Oxford Academic Health Science Network

PATIENT SAFETY

Sepsis Working Together
Community and Secondary Care

Welcome

Twitter #pscsepsis

Sepsis Working Together
Community and Secondary Care

Sepsis Working Together
Community and Secondary Care

Andrew Brent

NICE

Oxford Academic Health Science Network

PATIENT SAFETY

Overview of the NICE Sepsis Guidelines 2016




Andrew Brent

Sepsis Clinical Lead, Oxford AHSN

& Oxford University Hospitals NHS Foundation Trust

NICE Sepsis Guidelines 2016

- **Background**
- **Content**
  - Scope
  - Definitions
  - Risk stratification
  - Care pathways & bundles
- **Implementation**


NICE National Institute for Health and Care Excellence

NICE guideline

Sepsis: recognition, diagnosis and early management

NICE guideline
Published: 13 July 2016
nice.org.uk/guidance/ng51


Parliamentary and Health Service Ombudsman
TIME TO ACT
Severe sepsis: rapid diagnosis and treatment saves lives
NICE National Institute for Health and Care Excellence
NICE guideline
Sepsis: recognition, diagnosis and early management
NICE guideline
Published: 13 July 2016
nice.org.uk/guidance/ng51
Just Say Sepsis!
A review of the process of care received by patients with sepsis
CEPOD
Improving the quality of healthcare
Patient Safety Alert
Parliamentary and Health Service Ombudsman
An avoidable death of a three-year-c child from sep
A report by the Health Service Ombudsm for England on an investigation into a compla from Mr and Mrs Morrish about The Cricketfie Surgery, NHS Direct, Devon Doctors Ltd, Sou Devon Healthcare NHS Foundation Trust and N Devon Plymouth and Torbay Clus
Commissioning for Quality and Innovation (CQUIN)
Guidance for 2015/16

Background

- Department of Health asked NICE "*to produce a guideline on* ***Sepsis: the recognition, diagnosis and management of severe sepsis***."

- Focus on diagnosis, assessment and initial management

- Comprehensive critical care guidelines exist

Overall Evidence Quality (NICE)

- *"Limited evidence exists for the identification and early management of sepsis in primary care or the emergency department"*

- *"Only some critical care evidence relevant or interpretable for non-critical-care settings"*

- 137 recommendations…

Sepsis guidelines in context

- Link to 22 related NICE guidelines!
- Other guidelines taken into account
- Full alignment of guideline pathways under discussion (eg Feverish illness in under 5s)

NICE National Institute for Health and Care Excellence

NICE guideline

The Highlights

Sepsis: recognition, diagnosis and early management

NICE guideline
Published: 13 July 2016
nice.org.uk/guidance/ng51

What do we mean by "sepsis"?

THE UK SEPSIS TRUST

Sepsis is a life threatening condition that arises when a body's response to infection injures it's own tissues and organs.

www.sepsistrust.org

The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)

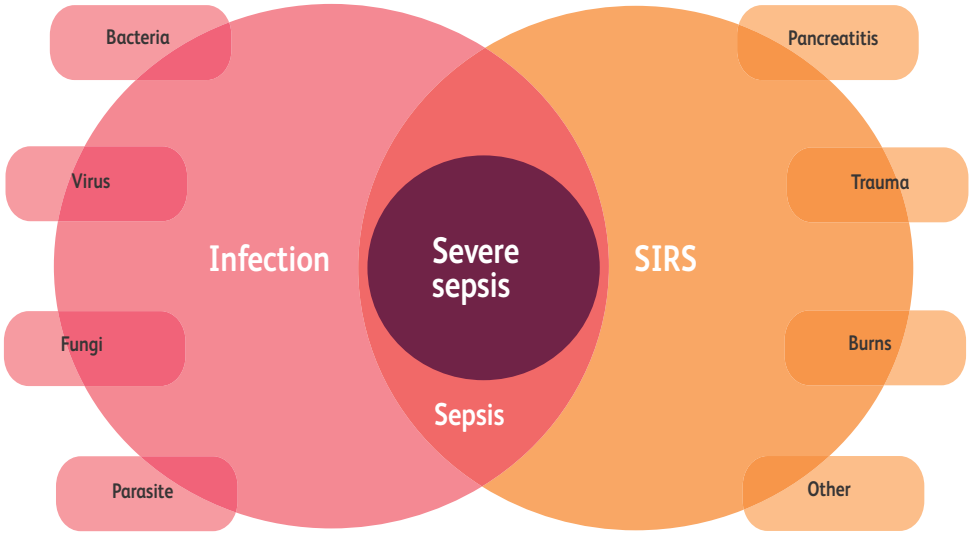
A syndrome of physiologic, pathologic and biochemical abnormalities induced by infection.

Singer et al. JAMA 2016; 315(8):801-10

SIRS, Sepsis, Severe Sepsis, Septic Shock

Systemic Inflammatory Response Syndrome (SIRS) = 2 or more of:

- **Temp** >38 or <36 °C
- **HR** >90 min^{-1}
- **RR** >20 min^{-1}
- **Acutely altered mental state**
- **WCC** <4 or >12 $x10^9$/L
- **Blood glucose** > 7.7 mmol/L (no known diabetes)



Sepsis	=	SIRS + evidence of infection
Severe Sepsis	=	Sepsis + end organ dysfunction
Septic Shock	=	Sepsis + hypotension despite adequate fluid resuscitation

Surviving Sepsis Campaign

The College of Emergency Medicine

THE UK SEPSIS TRUST

Red Flag Sepsis

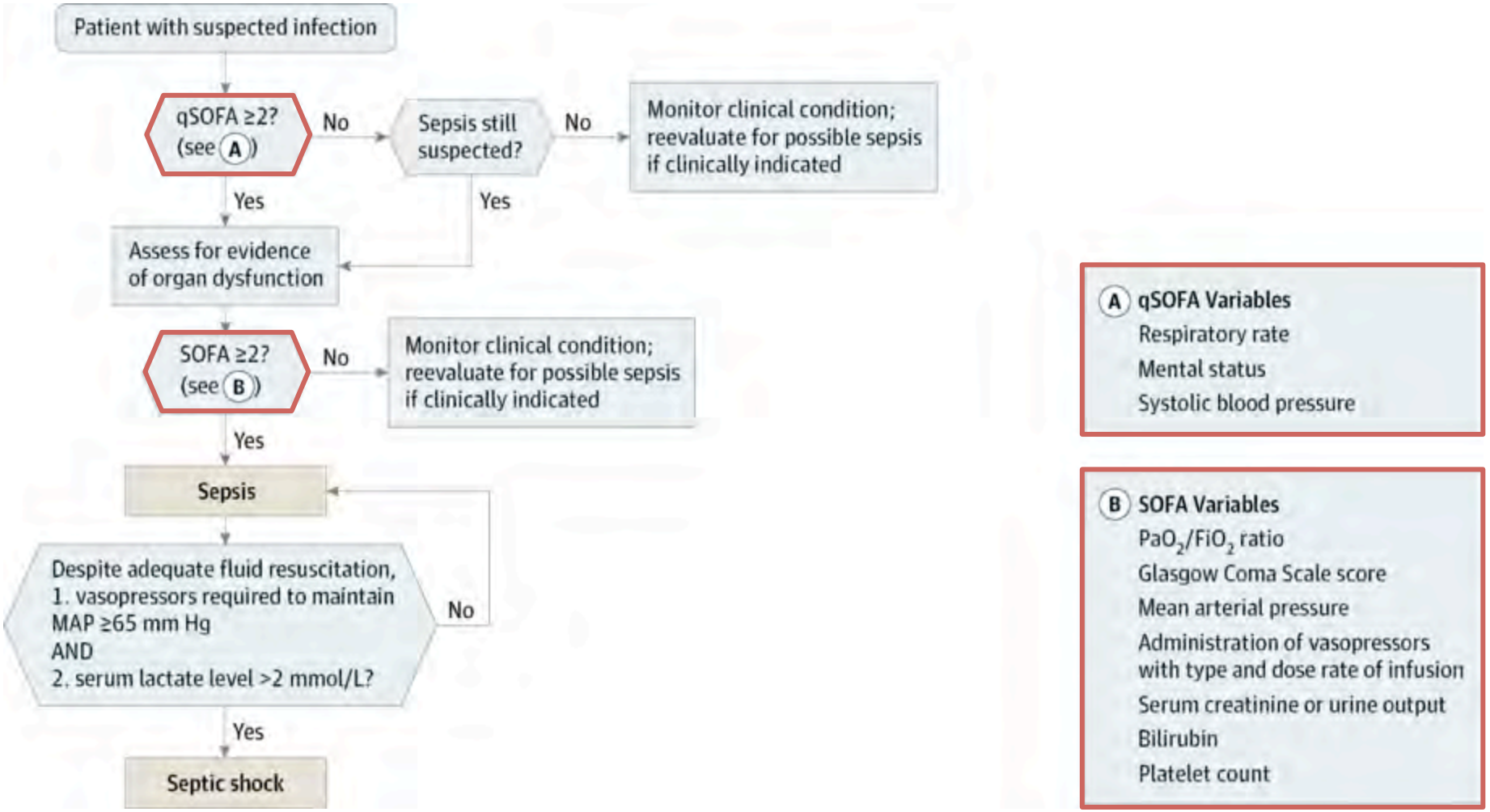
Sepsis +

- **HR** > 130
- **SBP** < 90 (MAP <65; ↓SBP >40)
- **RR** > 25
- **SaO_2** < 91%
- **Lactate** > 2
- **AVPU** < A (responds only to voice or pain; unresponsive)
- **Purpuric rash**

qSOFA

The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)

JAMA. 2016;315(8):801-810. doi:10.1001/jama.2016.0287



Operationalization of Clinical Criteria Identifying Patients With Sepsis and Septic ShockThe baseline Sequential [Sepsis-related] Organ Failure Assessment (SOFA) score should be assumed to be zero unless the patient is known to have preexisting (acute or chronic) organ dysfunction before the onset of infection. qSOFA indicates quick SOFA; MAP, mean arterial pressure.

NICE on Sepsis-3 definitions (qSOFA)

- *"qSOFA offers limited explanation on how to confirm or rule out sepsis in general clinical settings.*

- *qSOFA gives mortality risk but 'sepsis' includes all patients with BP<100 mmHg and RR>22.*

- *<u>But</u> not all these patients need antibiotics."*

Mark Baker, Director, Centre for Guidelines, NICE (July 2016)

How does NICE ‘define’ Sepsis?

THINK SEPSIS

Person with possible infection

- Think ***'could this be sepsis?'*** if they present with signs or symptoms that indicate infection, even if they do not have a high temperature.
- Be aware that people with sepsis may have non-specific, non-localising presentations (for example, feeling very unwell.
- Pay particular attention to concerns expressed by the person and family/carer.
- Take particular care in the assessment of people who might have sepsis who are unable, or their parent/carer is unable, to give a good history (for example, young children, people with English as a second language, people with communication problems)

ASSESSMENT

Assess people with suspected infection to identify:

- likely source of infection
- risk factors **(see righthand box)**
- Indicators of clinical of concern such as abnormalities of behaviour, circulation or respiration.

Healthcare professionals performing a remote assessment of a person with suspected infection should seek to identify factors that increase risk of sepsis or indicators of clinical concern.

People more vulnerable to sepsis

- the very young (under 1 year) and older people (over 75 years) or very frail people
- recent trauma or surgery or invasive procedure (within the last 6 weeks)
- Impaired immunity due to illness or drugs (for example, people receiving steroids, chemotherapy or immunosuppressants)
- Indwelling lines / catheters / intravenous drug misusers, any breach of skin integrity (for example, any cuts, burns, blisters or skin infections).

If at risk of neutropenic sepsis - refer to secondary care

Additional risk factors for women who are pregnant or who have been pregnant, given birth, had a termination or miscarriage within the past 6 weeks -gestational diabetes, diabetes or other co-morbidities; needed invasive procedure such as caesarean section, forceps delivery, removal of retained products of conception, prolonged rupture of membranes, close contract with someone with group A streptococcal infection, have continued vaginal bleeding or an offensive vaginal discharge).

Consider RISK FACTORS & Indicators of CLINICAL CONCERN

Structured Assessment:

Observations &
Early Warning Scores

SUSPECT SEPSIS

If sepsis is suspected, use a structured set of observations to assess people in a face-to-face setting.
Consider using early warning scores in hospital settings.
Parental or carer concern is important and should be acknowledged.

How does NICE 'define' Sepsis?

- SIRS is dead!
- Simplified terminology: "***Sepsis***" => severe
- Consideration of risk factors for Sepsis
- Less didactic definition combined with risk stratification
- Structured assessment – Observations & EWS

[Sepsis-3 (qSOFA) definitions not adopted by NICE]

Risk Stratification

Person with possible infection

- Think ***'could this be sepsis?'*** if they present with signs or symptoms that indicate infection, even if they do not have a high temperature.
- Be aware that people with sepsis may have non-specific, non-localising presentations (for example, feeling very unwell.
- Pay particular attention to concerns expressed by the person and family/carer.
- Take particular care in the assessment of people who might have sepsis who are unable, or their parent/carer is unable, to give a good history (for example, young children, people with English as a second language, people with communication problems)

ASSESSMENT

Assess people with suspected infection to identify:

- likely source of infection
- risk factors **(see righthand box)**
- Indicators of clinical of concern such as abnormalities of behaviour, circulation or respiration.

Healthcare professionals performing a remote assessment of a person with suspected infection should seek to identify factors that increase risk of sepsis or indicators of clinical concern.

People more vulnerable to sepsis

- the very young (under 1 year) and older people (over 75 years) or very frail people
- recent trauma or surgery or invasive procedure (within the last 6 weeks)
- Impaired immunity due to illness or drugs (for example, people receiving steroids, chemotherapy or immunosuppressants)
- Indwelling lines / catheters / intravenous drug misusers, any breach of skin integrity (for example, any cuts, burns, blisters or skin infections).

If at risk of neutropenic sepsis - refer to secondary care

Additional risk factors for women who are pregnant or who have been pregnant, given birth, had a termination or miscarriage within the past 6 weeks -gestational diabetes, diabetes or other co-morbidities; needed invasive procedure such as caesarean section, forceps delivery, removal of retained products of conception, prolonged rupture of membranes, close contract with someone with group A streptococcal infection, have continued vaginal bleeding or an offensive vaginal discharge).

Risk Stratification

SUSPECT SEPSIS

If sepsis is suspected, use a structured set of observations to assess people in a face-to-face setting.
Consider using early warning scores in hospital settings.
Parental or carer concern is important and should be acknowledged.

Stratify risk of severe illness and death from sepsis using algorithm appropriate to age and setting

Risk Stratification (age ≥12 years)

Stratify risk of severe illness and death from sepsis using the risk criteria in the stratification tool for adults, children and young people aged 12 years and over

High risk criteria

- Objective evidence of new altered mental state
- Respiratory rate: 25 breaths per minute or more OR new need for oxygen (more than 40% FiO2) to maintain saturation more than 92% (or more than 88% in known chronic obstructive pulmonary disease)
- Heart rate: 130 beats per minute or above
- Systolic blood pressure 90 mmHg or less or systolic blood pressure more than 40 mmHg below normal
- Not passed urine in previous 18 hours, or for catheterised patients passed less than 0.5 ml/kg of urine per hour
- Mottled or ashen appearance
- Cyanosis of skin, lips or tongue
- Non-blanching rash of skin

Moderate to high risk criteria

- History from patient, friend or relative of new onset of altered behaviour or mental state
- History of acute deterioration of functional ability
- Impaired immune system (illness or drugs including oral steroids)
- Trauma, surgery or invasive procedures in the last 6 weeks
- Respiratory rate: 21-24 breaths per minute
- Heart rate: 91-130 beats per minute (for pregnant women 100-130 beats per minute) OR new onset arrhythmia
- Systolic blood pressure 91-100 mmHg
- Not passed urine in the past 12-18 hours, or for catheterised patients passed 0.5-1 ml/kg of urine per hour
- Tympanic temperature less than 36°C
- Signs of potential infection, including redness, swelling or discharge at surgical site or breakdown of wound

Low risk criteria

- Normal behaviour
- No high risk or moderate to high risk criteria met

Risk Stratification (age 5-11 years)

Stratify risk of severe illness and death from sepsis using the risk criteria in the stratification tool for children aged 5-11 years

High risk criteria

- Objective evidence of altered behaviour or mental state
- Appears ill to a healthcare professional
- Does not wake or if roused does not stay awake
- Respiratory rate:
  - -Aged 5 years: 29 breaths per minute or more
  - -Aged 6–7 years: 27 breaths per minute or more
  - -Aged 8–11 years: 25 breaths per minute or more
  - -Oxygen saturation of less than 90% in air or increased oxygen requirement over baseline
- Heart rate:
  - -Aged 5 years: 130 beats per minute or more
  - -Aged 6–7 years: 120 beats per minute or more
  - -Aged 8–11 years: 115 beats per minute or more
  - -Or heart rate less than 60 beats per minute at any age
- Mottled or ashen appearance
- Cyanosis of skin, lips or tongue
- Non-blanching rash of skin

Moderate to high risk criteria

- Not responding normally to social cues
- Decreased activity
- Parent or carer concern that the child is behaving differently from usual
- Respiratory rate:
  - -Aged 5 years: 24–28 breaths per minute
  - -Aged 6–7 years: 24–26 breaths per minute
  - -Aged 8–11 years: 22–24 breaths per minute
  - -Oxygen saturation of less than 92% in air or increased oxygen requirement over baseline
- Heart rate:
  - -Aged 5 years: 120–129 beats per minute
  - -Aged 6–7 years: 110–119 beats per minute
  - -Aged 8–11 years: 105–114 beats per minute
  - -Or capillary refill time of 3 seconds or more
- Reduced urine output, or for catheterised patients passed less than 1 ml/kg of urine per hour
- Leg pain
- Cold hands or feet

Low risk criteria

- Normal behaviour
- No high risk or moderate to high risk criteria met

Risk Stratification (age <5 years)

Stratify risk of severe illness and death from sepsis using the risk criteria in the stratification tool for children aged under 5 years

High risk criteria

- Behaviour:
  - No response to social cues
  - Appears ill to a healthcare professional
  - Does not wake, or if roused does not stay awake
  - Weak high-pitched or continuous cry
- Heart rate:
  - Aged under 1 year: 160 beats per minute or more
  - Aged 1–2 years: 150 beats per minute or more
  - Aged 3–4 years: 140 beats per minute or more -
  - Heart rate less than 60 beats per minute at any age
- Respiratory rate:
  - Aged under 1 year: 60 breaths per minute or more
  - Aged 1–2 years: 50 breaths per minute or more
  - Aged 3–4 years: 40 breaths per minute or more
  - Grunting
  - Apnoea
  - Oxygen saturation of less than 90% in air or increased oxygen requirement over baseline
- Mottled or ashen appearance
- Cyanosis of skin, lips or tongue
- Non-blanching rash
- Temperature:
  - Less than 36ºC
  - Aged under 3 months: 38°C or more

Moderate to high risk criteria

- Behaviour:
  - Not responding normally to social cues
  - No smile
  - Wakes only with prolonged stimulation
  - Decreased activity
  - Parent or carer concern that child is behaving differently from usual
- Respiratory rate:
  - Aged under 1 year: 50–59 breaths per minute
  - Aged 1–2 years: 40–49 breaths per minute
  - Aged 3–4 years: 35–39 breaths per minute
  - Oxygen saturation of less than 91% in air or increased oxygen requirement over baseline
  - Nasal flaring
- Heart rate:
  - Aged under 1 year: 150–159 beats per minute
  - Aged 1–2 years: 140–149 beats per minute
  - Aged 3–4 years: 130–139 breaths per minute
- Capillary refill time of 3 seconds or more
- Reduced urine output, or for catheterised patients passed less than 1 ml/kg of urine per hour
- Pale or flushed
- Pallor of skin, lips or tongue
- Temperature:
  - Aged 3–6 months: 39°C or more
- Leg pain
- Cold hands or feet

Low risk criteria

- Responds normally to social cues
- Content or smiles
- Stays awake or awakens quickly
- Strong normal cry or not crying
- No high risk or moderate to high risk criteria met
- Normal colour

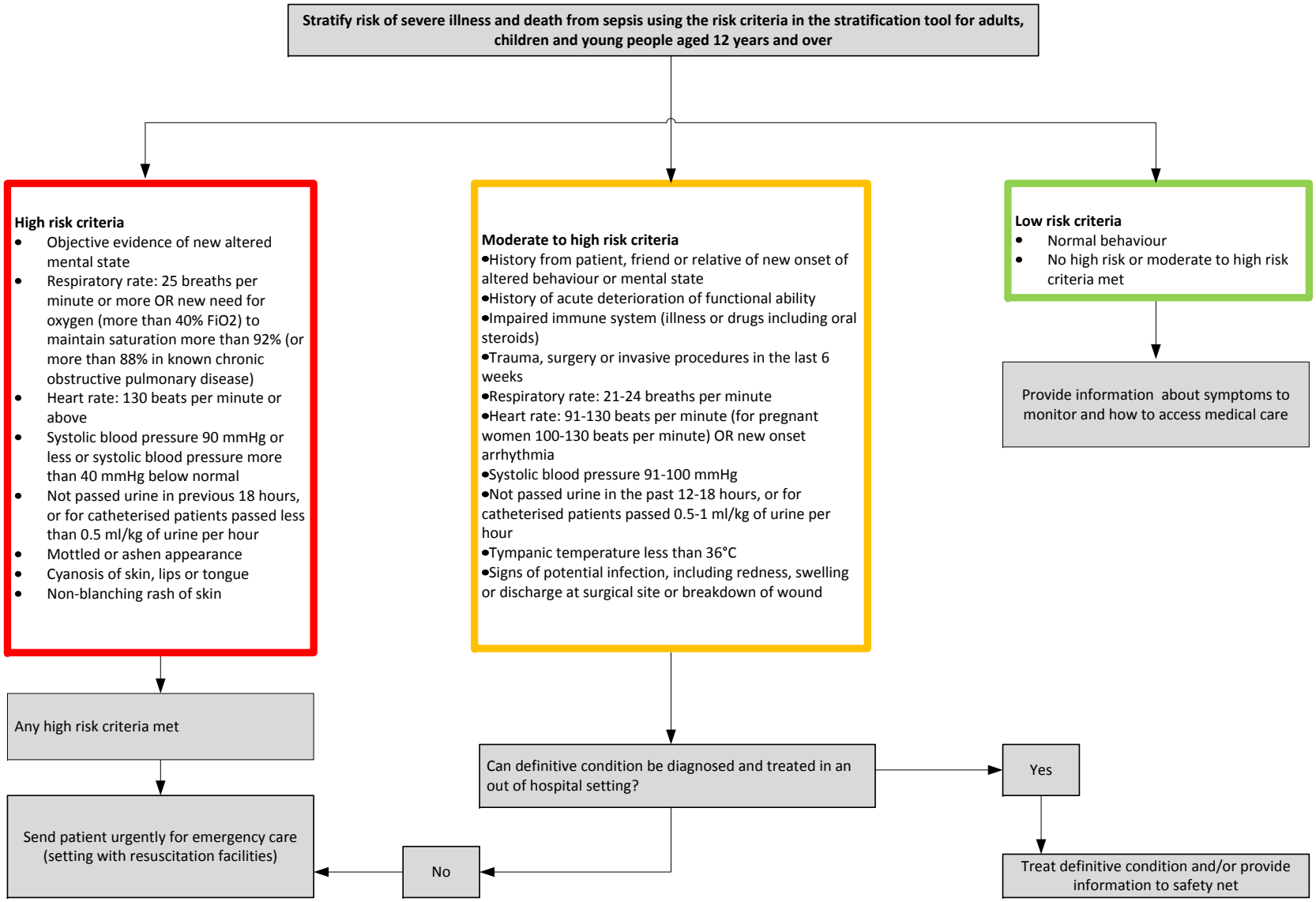
Risk Stratification

- Age & context specific tools & algorithms
  - Age: <5y, 5-11y, 12-adult
  - Community, Hospital
- High Risk = Red Flag Sepsis (with minor modifications)
- Moderate risk... difficult…
- Neutropaenic sepsis not included in High Risk

Care Pathways

- Risk stratification defines pathway

Managing suspected sepsis in adults and young people aged 18 years and over - outside an acute hospital setting



Managing suspected sepsis in adults and young people aged 18 years and over - in an acute hospital setting

Stratify risk of severe illness and death from sepsis using the risk criteria in the stratification tool for adults, children and young people aged 12 years and over

High risk criteria

- Objective evidence of new altered mental state
- Respiratory rate: 25 breaths per minute or more OR new need for oxygen (more than 40% FiO2) to maintain saturation more than 92% (or more than 88% in known chronic obstructive pulmonary disease)
- Heart rate: 130 beats per minute or above
- Systolic blood pressure 90 mmHg or less or systolic blood pressure more than 40 mmHg below normal
- Not passed urine in previous 18 hours, or for catheterised patients passed less than 0.5 ml/kg of urine per hour
- Mottled or ashen appearance
- Cyanosis of skin, lips or tongue
- Non-blanching rash of skin

Moderate to high risk criteria

- History from patient, friend or relative of new onset of altered behaviour or mental state
- History of acute deterioration of functional ability
- Impaired immune system (illness or drugs including oral steroids)
- Trauma, surgery or invasive procedures in the last 6 weeks
- Respiratory rate: 21-24 breaths per minute
- Heart rate: 91-130 bets per minute (for pregnant women 100-130 beats per minute) OR new onset arrhythmia
- Systolic blood pressure 91-100 mmHg
- Not passed urine in the past 12-18 hours, or for catheterised patients passed 0.5-1 ml/kg of urine per hour
- Tympanic temperature less than 36°C
- Signs of potential infection, including redness, swelling or discharge at surgical site or breakdown of wound

Low risk criteria

Suspected sepsis, but:
- Normal behaviour
- No high risk or moderate to high risk criteria met

1 high risk criterion

Arrange immediate review by senior clinical decision maker (person authorised to prescribe antibiotics, such as CT3/ST3 and above or advanced nurse practitioner).

Carry out venous blood test for the following:
- blood gas including glucose and lactate measurement
- blood culture
- full blood count
- C-reactive protein
- urea and electrolytes
- creatinine
- clotting screen.

Give intravenous antibiotics without delay, and at least within one hour of identification of high risk criteria.

Use an intravenous antimicrobial from agreed local formulary and in line with local (where available) or national guidelines.

Discuss with consultant

Lactate > 4 mmol/L **OR** SBP < 90 mmHg

- Give i.v. fluid (500 ml over less than 15 minutes) without delay
- Refer to critical care

Lactate 2 – 4 mmol /L

- Give i.v. fluid (500 ml over less than 15 minutes) without delay

Lactate < 2 mmol /L

Consider i.v. fluids.

Carry out observations, at least every 30 minutes or continuous monitoring in ED.
Consultant to attend if not already present if patient does not improve

2 or more moderate to high risk criteria **OR** SBP: 91-100 mmHg

Clinician to review person's condition and venous lactate results within 1 hour

Carry out venous blood test for the following:
- blood gas including lactate measurement
- blood culture
- full blood count
- C-reactive protein
- urea and electrolytes
- creatinine.

Lactate > 2 mmol / L OR assessed as having AKI* = escalate to high risk

Lactate ≤ 2 mmol / L and no AKI*

If no definitive condition identified, repeat structured assessment at least hourly

Ensure review by a senior decision maker within 3 hours for consideration of antibiotics.

Only 1 moderate to high risk criterion

Clinician review within 1 hour and perform blood tests if indicated

Manage definitive condition / infection if diagnosed

Suspected sepsis and no high risk or high to moderate risk criteria met

Clinical assessment and manage according to clinical judgement

* See Acute kidney injury (NICE guideline CG169)

Managing suspected sepsis in children aged under 5 years - in an acute hospital setting

Stratify risk of severe illness and death from sepsis using the risk criteria in the stratification tool for children aged under 5 years

High risk criteria

- Behaviour:
  - No response to social cues
  - Appears ill to a healthcare professional
  - Does not wake, or if roused does not stay awake
  - Weak high-pitched or continuous cry
- Heart rate:
  - Aged under 1 year: 160 beats per minute or more
  - Aged 1–2 years: 150 beats per minute or more
  - Aged 3–4 years: 140 beats per minute or more - Heart rate less than 60 beats per minute at any age
- Respiratory rate:
  - Aged under 1 year: 60 breaths per minute or more
  - Aged 1–2 years: 50 breaths per minute or more
  - Aged 3–4 years: 40 breaths per minute or more
  - Grunting
  - Apnoea
  - Oxygen saturation of less than 90% in air or increased oxygen requirement over baseline
- Mottled or ashen appearance
- Cyanosis of skin, lips or tongue
- Non-blanching rash of skin
- Temperature:
  - Less than 36ºC
  - Aged under 3 months: 38°C or more

Moderate to high risk criteria

- Behaviour:
  - Not responding normally to social cues
  - No smile
  - Wakes only with prolonged stimulation
  - Decreased activity
  - Parent or carer concern that child is behaving differently from usual
- Respiratory rate:
  - Aged under 1 year: 50–59 breaths per minute
  - Aged 1–2 years: 40–49 breaths per minute
  - Aged 3–4 years: 35–39 breaths per minute
  - Oxygen saturation of less than 91% in air or increased oxygen requirement over baseline
  - Nasal flaring
- Heart rate:
  - Aged under 1 year: 150–159 beats per minute
  - Aged 1–2 years: 140–149 beats per minute
  - Aged 3–4 years: 130–139 breaths per minute
- Capillary refill time of 3 seconds or more
- Reduced urine output, or for catheterised patients passed less than 1 ml/kg of urine per hour
- Pale or flushed
- Pallor of skin, lips or tongue
- Temperature:
  - Aged 3–6 months: 39°C or more
- Leg pain
- Cold hands or feet

Low risk criteria

- Responds normally to social cues
- Content or smiles
- Stays awake or awakens quickly
- Strong normal cry or not crying
- No high risk or moderate to high risk criteria met
- Normal colour

1 high risk criterion

Arrange immediate review by senior clinical decision maker (paediatric or emergency care ST4 or above or equivalent).
Carry out venous blood test for the following:

- blood gas including glucose and lactate measurement
- blood culture
- Full blood count
- C-reactive protein
- Urea and electrolytes
- Creatinine
- Clotting screen

Give i.v. antibiotics without delay, and at least within one hour.
Discuss with consultant

Lactate > 4 mmol/L

- Give i.v. fluid (bolus injection) without delay
- Discuss with critical care

Lactate 2 – 4 mmol /L

- Give i.v. fluid (bolus injection) without delay

Lactate < 2 mmol /L

Consider i.v. fluids (bolus injection)

Carry out observations, at least every 30 minutes or continuous monitoring in ED.
Consultant to attend if not already present if patient does not improve

2 or more moderate to high risk criteria **OR** SBP: 91-100 mmHg

Perform tests: venous blood for blood culture, FBC, CRP, U/E, creatinine, and blood gas for lactate
Clinican review and results review within 1 hour

Lactate > 2 mmol / L OR assessed as having AKI* = escalate to high risk

Lactate ≤ 2 mmol / L and no AKI*

If no definitive condition identified, repeat structured assessment at least hourly

Ensure review by a senior decision maker within 3 hours for consideration of antibiotics.

Only 1 moderate to high risk criterion

Clinician review and consider blood tests within 1 hour

Suspected sepsis and no high risk or high to moderate criteria met

Clinical assessment and manage according to clinical judgement

Manage definitive condition / infection if diagnosed

* See Acute kidney injury (NICE guideline CG169)

Care Pathways

- Risk stratification defines pathway
- Inpatient pathways complex and didactic
- Limited evidence to support complexity
- Easy to implement / operationalize?

Care Bundle

- **IV Antibiotics**
  - Pre-alert secondary care if high risk / red flag sepsis
  - Mechanism for delivery pre-hospital if >1h transfer
  - BenPen pre-hospital for suspected meningococcal disease
- **IV Fluids** - guided by need / lactate
- **Consider Oxygen** - target SaO_2 94-98% (88-92% if risk of T2RF)

- **Blood cultures**
- **Lactate**
- **Monitoring** (e.g. High Risk => Observations every 30 min)

- **Source Identification & Control**
- **Escalation criteria**

Care Bundle

- **IV Antibiotics**
  - Pre-alert secondary care if high risk / red flag sepsis
  - Mechanism for delivery pre-hospital if >1h transfer
  - BenPen pre-hospital for suspected meningococcal disease
- **IV Fluids** - guided by need / lactate
- **Consider Oxygen** - target SaO_2 94-98% (88-92% if risk of T2RF)
- **Blood cultures**
- **Lactate**
- **Monitoring** (urine output)
- **Source Identification & Control**
- **Escalation criteria**

Sepsis Six

Other aspects of guideline

- Education & Training
- Information & Support for patients & carers
- Recommendations for research
- Evidence Reviewed

NICE National Institute for Health and Care Excellence

NICE guideline

Where Now?

Sepsis: recognition, diagnosis and early management

NICE guideline
Published: 13 July 2016
nice.org.uk/guidance/ng51

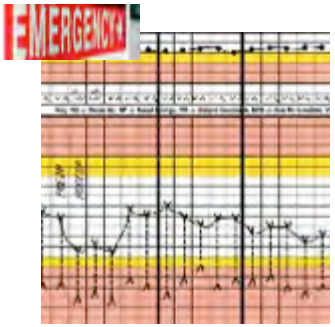
Applying the guidelines Locally & Regionally

Responsibilities (NICE)

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or service users. The application of the recommendations in this guideline are not mandatory and the guideline does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.

Challenges

- Operationalize the guidelines



- Integrate into existing pathways
  - Community
  - Acute admissions
  - Deteriorating patients (Track & Trigger / Early Warning Scores)

- Build on progress already made
  - 'Red Flag' Sepsis
  - Sepsis Six

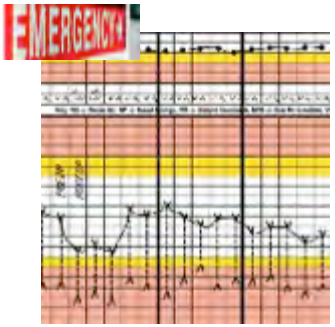
Summary

Oxford Academic Health Science Network
Patient Safety

- **Lots of good things**
  - A national approach
  - Simplified terminology (Sepsis) & less didactic definition
  - Structured assessment and risk stratification
  - Overall consistent with and builds on existing tools and progress
- **Some questions and challenges**
  - Very poor quality evidence – does this justify some of the complexity?
  - How much does the Amber pathway (moderate risk criteria) add?
  - Neutropaenic sepsis might be better integrated
- **Operationalizability is key to improve patient care**

Oxford AHSN approach

- Regional approach to implementation



- Integrate into existing pathways
  - Community
  - Acute admissions
  - Deteriorating patients (Track & Trigger / Early Warning Scores)

- Build on progress already made
  - 'Red Flag' Sepsis
  - Sepsis Six

Sepsis Working Together
Community and Secondary Care

Sepsis Working Together
Community and Secondary Care

Sue Morrish

Sam's story

An avoidable death of a three-year-old child from sepsis

We have found that had Sam received appropriate care and treatment, he would have survived, and that a lack of appropriate and timely bereavement support compounded the distress caused to his family as a result of the failures in care. We have also found failures in the way that the NHS investigated the events that took place, and that this caused the family a further injustice.

Red (high risk: take immediate action)

Many (but not all) children with these features are seriously unwell and need to be assessed straight away in hospital. Dial '999' for an ambulance if necessary.

Skin, lips and tongue	
Very pale or blue skin and sunken eyes	☐
Rash that does not fade when pressed firmly (use a clear glass)	☐
Activity	
Not responding to carers	☐
Very difficult to wake up	☐
Weak, high-pitched or continuous cry in younger children	☐
Older children are confused or unusually irritable	☐
Breathing	
Finding it much harder to breathe than normal	☐
Grunting breathing	☐
Very fast breathing: more than 60 breaths a minute	☐
Noticeable pauses in breathing	☐
Circulation	
Very cold hands and feet	☐
Temperature and body	
Under 3 months with raised temperature over 38°C	☐
The soft spot on an infant's head is bulging	☐
Stiff neck, especially when trying to look up and down	☐
The child has a seizure	☐
Vomiting, diarrhoea and hydration	
Very thirsty and not able to keep fluids down	☐
Bloody or black 'coffee ground' vomit	☐
Not had a wee for 12 hours	☐

Notes

NHS

SAM

Sepsis Assessment & Management

What to look for if your child has a temperature and you are concerned

Look out for the signs of sepsis

A raised temperature (fever) in children is common, but can be worrying. Almost all children will recover quickly and without problems. However, a very small proportion may have a serious infection with sepsis (bloodstream infection) that requires urgent treatment in hospital.

This information is designed to help you monitor your child's condition if they have a raised temperature, so you know when to ask for help and can describe the symptoms.

Just tick off any of those symptoms that you observe with a note of the date and time, and follow the advice at the top of the page.

For ease of use, the symptoms are split into:

- Amber, where medical advice should be asked for
- Red, which means you should get the child to hospital quickly – dial '999' if necessary and ask for an ambulance.

Again, we must stress that the great majority of children do not have sepsis. **But if you do have concerns and your child seems to be getting worse, even if their temperature falls, act swiftly just in case.**

Find out more

Detailed information can be found on the NICE website: www.nice.org.uk/Guidance/CG160

The UK Sepsis Trust also has a lot of helpful material at: www.sepsistrust.org
Email: info@sepsistrust.org
Phone: 0845 606 6255

Amber (intermediate risk: ask for advice)

Some (but not all) children with these features are seriously unwell. If you have any concerns, a trained health professional needs to assess them promptly. Contact your GP, NHS 111 or minor injuries unit.

	time/date	time/date	time/date
Skin, lips and tongue			
Unusually pale	☐	☐	☐
Rash that fades when pressed firmly (use a clear glass)	☐	☐	☐
Activity			
Not responding normally to family or carers	☐	☐	☐
Not smiling	☐	☐	☐
Difficult to wake up or unusually sleepy	☐	☐	☐
Not wanting to do very much	☐	☐	☐
Breathing			
Nostrils are flaring	☐	☐	☐
Fast breathing	☐	☐	☐
Unusually noisy or crackly breathing	☐	☐	☐
Cough that sounds like a seal barking	☐	☐	☐
Circulation			
Cold hands and feet	☐	☐	☐
Temperature and body			
Shivering or shaking	☐	☐	☐
Raised temperature for 5 days or more	☐	☐	☐
Swelling of a limb or joint	☐	☐	☐
Not using/putting weight on an arm, leg, hand or foot	☐	☐	☐
Aged 3-6 months with temperature of 39°C or above	☐	☐	☐
Vomiting, diarrhoea and hydration			
Under 1 year of age – vomiting and/or diarrhoea	☐	☐	☐
More than 5 watery poos in the last 24 hours	☐	☐	☐
Has vomited more than twice in last 24 hours	☐	☐	☐
Not feeding or eating much	☐	☐	☐
Dry mouth	☐	☐	☐
Only one wet nappy or wee in 12 hours	☐	☐	☐

Notes

www.sepsistrust.org

IF YOUR CHILD HAS:

AMBER symptoms

ASK FOR MEDICAL ADVICE

RED symptoms

GET YOUR CHILD TO HOSPITAL QUICKLY

Dial 999 for an ambulance if necessary

www.sepsistrust.org

This information is derived, with permission, from the SAM leaflet produced by NHS England (South West) following the death of three-year-old Sam Morrish in December 2010 to improve recognition of sepsis in children. Contributors include paediatricians, sepsis experts, nurses, GPs and parents of children who've had sepsis.

The UK Sepsis Trust is here to support you.

Helpline 0800 389 6255
info@sepsistrust.org or
www.sepsistrust.org

Protect your child's health. Think sepsis.

www.sepsistrust.org

Spotting sepsis and serious illness in children

www.sepsistrust.org

Please use this leaflet if you are concerned about your child's symptoms, especially if their illness seems different to any previous illness they've had, or if they are 'just not right' (even if their temperature falls).

This information will help you monitor your child's condition so you know:

- When to ask for help
- Where to go
- How to describe the symptoms

AMBER symptoms

Some (but not all) children with these symptoms are seriously unwell.

Ask for an assessment TODAY from a trained health professional.

Contact your GP Surgery, call NHS 111, or go to your local Walk-in Centre or Minor Injury Unit.

Temperature
- ☐ Raised temperature (more than 37.5°C) for five days or more
- ☐ Shivering or shaking

Breathing
- ☐ Nostrils change size with each breath
- ☐ Breathing that's noisy or sounds 'crackly'
- ☐ Cough that sounds like a seal barking

Skin, Lips & Tongue
- ☐ Unusually pale skin
- ☐ Dry mouth, lips and/or tongue

Eating & Drinking
- ☐ Baby who is not feeding (taking less than half their usual amount of milk)
- ☐ Eating much less than normal
- ☐ Has vomited (been sick) more than twice in the last 24 hours

Toilet/Nappies
- ☐ More than five watery poos (diarrhoea) in the last 24 hours in babies younger than one year of age
- ☐ Only one wee or wet nappy in eight hours

Activity & Body
- ☐ Less interested than usual in playing
- ☐ Difficult to wake up or unusually sleepy
- ☐ Swelling of a limb or joint
- ☐ Not using/putting weight on an arm, leg, hand or foot

It's sometimes hard to be sure about particular signs and symptoms. If you feel that your child may be seriously ill, or if something that concerns you is not on these lists, contact your GP surgery, NHS 111 or dial 999 according to your level of concern.

RED symptoms

Many (but not all) children with these symptoms are seriously unwell.

TAKE IMMEDIATE ACTION.
DIAL 999 STRAIGHT AWAY. DON'T DELAY.

Temperature
- ☐ Temperature over 38°C in babies under three months
- ☐ Temperature over 39°C in babies aged three to six months
- ☐ Any high temperature in a child who cannot be encouraged to show interest in anything
- ☐ Low temperature (below 36°C, check three times in a 10 minute period)

Breathing
- ☐ Finding it much harder to breathe than normal – looks like hard work
- ☐ Making 'grunting' noises with every breath (in newborns this may sound like a lamb bleating)
- ☐ Very fast breathing (more than one breath each second in babies)
- ☐ Can't say more than a few words at once (for older children who normally talk)
- ☐ Breathing that obviously 'pauses'

Skin, Lips & Tongue
- ☐ Skin is blue, mottled (purplish, red) or very pale
- ☐ Lips or tongue are bluish
- ☐ Eyes look 'sunken'
- ☐ Hands and feet are unusually cold to touch
- ☐ Rash that does not fade when pressed firmly (use a clear glass)

Eating & Drinking
- ☐ New baby under one month old with no interest in feeding
- ☐ Not drinking for more than eight hours (when awake)
- ☐ Extremely thirsty
- ☐ Unable to keep fluids down
- ☐ Persistently vomiting for more than 24 hours
- ☐ Bile-stained (green), bloody or black vomit/sick

Toilet/Nappies
- ☐ Not had a wee or wet nappy for 12 hours

Activity & Body
- ☐ Soft spot on a baby's head is bulging
- ☐ Child cannot be encouraged to show interest in anything
- ☐ Baby is floppy
- ☐ Weak, 'whining' or continuous crying in a younger child
- ☐ Older child who's confused
- ☐ Not responding or very irritable
- ☐ Hard to wake up, won't stay awake or doesn't seem to recognise you
- ☐ Stiff neck, especially when trying to look up and down

Sepsis Working Together
Community and Secondary Care

Sepsis Working Together
Community and Secondary Care

Celia Ingham Clark

National work to improve sepsis recognition and management

Sepsis Working Together
Community and Secondary Care

Sepsis Working Together
Community and Secondary Care

Refreshment Break

Twitter: #pscsepsis

Sepsis Working Together
Community and Secondary Care

Welcome back

Twitter: #pscsepsis

Sepsis Working Together
Community and Secondary Care

Facilitated table workshop and feedback

Twitter: #pscsepsis

Sepsis Working Together
Community and Secondary Care

Sepsis Working Together
Community and Secondary Care

Bethan Page

Monitoring progress and improvement

Oxford Academic Health Science Network

UNIVERSITY OF OXFORD

Outcome measurement

How will we know if things have improved?

How will we know if we've improved?

Measuring the impact of sepsis improvement programmes has proved difficult because of the changing definitions and the lack of an agreed method for monitoring sepsis.

In order to measure change in a sepsis programme we need to:

1. Define the target population – what's our definition? Is this a stable population?
2. Monitor processes of care – e.g. time to antibiotics
3. Monitor outcomes of our target population – e.g. mortality, LOS

Approaches used by others

Healthcare Improvement Scotland and UCL Partners have tried two approaches:

- Patients coded with A40/A41 (HES data)

- Patients with blood cultures taken (not just positive blood cultures)

Scotland: *30 day mortality for all patients who had a blood culture performed*

UCL Partners: *In some Trusts, review 10+ randomly selected patient records with blood cultures taken and check if severe sepsis/septic shock in 2015 or infection with qSOFA + 2 / NEWS 5 or more in 2016*

Scotland found no improvement with blood cultures , but did for A40/A41

HES data options

+ Readily available for all Trusts through the AHSN
+ Range of variables: mortality, LOS, demographics, comorbidities
- Time lag (AHSN is about to get new HES data up to June 2016, 5 years)
- Accuracy and variability of coding between Trusts and over time

Lab tests (e.g. blood cultures)

+ No time lag
+ Isn't dependent on accuracy of coding
- Would need to collect prospectively, how much work is this to do?
- Is this a stable population? (CQUIN requests blood cultures)

A40/A41 sepsis codes

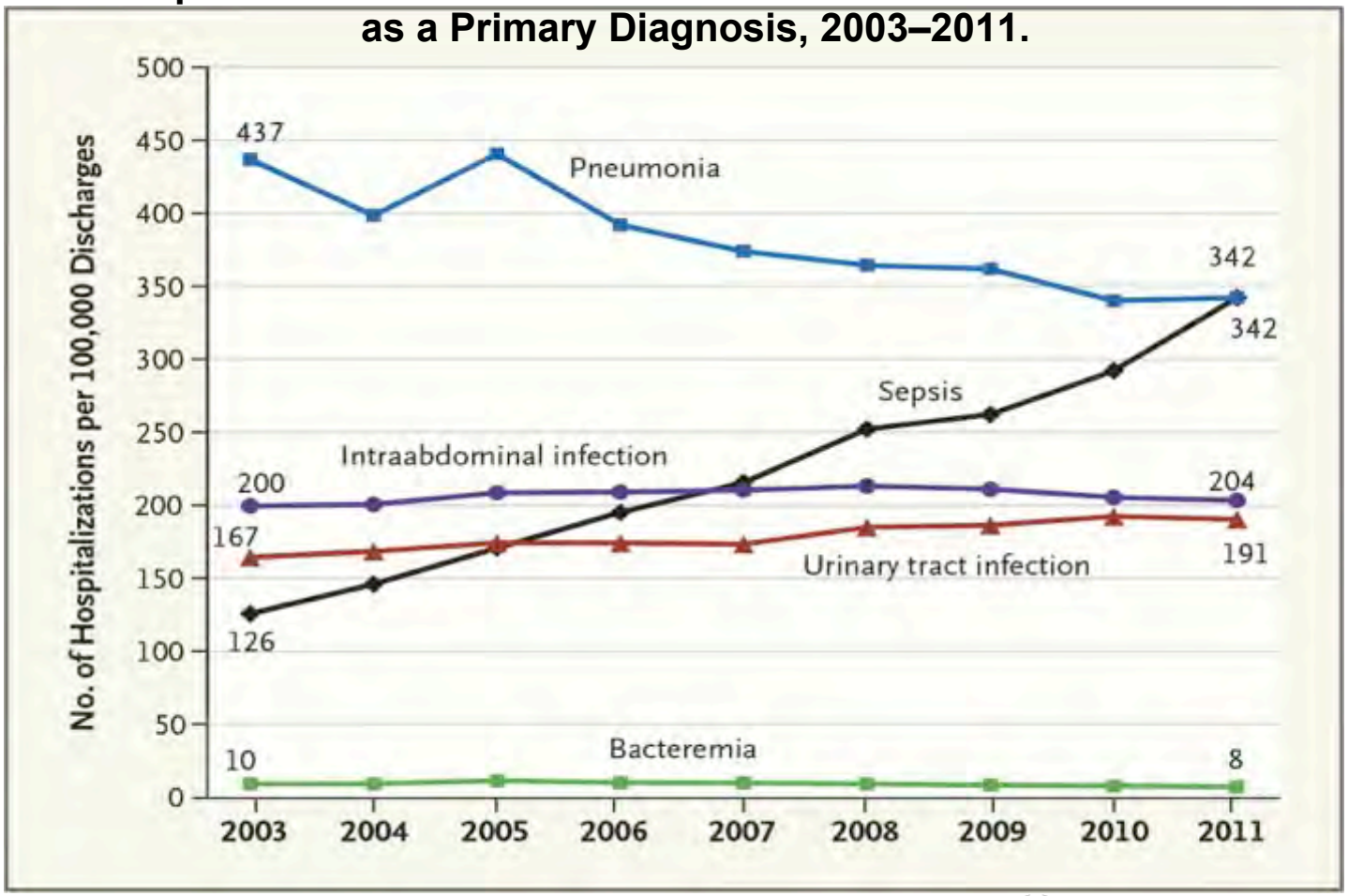
We have this data for all Trusts at the AHSN. Will be able to update shortly up to June 2016.

To be considered:

- Coders commonly code the source of infection. A419 is often used when the cause of infection is unknown. Coding practises vary between Trusts and are changing.

-“Even if there was a drive towards improved coding of sepsis in the UK, there would be no credible baseline to ascertain if improvement efforts have made a difference. By raising awareness of "sepsis", the first change will be an increase in the number of cases with a reduction in the mortality that might well be artificial.” (Inada-Kim et al., 2016)

Hospitalizations for Which Certain Infection Codes Were Listed as a Primary Diagnosis, 2003–2011.



Rhee C et al. N Engl J Med 2014;370:1673-1676.

Who are our target population?

- No defined diagnostic test (unlike troponin in acute coronary syndrome or an X ray in a fractured limb)
- In clinical practice we treat those with a "suspicion of sepsis"
- NICE guidelines: Identifying and assessing people with suspected sepsis
- Interventions are aimed at patients where there is "suspicion of sepsis"
- *"A successful intervention would see a reduction in later sepsis (however measured) but even in the absence of reliable sepsis definition we could monitor mortality, length of stay and other indices of outcome in a suspicion of sepsis group."* (Inada-Kim et al., 2016)

The Method

- HES data for all trusts in Oxford AHSN
- Matt Inada-Kim developed a list of all ICD-10 codes for bacterial infections. Codes verified by other specialists.
- Filter for all patients with a primary diagnosis for infection when admitted to hospital
- Outcomes: hospital mortality, LOS, readmission
- Find most common diagnosis and those associated with the most deaths.

Suspicion of sepsis (SOS)

SOS: Patients admitted with bacterial infection

Target population is patients admitted with infection.

+ Consistent with NICE guidelines and early intervention focus

+ Stable population even if increase in A40/A41 coding

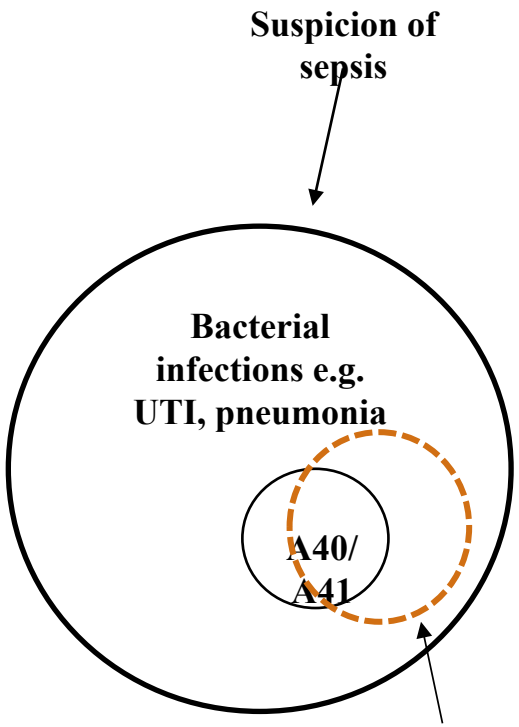
- Accuracy of coding

- Time lag

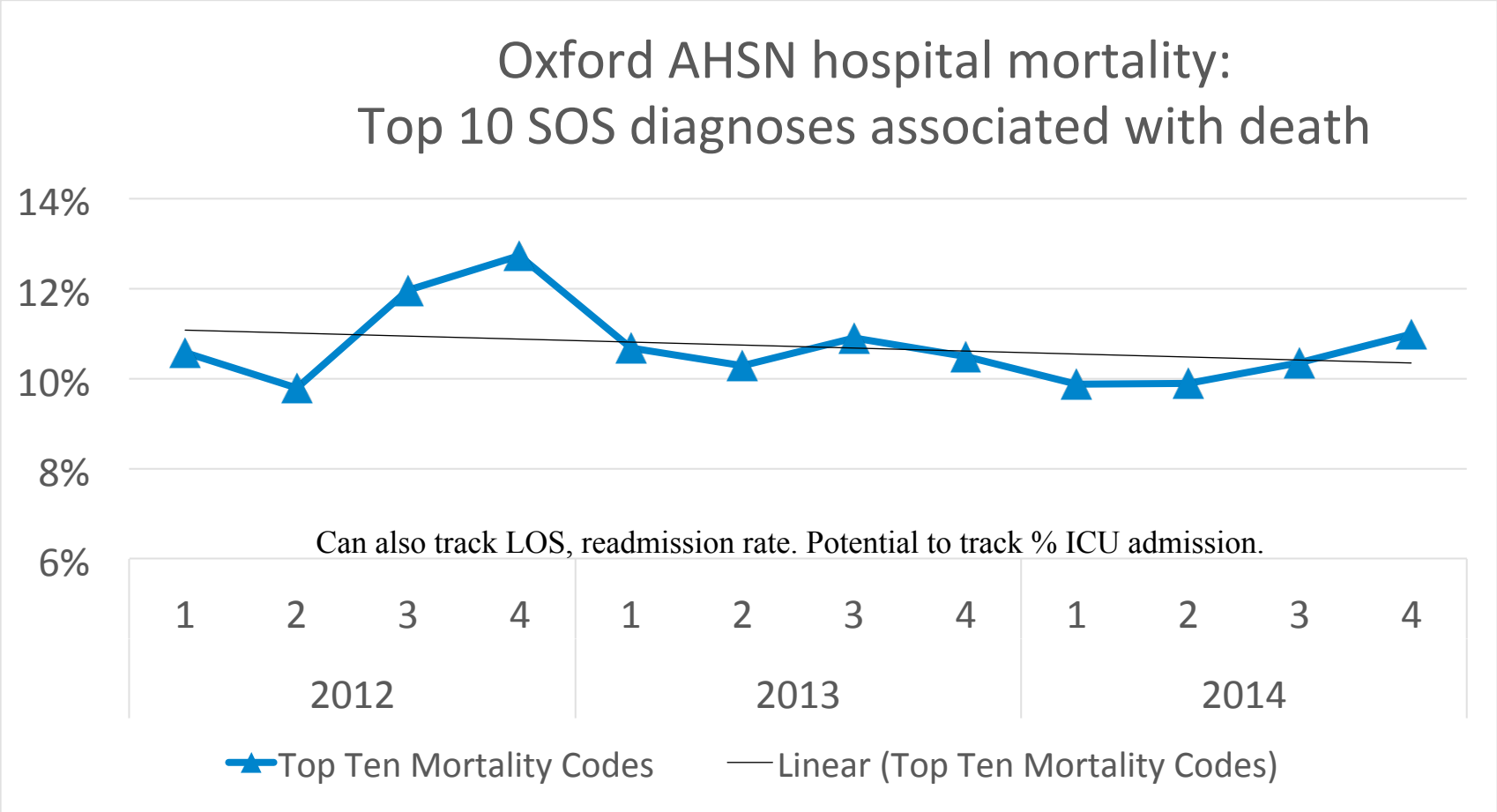
- Includes some low risk infections

SOS top 10

Track outcomes of the 10 "biggest killers"



SEPSIS: "Life-threatening organ dysfunction caused by a dysregulated host response to infection".


Oxford AHSN hospital mortality:
Top 10 SOS diagnoses associated with death
14%
12%
10%
8%
6%
Can also track LOS, readmission rate. Potential to track % ICU admission.
1 2 3 4 1 2 3 4 1 2 3 4
2012
2013
2014
Top Ten Mortality Codes
Linear (Top Ten Mortality Codes)

What should we track at Oxford AHSN?

(Can track more than one measure)

HES (Updated data to June 2016 due very shortly)

- ❑ A40/A41
- ❑ Suspicion of sepsis (SOS)
- ❑ SOS top 10 killers
  - ○ *A measure of confirmed sepsis cases?* Could we link to NEWS scores? Electronic format? *SOS + NEWS score >5*

Blood cultures

- ○ Random sample of blood culture patients? Mortality for these patients. Or check notes, e.g. do they have NEWS 5 or more.

Process measures need thinking about: CQUIN data of use here?

Sepsis Working Together
Community and Secondary Care

Sepsis Working Together
Community and Secondary Care

Lunch break

Twitter: #pscsepsis

Sepsis Working Together
Community and Secondary Care

Welcome back

Twitter: #pscsepsis

Sepsis Working Together
Community and Secondary Care

Andrew Brent

Geoff's Story

Sepsis Working Together
Community and Secondary Care

Sepsis Working Together
Community and Secondary Care

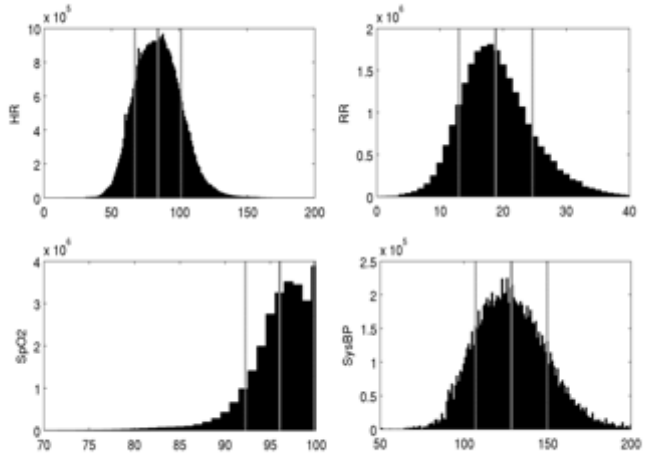
Peter Watkinson & Andrew Brent

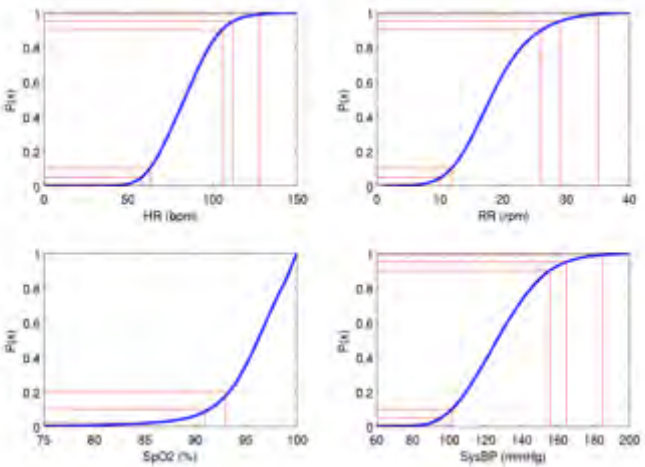
SEND and Sepsis:
Harnessing technology to improve patient care

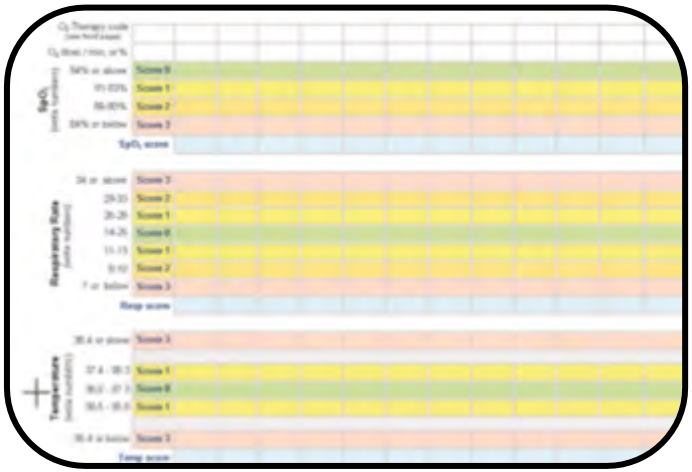
- **What's the problem?**


Acutely ill patients in hospital
Recognition of and response to acute illness in adults in hospital
Review into the quality of care and treatment provided by 14 hospital trusts in England: overview report
Professor Sir Bruce Keogh KBE
16 July 2013
Knowing the Risk
A review of the peri-operative care of surgical patients
PATIENT
SSSEMENT
HIGH RISK SURGERY
The Higher Risk General Surgical Patient
Towards Improved Care for a Forgotten Group
An Acute Problem?
A report of the National Confidential Enquiry into Patient Outcome and Death (2005)
NCEPOD
The Mid Staffordshire NHS Foundation Trust Public Inquiry
Report of
Staffordshire
ndation Trust
ic Inquiry

How do we recognize who is at risk?

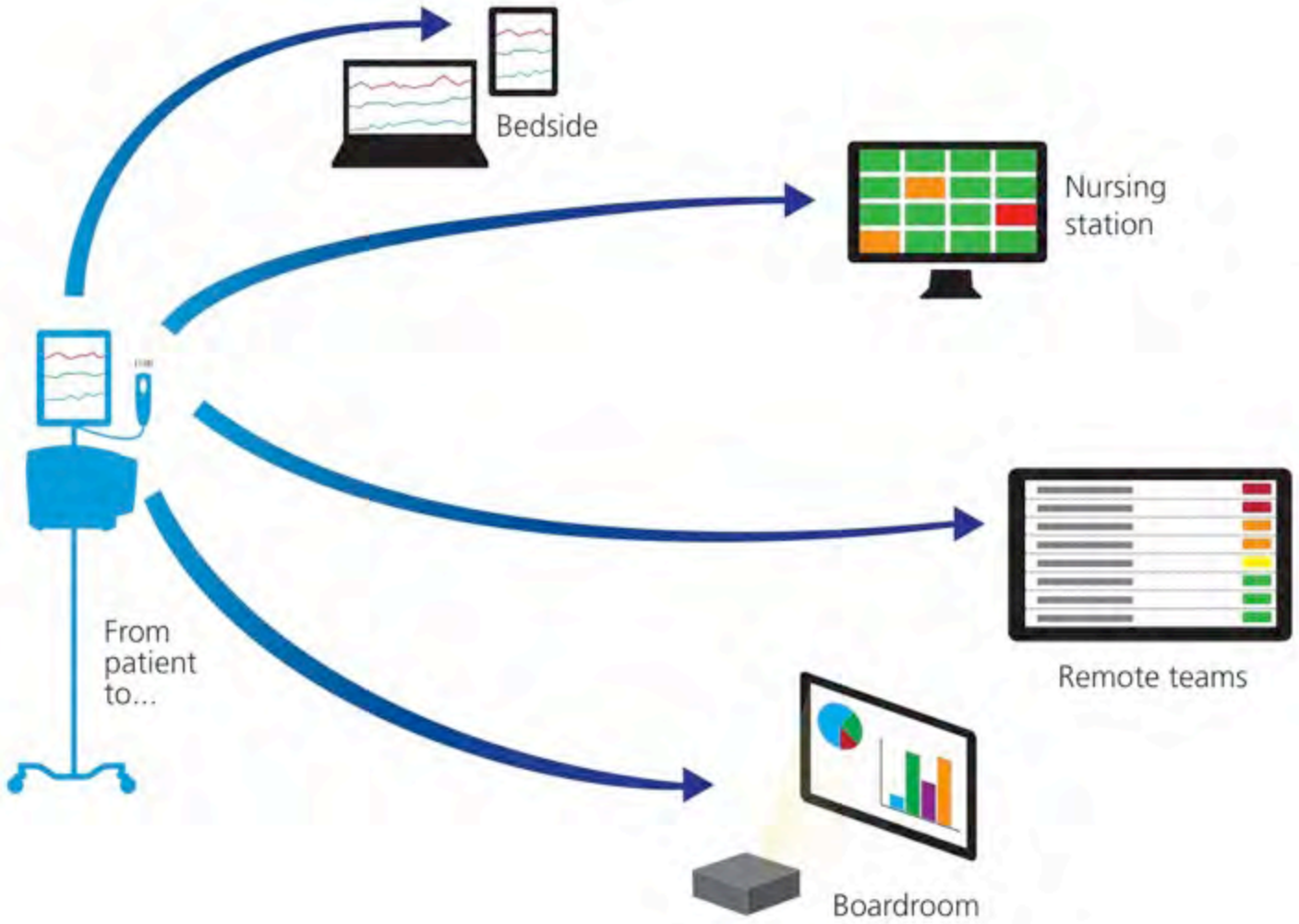






- Tarassenko *et al:* Centile-based early warning systems derived from statistical distributions of vital signs Resuscitation 2011:82;1013-8

- **Who needs the information?**

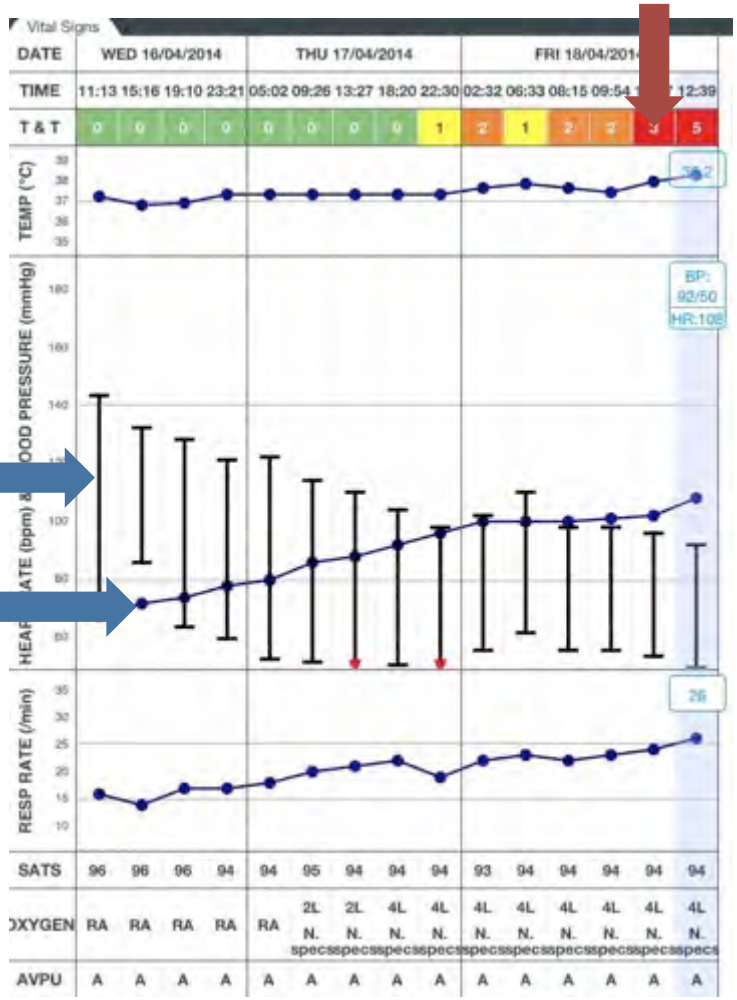


- **Ergonomic, efficient design**

- **Fast, easy data entry**

Clear intuitive display of vital signs

- Blood pressure
- Heart rate



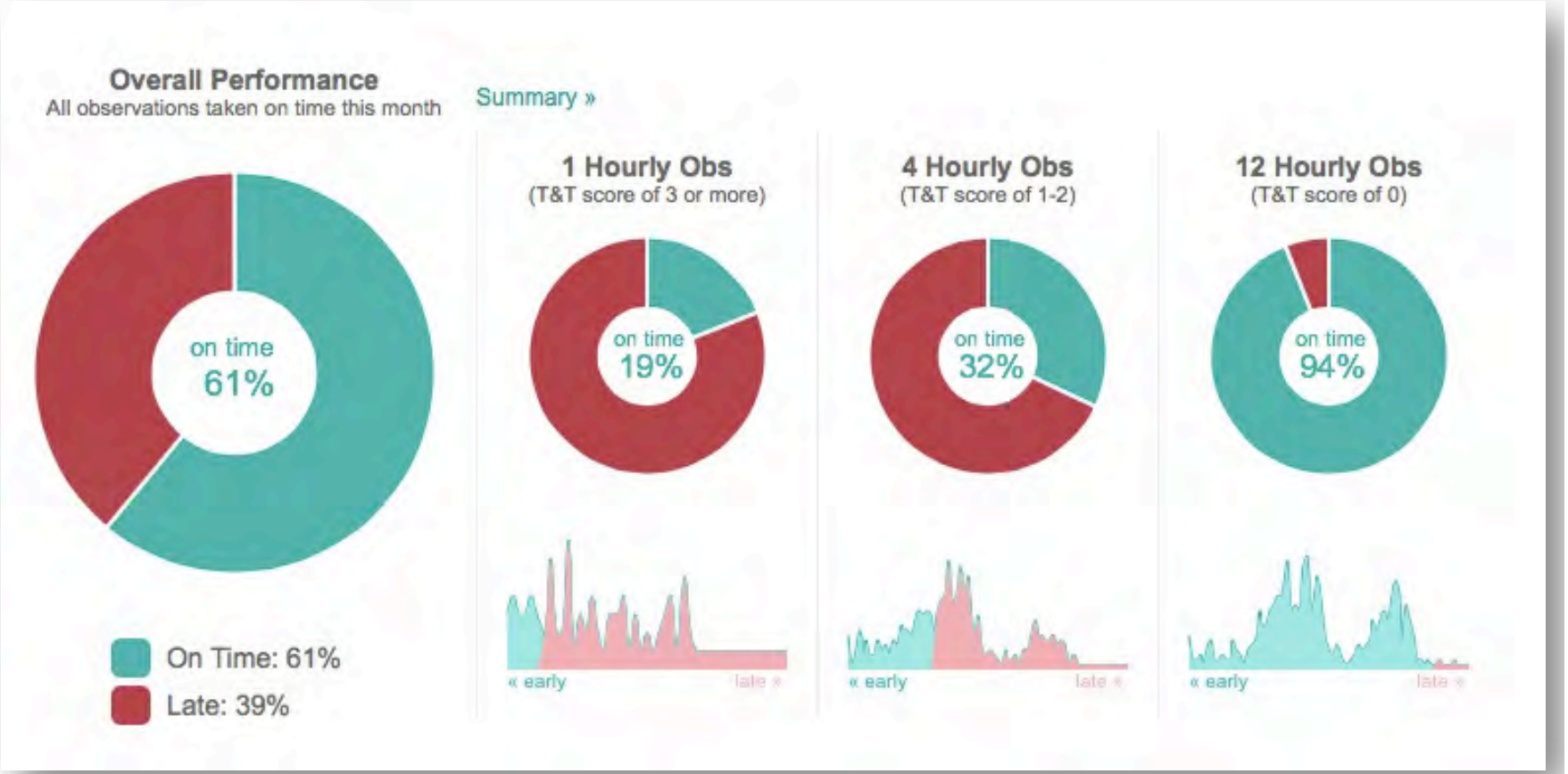
Deteriorating patients identified at a glance

Home Admin Log Out

The Oxford Upper GI Centre (OUGI) View Report

Bay/Bed		Patient	Starred	Admission	Priority		
Side Room 26	Bed 26		☆	Admitted 30 Sep 2015	3	obs 1 hr 7 m overdue	LATEST OBS
Bay A	Bed 04		☆	Admitted 17 Oct 2015	3	obs 1 hr 4 m overdue	LATEST OBS
Side Room 19	Bed 19		☆	Admitted 27 Sep 2015	1	obs 1 hr 44 m overdue	LATEST OBS
Bay B	Bed 06		☆	Admitted 14 Oct 2015	1	obs 1 hr 17 m overdue	LATEST OBS
Side Room 25	Bed 25		☆	Admitted 11 Oct 2015	1	obs 1 mins overdue	LATEST OBS
Bay C	Bed 09		☆	Admitted 15 Oct 2015	1	2 hr 47 m since last obs	LATEST OBS

Real-time audit – continuous quality improvement



Proven in practice

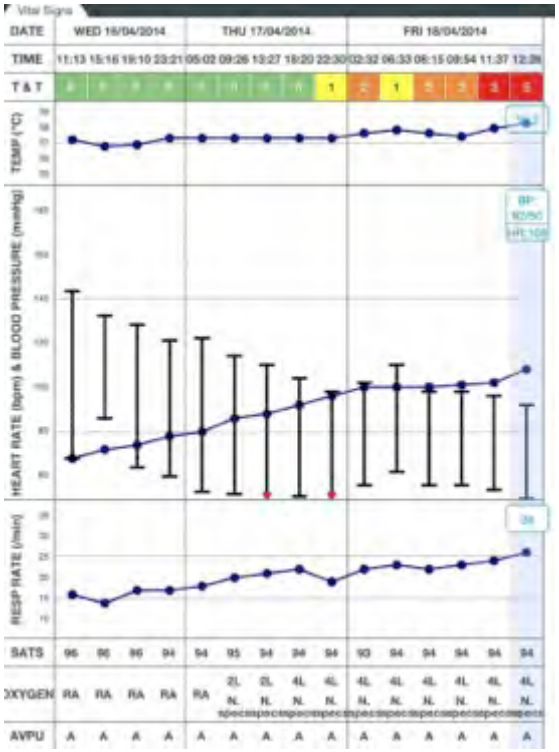
- 4 hospitals
- 12 million observations
- 87,000 patients
- No down time

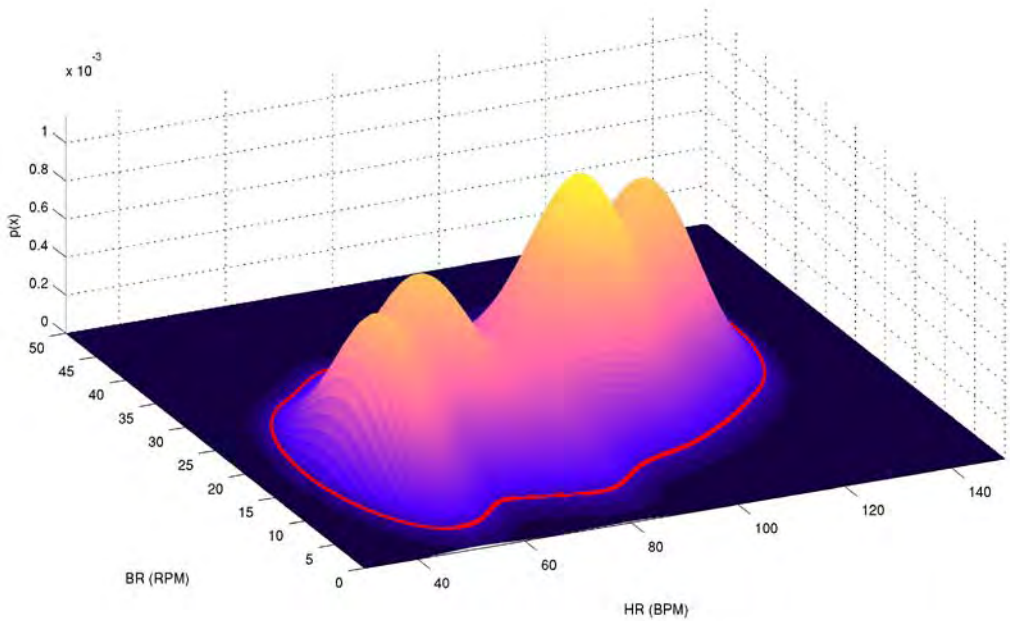
The benefits of good research coupled with good design

- Faster per observation set
- Minimal training
- System Usability Score 77.8
- Improved organizational management

- **The immediate future**

From addition to a multi-dimensional space





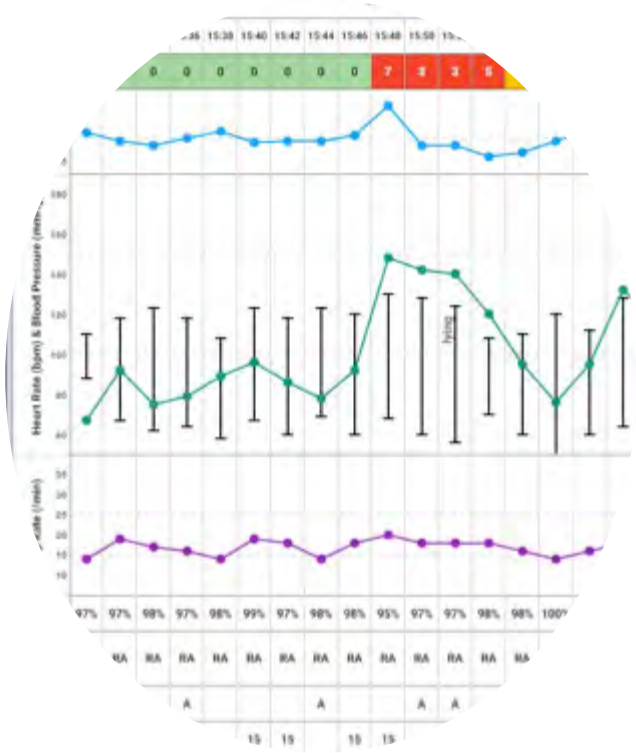
- SEND – 12 million vital signs to drive improvement in patient recognition

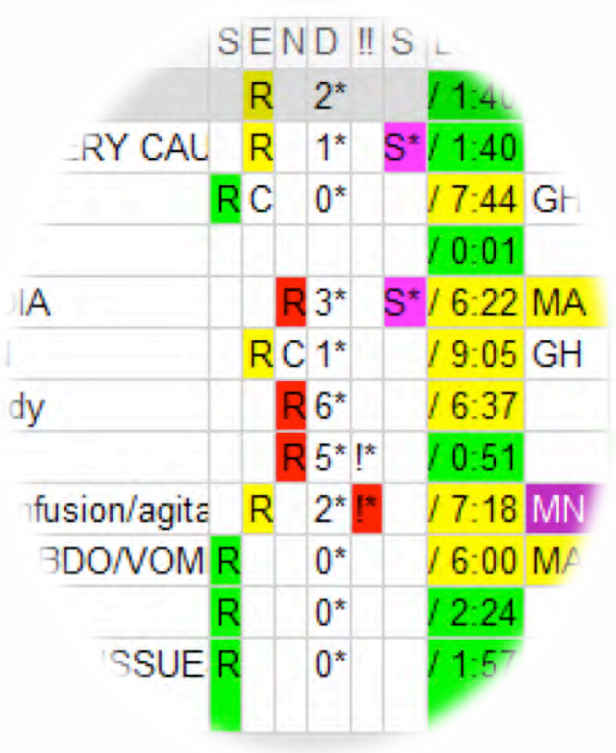
There is no acceptable clinical compromise for digital data

www.send-system.co.uk

Harnessing data to drive quality:

SEND, EPR & Sepsis



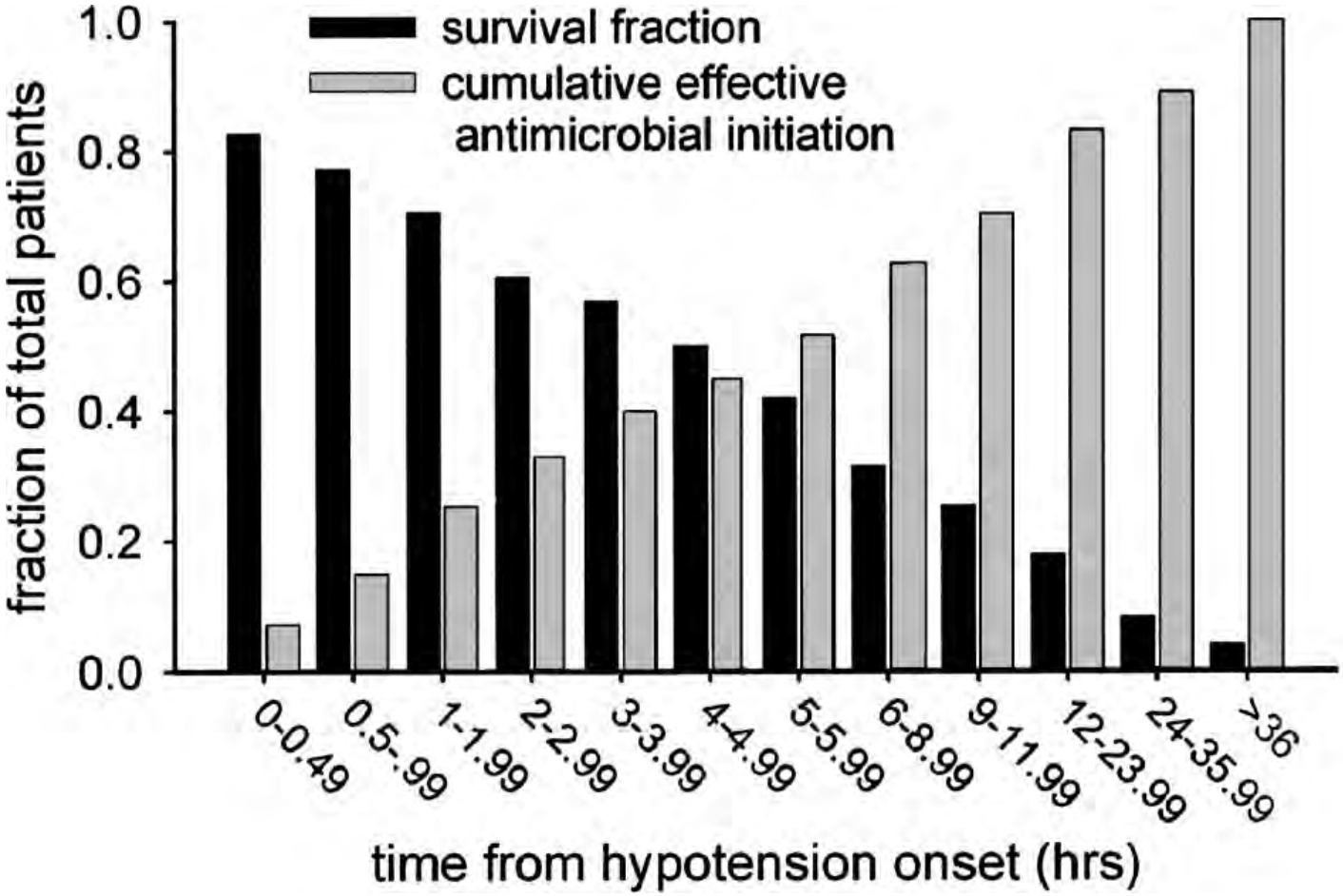


Andrew Brent

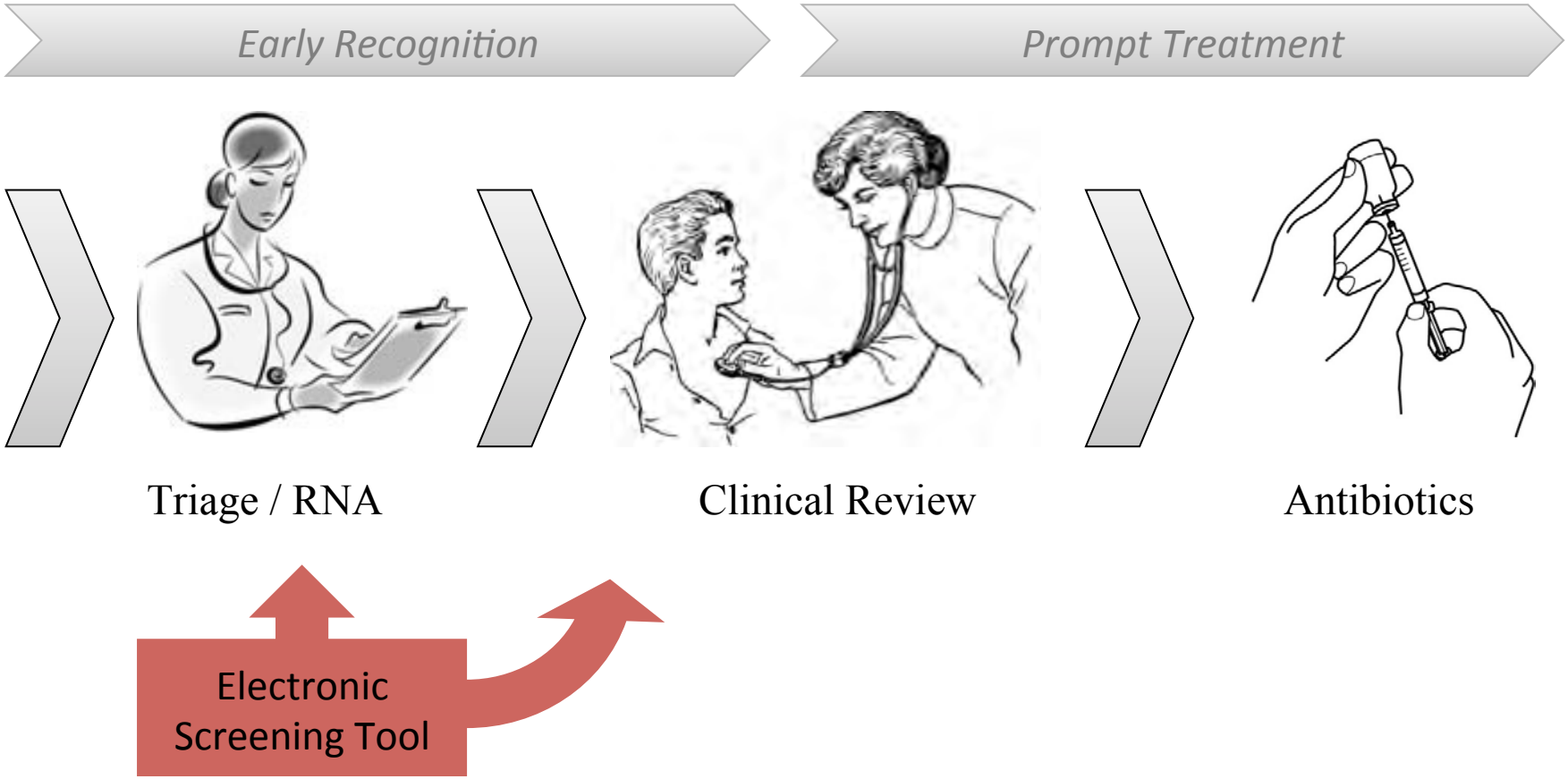
Infectious Diseases & Medicine Consultant; Oxford AHSN & OUH Sepsis Lead

Time is Life…

Early treatment → improved survival in severe sepsis



Kumar et al, Crit Care Med 2006


Early Recognition
Prompt Treatment
Triage / RNA
Clinical Review
Antibiotics
Electronic
Screening Tool

The College of Emergency Medicine

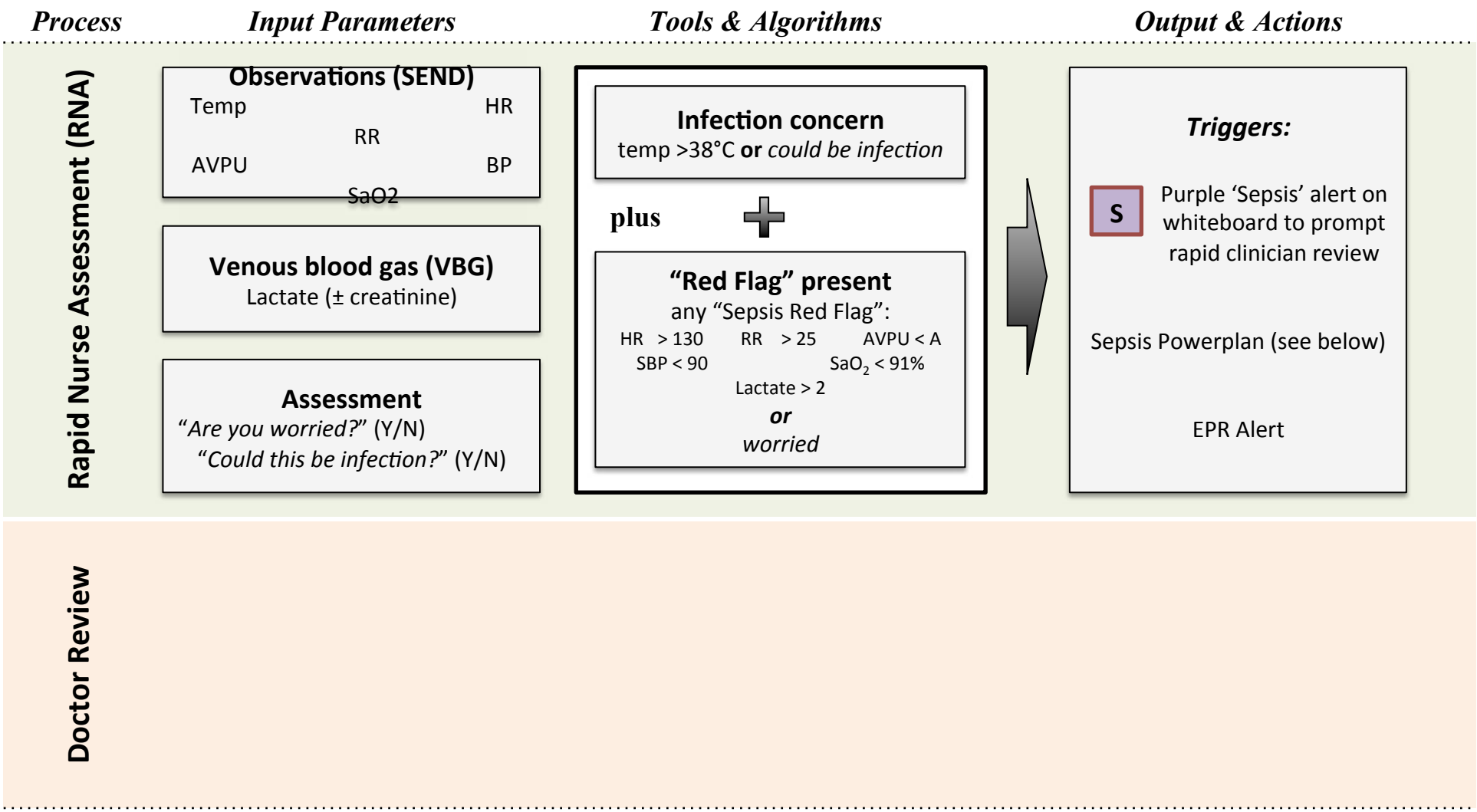
THE UK SEPSIS TRUST

"Red Flag" Sepsis

Infection +

- **HR** > 130
- **SBP** < 90 (MAP <65; ↓SBP >40)
- **RR** > 25
- **SaO_2** < 91%
- **Lactate** > 2
- **AVPU** < A (responds only to voice or pain; unresponsive)
- **Purpuric rash**

Electronic Screening Tool: Adult Emergency Admissions



(similar algorithms for paediatrics and for adult inpatients)

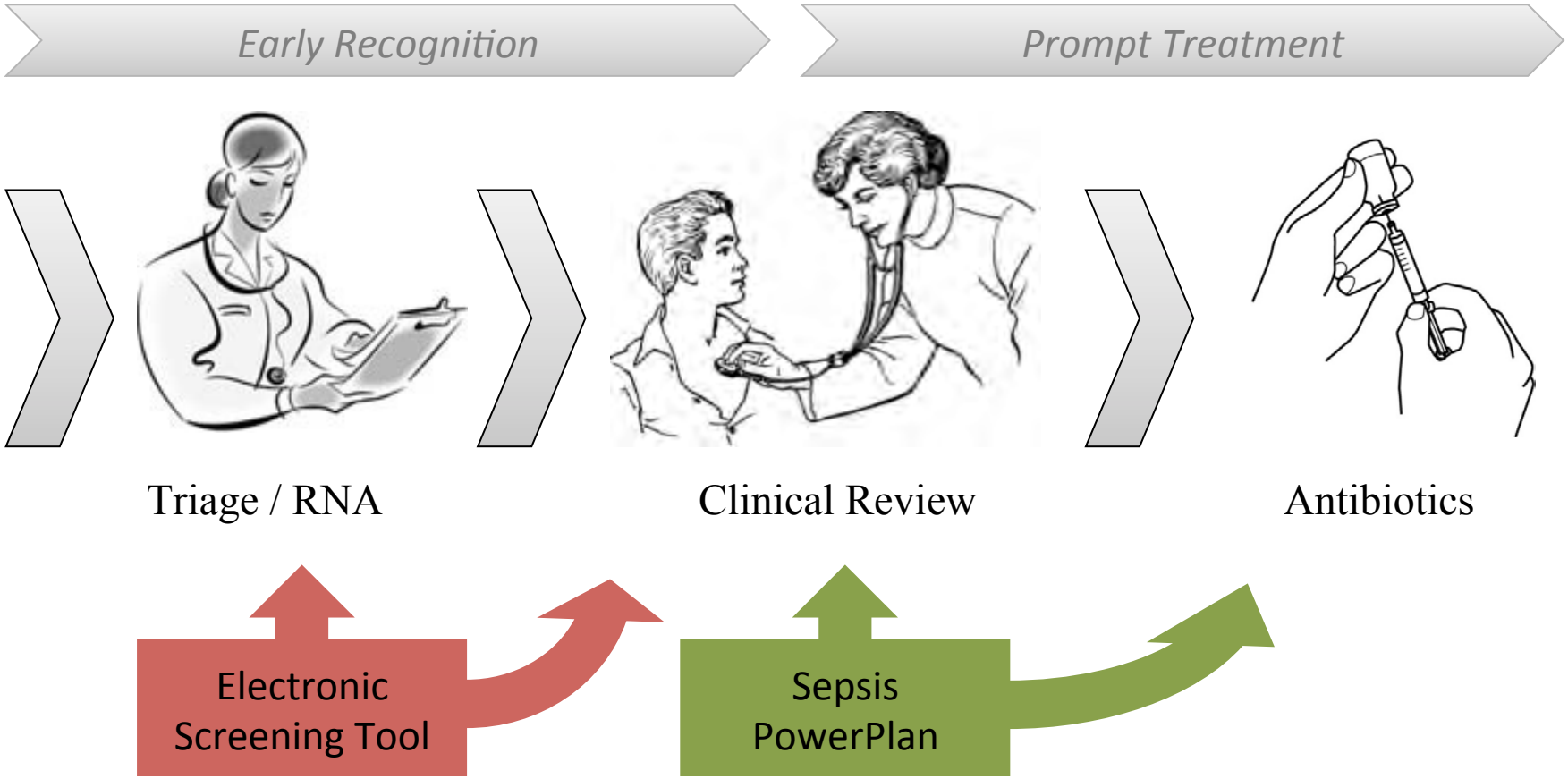
PowerChart Organiser for Brent , Andrew Jonathan

Whiteboards

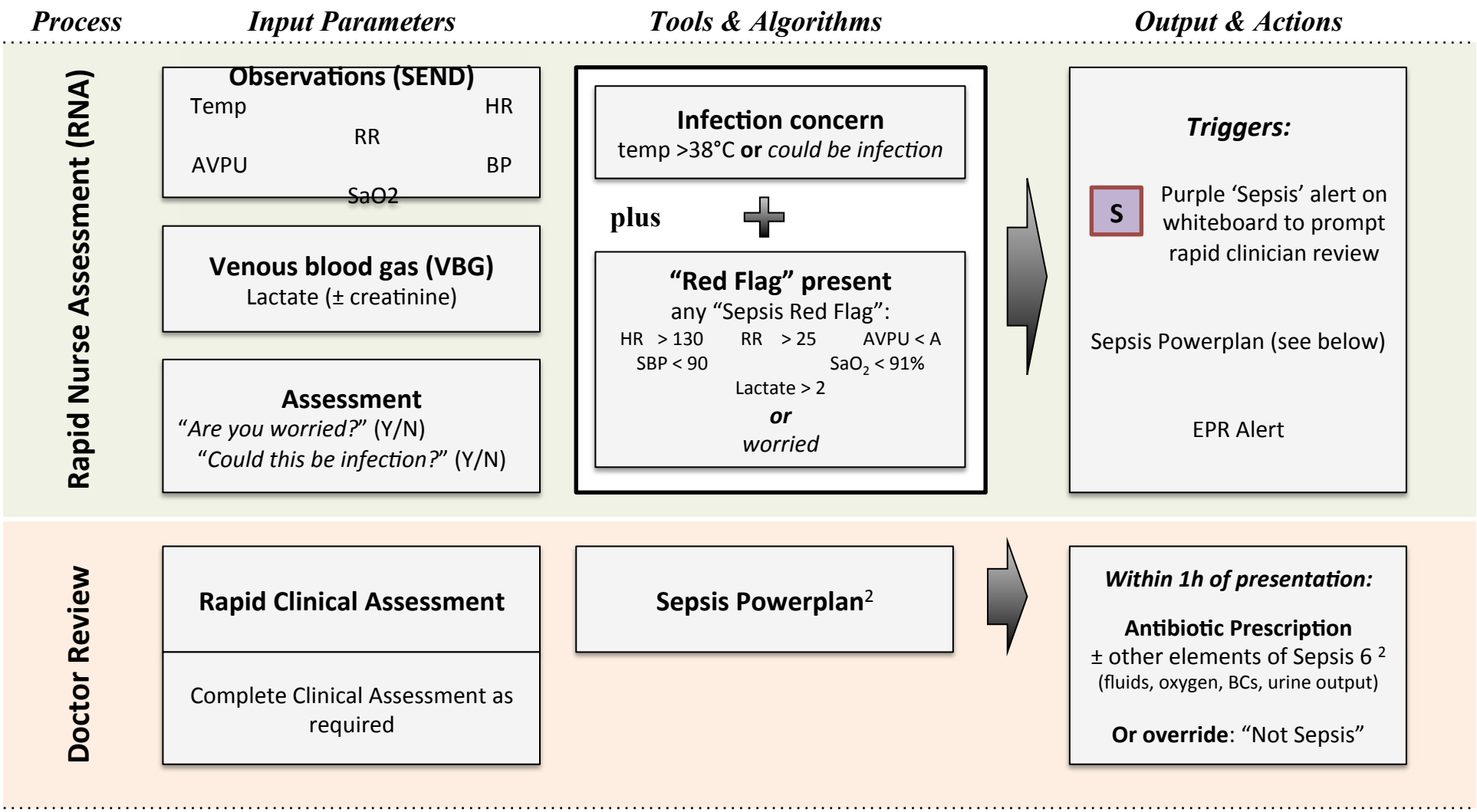
Patient: COOPER, TERESA MARG | WR: 0 Total: 12 Avg LOS: 8:47 | Filter: <None>

Arrival Time	Flag	Bed	P Name	Age	RFV	S	E	N	D	!!	S	LOS	DR	RN	A	MEDS	EAU Decisions	Specialty	Consultant	Preferred Destina	Transfer Destination	Lab	XR	Comment
02/Jun/2016 22:56		EAU - Bay 1,Bed 01			SOB		R		2*			/ 1:40		CN;		3		General Med	Arnold , Ian Robe	OAK SR	H-WD EAU 21:39	7/6	1/0	MEDICAL REVIEW 2*
02/Jun/2016 22:57		EAU - Bay 1,Bed 02			COLLAPSE QUERY CAU		R		1*		S*	/ 1:40				1		General Med	Arnold , Ian Robe		H-WD EAU 22:35	9/6		MEDICAL REVIEW 3*
02/Jun/2016 16:53		EAU - Bay 1,Bed 03			AV block	R	C		0*			/ 7:44	GH			10	EAU Observations*	General Med	Arnold , Ian Robe	CCU		8/6		TASKS TO COMPLETE GEENA SEEING ,on cardiac m
03/Jun/2016 00:36		EAU - Bay 1,Bed 04			SELF HARM							/ 0:01						General Med	Arnold , Ian Robe		H-WD EAU 23:40			suitable for ambulatory can go to EAU - EAU wrwr- no fe
02/Jun/2016 18:15		EAU - Bay 1,Bed 05			TACHYCARDIA			R	3*		S*	/ 6:22	MA	Laur		9		General Med	Arnold , Ian Robe		H-WD EAU 17:50	7/6		MADIHA SEEN IVI, IVabs and O2*
02/Jun/2016 15:31		EAU - Bay 2,Bed 06			CHEST PAIN		R	C	1*			/ 9:05	GH			17	Admit*	General Med	Arnold , Ian Robe		H-WD EAU 15:16	8/6		TASKS TO COMPLETE iv abx, nebs,rpt trop @2200*
02/Jun/2016 18:00		EAU - Bay 2,Bed 08			dizzy/unsteady			R	6*			/ 6:37				6	EAU Observations*	General Med	Arnold , Ian Robe			11/6		TIAN SEEING TASKS TO COMPLETE bair hugger*
02/Jun/2016 23:45		EAU - Bay 2,Bed 09			SOB		R		5*	!*		/ 0:51		Laur				General Med	Arnold , Ian Robe	LAB	H-WD EAU 23:14	6/5		MEDICAL REVIEW 4*
02/Jun/2016 17:19		EAU - Bay 2,Bed 10			increasing confusion/agita	R			2*	!*		/ 7:18	MN	Osca				General Med	Arnold , Ian Robe			9/4		DNR*
02/Jun/2016 18:36		EAU - Bay 3,Bed 12			DISTENDED ABDO/VOM	R			0*			/ 6:00	MA	Osca		1		General Med	Arnold , Ian Robe	juniper	H-WD EAU 18:15	15/5	2/0	MADIHA SEEING CD's*
02/Jun/2016 22:13		EAU - Bay 3,Bed 13			SOB	R			0*			/ 2:24		Osca				General Med	Arnold , Ian Robe	OAK	H-WD EAU 21:48	5/4		MEDICAL REVIEW 1*
02/Jun/2016 22:40		EAU - Bay 3,Bed 15			MENTAL HEALTH ISSUE	R			0*			/ 1:57		Laur			Refer to Specialty, Likely Home*	Accident anc	Fitton , Laurence		H-WD EAU 21:17	1/0		EDPS coming however may be hours*

	S	E	N	D	!!	S	LOS	DR	RN	A	MEDS	EAU Decisions
		R		2*			/ 1:40		CN;		3	
LAPSE QUERY CAU		R		1*		S*	/ 1:40				1	
AV block	R	C		0*			/ 7:44	GH			10	EAU Observations*
SELF HARM							/ 0:01					
TACHYCARDIA			R	3*		S*	/ 6:22	MA	Laura		9	
CHEST PAIN		R	C	1*			/ 9:05	GH			17	Admit*
dizzy/unsteady			R	6*			/ 6:37				6	EAU Observations*
SOB			R	5*	!*		/ 0:51		Laura			
increasing confusion/agita		R		2*	!*		/ 7:18	MN	Osca			
STENDED ABDO/VOM	R			0*			/ 6:00	MA	Osca		1	
	R			0*			/ 2:24		Osca			
TH ISSUE	R			0*			/ 1:57		Laura			Refe


Early Recognition
Prompt Treatment
Triage / RNA
Clinical Review
Antibiotics
Electronic Screening Tool
Sepsis PowerPlan

Electronic Screening Tool: Adult Emergency Admissions



(similar algorithms for paediatrics and for adult inpatients)

Sepsis PowerPlan

Plans
- Document in Plan
- Medical
  - **Sepsis (Adult) PowerPlan (Initiated Pending)**
  - 12 Hourly Fluids PowerPlan (Completed)
- Suggested Plans (0)
- Orders
  - Non Categorised
  - **Patient Care**
  - Continuous Infusions
  - **Medications**
  - **Laboratory**

Override options

Antimicrobial guidelines

Supportive therapy

Antibiotic therapy

Diagnoses & Problems

Related Results (2)

Patient Care

This PowerPlan has been launched because there is evidence the patier
Shock. It should be used in conjunction with Trust guidelines for Sepsis

Please either prescribe antibiotics (and supportive treatment as indicat
indicated. Antibiotics should be prescribed in accordance with Trust gu
complete the Neutropenic Sepsis PowerPlan below.

Reason If PowerPlan Not Indicated

- Sepsis PowerPlan Not Indicated - Not Sepsis - Alternative Diagnosis
- Sepsis PowerPlan Not Indicated - Active Treatment Not Currently Indicated
- Sepsis PowerPlan Not Indicated - IV Antibiotics Already Given

CLICK HERE TO ACCESS THE MICROGUIDE FOR GUID
REQUIRED

- Suspected Neutropenic Sepsis (Adult) PowerPlan

Medications

Supportive Treatment

- High Alert Oxygen Prescription
- Sodium chloride (Sodium chloride 0.9% BOLUS infusion)

Antimicrobial Injections

- High Alert Aciclovir (Aciclovir injection)
- Amoxicillin (Amoxicillin injection)
- cefTRIAXONE
- Ciprofloxacin (Ciprofloxacin injection)

Details

Dx Table

Sepsis PowerPlan

Plans
- Document in Plan
- Medical
  - **Sepsis (Adult) PowerPlan (Initiated Pending)**
  - 12 Hourly Fluids PowerPlan (Completed)
- Suggested Plans (0)
- Orders
  - Non Categorised
  - **Patient Care**
  - Continuous Infusions
  - **Medications**
  - **Laboratory**

Override options

Antimicrobial guidelines

Supportive therapy

Antibiotic therapy

Diagnoses & Problems

Related Results (2)

Patient Care

This PowerPlan has been launched because there is evidence the patier
Shock. It should be used in conjunction with Trust guidelines for Sepsis

Please either prescribe antibiotics (and supportive treatment as indicat
indicated. Antibiotics should be prescribed in accordance with Trust gu
complete the Neutropenic Sepsis PowerPlan below.

Reason If PowerPlan Not Indicated

- Sepsis PowerPlan Not Indicated - Not Sepsis - Alternative Diagnosis
- Sepsis PowerPlan Not Indicated - Active Treatment Not Currently Indicated
- Sepsis PowerPlan Not Indicated - IV Antibiotics Already Given

CLICK HERE TO ACCESS THE MICROGUIDE FOR GUID
REQUIRED

- Suspected Neutropenic Sepsis (Adult) PowerPlan

Medications

Supportive Treatment

- High Alert Oxygen Prescription
- Sodium chloride (Sodium chloride 0.9% BOLUS infusion)

Antimicrobial Injections

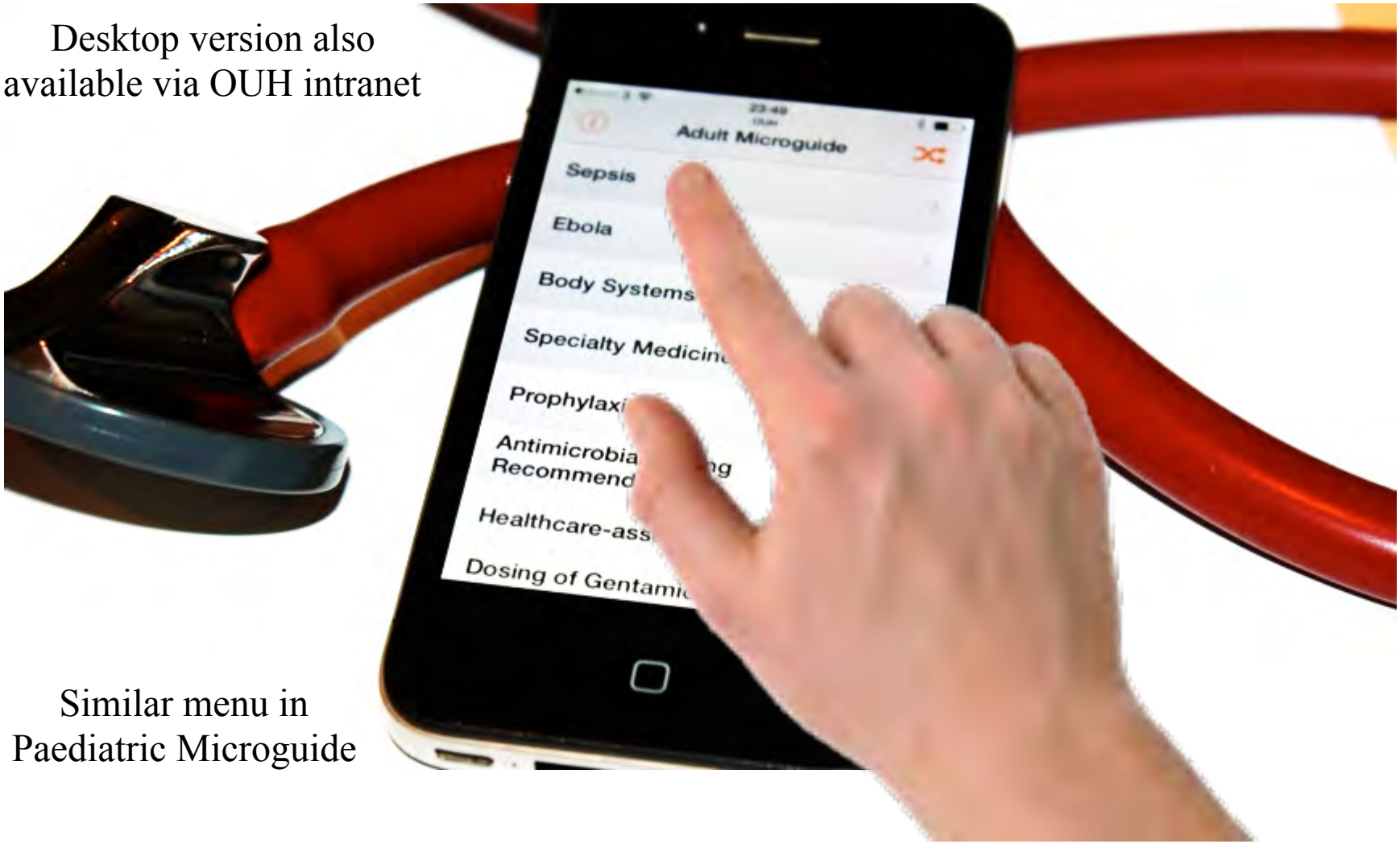
- High Alert Aciclovir (Aciclovir injection)
- Amoxicillin (Amoxicillin injection)
- cefTRIAXONE
- Ciprofloxacin (Ciprofloxacin injection)

Details

Dx Table

Microguide App & Sepsis

Desktop version also available via OUH intranet



Similar menu in Paediatric Microguide

Microguide App & Sepsis

Desktop version also available via OUH intranet

Similar menu in Paediatric Microguide

Sepsis PowerPlan

Plans
- Document in Plan
- Medical
  - **Sepsis (Adult) PowerPlan (Initiated Pending)**
  - 12 Hourly Fluids PowerPlan (Completed)
- Suggested Plans (0)
- Orders
  - Non Categorised
  - **Patient Care**
  - Continuous Infusions
  - **Medications**
  - **Laboratory**

Override options

Antimicrobial guidelines

Supportive therapy

Antibiotic therapy

Diagnoses & Problems

Related Results (2)

Patient Care

This PowerPlan has been launched because there is evidence the patier
Shock. It should be used in conjunction with Trust guidelines for Sepsis

Please either prescribe antibiotics (and supportive treatment as indicat
indicated. Antibiotics should be prescribed in accordance with Trust gu
complete the Neutropenic Sepsis PowerPlan below.

Reason If PowerPlan Not Indicated

- Sepsis PowerPlan Not Indicated - Not Sepsis - Alternative Diagnosis
- Sepsis PowerPlan Not Indicated - Active Treatment Not Currently Indicated
- Sepsis PowerPlan Not Indicated - IV Antibiotics Already Given

CLICK HERE TO ACCESS THE MICROGUIDE FOR GUID
REQUIRED

- Suspected Neutropenic Sepsis (Adult) PowerPlan

Medications

Supportive Treatment

- High Alert Oxygen Prescription
- Sodium chloride (Sodium chloride 0.9% BOLUS infusion)

Antimicrobial Injections

- High Alert Aciclovir (Aciclovir injection)
- Amoxicillin (Amoxicillin injection)
- cefTRIAXONE
- Ciprofloxacin (Ciprofloxacin injection)

Details

Dx Table

Sepsis PowerPlan

Plans
- Document in Plan
- Medical
  - **Sepsis (Adult) PowerPlan (Initiated Pending)**
  - 12 Hourly Fluids PowerPlan (Completed)
- Suggested Plans (0)
- Orders
  - Non Categorised
  - **Patient Care**
  - Continuous Infusions
  - **Medications**
  - **Laboratory**

Override options

Antimicrobial guidelines

Supportive therapy

Antibiotic therapy

Diagnoses & Problems

Related Results (2)

Patient Care

This PowerPlan has been launched because there is evidence the patier
Shock. It should be used in conjunction with Trust guidelines for Sepsis

Please either prescribe antibiotics (and supportive treatment as indicat
indicated. Antibiotics should be prescribed in accordance with Trust gu
complete the Neutropenic Sepsis PowerPlan below.

Reason If PowerPlan Not Indicated

- Sepsis PowerPlan Not Indicated - Not Sepsis - Alternative Diagnosis
- Sepsis PowerPlan Not Indicated - Active Treatment Not Currently Indicated
- Sepsis PowerPlan Not Indicated - IV Antibiotics Already Given

CLICK HERE TO ACCESS THE MICROGUIDE FOR GUID
REQUIRED

- Suspected Neutropenic Sepsis (Adult) PowerPlan

Medications

Supportive Treatment

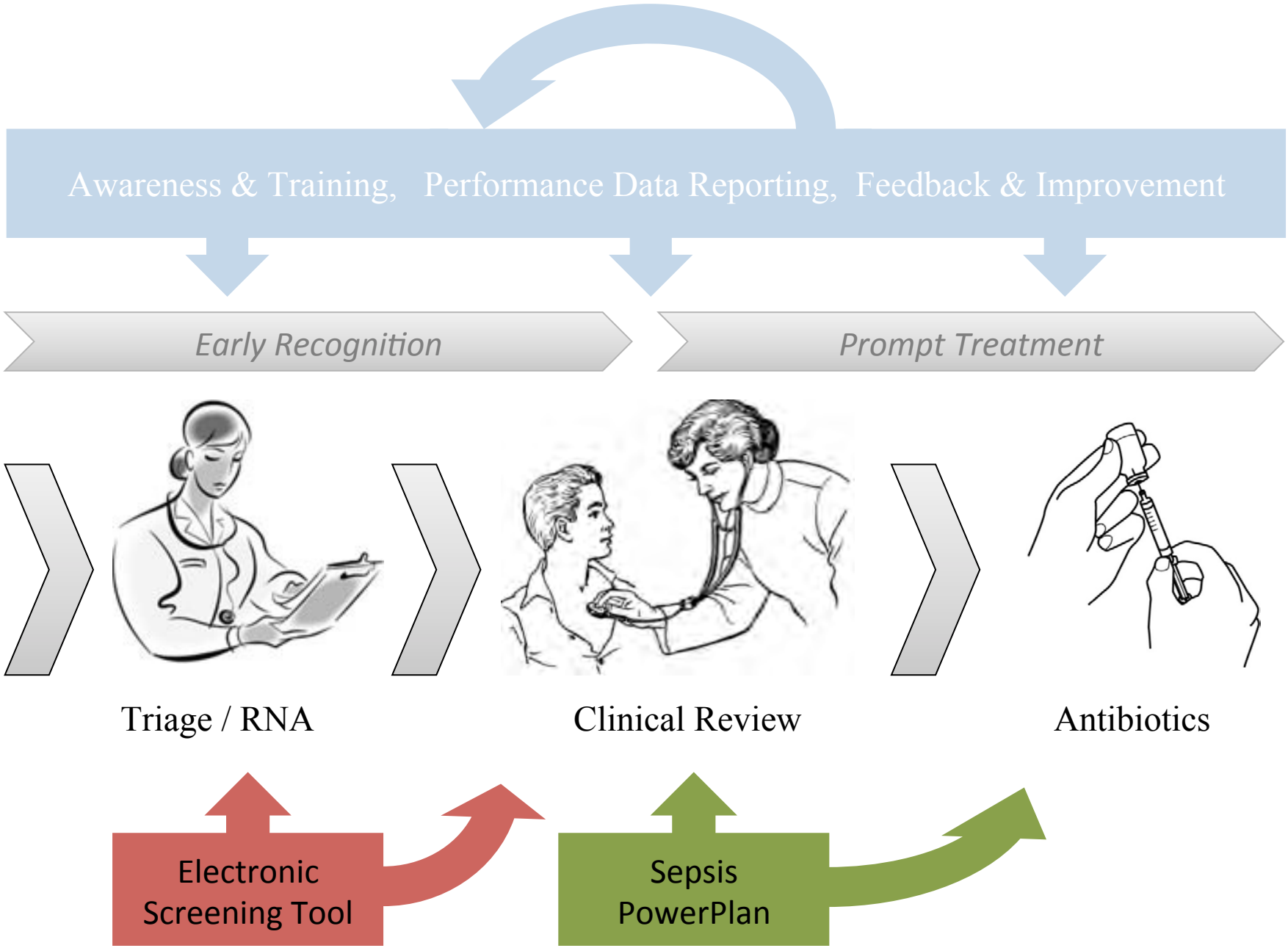
- High Alert Oxygen Prescription
- Sodium chloride (Sodium chloride 0.9% BOLUS infusion)

Antimicrobial Injections

- High Alert Aciclovir (Aciclovir injection)
- Amoxicillin (Amoxicillin injection)
- cefTRIAXONE
- Ciprofloxacin (Ciprofloxacin injection)

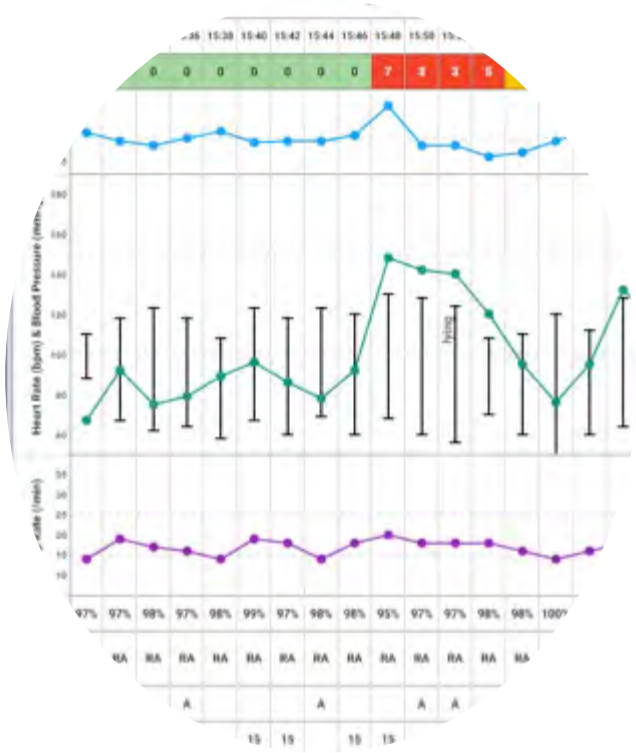
Details

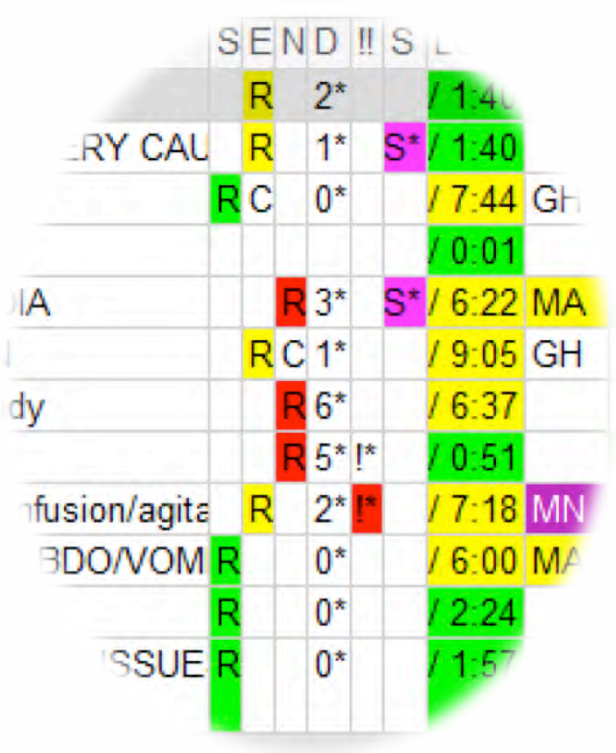
Dx Table


Awareness & Training, Performance Data Reporting, Feedback & Improvement
Early Recognition
Prompt Treatment
Triage / RNA
Clinical Review
Antibiotics
Electronic Screening Tool
Sepsis PowerPlan

Harnessing data to drive quality:

SEND, EPR & Sepsis





Andrew Brent

Infectious Diseases & Medicine Consultant; Oxford AHSN & OUH Sepsis Lead

Sepsis Working Together
Community and Secondary Care

Sepsis Working Together
Community and Secondary Care

Matt Inada-Kim

Recognising sepsis and taking action

Oxford Academic Health Science Network

Dialects & Tribes

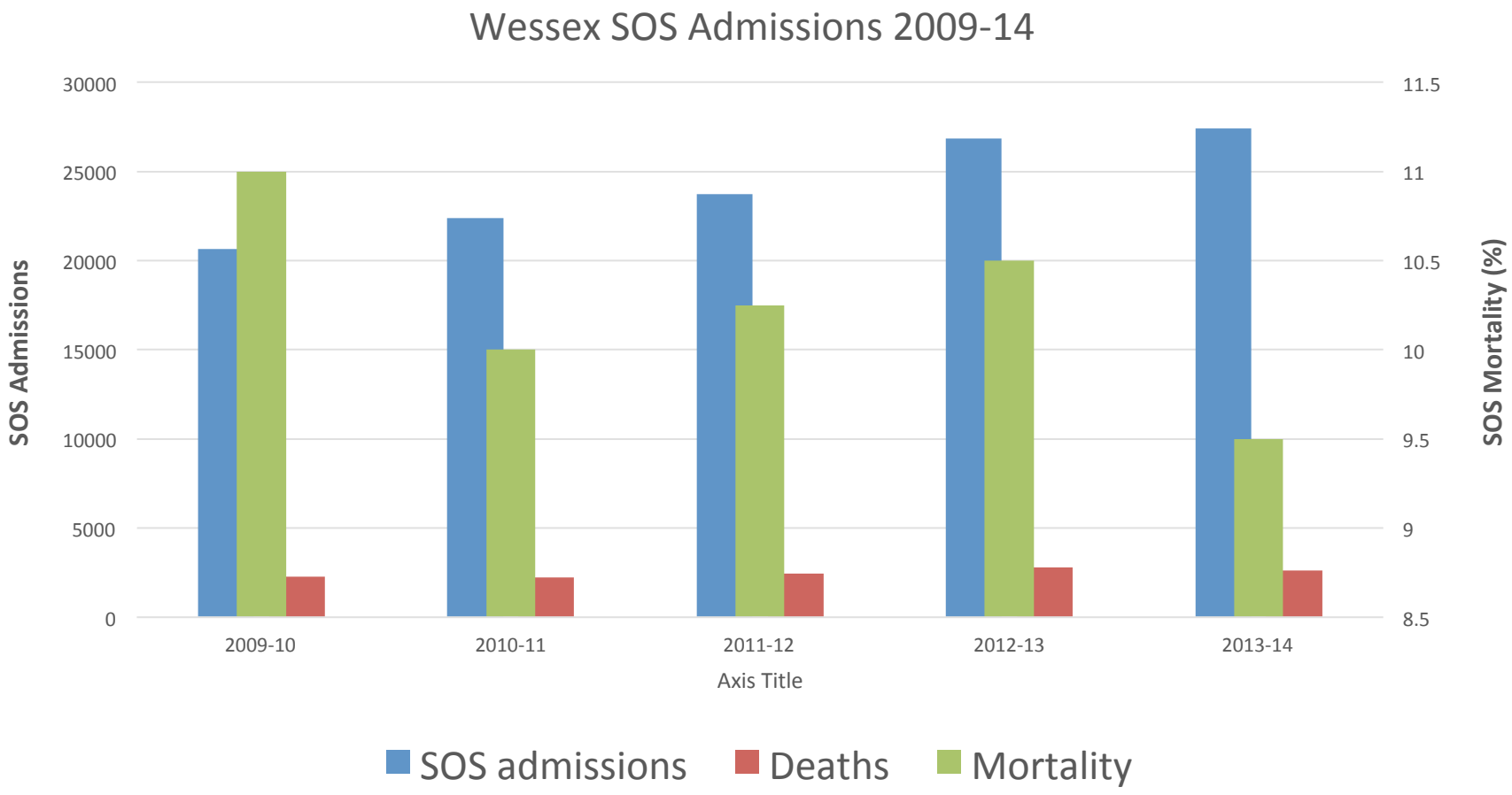
A Sepsis quality improvement strategy

I beg your pardon?

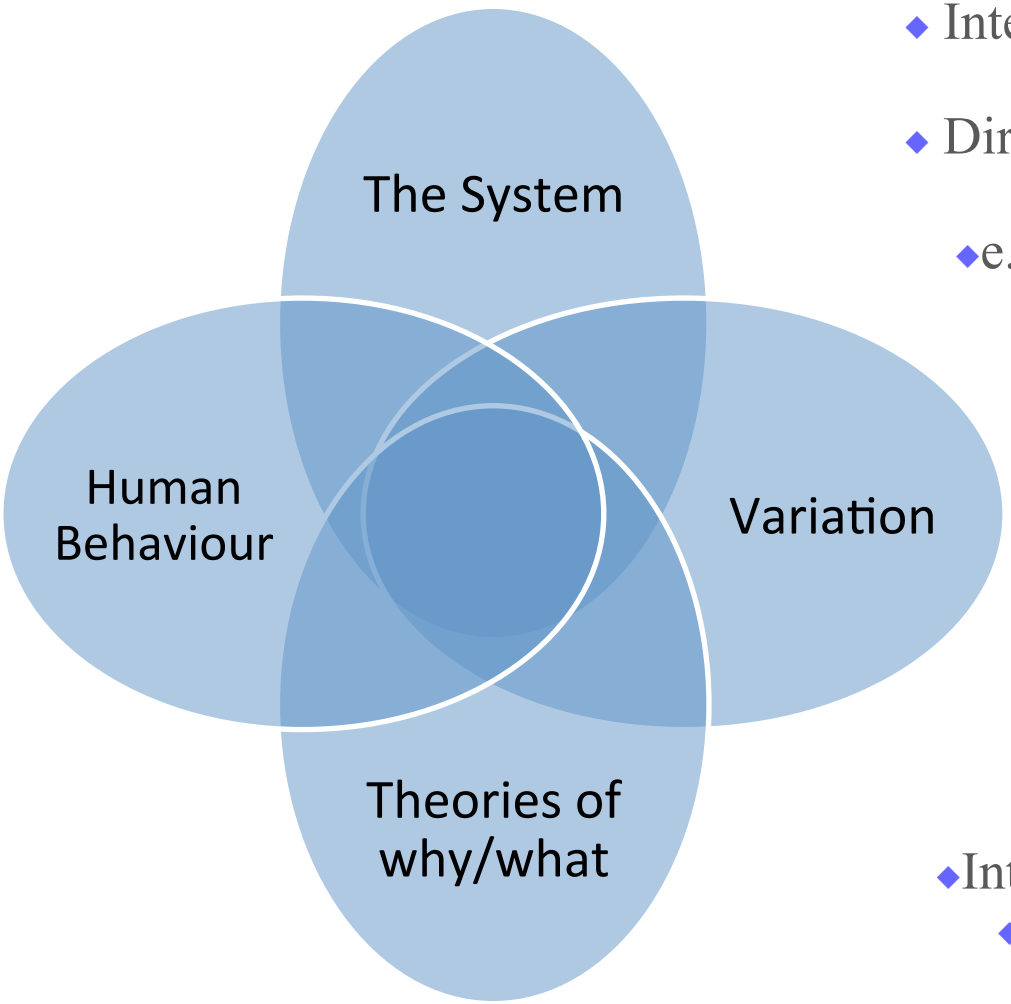
Standard English
I'm going into town today
Geordie
I'm ganen doon the toon the day
Yorkshire
Ah'm nicely off out t'taan
South London
Am gahn dahn tahn todiey
Glasgow
Am gun uptoon todee
Afro-Bristolian
Ahs goin ter bristle todayl
Serbo-Bradfordian
I go ter towen terdaay

Matt Inada-Kim, Lead of the National AHSN Sepsis cluster
Chair of the Wessex Sepsis network
Harkness fellow at IHI/Harvard
Consultant Acute Physician, Hampshire Hospitals

Good progress but still a long way to go



The Lens of Profound Knowledge Demings



- **System**
- Interdependence, dynamism of the parts
- The world is not deterministic
- Direct, indirect and interactive variables

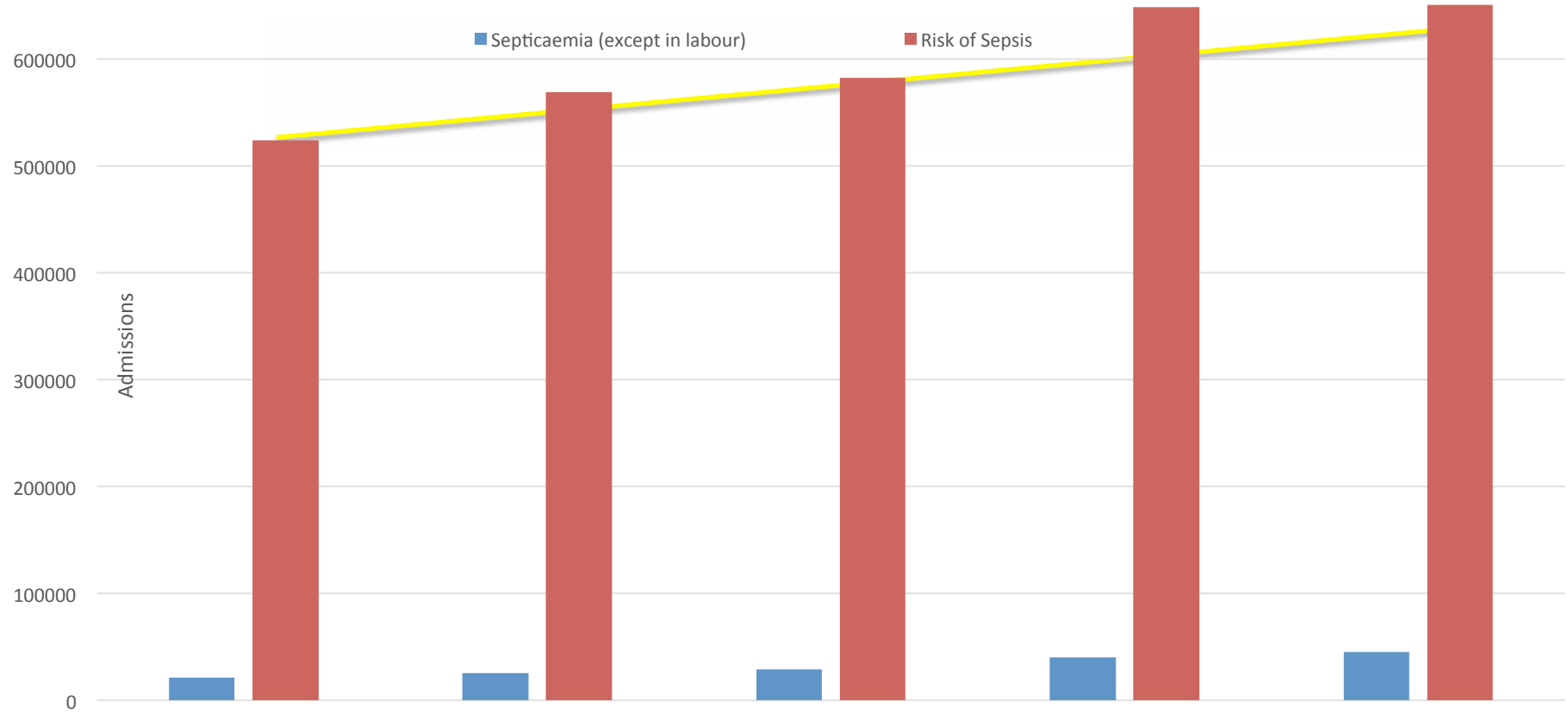
- e.g. Sepsis pathway communication

- **Human behavior**
- Interaction between people
- Intrinsic versus extrinsic motivation
- Beliefs, values & assumptions

- e.g. What is the Will to change?

Oxford Academic Health Science Network

English admissions with Suspicion of Sepsis vs Septicaemia (except in labour)



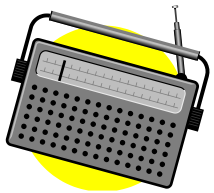
Year	2009/10	2010/11	2011/12	2012/13	2013/14
Septicaemia	**10.71%**	10.15	9.76	9.73	**9.06%**
Suspicion of Sepsis	**9.83%**	9.37	9.08	9.04	**8.49%**

Crude Mortality Rate (%)

- Since 2009, 13.6% reduction in mortality & 20,871 lives saved in total

There is huge variability to how/when patients present

"I feel unwell"



- seek help

“Person” problems within cross-silo pathways

Person

Variable understanding of acuity

Heterogeneous & Unpredictable

Non-specific presentations

(No ECG, hemiparesis)

The Human Factor

E.g. Teams, Distractions, old medical model

Hierarchies,

System

Different languages “Dialects & Tribes”

Dis- integrated organically evolved pathways

Multiple screening tools

Lack of Ownership

Non-evidence based prioritisation of Scarce resources

Non-collaborative

….Handover failures

“System” problems within cross-silo pathways

System

Different languages “Dialects & Tribes”

Dis- integrated pathways evolved in isolation

Multiple tools

Lack of Overall Ownership

Non-evidence based prioritisation of Scarce resources

Non-collaborative

Rarely have patient participation

….Handover failures

Person

Understanding of acuity is variable

Unpredictable

Heterogeneous

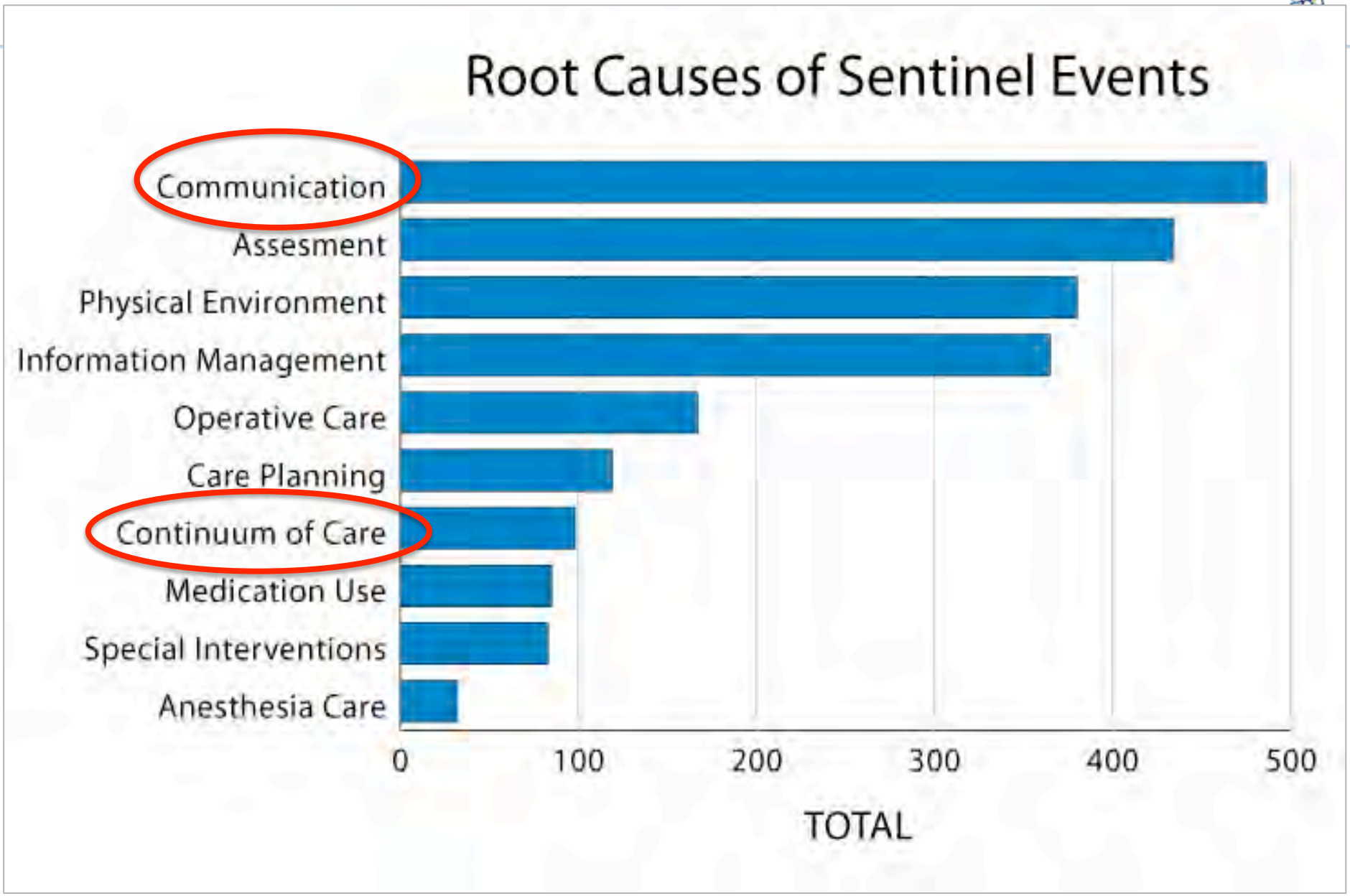
Non-specific presentations

(No ECG, hemiparesis)

The Human Factor

E.g. Teams, Distractions, old medical model

Hierarchies, Communication

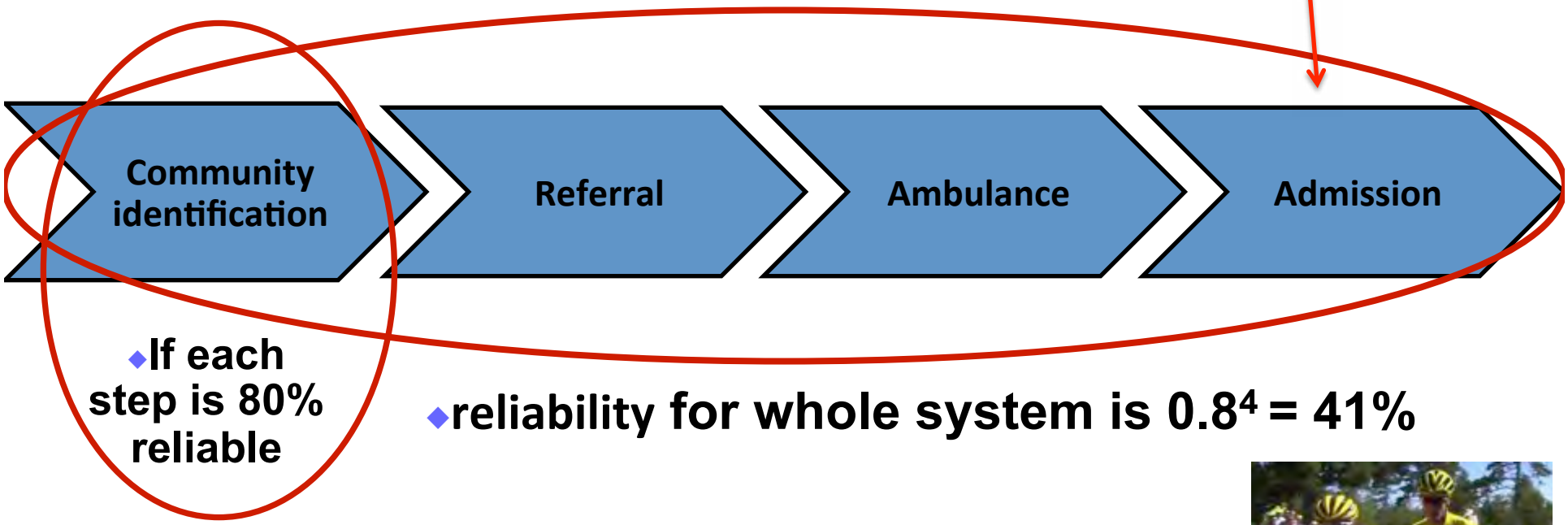


Joint Commission. (2011). Sentinel Event Statistics Data - Root Causes by Event Type

- **Sepsis recognition, admission and intervention is a complex system requiring a sequence of events and interactions to occur reliably, linked by pivotal reliance on communication between and within teams.**

- Just thinking about geographical transfers of care

- **Only the final step adds value to the patient**



- **reliability for whole system is $0.8^4 = 41\%$**

- If each step is 95% reliable then system reliability = 81%

Model for Improvement

- **What are trying to accomplish?**

How will we know that a change is an improvement?

What change can we make that will result in improvement?

- *AIM*
- *A single physiological score to describe*
- *The severity of any cause of deterioration*
- *In all parts of the care pathway by 09/16*

◆**there is** a *standardised assessment system,*
◆ *communication model and activation system in healthcare*

Amazing Opportunity !

◆***No*** *standardised assessment system,*
◆ *communication model and activation system in healthcare*

◆Sepsis improvement with traction

◆"We know what we should do, sometimes we do it, but its just not reliable" – trust X

Definitions
What is sepsis ?
What is the "at risk of sepsis" burden?

→

◆**Benchmarking**
◆Measure "at risk of sepsis"
◆Establish process/outcomes measurement

→

◆**AHSNs**
◆Curation of resources
◆Dynamic Standardisation
◆Cross-silo strategies

→

◆**Networks/Learning Events**
◆All Teach, Share & learn

Oxford Academic Health Science Network

◆**Individual departments/ trusts**

◆**The pursuit of 95% reliability**

Wessex Academic Health Science Network

◆**Injecting sepsis teams with <u>focused</u> quality improvement capability**

◆1. Seeing the opportunity

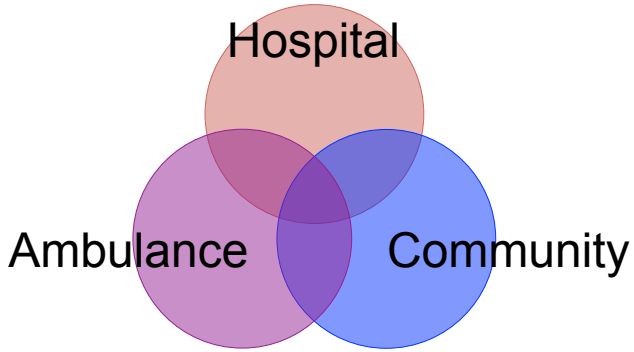
How do you tell if someone is sick ?

- Experience
- Intuition
- Knowledge
- Physiology
- Tests
- Examination

◆How well do we communicate this ?

- Across silos
- Across geography

- Language
- Observations
- SBAR
- Written/verbal/ computerised



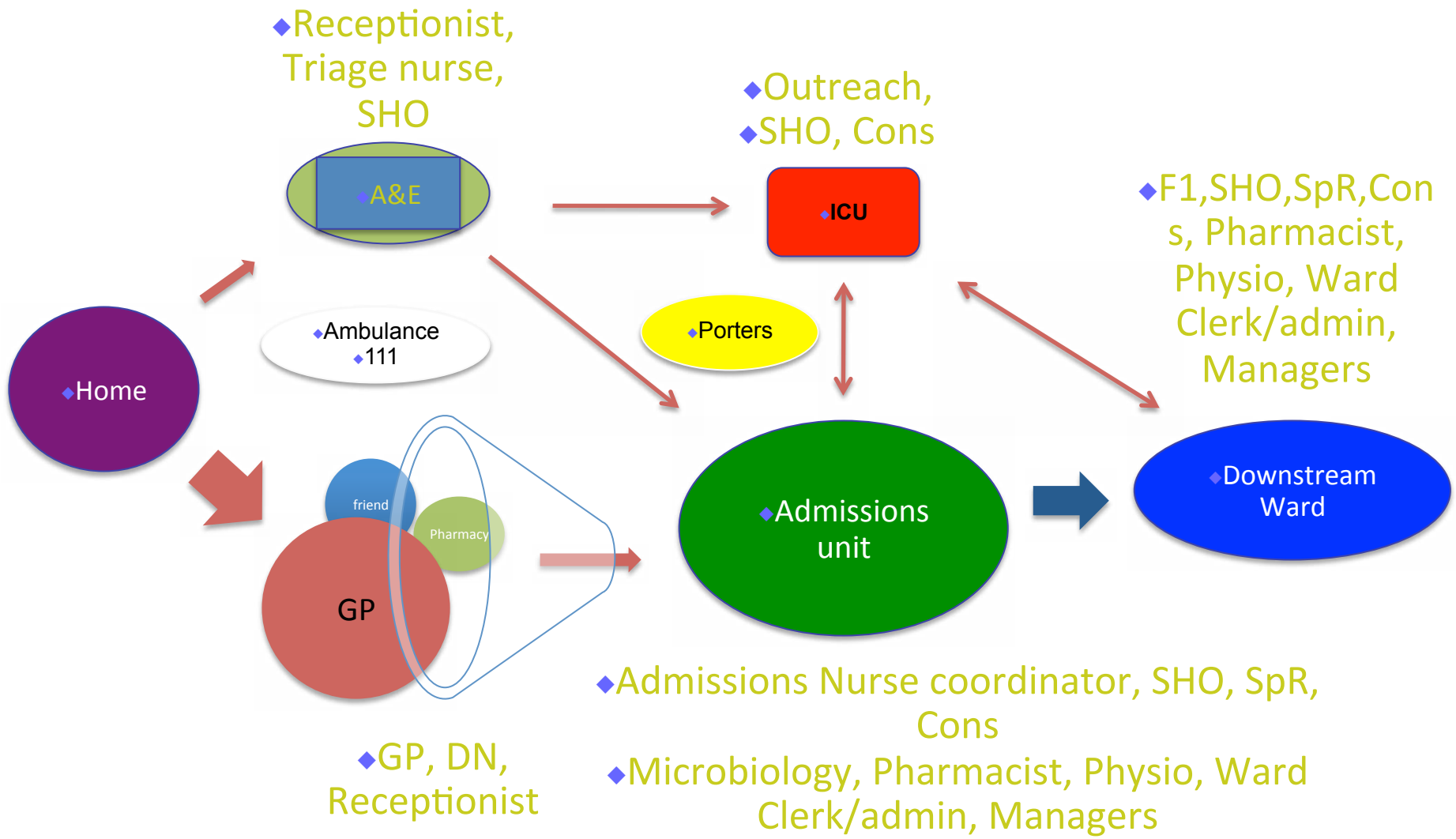
◆Is it evidence-based ?

2. Realising the potential

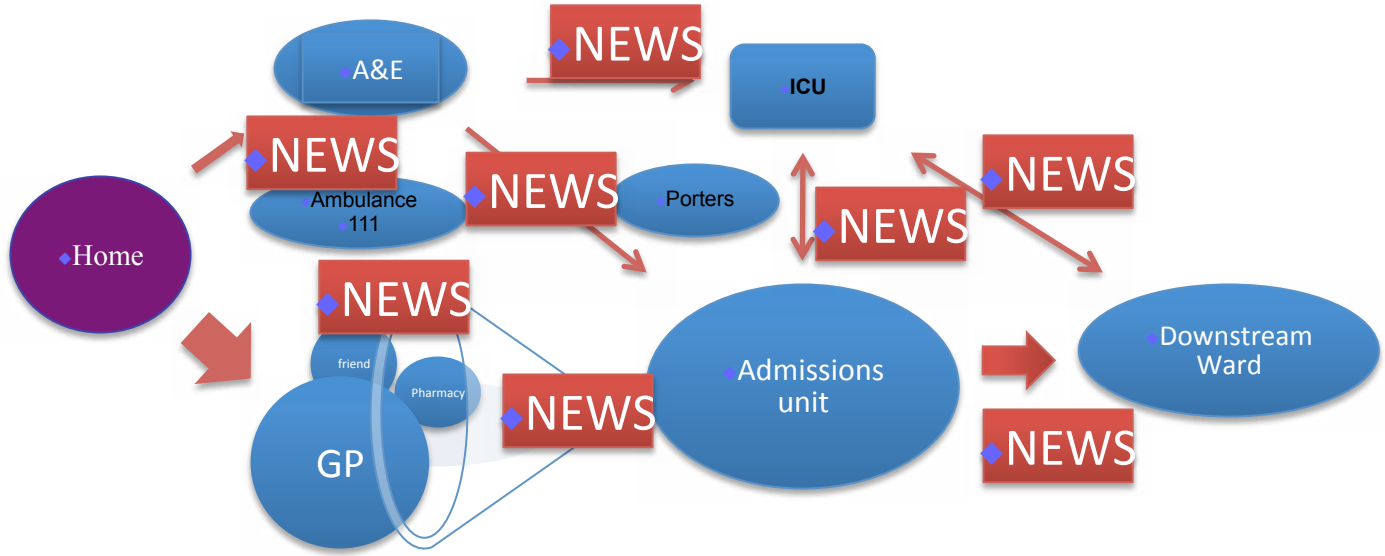
- **The more aligned we are…**

- The better the
  - Patient
  - Outcomes

◆3. Appreciating where we are now

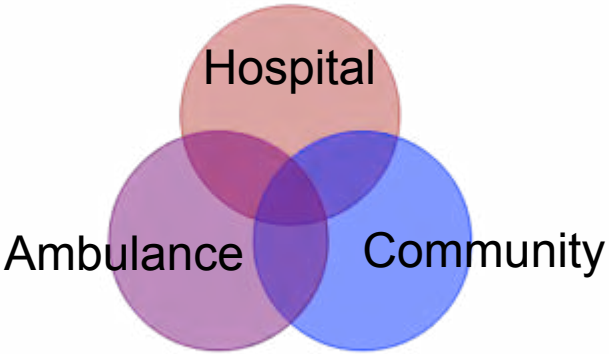


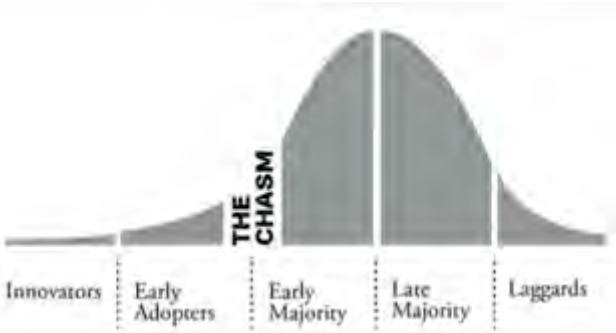
◆4. Envisioning the future



◆Standardised cross silo communication

5. Doing something about it !





GP Sepsis NEWS pilot Dec 2015

Dr Lambert and Matthew Richardson

133 Emergency referrals

80 SOS

40 Analysed

- With Suspicion of Sepsis (SOS) codes
- (Bethan's talk)

Large city mid HANTS GP practice
SOS caused 2/3 emergency referrals
10.8% mortality
Median 4/6 parameters recorded
Mean 72 years
466 bed days

NEWS in General Practice

- Retrospective service improvement audit of EMIS records for adult patients admitted to acute care between April 2013 and April 2015 with a diagnosis of sepsis to evaluate:
  - How many NEWS parameters were recorded during preceding GP consultations
  - The correlation of NEWS with admission
  - The anticipated workload for GP's of using NEWS

RR = under-used

1 in 5 NEWS

	RR	SpO_2	Temp	SBP	HR	AVPU	Total with all parameters complete
All	20.7%	72.4%	75.9%	75.9%	86.2%	96.6%	17.2%
Home Visits	21.1%	68.4%	84.2%	89.5%	84.2%	94.7%	21.1%
Surgery	20.0%	80.0%	60.0%	50.0%	90.0%	100%	10.0%

- All consultations - median of **4 of the 6** NEWS parameters recorded (10.8% mortality)
- If RR routinely measured, proportion of patients with complete NEWS would ↑from 17% to 41%
- Indication that all admitted patients had (or were likely to have) an elevated NEW Score –

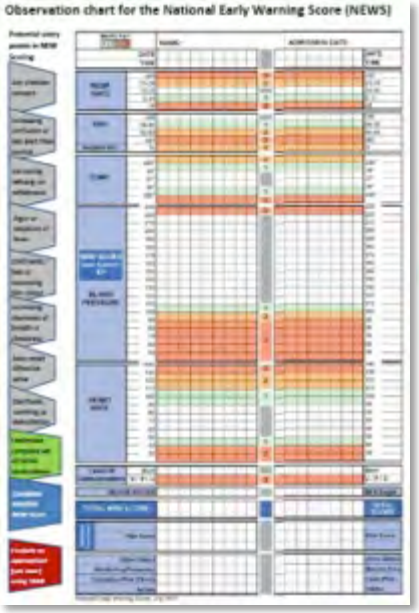
  good predictor for admission with no additional burden around consultation
- Recording needs to be simplified to capture data during GP consultations
- Future plans – wider roll out and study around escalation parameters and pathways

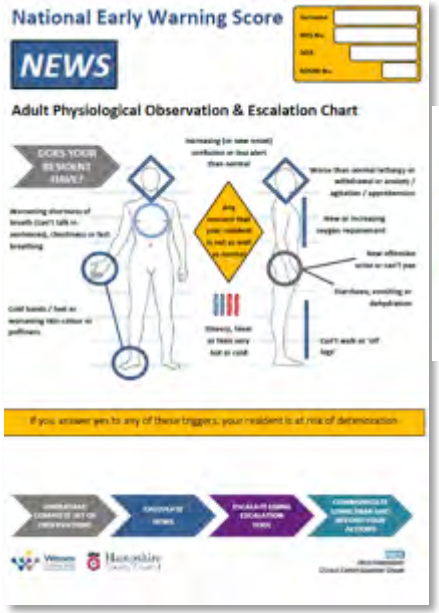
NEWS in Care Homes

Oxford Academ

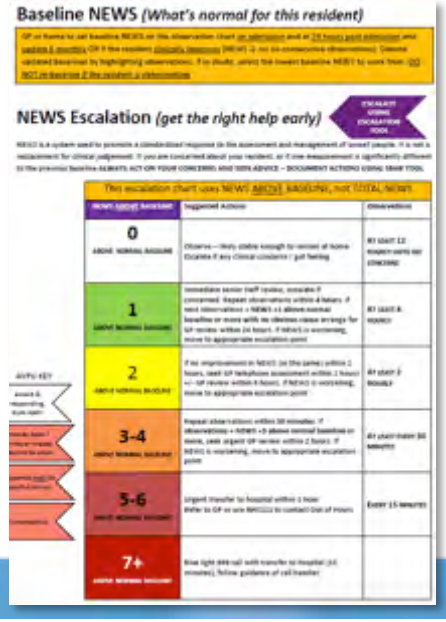
Wessex Academic Health Science Network

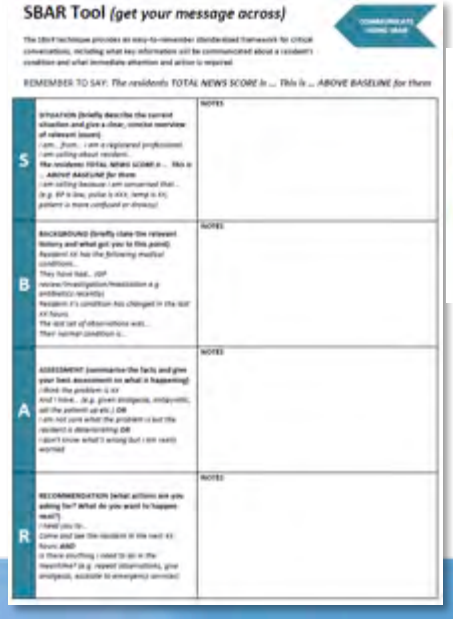
Hampshire County Council





- **27 PDSA cycles**
  - 3 pilot sites
  - 4 training sessions
  - 5 focus groups
  - 5 case studies
  - Baseline NEWS measurement





This escalation chart uses NEWS ABOVE BASELINE, not TOTAL NEWS		
NEWS ABOVE BASELINE	**Suggested Actions**	**Observations**
0 ABOVE NORMAL BASELINE	Observe – likely stable enough to remain at home Escalate if any clinical concerns / gut feeling	AT LEAST 12 HOURLY UNTIL NO CONCERNS
1 ABOVE NORMAL BASELINE	Immediate senior staff review, escalate if concerned. Repeat observations within **4 hours**. If next observations = **NEWS +1 above normal baseline or more with no obvious cause** arrange for GP review within 24 hours. If NEWS is worsening, move to appropriate escalation point	AT LEAST 4 HOURLY
2 ABOVE NORMAL BASELINE	If no improvement in NEWS (or the same) within 2 hours, seek GP telephone assessment within 2 hours +/- GP review within 6 hours. If NEWS is worsening, move to appropriate escalation point	AT LEAST 2 HOURLY
3-4 ABOVE NORMAL BASELINE	Repeat observations within **30 minutes**. If **observations = NEWS +3 above normal baseline or more**, seek urgent GP review within 2 hours. If NEWS is worsening, move to appropriate escalation point	AT LEAST EVERY 30 MINUTES
5-6 ABOVE NORMAL BASELINE	Urgent transfer to hospital within 1 hour Refer to GP or use NHS111 to contact Out of Hours	EVERY 15 MINUTES
7+ ABOVE NORMAL BASELINE	Blue light 999 call with transfer to hospital (15 minutes), follow guidance of call handler	

- Likely amenable to community management
- May need secondary care assessment e.g. via ambulatory care
- Likely to require prompt hospital admission

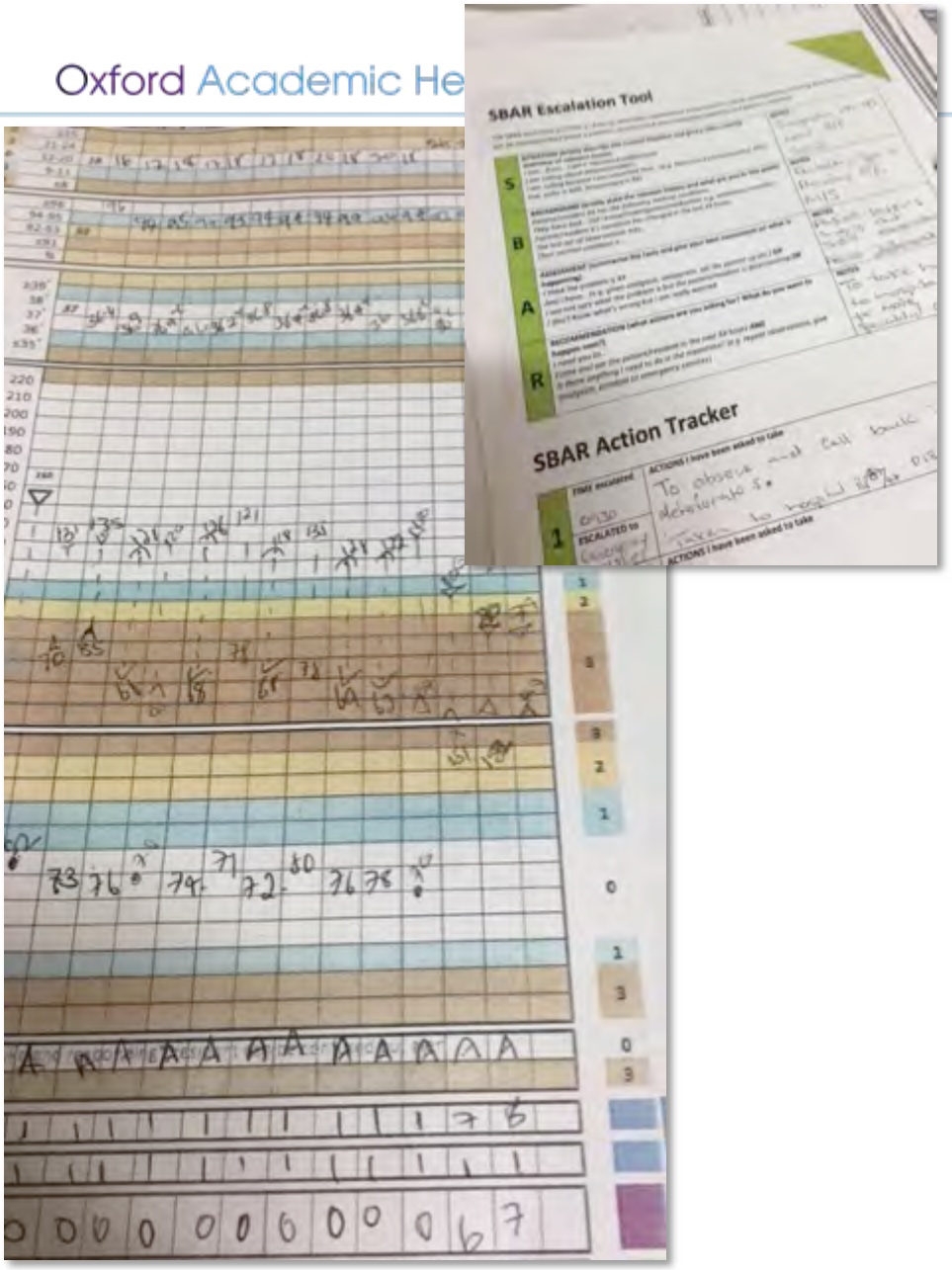
Case Study

Oxford Academic He

- 60yr old, MS, Type 2 Diabetes, previous PE, normal baseline NEWS = 1
- Sitting in lounge when suddenly felt nauseous / tired and asked to go to bed
- RN called by carers as this was unusual
- RN carried out a full set of vital signs:
- HR >181, SBP 100 dropping to 79
- SpO_2 92-93 % from 95%, denied chest pain
- NEWS above baseline = 6 – 7
- 999 transfer (Δ fast AF)

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

100% of respondents felt the tool had helped them to escalate concerns and achieve earlier assessment/intervention from RN's, GP's, OOH or SCAS



Future plans

extended rollout of NEWS to nursing homes/care homes

Training packages for NEWS and observations

GP study around entry point for NEWS and escalation pathway

Roll out of NEWS capability to General Practice

Linking with SCAS and OOH to join up the health economy

measurement for improvement

PROCESSES

- Screening
- Administration time
- Antibiotic reviewing

OUTCOMES

- Analyse the **"Suspicion of sepsis"** group
  - Mortality / ICU admissions
  - Length of stay/ comorbidites
- Benchmark data over time and share results

Inada-Kim, Page, Maqsood and Vincent 2016

Wessex Academic Health Science Network

Oxford Academic Health Science Network

Summary

- There are a lot of stakeholders
  - LMC
  - GPs
  - Ambulances
  - Care homes
  - Hospitals
  - County council
  - Community nursing
  - Patients

- **Speaking the same language is a game changer**

Small scale change is challenging concept
Model for Improvement creates momentum
Measurement is critical

- **Thank you, any questions?**

Sepsis Working Together
Community and Secondary Care

Sepsis Working Together
Community and Secondary Care

Refreshment Break

Twitter: #pscsepsis

Sepsis Working Together
Community and Secondary Care

Welcome back

Twitter: #pscsepsis

Sepsis Working Together
Community and Secondary Care

Mark Ainsworth Smith

Pre-hospital setting:
how to recognise the signs and symptoms of sepsis

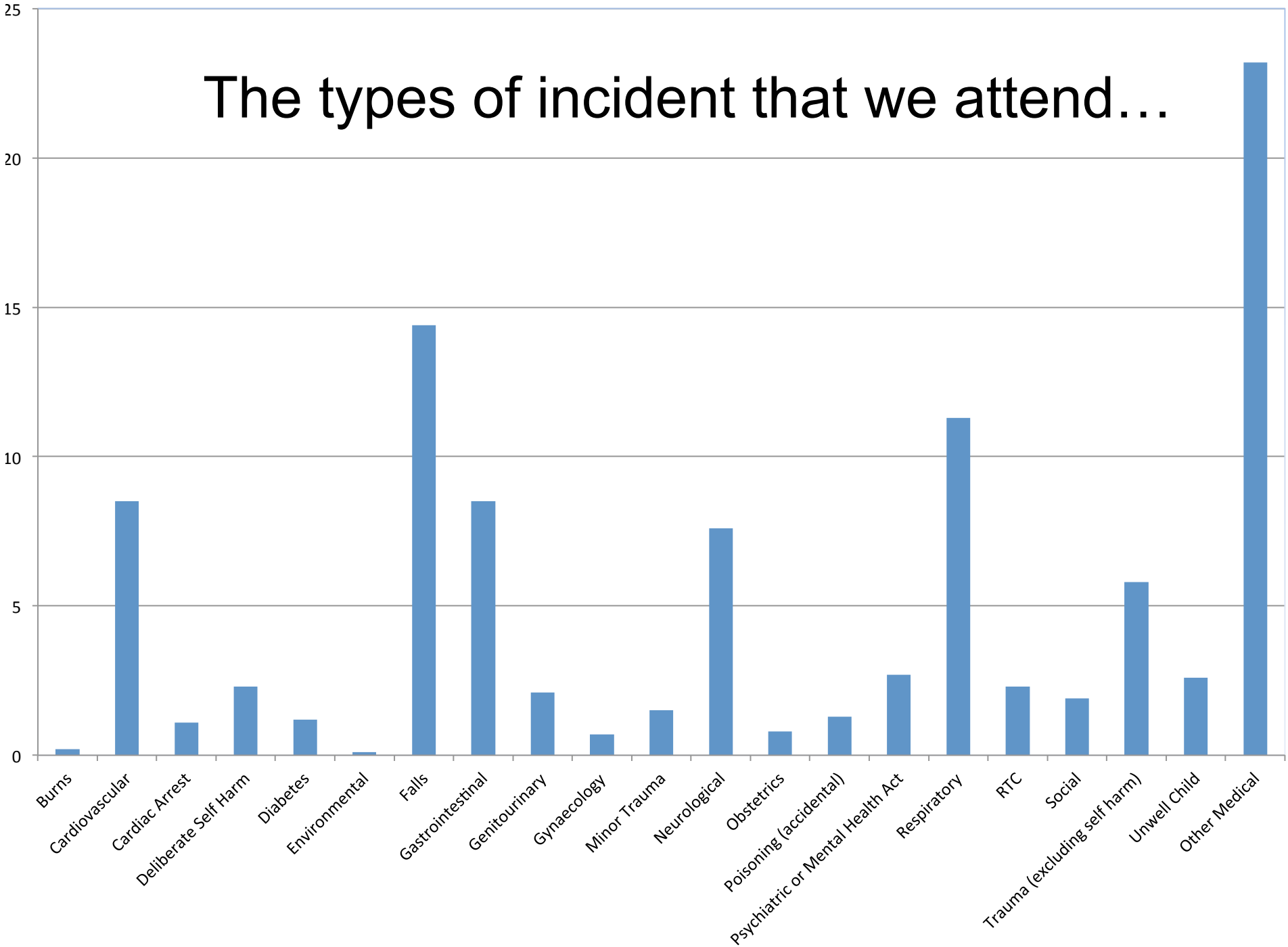
South Central Ambulance Service NHS
NHS Trust

Pre-Hospital Care - Sepsis

Mark Ainsworth-Smith

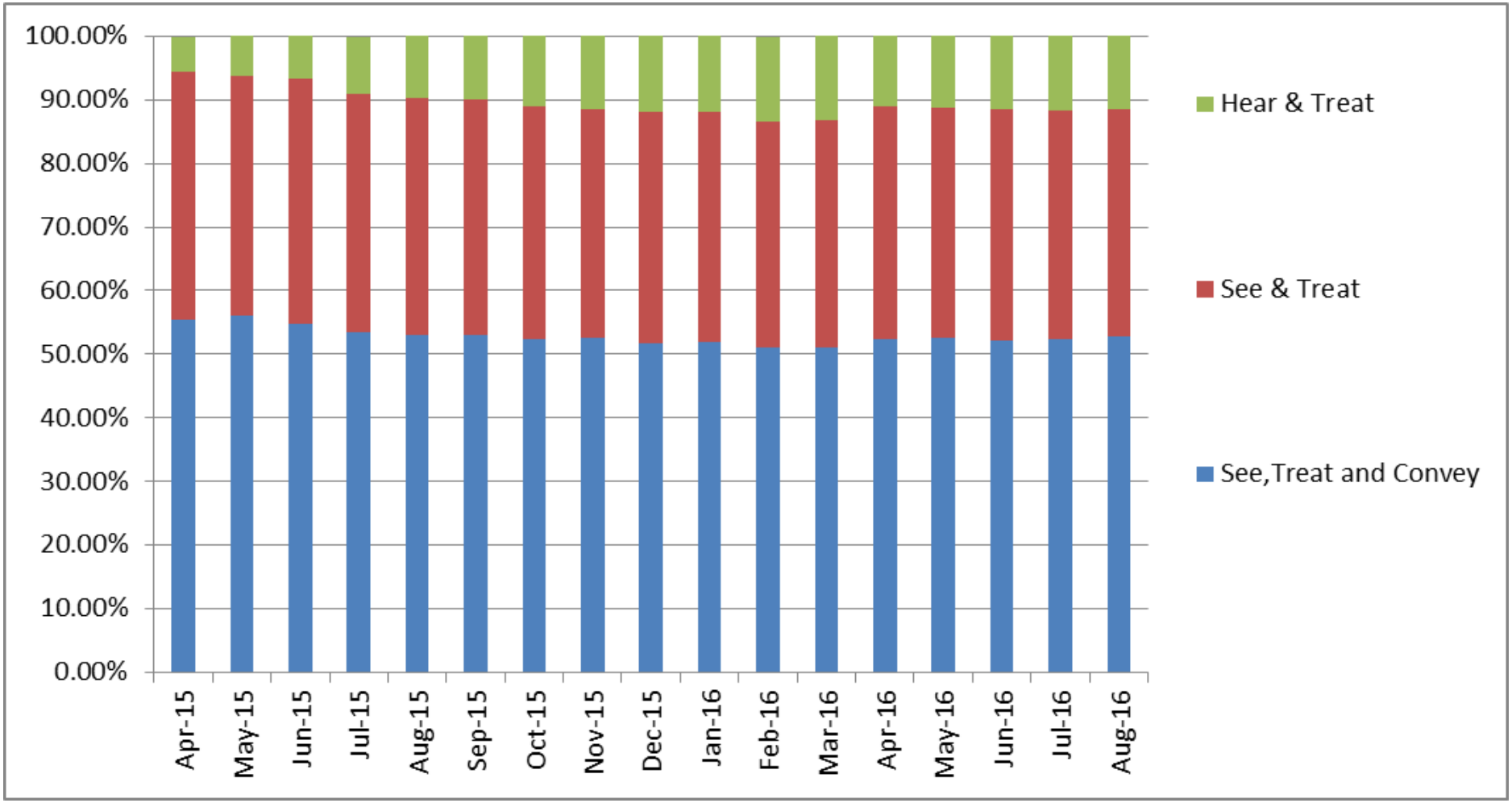
Consultant Pre-Hospital Care Practitioner, SCAS

September 2016


The types of incident that we attend…
25
20
15
10
5
0
Burns
Cardiovascular
Cardiac Arrest
Deliberate Self Harm
Diabetes
Environmental
Falls
Gastrointestinal
Genitourinary
Gynaecology
Minor Trauma
Neurological
Obstetrics
Poisoning (accidental)
Psychiatric or Mental Health Act
Respiratory
RTC
Social
Trauma (excluding self harm)
Unwell Child
Other Medical

Dispositions in SCAS

South Central Ambulance Service NHS
NHS Trust



Some patients are easy….

South Central Ambulance Service NHS
NHS Trust

Heart Attack, Stroke, Major Trauma

Sore throat, toothache, minor conditions

We have a dream…..

South Central Ambulance Service NHS
NHS Trust

To have ONE sepsis recognition tool that can be used by:

- **Primary Care**
- **Residential / Care Homes**
- **Ambulance services**

NEWS…..

The benefits of the NEWS scoring system…..

- **Consistent language from *call* to *hospital handover***
- **Allows us to achieve the most appropriate time-frame for the patient**
- **Allows us to recognise the deteriorating patient**
- **Allows us to match the most appropriate ambulance resource to the patient**

Understanding our skill grades

ECA (Band 3) (Emergency Care Assistant)	Technician / AAP (Band 4)	Paramedic / Ambulance Nurse (Band 5)	ECP (Band 6) (Emergency Care Practitioner)
Basic life support AED Primary and secondary survey Oxygen therapy Entonox Dextrose 40% gel Aspirin **Recognition of deteriorating patient**	Intermediate airway management (LMA) Manual defibrillation and ECG recognition Medicines for life threatening conditions Patient assessment and treatment	Advanced Life Support including Intubation Cannulation IV medicines Patient assessment and treatment	Skills as per Paramedic Able to treat: Chronic conditions Minor Injuries Minor Illness A focus on "see and treat"

South Central Ambulance Service NHS
NHS Foundation Trust

HCP direct line

GPs (and other HCPs) have a dedicated telephone number to call for appropriate transport

In Thames Valley this number is:

0300 1239826

The evidence

South Central Ambulance Service NHS
NHS Trust

Resuscitation 89 (2015) 31–35

Contents lists available at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Rapid Response Systems

Validation of the National Early Warning Score in the prehospital setting*

Daniel J. Silcock[a,*], Alasdair R. Corfield[a], Paul A. Gowens[b], Kevin D. Rooney[a,c]

[a] Royal Alexandra Hospital, Paisley, UK
[b] Scottish Ambulance Service, UK
[c] Institute for Care and Practice Improvement, University of the West of Scotland, UK

Conclusions: Elevated NEWS among unselected prehospital patients is associated with a higher incidence of adverse outcomes. Calculation of prehospital NEWS may facilitate earlier recognition of deteriorating patients, early involvement of senior Emergency Department staff and appropriate critical care.

have been developed in recent years[5] and have been shown to be good predictors of mortality and deterioration.[5] Recent work by the Royal College of Physicians has led to the development of a National Early Warning Score (NEWS)[6] which is currently implemented by the National Health Service (NHS) in acute hospitals across the UK and has been successful in identifying patients at risk of deterioration or death.[7] More recently there has been adoption

* A Spanish translated version of the summary of this article appears as Appendix in the final online version at http://dx.doi.org/10.1016/j.resuscitation.2014.12.020.

* Corresponding author.
E-mail address: daniel.silcock@nhs.net (D.J. Silcock).

http://dx.doi.org/10.1016/j.resuscitation.2014.12.020
0300-9572/© 2015 Elsevier Ireland Ltd. All rights reserved.

whom a course of treatment had already been started, uncertainty exists as to the applicability of the NEWS to other settings, particularly the emergency department and prehospital setting, where scores would be derived prior to the institution of any treatment. In this situation the score may contribute to a decision to transfer a patient to hospital[14] or may be used as a triage aid, both of which roles differ slightly from the track and trigger (of a clinical review) role for which NEWS was originally intended.

The NEWS was based on the earlier ViEWS[15] (VitalPAC Early Warning Score) developed in Portsmouth and stratifies patients into risk categories based on observed heart rate, respiratory rate, systolic blood pressure, arterial oxygen saturation, temperature, and conscious level; plus an additional weighting if the patient is

Currently

South Central Ambulance Service NHS
NHS Trust

SCAS crews <u>are</u> using a sepsis recognition tool

Sepsis recognition

South Central Ambulance Service NHS
NHS Trust

Pre-hospital Sepsis Action Tool --clinical memo in RESOURCES-------->>

Resources

Adult High Risk

Patients who have been in contact with a number of health care professionals or services with no apparent resolution or improvement. Consider escalation to an assessment facility / ED.

Children High Risk

Children that have been seen by an HCP within the previous 24 hours, and have exacerbated or non-improved symptoms.
Children under 2 years (Should normally be conveyed to ED or a HCP for face to face assessment).

ADULT

CHILD

Sepsis recognition

South Central Ambulance Service NHS
NHS Trust

Pre-hospital Sepsis Action Tool --clinical memo in RESOURCES--------->>

Resources

Are any 2 of the following present?

Temperature: > 38.3 °C or < 36 °C
Respiratory Rate: >20 per minute
Heart Rate: >90 per minute
Acutely confused or reduced conscious level
Glucose: >7.7 mmol/L (unless known diabetes)

YES

NO

Sepsis recognition

South Central Ambulance Service NHS
NHS Trust

Pre-hospital Sepsis Action Tool --clinical memo in RESOURCES-------->>

Resources

Are there any signs of shock?

Systolic BP: < 90 mmHg
Respiratory Rate: >25 per minute
Heart Rate: >130 per minute
Oxygen saturation: <91%
Responds only to voice or pain
Mottled/cold peripheries
Central capillary refill time: > 2 seconds
Purpuric rash
Absent radial pulse

YES

NO

Sepsis recognition

South Central Ambulance Service NHS
NHS Trust

Pre-hospital Sepsis Action Tool --clinical memo in RESOURCES-------->>

Resources

Septic Shock

Administer

Oxygen: 15 L/min via non rebreathing mask
IV Fluids: 250ml boluses of crystalloid to max 2 L
(consider IV anti-biotics if available)

Transfer

Blue light transfer to nearest ED

Pre-alert

Stating "Suspected Septic Shock"

Return

An opportunity…..

South Central Ambulance Service NHS
NHS Trust

We now have ePR across the whole of SCAS…..

SCAS have developed a "beta-version" of a sepsis recognition tool on the ePR devices

This calculates the NEWS (and POPS) scores from the physiological observations entered

ePR

South Central Ambulance Service NHS
NHS Trust

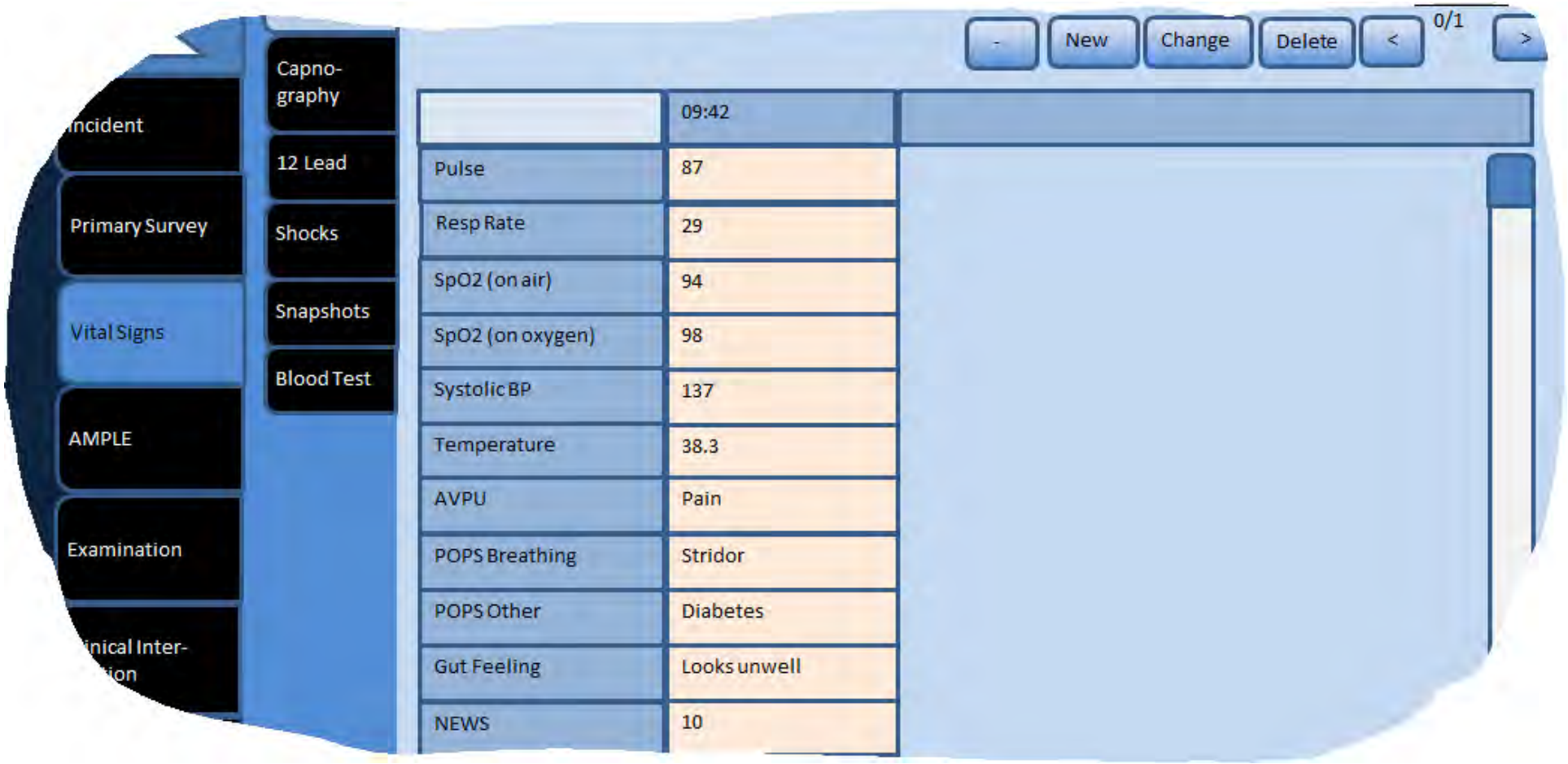
NEWS Score

Physiological parameters	3	2	1	0	1	2	3
Pulse Rate							
Respiratory Rate							
SpO2							
Supplemental oxygen used							
Systolic BP							
Temperature							
AVPU							
Total Score							

Close

ePR

South Central Ambulance Service NHS
NHS Trust



Conclusion

South Central Ambulance Service NHS
NHS Trust

It is vital that we have <u>one</u> sepsis screening tool that is used right across:

- Primary Care
- Residential / Care homes
- Ambulance Services

Let's work together NICEly……!

Questions

Sepsis Working Together
Community and Secondary Care

Sepsis Working Together
Community and Secondary Care

Gail Hayward

Sepsis identification in the community

Sepsis Working Together
Community and Secondary Care

Sepsis Working Together
Community and Secondary Care

Amanda Pegden

Fighting sepsis, saving lives, sharing our journey

Great Western Hospitals NHS
NHS Foundation Trust

Oxford Academic Health Science Network

"Fighting Sepsis – Saving Lives" Sharing our journey

Amanda Pegden
Sepsis Working Group
Great Western Hospital NHS Foundation Trust






Our Values
Service Teamwork Ambition Respect

Objectives

- Sepsis the problem
- What needs to be done
- How to start/what to do
- Results
- Summary

The case that changed my practice

- 2007
- ITU Consultant in Portugal
- Gym Dinner
- Daughters
- 3/52 later admitted to ITU
- Meningococcal septicemia
- Survival but quadri-amputated

My Sepsis Mission

- My motivation to implement change
- What have we done and achieved so far
- Share with you - what to do & how to start

Objectives

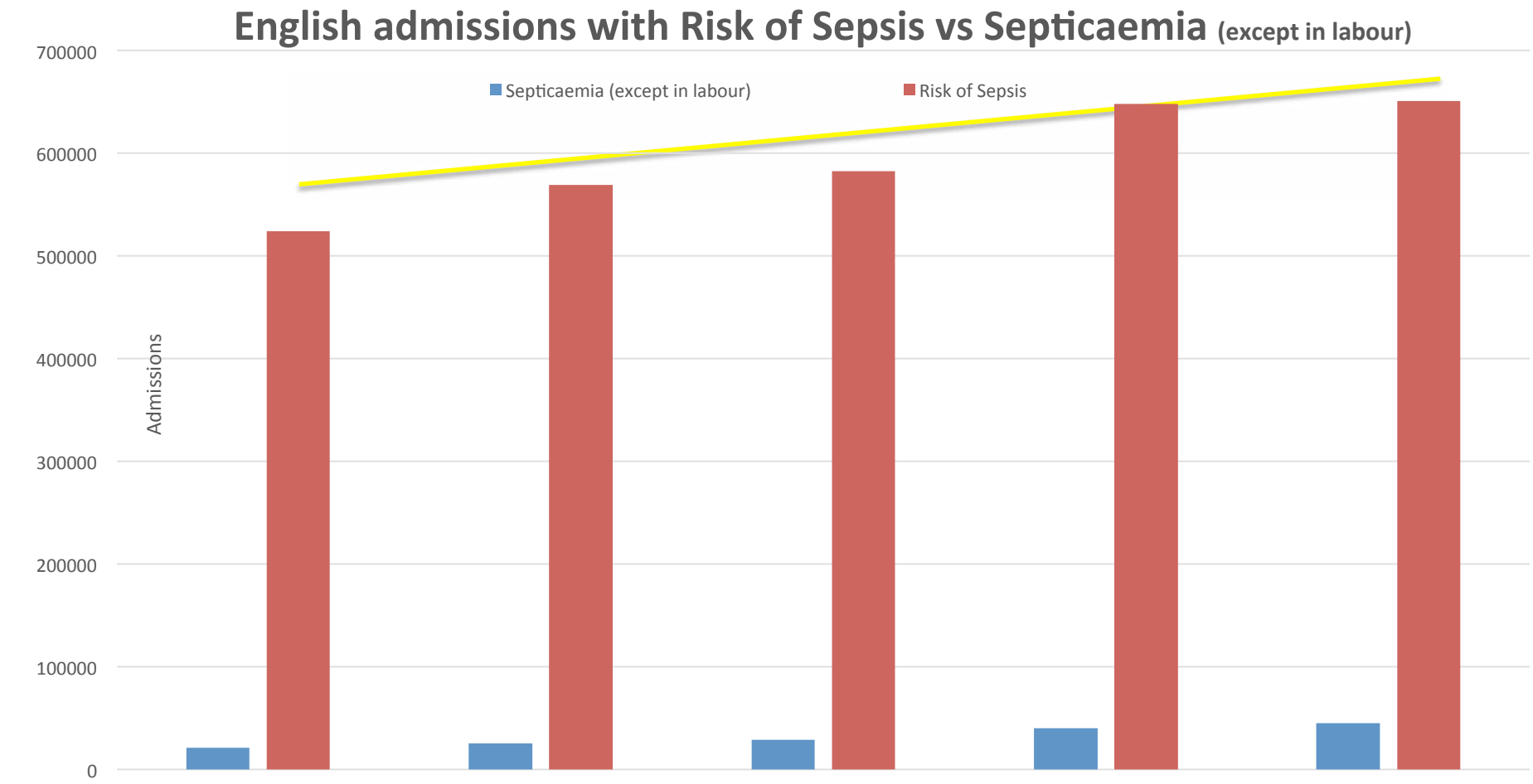
- Sepsis the problem
- What needs to be done
- What we are doing
- Results
- Summary

- Overwhelming systemic inflammatory response. Driven by the immune system and inflammatory pathways in response to an infection.

- *"Sepsis is a life-threatening condition that arises when the body's response to an infection injures its own tissues and organs.*

- *Infections which can give rise to sepsis are common, and include lung infections (pneumonia), urine infections and wound/skin/joint infections.*

- *Sepsis can lead to shock, multiple organ failure and death, especially if not recognized and treated early"* UK sepsis trust



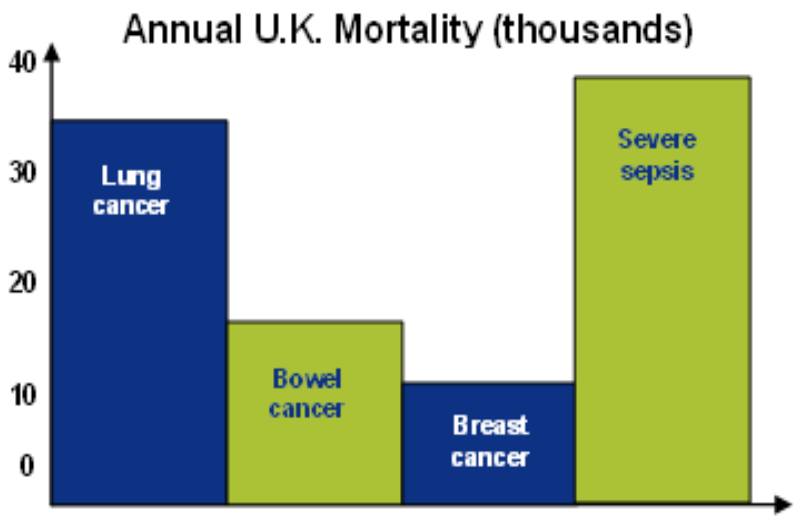
Year	2009/10	2010/11	2011/12	2012/13	2013/14
Septicaemia	**10.71%**	10.15%	9.76%	9.73%	**9.06%**
Risk of Sepsis	**9.83%**	9.37%	9.08%	9.04%	**8.49%**

Crude Mortality Rate (%)

- **Since 2009, 13.6% reduction in mortality & 20,871 lives saved in total**

◆The Burden of Sepsis

In the UK sepsis is estimated to cost the NHS £2.5 billion



◆Daniels R. The incidence, mortality and economic burden of sepsis. (2009) In: NHS Evidence emergency and urgent care.

http://library.nhs.uk/Emergency/

- Affects around 30 million in the world each year
- Incidence is rising by over 8% each year
- Can affect any speciality, for any age patient
- More than 44,000 deaths in the UK each year
- ...more likely to die of sepsis than heart attack or stroke.
- ...more than breast, bowel, and prostate cancer, HIV and AIDS and RTCs combined...
- ...more than COPD.....
- Kills more than lung cancer....

Objectives

- Sepsis the problem
- What needs to be done
- What we are doing
- Results
- Summary

Sepsis - the problem

- National ED audit 2011
- In Dec. 2012 a GWH mortality review
- ED/AMU sepsis audit – only 1:30
- New ED audit for 2017

Global and National action

- Sepsis recognition and timely treatment- a global issue

- "Surviving Sepsis campaign" launched
- - guidelines 1st published in **2004** & updated in **2012**

- Dr. Ron Daniels and UK Sepsis Trust
- UK national CQUINN 2015

- New NICE guidelines July 2016

Objectives

- Sepsis the problem
- What needs to be done
- What we are doing
- Results
- Summary

Great Western Hospitals NHS
NHS Foundation Trust

Sepsis Working Group






Our Values
Service Teamwork Ambition Respect

◆Sepsis Working Group

◆In July 2013 we formed a large multi-disciplinary "grassroots" group
◆with a front-door leader

- Doctors
- Nurses
- Pharmacists
- Emergency Department Assistants (EDAs)
- Admin staff

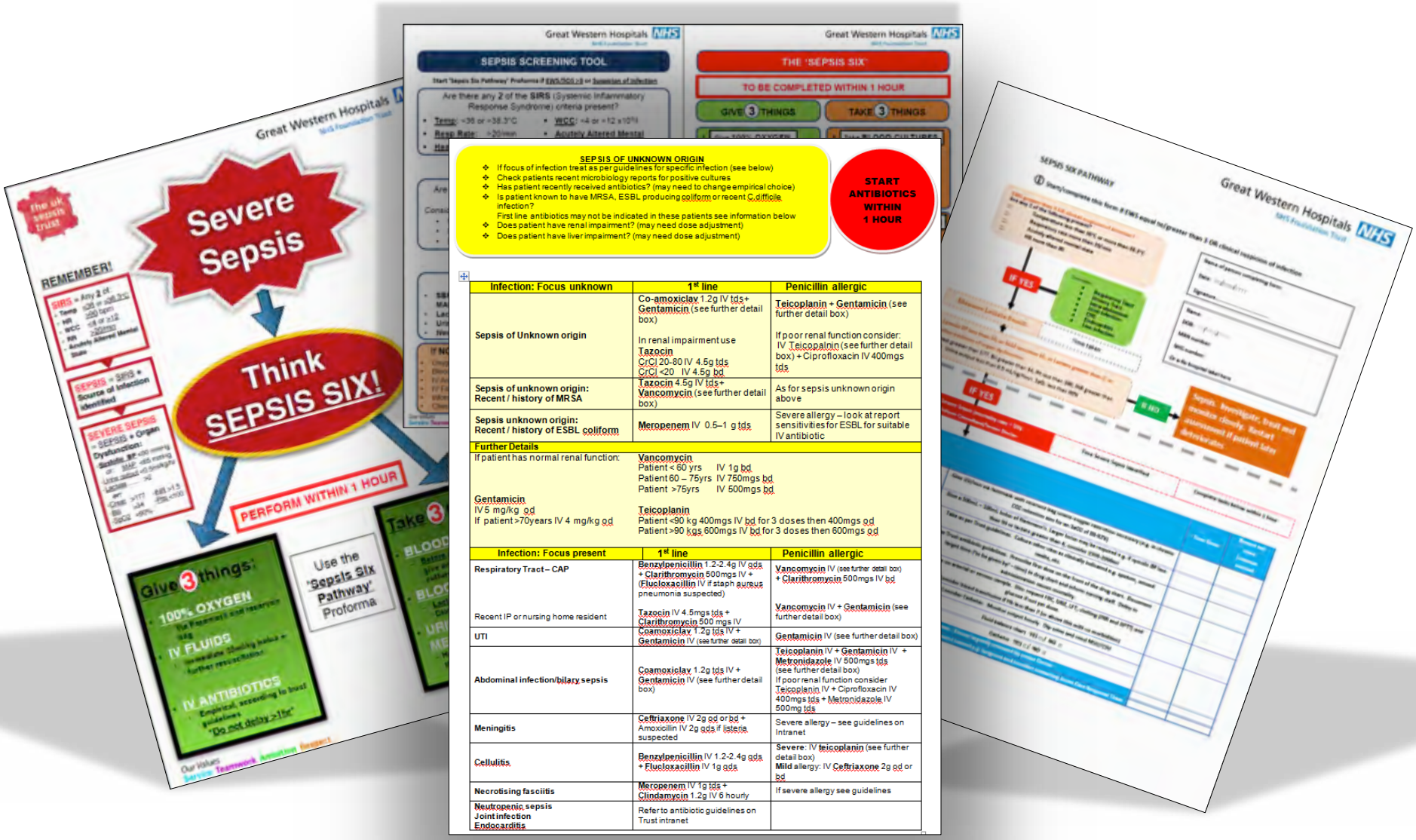
◆We meet once a month
◆We work in different areas of the hospital
◆We are all "Sepsis Champions"

What did we do at GWH

1. Sepsis working group – a front door leader
2. Sepsis Champions
3. Sepsis screening tool
4. Sepsis measurement tool
5. Sepsis card for lanyard
6. Sepsis six posters
7. Teaching – all health care staff across the trust
8. World Sepsis day – Sepsis Café Sept 13th 2013, 2014,2015 & 2016

- GWH Sepsis Intranet web page
- Media – hospital and local radio and newspaper
- E-learning module
- SMT inside all medical proformas
- SIRS criteria on obs charts
- Sepsis referral site sepsisrefs@gwh.nhs.uk

◆NEW TOOLS



SEPSIS OF UNKNOWN ORIGIN

- If focus of infection treat as per guidelines for specific infection (see below)
- Check patients recent microbiology reports for positive cultures
- Has patient recently received antibiotics? (may need to change empirical choice)
- Is patient known to have MRSA, ESBL producing coliform or recent C.difficile infection?
  First line antibiotics may not be indicated in these patients see information below
- Does patient have renal impairment? (may need dose adjustment)
- Does patient have liver impairment? (may need dose adjustment)

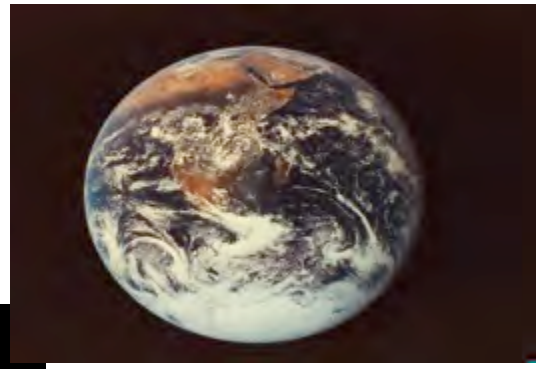
START ANTIBIOTICS WITHIN 1 HOUR

Infection: Focus unknown	1st line	Penicillin allergic
Sepsis of Unknown origin	Co-amoxiclav 1.2g IV tds + Gentamicin (see further detail box) In renal impairment use Tazocin CrCl 20-80 IV 4.5g tds CrCl <20 IV 4.5g bd	Teicoplanin + Gentamicin (see further detail box) If poor renal function consider: IV Teicopalnin (see further detail box) + Ciprofloxacin IV 400mgs tds
Sepsis of unknown origin: Recent / history of MRSA	Tazocin 4.5g IV tds + Vancomycin (see further detail box)	As for sepsis unknown origin above
Sepsis unknown origin: Recent / history of ESBL coliform	Meropenem IV 0.5–1 g tds	Severe allergy – look at report sensitivities for ESBL for suitable IV antibiotic
Further Details		
If patient has normal renal function: Gentamicin IV 5 mg/kg od If patient >70years IV 4 mg/kg od	Vancomycin Patient < 60 yrs IV 1g bd Patient 60 – 75yrs IV 750mgs bd Patient >75yrs IV 500mgs bd Teicoplanin Patient <90 kg 400mgs IV bd for 3 doses then 400mgs od Patient >90 kgs 600mgs IV bd for 3 doses then 600mgs od	

Infection: Focus present	1st line	Penicillin allergic
Respiratory Tract – CAP Recent IP or nursing home resident	Benzylpenicillin 1.2-2.4g IV qds + Clarithromycin 500mgs IV + (Flucloxacillin IV if staph aureus pneumonia suspected) Tazocin IV 4.5mgs tds + Clarithromycin 500 mgs IV	Vancomycin IV (see further detail box) + Clarithromycin 500mgs IV bd Vancomycin IV + Gentamicin (see further detail box)
UTI	Coamoxiclav 1.2g tds IV + Gentamicin IV (see further detail box)	Gentamicin IV (see further detail box)
Abdominal infection/biliary sepsis	Coamoxiclav 1.2g tds IV + Gentamicin IV (see further detail box)	Teicoplanin IV + Gentamicin IV + Metronidazole IV 500mgs tds (see further detail box) If poor renal function consider Teicoplanin IV + Ciprofloxacin IV 400mgs tds + Metronidazole IV 500mg tds
Meningitis	Ceftriaxone IV 2g od or bd + Amoxicillin IV 2g qds if listeria suspected	Severe allergy – see guidelines on Intranet
Cellulitis	Benzylpenicillin IV 1.2-2.4g qds + Flucloxacillin IV 1g qds	**Severe**: IV teicoplanin (see further detail box) **Mild** allergy: IV Ceftriaxone 2g od or bd
Necrotising fasciitis	Meropenem IV 1g tds + Clindamycin 1.2g IV 6 hourly	If severe allergy see guidelines
Neutropenic sepsis Joint infection Endocarditis	Refer to antibiotic guidelines on Trust intranet	

Rolling Teaching

- F1/F2/CMT/Consultants/Grand Round
- USC Directorate Meeting
- Nurse teaching – AMU/ED/Wards
- Regional networking
- Regional master class



- Please support our trust and get involved with raising awareness!

Our Values
Service Teamwork Ambition Respect

◆"Fighting Sepsis – Saving Lives"

Great Western Hospitals NHS
NHS Foundation Trust

NEWS

Standing up to sepsis

Trust celebrates first anniversary of the lifesaving Sepsis Six

A YEAR after launching the Sepsis Six, staff at the Great Western Hospital in Swindon have seen the number of people dying from the disease drop by nearly 40 per cent.

The Sepsis Six, a set of internationally recognised steps designed to help doctors and nurses identify the symptoms of the disease fast, has played a huge part in lowering mortality rates in sufferers from 68 per cent to just 25 per cent.

Time spent at the Great Western Hospital by sepsis patients has also gone down, with the average stay now one day shorter than it was a year ago.

Staff came together in the autumn to mark the achievements and to celebrate World Sepsis Day.

The special lunchtime event, which was held to raise awareness, included hands-on activities, information stands and even sepsis-themed games.

Guest of honour at the event was 74-year-old Ann Brady, who spent three months in GWH fighting the often fatal illness.

"The doctors here said I was the sickest person in the hospital. I was on a life support machine for a week as I had total organ failure," she said.

"I think it's absolutely amazing that the hospital is raising awareness of this. Knowing the early symptoms is what will save people's lives."

Sepsis occurs when the body starts attacking its own organs following an internal infection or an infected cut, bite or wound.

If it's not treated quickly, sepsis can lead to multiple organ failure and, in many instances, death.

Amanda Pegden, Consultant Physician, said: "I am delighted with the success we have had in tackling sepsis in the last 12 months. The enthusiasm that we have seen from staff has been really inspiring.

"The Sepsis Six tool is becoming quickly embedded into the hospital and awareness has improved greatly. More patients have been treated

Nic Lyttleton, Sepsis Nurse, Dr Amanda Pegden, Consultant, Dana Rankin, Staff Nurse, and Emma Roberts, Junior Sister.

Know the signs

Spotting sepsis early significantly increases a person's chances of survival. Things to look out for include:

- A high temperature of over 38°C
- Chills and shivering
- A fast heartbeat

Our Values
Service Teamwork Ambition Respect


September
13
2014
World
Sepsis
Day

Sepsis six workstation
IV fluids- a challenge!

Competitive!

New Venflons – how to insert correctly

Sepsis Simulation

Teaching 2014

Sepsis Competitions

All about people

Our Sepsis Stories

What happened in 2013 to 2014.....

- Rolling audit of patients coded as having sepsis:
- Sepsis six breakdown:
- Use of SMT/Antibiotic administration/ lactate etc

Positive results

Charitable fund bid successful for a pilot .....

- Employment of a sepsis specialist nurse for the trust

- Took up post in March 2014 – full time from May
- Now appointed in a substantive post from 15/07/2015!!!

Great Western Hospitals NHS
NHS Foundation Trust

Sepsis specialist nurse role

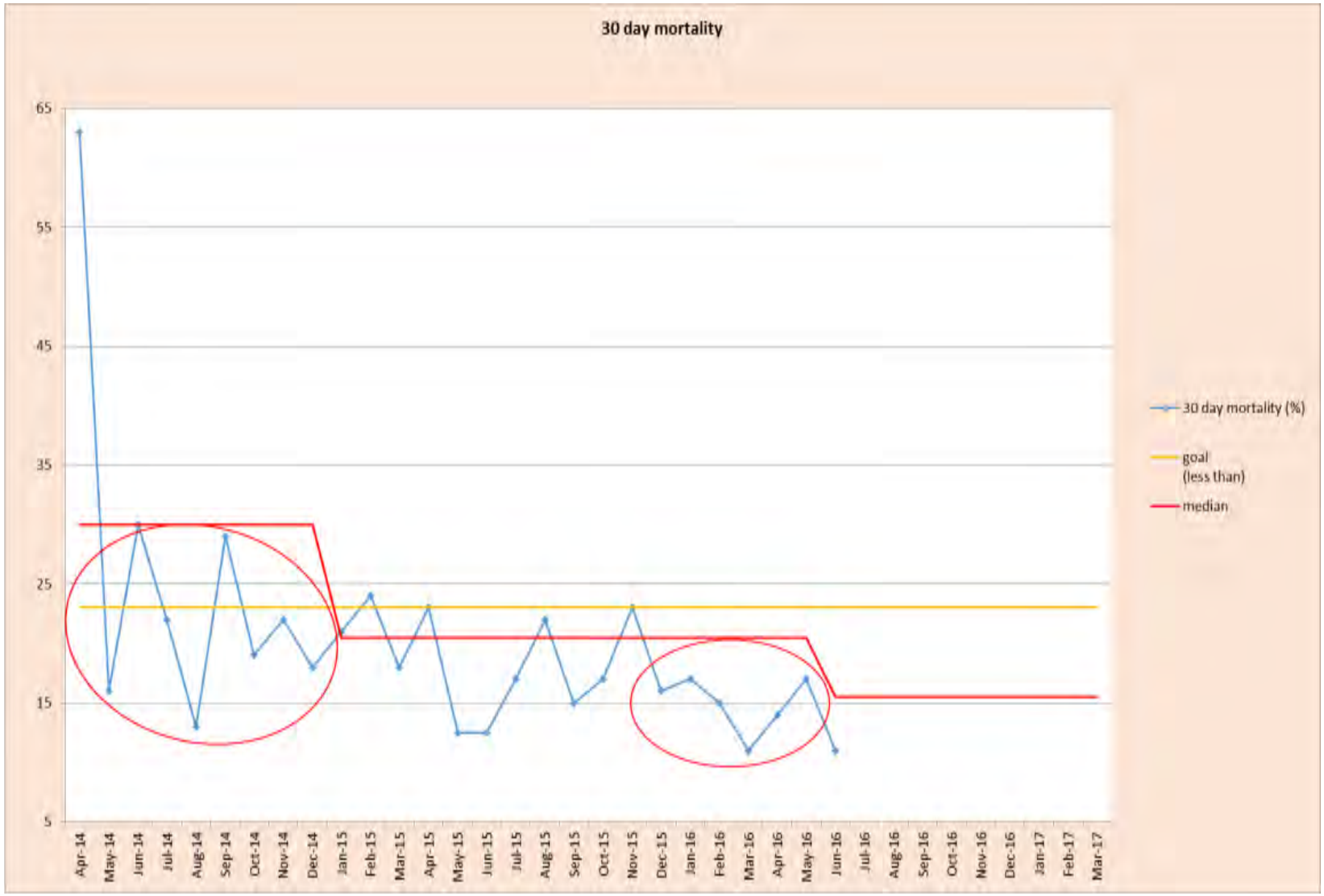
- Clinical role – daily front door "trawl" and bleep
- Data collection and analysis
- Regular monthly reports – feedback to SWG/ USC/managers/trust board
- Teaching
- Monthly SWG meetings – organising/ minutes
- Development of new initiatives – regional/ community/master class

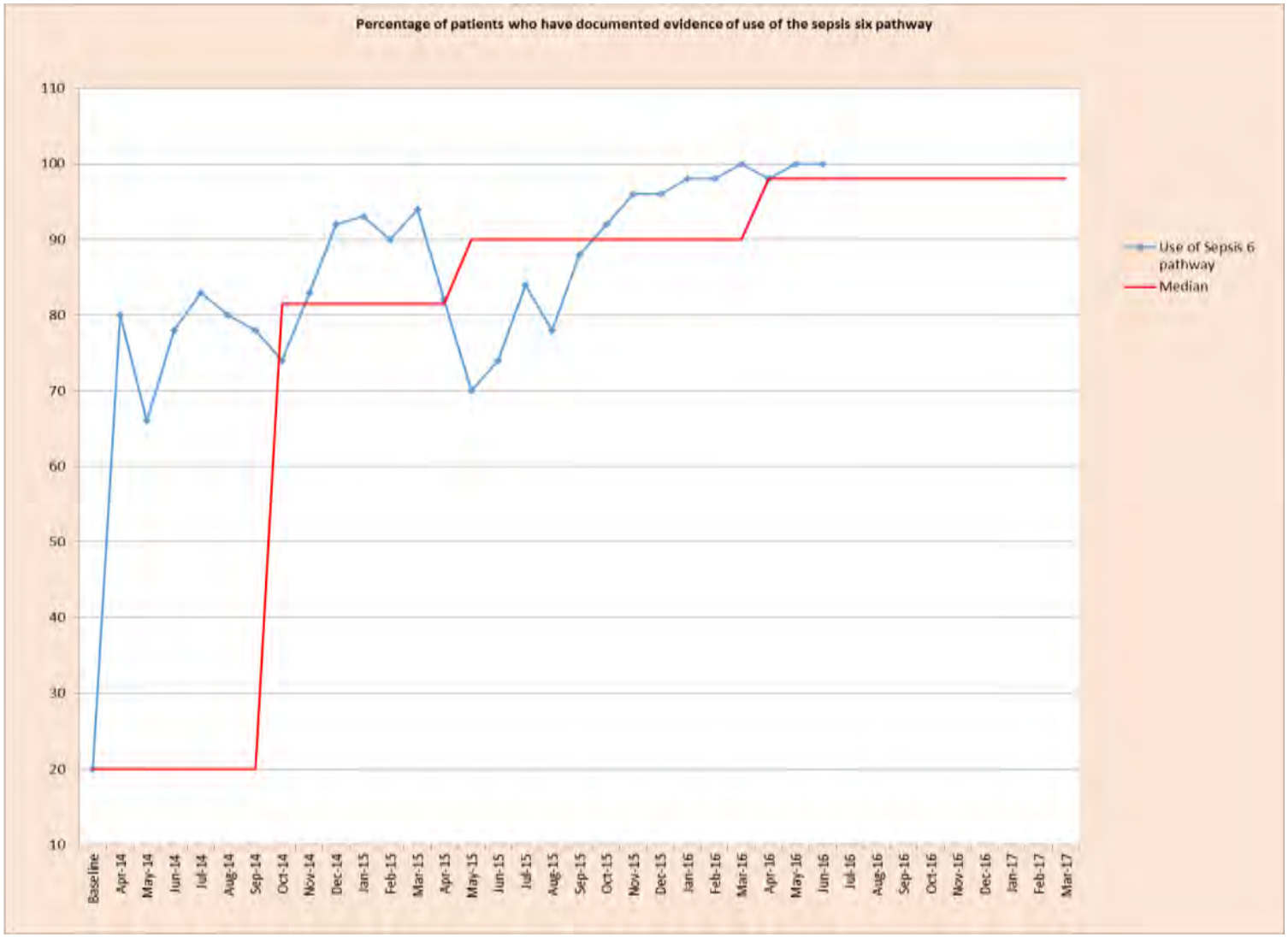
Things we are measured against….

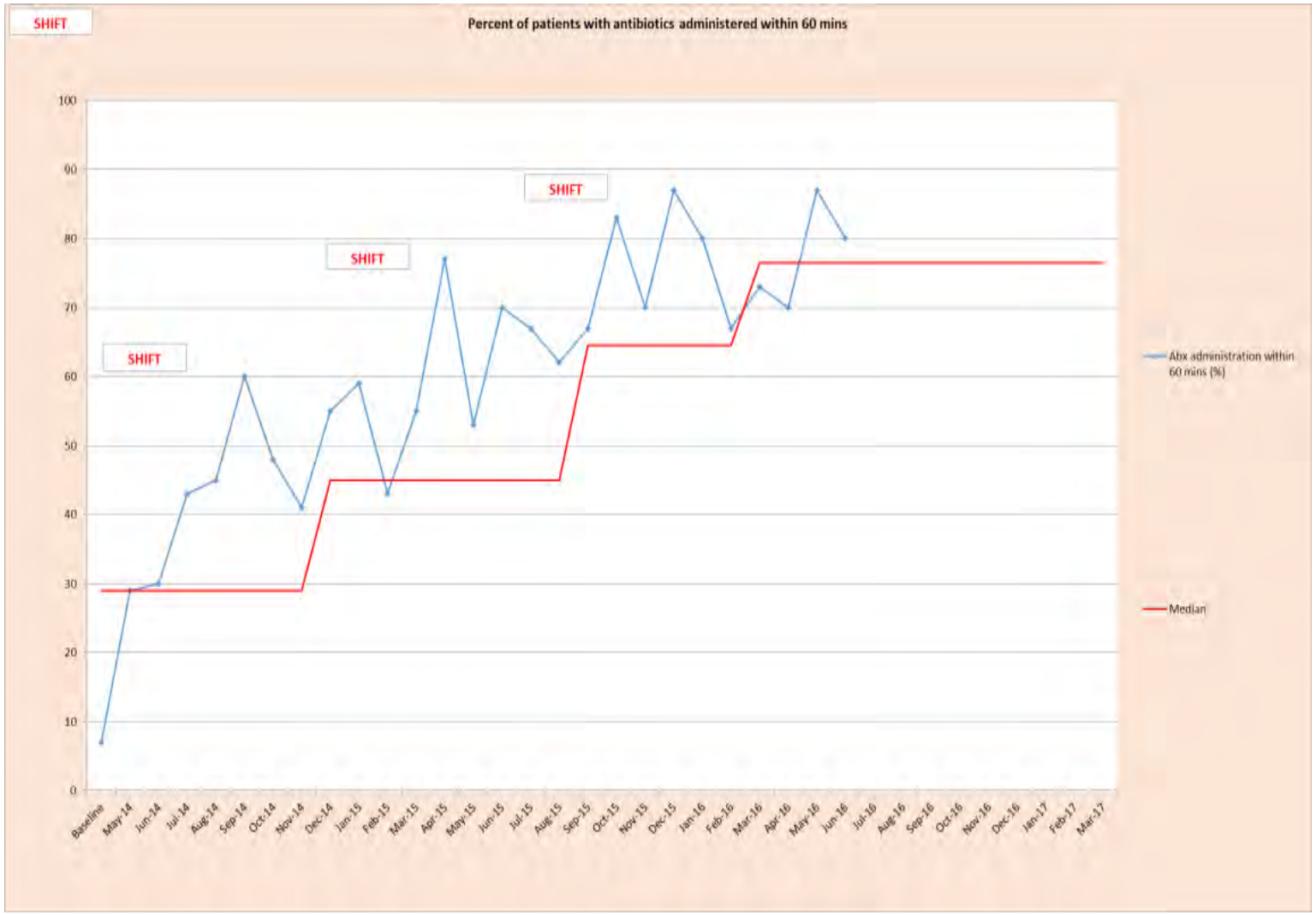
- *All* patients admitted (to ED, SAU, LAMU or PAU) with clinical evidence of infection will be screened for sepsis (using the Sepsis 6 Pathway).
- This includes paediatrics, maternity, medical, surgical, orthopaedic.
- Patients at 'end-of-life', those in 'minors', and trauma cases are excluded from the audit.
- *All* patients with evidence of severe sepsis or red-flag sepsis will have IV Antibiotics administered within an hour of presenting to GWH.

Objectives

- Sepsis the problem
- What needs to be done
- What we are doing
- Results
- Summary


30 day mortality
65
55
45
35
25
15
5
Apr-14
May-14
Jun-14
Jul-14
Aug-14
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
30 day mortality (%)
goal
(less than)
median


Percentage of patients who have documented evidence of use of the sepsis six pathway
110
100
90
80
70
60
50
40
30
20
10
Baseline
Apr-14
May-14
Jun-14
Jul-14
Aug-14
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Use of Sepsis 6 pathway
Median


SHIFT
Percent of patients with antibiotics administered within 60 mins
SHIFT
SHIFT
SHIFT
100
90
80
70
60
50
40
30
20
10
0
Baseline
May-14
Jun-14
Jul-14
Aug-14
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Abx administration within 60 mins (%)
Median

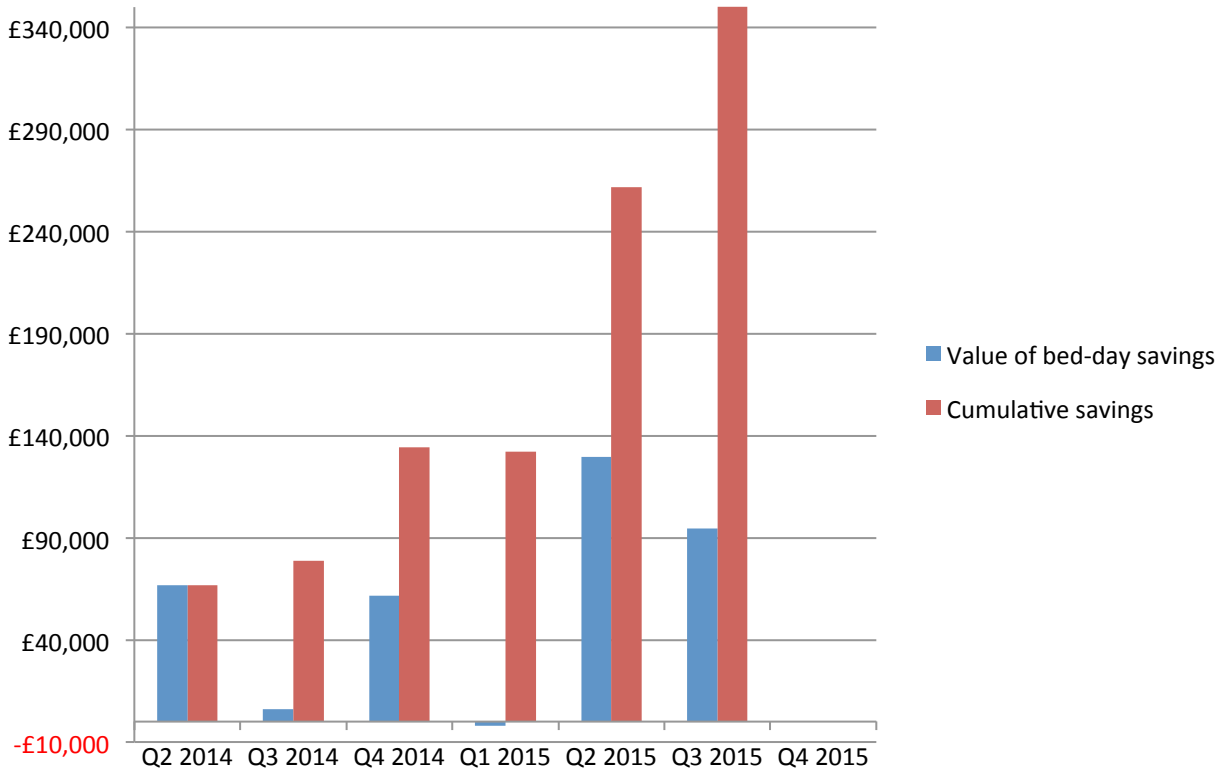
Great Western Hospitals NHS
NHS Foundation Trust

Our CQUINN data

- The use of the Sepsis 6 Pathway has become part of gold standard practice at GWH
- Mortality 63% -> 11%
- LOS has reduced 1 day in the first year– saving of 800 bed days
- Antibiotics in 1 hour 7% -> more than 80%

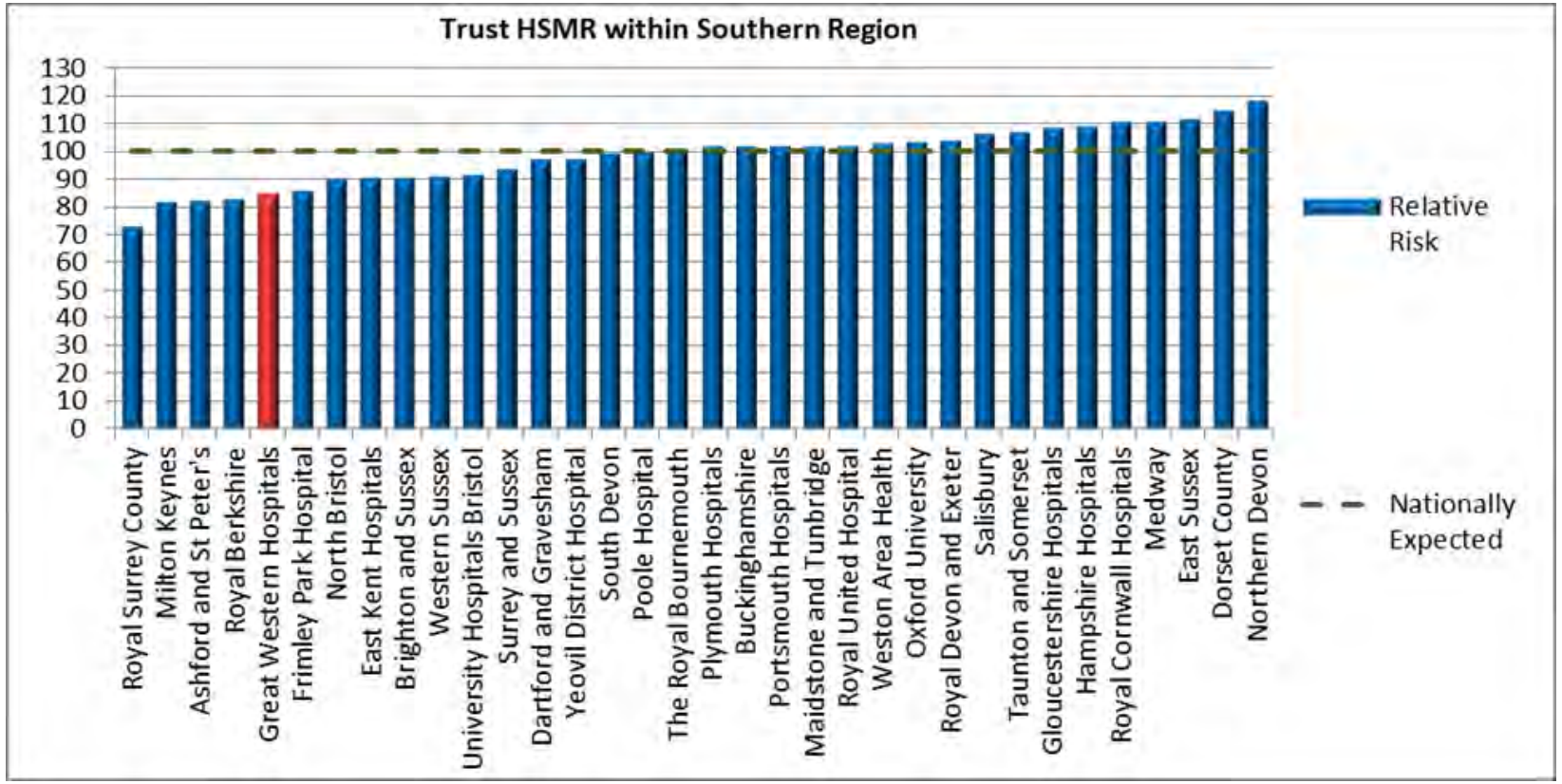
Savings

- Length of stay
- Bed-day savings >£350,000
- ITU admissions 14% to 5% (in 1st year)



- "Fighting Sepsis – Saving Lives"

HSMR has gone from "4th worst to 5th best" in region



(Statistical) lives saved

	% receiving Antibiotics within an hour of arrival	Number of additional patients receiving antibiotics (compared to 7% baseline)	Number of additional lives saved (Based on NNT=4.19)
Q1 2014/15	29%	22	5
Q2 2014/15	49%	84	20
Q3 2014/15	48%	111	27
Q4 2014/15	52%	117	30
2014/15 Total		334	**82**
Q1 2015/16	61%	54	13
Q2 2015/16	64%	114	27
Q3 2015/16	80%	182	43
Q4 2015/16	73%	172	41
2015/16 (estimated)		522	**124**
Q1 2016/17	79%	72	17

Great Western Hospitals NHS
NHS Foundation Trust

- "Fighting Sepsis – Saving Lives"

- **223 additional lives saved so far!**

Our Values
Service Teamwork Ambition Respect

INFORMATION FOR HEALTH PROFESSIONALS

SEPSIS IS WHEN THE BODY'S RESPONSE TO INFECTION INJURES ITS OWN TISSUES AND ORGANS.

THINK SEPSIS IF YOUR PATIENT:

- IS TRIGGERING AN EARLY WARNING SCORE
- LOOKS ILL
- HAS ANY SIGNS OF INFECTION

IF LEFT UNTREATED, SEPSIS CAN LEAD TO SHOCK, MULTI-ORGAN FAILURE AND DEATH.

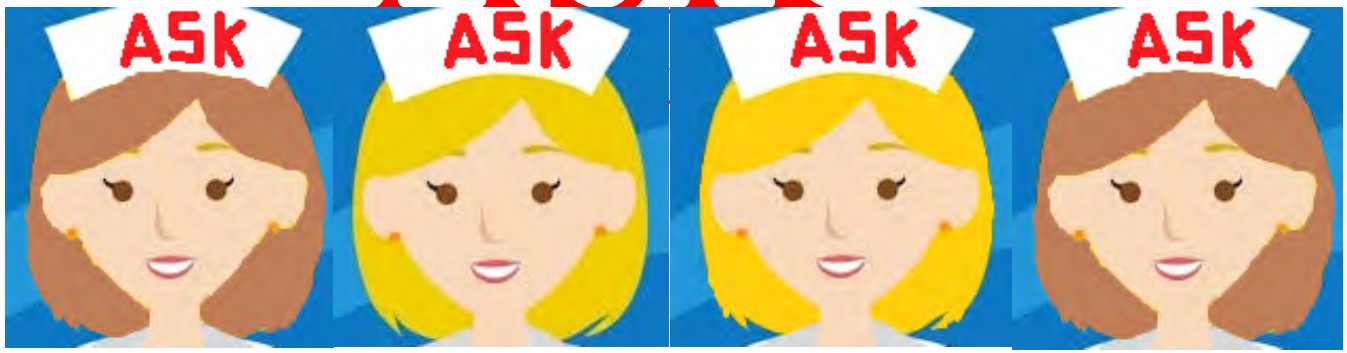
EMAIL: INFO@SEPSISTRUST.ORG FOR MORE INFORMATION

THE UK SEPSIS TRUST


SEPSIS KILLS MORE THAN
44,000 PEOPLE
PER YEAR, IN THE UK ALONE.
SPOT IT
TREAT IT
BEAT IT
LOOK FOR SIGNS OF SEPSIS IN EVERY
PATIENT WHERE INFECTION IS LIKELY.
SEPSIS
TRUST


PATIENT SAFETY AWARD
STAR

Just ASK*



- Lisa Penny is currently a sister on AMU, she will be joining the team in October.
- Siobhan Dixey is joining us from ITU in September, and has a background in Acute Stroke.
- Jennifer Harrington is joining us from ITU in September, with a background in Orthopaedic Surgery.
- Vicky Bruch is also joining us from ITU in September, and has a background in Trauma and AMU.

Objectives

- Sepsis the problem
- What needs to be done
- How to start/what to do
- Results
- Summary

Great Western Hospitals NHS
NHS Foundation Trust

Summary

- A grassroots front door group has effected a massive change in practice:
  - 223 lives have been saved (since May 2014)
  - We speak a common language
  - We have embedded gold standard practice in
    - our care for sepsis at the front door
- We are now developing the same care + AKI across all the ward inpatient areas,
  - including maternity and paediatric areas
  - Regional working is now well established

- Thank you for your time

- Any Questions?

- Amanda.pegden@gwh.nhs.uk
- Nicola.lythell@gwh.nhs.uk

Sepsis Working Together
Community and Secondary Care

Sepsis Working Together
Community and Secondary Care

Questions, Summary and Close

Sepsis Working Together
Community and Secondary Care

Thank you

www.patientsafetyoxford.org