2: Clinical Decision Support Framework for the initial evaluation of sepsis in children <16 years

Child appears unwell to health professional YES → NO ←

Vital signs	National PEWS	0	1-4	5-8	≥9
Initial assessment	Assessment	Assess Airway, Breathing, Circulation, Disability - correct urgent problems as identified • Other Rx as indicated (e.g. analgesia, correct hypoglycaemia)			
		Inform senior clinical decision maker [^] if concerned	Arrange Senior clinical review (ST4+) [^]	Appears unwell to health professional /High PEWS: <ul style="list-style-type: none"> • If septic shock suspected, resuscitate and administer antimicrobials following microbial tests • Arrange Senior clinical review (ST4+)[^] , ± ICU/HDU referral 	
Initial (generic) actions	Initial monitoring, escalation plan	Standard observations Laboratory / imaging tests as indicated	<ul style="list-style-type: none"> • Registered nurse review <1 h • Obs 4-6 hrly if stable. • Escalate if no improvement • Laboratory / imaging tests as indicated 	<ul style="list-style-type: none"> • Obs hourly. • Review <30 min by clinician competent in acute illness assessment • Escalate if no improvement • Laboratory / imaging tests as indicated 	<ul style="list-style-type: none"> • Obs every 30 mins. • Review <15 min by clinician competent in acute illness assessment. • Senior doctor review <1 hr if no improvement: refer to ICU • Laboratory / imaging tests as indicated
	Timeframe for definitive decision regarding further treatment	< 4 hrs		<3 hrs	<1 hr
Likelihood of infection & specific actions	Unlikely	Treat other underlying causes. Consider whether antibiotics should be used empirically or not from clinical perspective.			
	Possible/Definite	Within 4 h Re-assess patient and test results OR earlier if PEWS worsens ≥2 points OR clinical concern <ul style="list-style-type: none"> • Source identification/control • Microbiology tests • Antimicrobials: prescribe or revise • D/w ID/micro if uncertain • If parent still concerned, discuss with senior clinical decision maker[^] 	Within 3 h Re-assess patient and test results OR earlier if PEWS worsens ≥2 points OR clinical concern <ul style="list-style-type: none"> • Source identification/control • Microbiology tests • Antimicrobials: prescribe or revise • D/w ID/micro if uncertain Within 48 h <ul style="list-style-type: none"> • Review antimicrobials with ID/micro 	Within 1 h: Re-assess patient and test results OR earlier if PEWS worsens ≥2 points OR clinical concern <ul style="list-style-type: none"> • Microbiology tests • Antimicrobials: prescribe or revise (broad-spectrum if causative organism uncertain). • Source identification/control Within 24 h: <ul style="list-style-type: none"> • Review antimicrobials with ID/micro 	





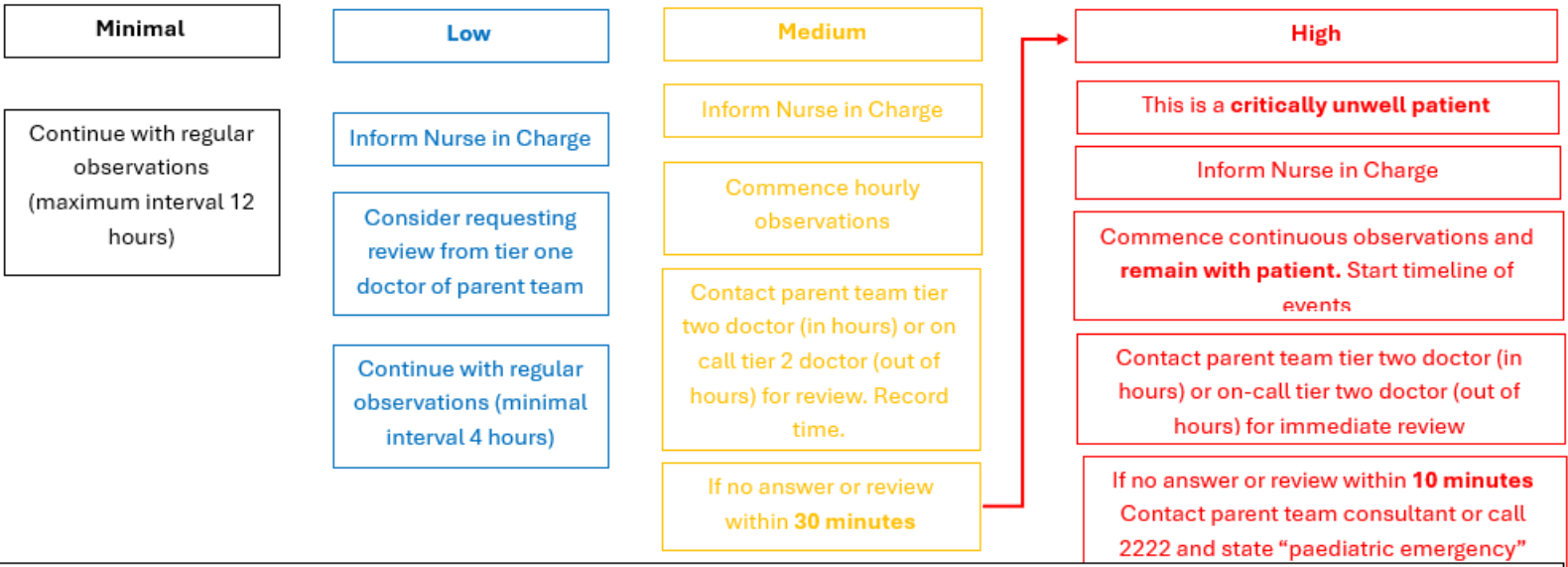
Out of hours
Surgical specialties
Busy specialties

Paediatric Deterioration and Escalation Flow Chart

- Take full set of observations
(Temperature, heart rate, respiratory rate, O2 saturations, blood pressure)
- Document if any family concern
- Document if any nursing concern
- Electronic system will calculate risk score

At all points clinical judgement is key and patients with normal observations can be escalated due to the concerns of any team member.

At all points also screen for sepsis



For escalation of surgical patients it may also be appropriate to contact the general paediatric tier two resident doctor (DECT 21814)

ESCALATION LEVEL		LOW (L)	MEDIUM (M)	HIGH (H)	EMERGENCY (E)
TRIGGER CRITERIA:	Specific concern (neurology, sepsis, or pre-existing risk factor)		New suspicion of sepsis	AVPU: Change to AVPU - V 'Responsive only to Voice' or New suspicion of septic shock	AVPU: Change to AVPU - P or U 'Responsive only to Pain' or 'Unresponsive' OR Abnormal pupillary response
Respond as per the highest level based on CHANGE in ANY ONE of these criteria	Clinical Intuition	Nurse/clinician concern that patient needs increased monitoring despite low PEWS	Nurse/clinician concern that patient needs a medical review irrespective of PEWS	Nurse/clinician concern that patient needs a 'Rapid Review' irrespective of PEWS	Nurse/clinician concern that patient needs emergency review for life-threatening situation
	Carer Question	Carer uses words that suggests the child needs increased monitoring or intervention despite the low PEWS	Carer uses words that suggests the child needs a clinical review irrespective of PEWS	Carer uses words that suggests the child needs a 'Rapid Review' irrespective of PEWS	Carer uses words that suggests the child has collapsed or significantly deteriorated
	Paediatric Early Warning Score	1-4	5-8	9-12	≥13
	Communication & response (use ISBAR Framework)	Inform Nurse-in-charge	Review by Nurse-in-charge for potential escalation (and/or Outreach nurse or equivalent)	Immediate review by Nurse-in-charge for potential escalation	Immediate 2222 call: "Paediatric Medical Emergency" and review by Nurse-in-charge
Medical plan for stabilisation Structured medical plan to be documented including: 1. specific actions to be taken 2. expected outcome 3. outcome deadline 4. escalation if outcome not met by deadline.	Consider Medical Review by ST3+ or equivalent	Request Medical Review by ST3+ or equivalent	Call for 'Rapid Review': Medical incl. airway skills ST3+ or equivalent and outreach nurse (if available or equivalent)	Consultant informed urgently to confirm stabilisation plan	
Medical review timings	As agreed with medical team	Within 30 minutes	Within 15 minutes	Immediate	
Minimal observations Repeated escalation if remaining in one level not required but ongoing plan must be clearly documented in notes.	Must reassess within 60 minutes (and then document ongoing plan)	Must reassess within 30 minutes (and then document ongoing plan) Continuous Oxygen Saturation monitoring needed	Every 30 minutes and continuous monitoring of Respiratory Rate / Oxygen Saturation / ECG GCS recording if change in AVPU	Every 15 minutes and continuous monitoring of Respiratory Rate / Oxygen Saturation / ECG GCS recording if change in AVPU or abnormal pupillary response	
FOR EMERGENCY OR LIFE-THREATENING SITUATIONS: CALL 2222 AND STATE "PAEDIATRIC MEDICAL EMERGENCY"					

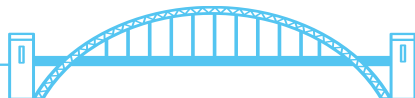
THINK! Could this be sepsis?

Think sepsis if any of the following are present:

- Neutropenia or immunocompromised (call medical professional for immediate review)
- Known or suspected infection
- Temperature $\geq 38^{\circ}\text{C}$ or $< 36^{\circ}\text{C}$
- Increasing oxygen requirement
- Unexplained tachypnoea/ tachycardia
- Altered mental state (e.g. lethargy/floppy)
- Prolonged CRT, mottled or ashen appearance


If suspicion of sepsis, inform nurse-in-charge. Escalate to patient's own or on-call team.

- I** Hello, I am staff nurse (xx) from Ward (xx), I am calling about (xx).
- S** I am calling because (e.g. PEWS increased to xx, carer is concerned because xx). The last observations were (xx).
- B** They are (age), admitted on (date) for (reason). They recently had surgery (xx); treatment (xx).
- A** I think they are (e.g. hypovolaemic). I don't know what is wrong with them but I am/carer is very concerned.
- R** I would like you to (e.g. review in xx minutes please).



National Paediatric Early Warning System Observation and Escalation Chart

0
1
2
4



1-4 years

Patient Name: _____

Hospital No. _____

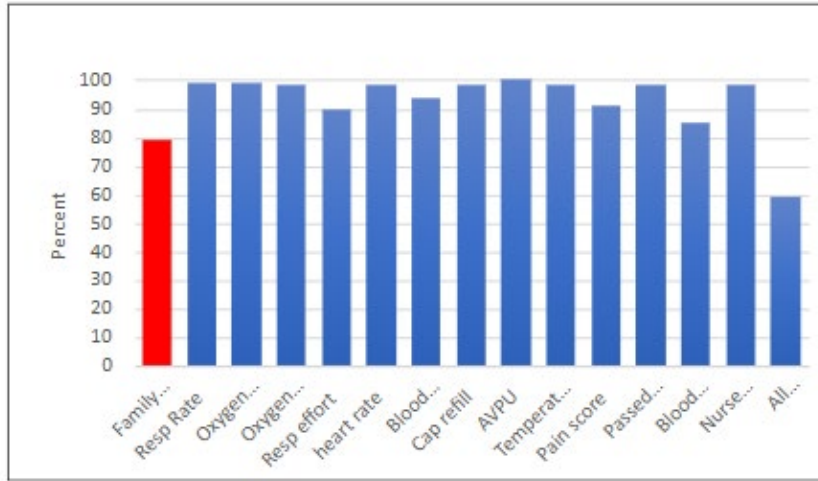
NHS No. _____

Date of Birth: _____

Consultant: _____

<p>Carer question: Ask your parent/carer: How is your child different since I last saw them? You decide if their response means:</p> <p>W - Worse A - Parent/Carer Asleep S - Same U - Unavailable B - Better</p>	Date				
	Time				
	Frequency				
	W/S/B/A/U				

Parental Concern



“Have you noticed anything different that worries you about your child?”

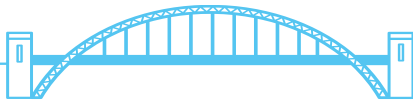


Recognising Deterioration

Are you worried about your child?

Tell us early if you think your child is more unwell so we can do something to stop them getting worse. You know your child best and we need you in our team.

Changes to look out for

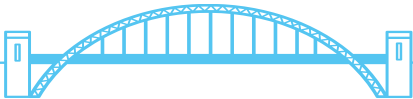


Patient wellness questionnaire

- Once every 24 hrs
- How are you feeling?
Better or worse
compared to yesterday

Family concern

- Every set of observation
- Is your child different
from before
(same/better/worse)
- Embedded in PEWS



3 Components of Martha's Rule



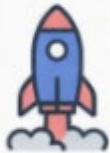
Patient Wellness Questionnaire

Patients will be asked, at least daily, about how they are feeling, and if they are getting better or worse, and this information will be acted on in a structured way



Staff escalation

All staff will be able, at any time, to ask for a review from a different team if they are concerned that a patient is deteriorating, and they are not being responded to.



Patient, Family & Carers

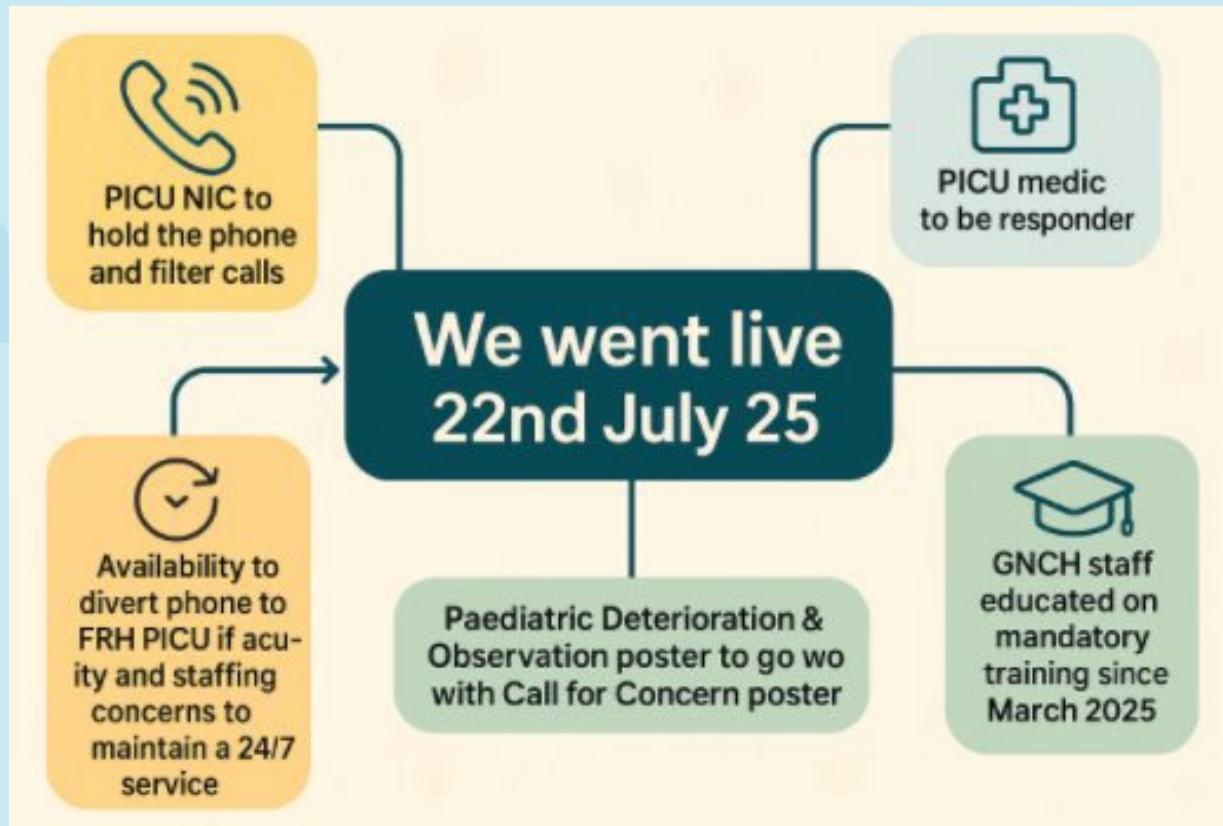
This staff escalation route will also always be available to patients themselves, their families and carers and advertised across the hospital.



The NHS is rolling out
'Martha's Rule'

Patients and families will be able to access an
urgent review if their condition deteriorates





Call for Concern

Are you worried your child is getting worse or not getting better as expected?

1. Talk to us, we will listen – If you are worried tell the nurse looking after your child or any member of staff and they will act.
2. Raise concerns – If you are still worried call the number below to get a review or you can ask our nursing staff to call us.

If you do not have a phone please ask a member of staff to help you.

Talk to us, we will listen.

Great North Children's Hospital:
0191 282 9603

Freeman Hospital Children's Heart Unit:
0191 244 8832



How we monitor your child

We monitor your child using a set of measures to look for any changes - this is called the Paediatric Early Warning Score (PEWS)

We need to do all these measures to tell us how well or unwell your child is and if they are getting better or not.

We will check these measures using a thermometer, a plaster or clip on the finger or toe and a cuff on the arm.

If your child becomes more unwell, we need to do these measures more often and may need to wake your child.

The measures we use



Ask us to explain anything you are unsure about. We are here to help.

Recognising deterioration

Are you worried about your child?

Tell us early if you think your child is more unwell so we can do something to stop them getting worse.

You know your child best and we need you in our team.

Changes to look out for



Ask us to explain anything you are unsure about. We are here to help.



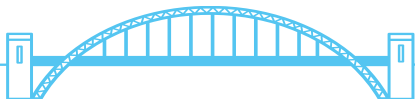
Paediatric Call for Concern Calls						
Month	Total Number of calls	Total number of calls that actioned a review	Total no. of calls that were admitted to critical care	Total % of actual call for concern	Total % of actual call for concern calls admitted to critical care	100% total
Jul-25	0	0	0	0%	0%	100%
Aug-25	1	1	0	100%	0%	100%
Sep-25	2	0	0	0%	0%	100%
Oct-25	0	0	0	0%	0%	100%
Nov-25	2	0	0	0%	0%	100%
Dec-25	0	0	0	0%	0%	100%
Jan-26	2	0	0	0%	0%	100%
Feb-26	5	1	1	20%	100%	100%
Mar-26	0	0	0	0%	0%	100%
Total	12	2	1			

Types of Calls

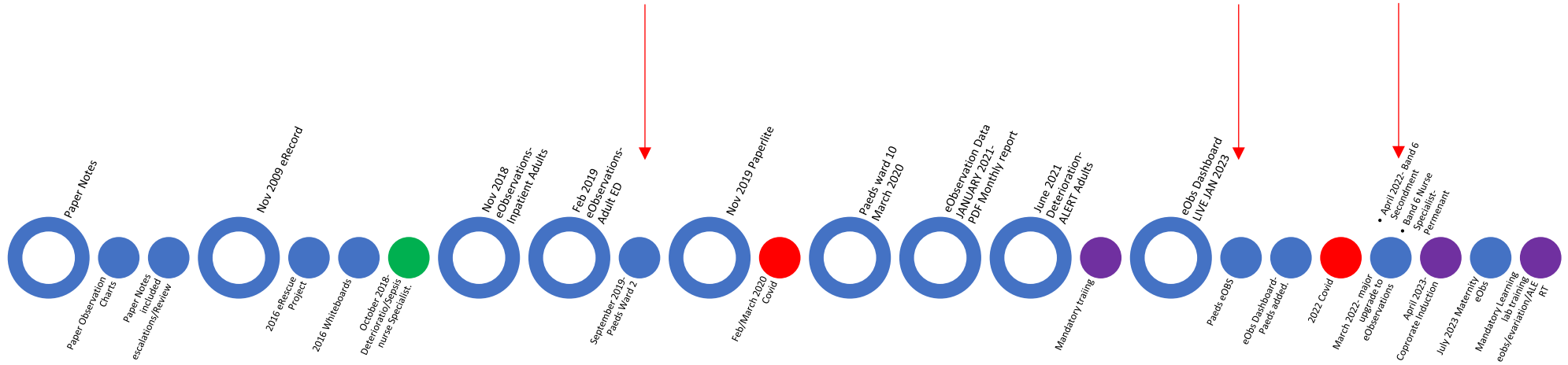


- Deterioration
- Complaint
- Communication
- Clinical Matter

'We used Martha's call for concern once – we were just concerned because the doctor said they needed PICU, and the PICU consultant said they don't, To be fair, it was a big help to feel we had a recourse to this'



NEWS/PEWS Implementation Newcastle upon Tyne



Fran Kavangh

Paediatric Nurse
GNCH PEWS POLICE



Improving recognition
of deterioration

P
Pause
and
observe

E
Escalate
early

W
Watch
trends

S
Score
PEWS

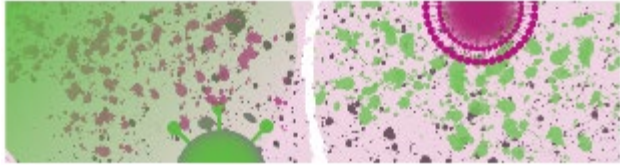
Working together to
spot the signs early and
keep our patients **SAFE**



E Ifh Sepsis Paediatric Learning modules

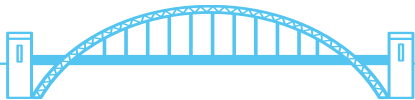
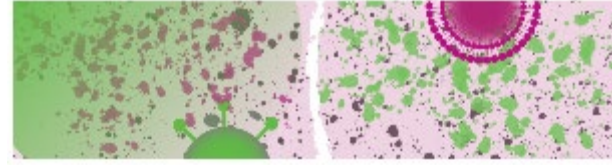
- Resource

 Sepsis in Acute Care Settings



- Resource

 Sepsis in community-based care



Thank you



References

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