Sepsis - a nation’s response

Learning & Listening
Understanding Context
Measurably Winning (after 3000 years)
Why we must be Relentless

Understanding Badness
Evolving from Blaming Individuals to Systems Improvement
The opportunities NEWS2 and a ‘sepsis test’ will bring

Matt Inada-Kim, Acute Physician, Hampshire Hospitals,
National Clinical Advisor NHSE & NHSI
Clinical Lead Deterioration & Sepsis, Wessex PSC

Kate Cheema, Associate Director Transformation Analytics
and Health Economics
NHS South, Central and West Commissioning Support Unit

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1. Context
2. Opportunity
3. Balance
4. Measurement
5. Resources
6. Future
Admissions are sicker with more comorbidities. Infection is the most common cause of deterioration leading to acute admission.

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Infection with badness: A life-threatening organ dysfunction caused by a dysregulated host response to infection.

Est. 250,000 cases / 44,000 deaths in England per year.

36,000 cases/ 9,000 deaths in ICU in England per year.

Tensions:

- Treatment
- Stewardship

Protocol vs. Clinical Judgement

Blame vs. Learning

Antibiotics for Sepsis: Does Each Hour Really Count, or Is It Inconsequential Amplification?

Are GPs suffering from ‘sepsis fatigue’?

English SOS Deaths 2011-18 by Age band:

- 0 - 4: 174572
- 5 - 49: 499571
Sepsis is Infection with Badness

Sepsis has no test

when it is determined affects accuracy and the ‘N’

Hospital Discharge (most reliable)
Death certificate

ICU adm

Ambulance
Emergency Department
GP (unreliable)

"Sepsis" is a syndrome without a set presentation or gold standard diagnostic test

NCEPOD Just Say Sepsis! 2015

Even when spotted & treated, it’s poorly documented
(No mention of Sepsis on death certificates in 60%)
We don’t TREAT sepsis, we treat SUSPICION, informed by JUDGEMENT

Patients are admitted with Opacity & Greyness

The diagnosis is best established at the end & not the beginning of admission

e.g. results, conviction/response to treatment

‘Badness’ is defined by where they are managed
Variation & Separation

Multiplicity of ‘sepsis’ definitions

Which chart for monitoring physiology?

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With thanks to S.Tees
Timeline of key publications

<table>
<thead>
<tr>
<th>Year</th>
<th>Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>700BC</td>
<td>Hippocrates defines ‘Sepsi’</td>
</tr>
<tr>
<td>2006</td>
<td>Kumar, Rivers (EGDT)</td>
</tr>
<tr>
<td>2013</td>
<td>Ombudsman, <em>Time to Act</em></td>
</tr>
<tr>
<td>2014</td>
<td>SIRS Toolkit</td>
</tr>
<tr>
<td>2015</td>
<td>CQUIN, NCEPOD-Just Say Sepsis, RFS</td>
</tr>
<tr>
<td>2016</td>
<td>NHSE, <em>Improving Outcomes for Patients with Sepsis</em></td>
</tr>
<tr>
<td>2017</td>
<td>Consensus 3, qSOFA (Quick SOFA), NICE Clinical Guideline</td>
</tr>
<tr>
<td>2018</td>
<td>NHSE Sepsis guidance</td>
</tr>
<tr>
<td>2018</td>
<td>NEWS2 MANDATE, CQUIN revision, Patient Safety Alert</td>
</tr>
</tbody>
</table>

An aggregate NEWS of 5 or more identifies adult hospital patients who are severely ill with likely organ dysfunction and who require urgent assessment. Where accompanied by suspicion of sepsis this should prompt the senior clinical decision-maker, using clinical judgement, to start appropriate treatment, as indicated, within an hour of the risk being recognised.

Combined Sepsis/Deterioration Pathway
opportunities for sepsis improvement

No stable definition
No process metric
No Gold standard test
Overreliance on diagnostics/IT
Separation of sepsis from deterioration
Poor Handover
Awareness
No outcome metric
Non standardised/aligned pathways
Communication
Teamwork
Absent induction
Human error
Training

What is sepsis?
Blame to Learning Culture
Different languages of sickness
Disregard for clinical judgement
Start smart, then focus
Earlier senior review
Contingency

Whose Leading?

National issue
Local issue

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menu

1. Context
2. Opportunity
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Before every death, there is a worsening in physiology - A Deterioration

Don't kill, deterioration does
Communication in Deterioration is the #1 Avoidable cause of death

NEWS2 would improve nearly all the common root causes

Thematic analysis of Safety Incidents Donaldson et al 2010

<table>
<thead>
<tr>
<th>Root Cause</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mismanaged Deterioration</td>
<td>35%</td>
</tr>
<tr>
<td>Failure to Prevent</td>
<td>26%</td>
</tr>
<tr>
<td>Deficient Checking/oversight</td>
<td>11%</td>
</tr>
</tbody>
</table>

Root Causes of Sentinel Events (All categories: 1995-2002)
The next great advance in healthcare will not be a cure, but a change in the way we work as a system.

Hypothesis - A standardised, reliable system will save lives and money.

Vital signs recorded
<table>
<thead>
<tr>
<th>Mrs Jones is...</th>
</tr>
</thead>
<tbody>
<tr>
<td>SICK,</td>
</tr>
<tr>
<td>UNWELL,</td>
</tr>
<tr>
<td>PEAKY,</td>
</tr>
<tr>
<td>CRITICAL,</td>
</tr>
<tr>
<td>DETERIORATING,</td>
</tr>
<tr>
<td>DEBILITATED,</td>
</tr>
<tr>
<td>IMPAIRED,</td>
</tr>
<tr>
<td>ILL,</td>
</tr>
<tr>
<td>DECLINING,</td>
</tr>
<tr>
<td>OFF LEGS</td>
</tr>
<tr>
<td>IN A BAD WAY,</td>
</tr>
<tr>
<td>SICK AS A DOG,</td>
</tr>
<tr>
<td>RUN DOWN,</td>
</tr>
<tr>
<td>MORIBUND</td>
</tr>
</tbody>
</table>

Vital signs recorded | GP % completion
--- | ---
Temperature | 26.4
Blood pressure | 24.8
Heart Rate | 31.0
Respiratory Rate | 6.2
AVPU | 6.2
70 YEARS OF THE NHS 1948 - 2018

www.nhs70.nhs.uk
A single language of sickness across healthcare

**Situation:**

**Background:**

**Assessment:**

What's the Problem/Urgency?

Mrs X is sick with a NEWS of 7

**Recommendation:** Clinical Judgement

**Collective intelligence across the NHS to guide Priority, Planning, Preparation, Placement**
NEWS2 & Sepsis Changes

Hypercapnic hypoxia subchart

Use Scale 2 when there is confirmed previous/current hypercapnic respiratory failure
Use Scale 1 in all other cases

New Confusion/Delirium

C is New Confusion or confusion that is worse than the patient’s baseline. It also represents altered mental state with a Glasgow coma scale <15

News of 5 > Single parameter 3

Single component 3 scores have significantly lower risk (OR 0.26) than an aggregate value of 5 (OR 1.0).

NHS England & RCP Sepsis definition

Suspected Sepsis = NEWS 5 + Clinical Judgement

The Deadline for those seeking to achieve the sepsis CQUIN is Dec. 18, the mandate for all acute trusts is by March 2019
Spot Deterioration, Consider Sepsis

Could this be sepsis in every deterioration?
But not all deterioration is due to sepsis

- the same system for “describing” the level of sickness in any healthcare system must be usable, utilised and communicated across all settings
- NEWS is at the heart of the national operational pathway for deterioration & sepsis
- Paving the way for a potential combined all cause deterioration pathway
**Deterioration Driver Diagram**

Reduce Avoidable Deaths

- **Recognition**
  - Establish/Support NEWS2 Champions
  - Reliable Monitoring
  - Reliable Escalation
  - Reliable Communication
  - Reliable Appropriateness

- **Activation**

- **Escalation**

- **Measurement**
  - Processes & Outcomes

- **Learning**
  - Ensure competence of healthcare professionals taking observations and responding
  - Regular reflection of deterioration episodes

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Patient Safety Alert April 26th

Alignment National Bodies can do great things

Resource to support the safe adoption of the revised National Early Warning Score (NEWS2)

25 April 2018

Alert reference number: NHS/PSA/RE/2018/003

Resource Alert

Failure to recognise or act on signs that a patient is deteriorating, for example changes in systolic blood pressure or pulse rate, is a key patient safety issue. In 2017, the National Reporting and Learning System (NRLS) received 100 reports where deterioration may not have been recognised or acted on and the patient died. Although these patients may not have survived even with prompt action, the care provided did not give them the best possible chance of survival.

A typical incident reads: “Patient transferred from AMU at 21:00 and found unresponsive at 21:15. Patient had scored 8 at 14:00 on AMU and no review _____. documented in the medical or nursing documentation. Next observations recorded at 16:30 as NEWS2 urine scored as 0 but no urine output recorded on fluid balance. No further observations recorded until cardiac arrest.”

Recognising and responding to patient deterioration relies on a whole systems approach and the revised National Early Warning Score (NEWS2), published by the Royal College of Physicians in December 2017. Reliably detects deterioration in adults, triggering review, treatment and escalation of care where appropriate. NEWS2 is an improvement on the original NEWS, in use since 2012, in key areas including:

- Better identification of patients likely to have sepsis
- Improved scoring for patients with hypercapnic respiratory failure
- Recognising the importance of new-onset confusion or delirium.

Currently, around two-thirds of healthcare providers use the original NEWS for adult patients, with the rest using adapted versions or locally devised early warning scores. Harm could result from having different scoring systems in use across the NHS when patients or staff move between services. The adoption of NEWS2 is vital to standardise how adult patients who are acutely deteriorating are identified and responded to, and to streamline communication across the NHS.

NHS England’s aim is for all acute hospital trusts and ambulance trusts to fully adopt NEWS2 for adult patients by March 2019. This alert is issued to highlight the resources that support adoption of NEWS2 and to signpost additional support to ensure trusts can adopt NEWS2 promptly, safely and effectively as possible. This support will be provided through the establishment of a virtual community network of NEWS2 champions who will: receive regular bulletins including information on the latest training; have opportunities to share challenges and best practice via regular webinars; and be given access to resources via an online repository. The implementation of NEWS2 is also associated with a new CQUIN indicator published by NHS England.

This focused support for the adoption of NEWS2 links to the wider support for improving recognition and response to patient deterioration provided by the Patient Safety Collaboratives.
1. Context
2. Opportunity
3. Balance
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5. Resources
6. Future
Balanced Sepsis improvement

Understand that sepsis delays are rarely the fault of an individual but commonly due to system failures and that 70% of Sepsis arises in the community

**Optimise systems in your area & across the pathway**

Learning vs Blame

Communication is the #1 cause of harm in healthcare, standardise the language and the pathway

Consider Sepsis in all deteriorations, but remember that all deteriorations are not due to sepsis

**Don’t be blinkered**

A system with reflex antibiotics administration for anyone with a temperature needs to be guarded against.

**Support Antibiotic stewardship, early senior review and Clinical Judgement**

Practice **Engaged, Supportive & Just leadership.**

Celebrate successes, Learn from failure
Antimicrobial Stewardship

**Aims**

- Inappropriate Antibiotic prescribing
- Gram Negative Bloodstream Infection
- Start Smart then Focus

**Collaboration**

- APPROPRIATE use
- EARLY cessation
- NARROW spectrum

**O’Neill reports estimate 10 million deaths worldwide each year due to AMR in 2050**

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The importance of Systems in Blood cultures & Getting Antibiotic choices right

**Septic patient journey**

- **Admission**
- **Processing**
  - 60 min
  - < 72 hours
- **10 days**

**Best guess Antibiotics**
- Aseptic technique
- 2 bottles not 1
- 20 ml of blood not 2 ml
- Specimen reception
- Urgent Blood Culture incubation
- Flag Positive- ID of organism and sensitivities
- Microbiology

**Focused Antibiotics**
- This can only be improved with a systems approach

The quicker a blood culture reaches the lab (incubation), the sooner a bacteria can be identified so the correct antibiotic can be prescribed. For a septic patient, minutes count. There is huge national variation in how soon & reliably this happens. *How does your trust compare?*

Blood cultures save lives

They Should not be left on the side of the counter...
menu

1. Context
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3. Balance
4. Measurement
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CQUIN process improvement

Admission or Ward
Deterioration
NEWS 5

SCREEN
(Clinical Judgement)

TREATMENT

ANTIBIOTIC
REVIEW

Time zero 60 minutes 72 hours

Admission to prescription time
Prescription to Administration time

Admission to Administration time

CQUIN Annex April 2018

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Proportion of appropriate patients, screened for sepsis

60%

92%

% of patients screened for sepsis

Emergency Screening %

Inpatient Screening %

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Proportion of appropriate patients given ANTIBIOTICS < 60 min of admission or inpatient deterioration

51% Definition change

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Increased Awareness/Coding & Definitions has led to swings in ‘N’

@mattinadakim

Identifying ‘sepsis’ from ICD10 codes is not the answer

the size of the infection bubble is the only relative constant

We need a proxy measure
It must be reproducible and less subject to variation and time
It must be easy to get, from administrative data

Causing Media reporting Chaos

https://twitter.com/mattinadakim/status/1025365554742403072
Measuring sepsis
...lessons from mental health

Flawed
No gold standard test
legion presentations
Unreliable documentation

Uncertain
Coding change April 2017
Variable & dynamic sepsis definition
Interpretation and operationalisation
Internationally & Chronologically corrupt

Proximate
In the face of this, a proxy is the only thing we can credibly measure
(vast There were allegedly 250,000 cases last year)
Birth of suspicion of sepsis (SOS)

All patients who die or are discharged are given an ICD 10 discharge code. Look at all ICD 10 codes to find all codes that relate to bacterial infection. Clinically validate by sending them to clinicians from each affected specialty. Apply SOS to Oxford’s population, then to all regions and acute trusts in England, over the last 7 years.

With thanks to P. Meredith, P. Schmidt, G. Smith, D. Prytherch, E. Nsutebu, P. Martin
Sepsis is Infection with Badness - “measuring Badness”

Wicked Problem
Sepsis has no gold standard test or standard definition
Leading to variable reported numbers, mortality

Solution - a Credible Proxy
The only reproducible measure are emergency admissions with infection

Community

Hospital

Infection

Suspicion of Sepsis (SOS)

Those patients admitted as emergencies to hospitals with bacterial infection that can cause sepsis.

Sepsis can only be suspected at initial assessment.

SOS with evidence of physiological compromise (NEWS 5) and/or clinical concern.

only confirmed once investigation results and response to treatment processed and other diagnoses have been excluded.
Nationally, SOS is the most common reason for admission & Death, and is growing.

1.9 million SOS admissions in England/year (38% of total)
SOS occupies 75% of NHS Beds

There are 120,000 SOS Deaths in England/year
admission reason in \(\frac{2}{3}\)rd of deaths
so how are we doing across different ages?

What if we could do this for every organisation, region, country, postcode?

And measures this over time?
But has the CQUIN made a difference to SOS outcomes?
NEWS implementation across an entire Region (WEAHSN)

1. STANDARDISE all Acutes to NEWS
2. SWAmbulance NEWS EPR TOOL
3. The ED Safety CHECKLIST calculation of NEWS
4. Regional Sepsis Masterclasses
5. Implement COMMUNITY NEWS
SOS dashboard

- Product of partnership
- Number of admissions
- Survival
- Bed days
- Length of stay (LoS) by
  - Trust
  - PSC/AHSN/STP Region
  - Disease categories

Available from end of July
‘Soft’ Launch/Trial sites
National Launch in September
Accessible from
https://imperialcollegehealthpartners.com/
http://psmu.improvement.nhs.uk/
1. Context
2. Opportunity
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NHS RightCare sepsis scenario

- Document shows a fictional patient’s journey through a Suboptimal VS Optimal sepsis pathway
- The two stories are compared, showing variation in terms of patient outcomes, quality of care and costs to the system
- Developed in partnership with NHS England’s cross-system sepsis programme board
- Co-authored with expert clinicians, analysts and the RightCare team

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Published in June 2018
Robert is a 72 year old man who has recently undergone gallbladder surgery.

Post-op complications lead to sepsis, but in the suboptimal scenario it is not immediately suspected or recognised.

Improved **awareness, consistent cross-system language** and the use of **NEWS2** in the optimal story lead to less time in hospital and better outcomes.

Role of **Biomarkers**

In both scenarios Rob ‘recovers’ but the differences for him, his family and the health economy are clear.
The document also includes:

- Information about NEWS2
- A summary of CQUIN data
- Julie’s story
- Links to supporting
  - clinical guidelines,
  - policy documents and resources
- Financial analysis of both patient journeys
How the scenario will be used

• NHS RightCare has a team of Delivery Partners

• Each is aligned to named CCGs, STPs and regional teams

• Delivery Partners support and facilitate local improvement programmes

• The scenario is also being shared through sepsis networks and PSCs

• Feedback about its use will inform the development of future work
Further support and information

• The sepsis scenario can be found on the RightCare website
• Summary slide packs are available to help present the story at meetings
• Other scenarios and RightCare resources are also on the website
• For more information you can:
  • Visit www.england.nhs.uk/rightcare
  • Email rightcare@nhs.net
  • Tweet @nhsrightcare
HEE/ e-Learning for Healthcare (eLfH)

http://www.e-lfh.org.uk/programmes/sepsis
Sepsis programme site
Hospitals, Primary Care, Paediatrics

Antimicrobial resistance
A training resources guide

@NHS_HealthEdEng  #sepsis  #AMR

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Understand that sepsis delays are rarely the fault of an individual but commonly due to system failures and that 70% of Sepsis arises in the community

**Optimise systems in your area & across the pathway**

**Systems Learning vs Individual Blame**

Communication is the #1 cause of harm in healthcare, standardise to NEWS2

Consider Sepsis in all deteriorations, but remember that all deteriorations are not due to sepsis

A system with reflex antibiotics administration for anyone with a temperature needs to be guarded against.

**Support Antibiotic stewardship, early senior review and Clinical Judgement**

Practice **Engaged, Supportive & Just leadership. Celebrate successes, Admit and apologise for failures- Learn & Improve from them**
menu

1. Context
2. Opportunity
3. Balance
4. Measurement
5. Resources
6. Future
Has there been Deterioration, could this be Sepsis, what is Appropriate?
Infection symptoms *
- Fever, Confusion
- RTI= Cough, Shortness of breath
- UTI= Frequency, dysuria, loin pain
- Cellulitis= Red tender skin
- Ulcer= New redness or discharge
- Abdominal pain, diarrhoea, vomiting

Deterioration symptoms *
- Limb pain, swelling, bleeding
- faint/dizzy
- Weakness, sensory loss
- constipation
- chest pain, palpitations

Severe symptoms
- Fall
- Confusion
- Inability to Cope

Emergency Admission

*Hard (Medical) signs
Infection symptoms *
- Fever, Confusion
- RTI= Cough, Shortness of breath
- UTI= Frequency, dysuria, loin pain
- Cellulitis= Red tender skin
- Ulcer= New redness or discharge
- Abdominal pain, diarrhoea, vomiting

Deterioration symptoms *
- Limb pain, swelling, bleeding
- Faint/dizzy
- Weakness, sensory loss
- Constipation
- Chest pain, palpitations

Soft Signs
- FUNCTION
- BEHAVIOUR
- CONCERN

‘Soft Signs’ of acute deterioration

2 days before

1 week before

Deterioration symptoms *

Infection symptoms *

Urgent Assessment

Emergency Admission

High Risk

Medium Risk

Low Risk

Emergency

Admission

DNAR

Do not admit

Do not treat (IV/PO)

Do not artificially feed/hydrate/ventilate

1.

2.

3.

4.

*Hard (Medical) signs

Severe symptoms
- Fall
- Confusion
- Inability to cope
evolved pathways from learning

**Worrying features**
- Rapid progression
- Pain/Ill out of proportion
- Sense of Impending Doom
- Repeated attendances

**Red Flags**
- Can’t Walk / Stand
- Can’t Pee
- Confusion
- Off Baseline

**Soft signs**
- Function ↓
- Behaviour ↕
- Concern ↑

“I feel unwell”

seek help

**NEWS 5**

Worrying features + Clinical Judgement = Suspected Sepsis
**Recognise Soft Signs**

**Take observations**

**Calculate NEWS**

**Escalate using Escalation Tool**

**Communicate using SBARD**

---

**Agreed Limit of Treatment**

Discuss end of life preferences in advance of any crisis. Ensure wishes of the resident are clear.

**Respect the right help early**

Always consider the resident's total NEWS2 in relation to their normal reference score.

---

**SBARD Escalation Tool and Action Tracker**

<table>
<thead>
<tr>
<th>Situation</th>
<th>Background</th>
<th>Assessment</th>
<th>Recommendation</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shivery,</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Fever,</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weakness,</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Tachypnoea,</td>
<td></td>
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</tr>
<tr>
<td>Nausea,</td>
<td></td>
<td></td>
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<tr>
<td>Diaphoresis,</td>
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</tbody>
</table>

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**Worse than normal lethargy or withdrawal or anxiety/agitation/apprehension or not themselves**

**Increasing (or new onset) confusion or less alert than normal**

**Shivery, fever, very hot, cold, clammy**

---

**NEW ONSET OF:**

- **Stroke (facial weakness, speech problems)**
- **Central Chest Pain/Heart Attack**

---

**Observable, Assessable, Relevant, Definitive, or on Treatment**

---

**Observations**

- **At least 12 hours until no concerns**
- **At least hourly**
- **Every 15 minutes**

---

**Action**

- **Assess & 8-hourly when actions completed**
- **At least 8-hourly**
- **At least 4-hourly**

---

**Admission to hospital should be in line with any appropriate, agreed and documented plan of care.**

---

**Continuous monitoring until transfer**

---

**Repeat observations within 30 minutes. If observations = NEWS 3 or 4, seek urgent GP telephone or face to face review within 2 hours. If NEWS is worsening, move to appropriate escalation point.**

---

**Immediate clinical advice required. Refer to GP using surgery bypass number or use NHS 111 to contact out of hours. Urgent transfer to hospital within 1 hour may be required.**

---

**Blue light 999 call with transfer to hospital (15 minutes), follow guidance of call handler.**
LOCAL NEWS implementation across the pathway

Hospital

Please indicate the baseline NEWS on all summaries. This is particularly useful for GPs when deciding if their patients have deteriorated and for us if the patient returns. The documentation of chronic hypoxia, its baseline level and risk of CO2 narcosis is similarly useful.

Community - to prioritise, plan, prepare and place appropriately

When making emergency referrals, we require the NEWS in order to risk assess, place and guide urgency.

If we have one language, standardised protocols develop

“The tool gives me the confidence to speak to others about my concerns”

<table>
<thead>
<tr>
<th>Referral NEWS</th>
<th>Ambulance</th>
<th>Disposition</th>
<th>Area</th>
<th>Mortality/ICU (est.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>AMU Clinic</td>
<td>Chairs</td>
<td></td>
<td>0.5-2%</td>
</tr>
<tr>
<td>3-4</td>
<td>AMU</td>
<td>Trolley</td>
<td></td>
<td>8%</td>
</tr>
<tr>
<td>5-6</td>
<td>60min</td>
<td>ED</td>
<td>Majors</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>AMU</td>
<td></td>
<td>High Care</td>
<td></td>
</tr>
<tr>
<td>7+</td>
<td>Blue Light Pre Alert</td>
<td>ED</td>
<td>Resus</td>
<td>30%</td>
</tr>
</tbody>
</table>

Nursing home NEWS

NEWS to triage Hospital location

GP NEWS referral in use

Thank you for seeing this 56 year old lady. My colleague saw her first thing this am and she had dx a LRTI and prescribed some amoxicillin. She had had some streaks in the sputum. She then had NEWS of 2.

She has deteriorated clinically and now has significant fresh haemoptysis and is needing a bowl and cloth to haemoptysis. She now has NEWS of 6+ and feels unwell, faint and looks very unwell pale.

I have arranged a blue light ambulance. (tried to ring you but no answer from Med Reg or Sho and switch said they could not put me through to on call consultant)

She has Rheumatoid Arthritis and is on

Consultations Today:
**Consider Sepsis High Risk Factors**
- Age ≥ 75
- Peripartum
- Immunosuppressed / Chemo
- IV/sub
- Surgery/trauma <6/52
- Indwelling line/catheter /broken skin
- Prev. sepsis, current antibiotics

**NEWS 0-2**
- NEWS 3-4
- NEWS ≥ 5 or +3 from baseline
- NEWS ≥ 7

**Do Physiological observations**
- NEWS 0-2 (6-12 hourly obs)
- NEWS 3-4 (2-4 hourly obs)
- NEWS ≥ 5 or +3 from baseline (Hourly obs)
- NEWS ≥ 7 (30 minute obs)

**Any concerning clinical features?**
- New Confusion
- Worry (Dr/Nurse/Pt/Carer)
- Significant Pain
- Single NEWS parameter of 3
- Mottled / ashen skin / cyanosis / new rash
- Inadequate urine output*
- Lactate 2+
- Cap Refill ≥ 3 sec

**Urgent Clinical Assessment**
- Is Sepsis Suspected?
  - Apply Clinical Judgement
  - Yes**
    - Commence appropriate Treatment
    - Follow organisational NEWS protocol
    - Closely monitor patient

**Senior Review**
- Pts should be reviewed urgently if non-responsive to treatment within 1 hr

**NEWS2**
- NHS England, NICE & NEWS2 compliant
- For use in all healthcare settings

**ABCDE**
- Worry

**NEWS**
- NEWS 0-2
- NEWS 3-4
- NEWS ≥ 5 or +3 from baseline
- NEWS ≥ 7

**Worry**
- Yes**
The continuum of Badness in Group A Strep - NEWS, Biomarkers & mortality

A ‘Sepsis Test’ encompassing Clinical Judgement + Risk Factors + NEWS + Biomarkers

<table>
<thead>
<tr>
<th></th>
<th>Skin infection</th>
<th>Mild Cellulitis</th>
<th>Severe Cellulitis</th>
<th>Necrotising Fasciitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEWS</td>
<td>0-1</td>
<td>1-4</td>
<td>5-6</td>
<td>≥ 7</td>
</tr>
<tr>
<td>Blood Culture/CRP/WBC</td>
<td>+/-</td>
<td>+/-</td>
<td>+/-</td>
<td>+/-</td>
</tr>
<tr>
<td>PCT</td>
<td>-</td>
<td>+</td>
<td>+++</td>
<td>++++</td>
</tr>
<tr>
<td>ProADM</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>Mortality</td>
<td>0.5%</td>
<td>8%</td>
<td>12%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Gp A streptococcal soft tissue infection and has a spectrum of severity
The #NEWS2 app from @RCPLondon is coming...can't wait!

An exciting area of research that @Ldn_ICHP team, myself & @katycheema are doing is to try & get to the heart of what #sepsis really is using a bowtie analysis of pre episode clinical phenotypes/SOS codes & post outcomes surveillance and AI/machine learning. Huge potential!
In summary

Great progress so far...

Wicked problems have pragmatic solutions

Spot the sick patient, consider sepsis

Collaboration & compromise is critical

-what can you do in your area, region?
-what are your takeaways?

Always measure & Understand the data

Evolving from Blame to Learning

(... we are winning)