WELCOME TO THIS SIGN UP TO SAFETY WEBINAR

Sepsis – a cross system response
Dr Ron Daniels

All participants lines are muted to reduce background noise
Sign up to Safety: Sepsis

Dr Ron Daniels FFICM FRCA FRCPEd
Chair, UK Sepsis Trust
Sepsis. Why you’re involved.
Breast cancer

Bowel cancer

Annual UK sepsis deaths
Sepsis occurs when the body’s response to an infection damages its own tissues and organs. It can lead to shock, multiple organ failure and death.

Teenager Patrick Kane uses a bionic hand after he lost all his fingers when he contracted meningococcal septicaemia as a baby. Dr Ron Daniels (above), chief executive of the Global Sepsis Alliance.

Cases of sepsis worldwide each year:
- Total cases: 18m
- Cases end in death: 8m

STAGES OF SEPSIS:
- Simple Infection: Low risk
- Body Becomes Inflamed: 10% risk of death
- Severe Sepsis: 34% risk of death
- Septic Shock: 50% risk of death

Sources: Global Sepsis Alliance, UK Sepsis Trust, European Commission

More than 100,000 people in Britain suffer from sepsis every year, 37,000 of them die from the disease.

Each case of sepsis costs the healthcare system £20,000 meaning treatment costs about £2bn a year in Britain.

6m newborn and small children are killed by sepsis every year in developing countries.
Your stats

1. Population in 100,000s = x
2. 150 x = incidence (y)
3. 0.35 y = annual mortality now (z)
4. £20,000 y = annual cost (£)
5. 0.65 y = survivor numbers
6. 0.33 z = potential lives saved
7. 0.1£ = potential cost savings
Potential conflict?
Antibiotics resistance 'as big a risk as terrorism' - medical chief

By Fergus Walsh
Medical correspondent

Prof Dame Sally Davies: "If you get an infection in your bloodstream, in about 10, 20 years it might be untreatable"

The danger posed by growing resistance to antibiotics should be ranked along with terrorism on a list of threats to the nation, the government's chief medical officer for England has said.

Professor Dame Sally Davies described it as a "ticking time bomb".
Infections like sepsis are life threatening without timely antibiotic treatment. We have to safeguard our antibiotics or we won’t be able to fight these serious conditions.
The trinity of infection management: United Kingdom coalition statement

“This coalition statement, on behalf of our organizations (the UK Sepsis Trust, Royal College of Nursing, Infection Prevention Society, British Society for Antimicrobial Chemotherapy, British Infection Association, British Association of Critical Care Nurses and Antibiotic Action*), addresses the real and urgent need for collaboration in reducing the incidence and impact of life-threatening infection and ensuring that we have effective antimicrobial agents to treat such infection, now and in the future.”

*Antibiotic action is a global initiative of the BSAC
Fixing the system.
Many doctors failing to spot sepsis, officials warn
For each hour’s delay in administering antibiotics in septic shock, mortality increases by 7.6%
The Sepsis Six

1. Give high-flow oxygen via non-rebreath bag
2. Take blood cultures and consider source control
3. Give IV antibiotics according to local protocol
4. Start IV fluid resuscitation Hartmann’s or equivalent
5. Check lactate
6. Monitor urine output consider catheterisation within one hour

..plus Critical Care support to complete EGDT
Compliance, GHH (%)
## Mortality

<table>
<thead>
<tr>
<th></th>
<th>Cohort size (%)</th>
<th>Mortality %</th>
<th>‘RRR’ % ('NNT')</th>
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<tbody>
<tr>
<td>Total</td>
<td>567 (100)</td>
<td>34.7</td>
<td>-</td>
</tr>
<tr>
<td>Sepsis Six</td>
<td>347 (61.2)</td>
<td>44.0</td>
<td></td>
</tr>
<tr>
<td>Sepsis Six</td>
<td>220 (38.8)</td>
<td>20.0</td>
<td>46.6 (4.16)</td>
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Basics limit severity

Multicenter implementation of a severe sepsis and septic shock treatment bundle.


Abstract

RATIONALE: Severe sepsis and septic shock are leading causes of intensive care unit (ICU) admission, morbidity, and mortality. The effect of compliance with sepsis management guidelines on outcomes is unclear.

OBJECTIVES: To assess the effect on mortality of compliance with a severe sepsis and septic shock management bundle.

METHODS: Observational study of a severe sepsis and septic shock bundle as part of a quality improvement project in 18 ICUs in 11 hospitals in Utah and Idaho.

MEASUREMENTS AND MAIN RESULTS: Among 4,329 adult subjects with severe sepsis or septic shock admitted to study ICUs from the emergency department between January 2004 and December 2010, hospital mortality was 12.1%, declining from 21.2% in 2004 to 8.7% in 2010. All-or-none total bundle compliance increased from 4.9-73.4% simultaneously. Mortality declined from 21.7% in 2004 to 9.7% in 2010 among subjects noncompliant with one or more bundle element. Regression models adjusting for age, severity of illness, and comorbidities identified an association between mortality and compliance with each of inotropes and red cell transfusions, glucocorticoids, and lung-protective ventilation. Compliance with early resuscitation elements during the first 3 hours after emergency department admission caused ineligibility, through lower subsequent severity of illness, for these later bundle elements.

CONCLUSIONS: Total severe sepsis and septic shock bundle compliances increased substantially and were associated with a marked reduction in hospital mortality after adjustment for age, severity of illness, and comorbidities in a multicenter ICU cohort. Early resuscitation bundle element compliance predicted ineligibility for subsequent bundle elements.
Standards

Patients with severe sepsis or septic shock

- In 95% of cases documented evidence in the notes of temperature, pulse rate, respiratory rate, blood pressure, mental status (AVPU or GCS) and capillary blood glucose on arrival.
- In 95% of cases documented evidence in the notes that senior EM / ICU help was summoned.
- In 95% of cases documented evidence in the notes that high flow O2 via non-rebreath mask was initiated (unless there is a documented reason to the contrary) prior to leaving the Emergency Department (ED).
- In 95% cases documented evidence that serum lactate measurement obtained prior to leaving the ED.
- In 95% of cases documented evidence that blood cultures were obtained prior to leaving the ED.
- Fluids - documented evidence that first intravenous crystalloid fluid bolus (up to 20mls/kg) was given:
  - In 75% of cases within 1 hour of arrival
  - In 90% of cases within 2 hours of arrival
  - In 100% cases prior to leaving the ED
- Antibiotics - documented evidence that antibiotics were administered
  - In 50% of cases within 1 hour of arrival
  - In 90% of cases within 2 hours of arrival
  - In 100% cases prior to leaving the ED
- In 90% of cases documented evidence that urine output measurements were instituted prior to leaving the ED.

Review January 2011
Three additional cases of blood poisoning

7:21 - 6 JUN 2014

Three additional cases of blood poisoning linked to a batch of intravenous fluid given to babies have been identified by health officials.
Boy, 17, died when bungling doctors misdiagnosed his blood poisoning FOUR times thinking it was flu

- Greg Bear's condition was dismissed by three doctors and a paramedic six days before he died
- Mother was told his condition did not warrant a hospital visit, even when he began coughing up blood
- Paramedic told Elizabeth Bear: If I was to take every 17-year-old boy coughing up blood, the system would grind to a halt'

By AMY OLIVER
PUBLISHED: 10:29, 12 October 2012 | UPDATED: 18:00, 12 October 2012

A teenager died of blood poisoning after medics dismissed his illness as flu four times, an inquest has heard.

Greg Bear, 17, had been examined by three doctors and a paramedic six days before he died.

After he began coughing up blood - a key symptom of septicaemia - his mother Elizabeth begged one paramedic to rush the teen to hospital.

But she was told his condition was not bad enough and that he should take some paracetamol.
Medical staff failed to spot Nottinghamshire boy's sepsis

18 February 2015 | Nottingham

Lewis had an operation to remove his appendix at a Turkish hospital while on holiday.
Patient safety alert – resources to support the prompt recognition of sepsis and the rapid initiation of treatment

A patient safety alert has been issued by NHS England to continue to raise awareness of sepsis and to signpost clinicians in the ambulance service, primary and community services and secondary care to a set of resources developed by the UK Sepsis Trust, and others. These resources support the prompt recognition and initiation of treatments for all patients suspected of having sepsis.

You can read the full patient safety alert on resources to support the prompt recognition of sepsis and the rapid initiation here.

You can access the resources on the UK Sepsis Trust website.
Acute care toolkit 9: Sepsis

Produced in association with the UK Sepsis Trust

Sepsis, which arises when the body’s response to infection causes systemic effects, causes 37,000 deaths in the UK each year. Patients admitted to hospital with severe sepsis are five times more likely to die from this than those admitted with a heart attack or stroke. The acute medical unit (AMU) has a key role to play in the management of sepsis, which responds well to early intervention and, if required, rapid escalation of therapy. All staff working in AMUs need to possess the knowledge and skills to identify patients with sepsis, stratify risk and determine appropriate levels of care.

This toolkit provides an overview of sepsis, with useful definitions and stratification tools. It suggests clinical guidelines for the management of patients admitted to or developing sepsis in an AMU. It also sets out the exemplar standards that have been identified by the UK Sepsis Trust and the All-Party Parliamentary Group on Sepsis as being important in sepsis management.

Watch Dr Frank Joseph discuss Acute care toolkit 9 below:
Emergency Department Sepsis Screening and Action Tool

Sepsis is a time critical condition. Screening, early intervention and immediate treatment saves lives. This tool should be applied to all adult patients who are not pregnant who have a suspected infection or their clinical observations are outside of normal limits.

1. Are any 2 of the following present?
   - Temperature > 38.3°C or < 36°C
   - Respiratory rate > 20 per minute
   - Heart rate > 90 per minute
   - Acute confusion/ reduced conscious level
   - Glucose > 7.7 mmol/l (uninv.cn)

[Flowchart diagram with decision points]

2. Could this be an infection?
   - For example:
     - Pneumonia
     - Urinary Tract Infection
     - Abdominal pain or distension
     - Meningitis
     - Cellulitis/ septic arthritis/ infected wound

3. Is any red flag present?
   - Systolic B.P. < 90 mmHg or MAP < 65 mmHg
   - Lactate > 2 mmol/l
   - Heart rate > 130 per minute
   - Respiratory rate > 25 per minute
   - Oxygen saturations < 91%
   - Responds only to voice or pain/ unresponsive
   - Purpuric rash

[Results pathway]

- Sepsis present
  - Inform responsible clinician.
  - Begin hourly observations.
  - Reassess for sepsis hourly.
  - Review bloods for markers of severe sepsis.
  - Consider life threatening sepsis mimics e.g. Asthma.

- Red Flag Sepsis
  - This is a time critical condition, immediate action is required.
  - Assume severe sepsis present.

  - Sepsis Six
    1. High-flow oxygen.
    2. Blood cultures and consider source control.
    3. Intravenous antibiotics.
    4. Intravenous fluid resuscitation.
    5. Check haemoglobin and serial lactates.
    6. Hourly urine output measurement.

  - Record the time each of these actions is completed. All actions should be completed as soon as possible but always within 60 minutes.

  - Communication:
    - Inform senior clinician (e.g. registrar or above).
  - Additional:
    - Bloods should include: FBC, U/E’s, LFT’s, and clotting profile.
    - Observations should be taken every 30 minutes
    - Lactate should be repeated within 2 hours.
    - Perform a CXR and Urinalysis
    - Consider source control (e.g. surgical intervention)
3. Is any red flag present?

Systolic B.P < 90 mmHg or MAP < 65 mmHg
Lactate > 2 mmol/l
Heart rate > 130 per minute
Respiratory rate > 25 per minute
Oxygen saturations < 91%
Responds only to voice or pain/ unresponsive
Purpuric rash

Red Flag Sepsis
This is a time critical condition, immediate action is required. Assume severe sepsis present.

Sepsis Six
1 High-flow oxygen.
2 Blood cultures and consider source control.
3 Intravenous antibiotics.
4 Intravenous fluid resuscitation.
5 Check haemoglobin and serial lactates.
6 Hourly urine output measurement.
Record the time each of these actions is completed. All actions should be completed as soon as possible but always within 60 minutes.

Communication:
Inform senior clinician (e.g. registrar or above).

Additional:
Bloods should include: FBC, U/E’s, LFT’s, clotting profile.
Observations should be taken every 30 mins
Lactate should be repeated within 2 hours.
Perform a CXR and Urinalysis
Consider source control (e.g. surgical intervention)
Table 1 – Time Critical Features/Conditions

- **Adrenal crisis** (including Addisonian crisis) - is a life threatening condition resulting from adrenal insufficiency — refer to hydrocortisone guidelines.

- **Airway impairment.**

- **Anaphylaxis** — is a life threatening condition resulting from an immune response to an allergen refer to allergic reactions including anaphylaxis guideline.

- Any patient with GCS <15 - check the airway and blood glucose levels in all patients with a decreased GCS.

- **Cardiac chest pain.**

- **Cardiogenic shock.**

- **Sepsis** - is a life threatening condition resulting from infection. Suspect sepsis in patients who have a history of infection, altered body temperature and a systolic blood pressure below 90mmHg - refer to intravascular fluid guidelines.

- **Failing ventilation.**

- **Severe breathlessness** - unable to complete a sentence.

- Severe haemorrhage - refer to trauma.
Sepsis is a rare but serious condition that can look just like self-limiting infection as flu, gastroenteritis or chest infections.

Seek medical help urgently if you develop any one of the following:

- Slurred speech
- Extreme shivering or muscle pain
- Passing no urine (in a day)
- Severe breathlessness
- ‘I feel like I might die’
- Skin mottled or discoloured

Email: info@sepsistrust.org for more information
The soon?

“I’m worried my Dad might have sepsis”

“Try not to worry. I’ve activated a sepsis alert. The Paramedic crew are on their way. They’ll check for signs of sepsis and if necessary take him straight to ED Resusc. The hospital team will work together to get him treated quickly- we all
## SEPSIS – IMPROVEMENT GOAL SPECIFICATION
(NOT MANDATORY – ORGANISATIONS CAN SET AN ALTERNATIVE SEPSIS IMPROVEMENT GOAL)

<table>
<thead>
<tr>
<th>Indicator number</th>
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<tbody>
<tr>
<td>Indicator name</td>
<td>Sepsis</td>
</tr>
<tr>
<td>Indicator weighting (% of CQUIN scheme available)</td>
<td></td>
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<tr>
<td>Description of indicator</td>
<td>This CQUIN focusses on patients arriving in the hospital via the Emergency Department (ED) or by direct emergency admission to Medical Assessment Unit (MAU) or an acute ward. It seeks to incentivise providers to screen for sepsis all those patients who present in a clinical condition that is suggestive of sepsis, and to rapidly initiate intravenous antibiotics, within 1 hour of presentation, for those patients who have suspected sepsis.</td>
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<tr>
<td>Numerator</td>
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| **Part 1**  
The numerator for part 1 (screening) is the total number of sampled patients who were screened for sepsis after they triggered on the NEWS tool (an aggregate score of 5 or more, or a ‘red’ score of 3 for any single parameter) or trigger on any other relevant locally agreed early warning score (e.g. one used for paediatric patients). |
| **Part 2**  
The numerator for part 2 (antibiotic administration) is the number of patients who present to the ED, MAU or acute ward with sepsis (as identified retrospectively via case note review) and who received intravenous antibiotics within 1 hour of presenting. |
The following rules should be used to construct the sample of 30 case notes of patients with a diagnosis of sepsis. 30 cases should be reviewed after the exclusion criteria below have been applied, unless there are fewer than 30 patients meeting these criteria in total per month. The denominator should then be adjusted accordingly. The initial pool should therefore be greater than 30 patients:

1. Step one: if there is clear evidence sepsis was NOT present on admission to the trust’s care discard from sample
2. Step two: if there is clear evidence of a decision NOT to actively treat sepsis recorded in the first hour (e.g. advance directive, treatment futile) discard from sample
3. Step three: if an appropriate antibiotic was given PRIOR to arrival at the ED, MAU or acute ward, discard from sample
4. Number now remaining in sample becomes denominator – should be 30 cases unless fewer cases than this that meet these criteria have presented in a month. If so, adjust denominator accordingly.
5. Of these cases, were antibiotics clearly recorded as GIVEN within 60 minutes or less of recorded time of ARRIVAL (not time of triage) = counts towards numerator total
6. All other cases, including those where time of arrival and/or time
What does this mean?

1. Potential harm
2. Is it deliverable?
3. Resource application
4. Role of those outside hospitals
5. Exemplar standards