



# How the SEPSIS KILLS app will help improve patient outcomes

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Clinical Excellence Commission



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## Hospital killer to be tamed by new app

Posted Tue, 16/10/2012 - 11:10 by Will Turner

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- Systemic response to an infection leading to shock, organ failure and death
- High mortality and morbidity
- Increasing incidence
- High costs – acuity, LOS, ICU hours
- Difficult diagnosis especially in the elderly and young



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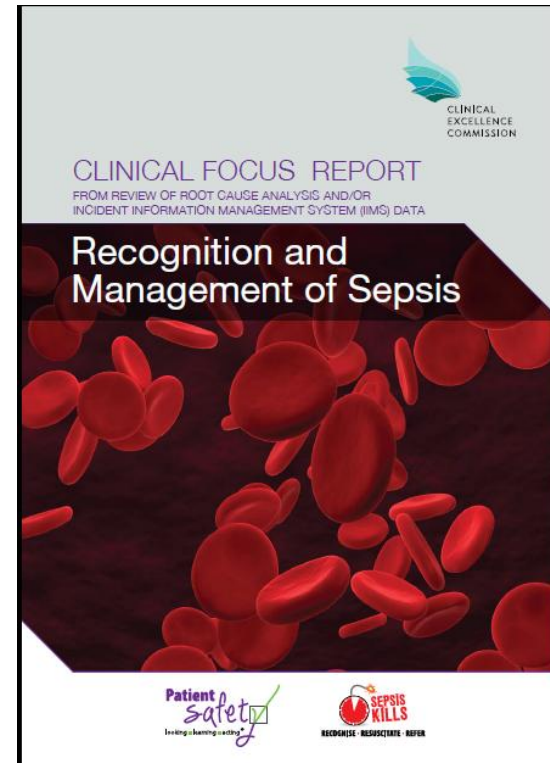
# The problem in NSW

- 167 sepsis related incidents over 18 month period from IIMS
- Failure to **recognise** sepsis
- Failure to take **appropriate and timely action**
- Poor patient outcomes
- Failure to see sepsis as a **medical emergency**

CEC Clinical Focus Report - Dec 2009



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# The SEPSIS KILLS solution....



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## **RECOGNISE:**

Risk factors, signs and symptoms of sepsis and inform senior clinician

## **RESUSCITATE:**

With rapid antibiotics and IV fluids within one hour

## **REFER:**

To specialist care and initiate retrieval if needed



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# Sepsis Toolkit



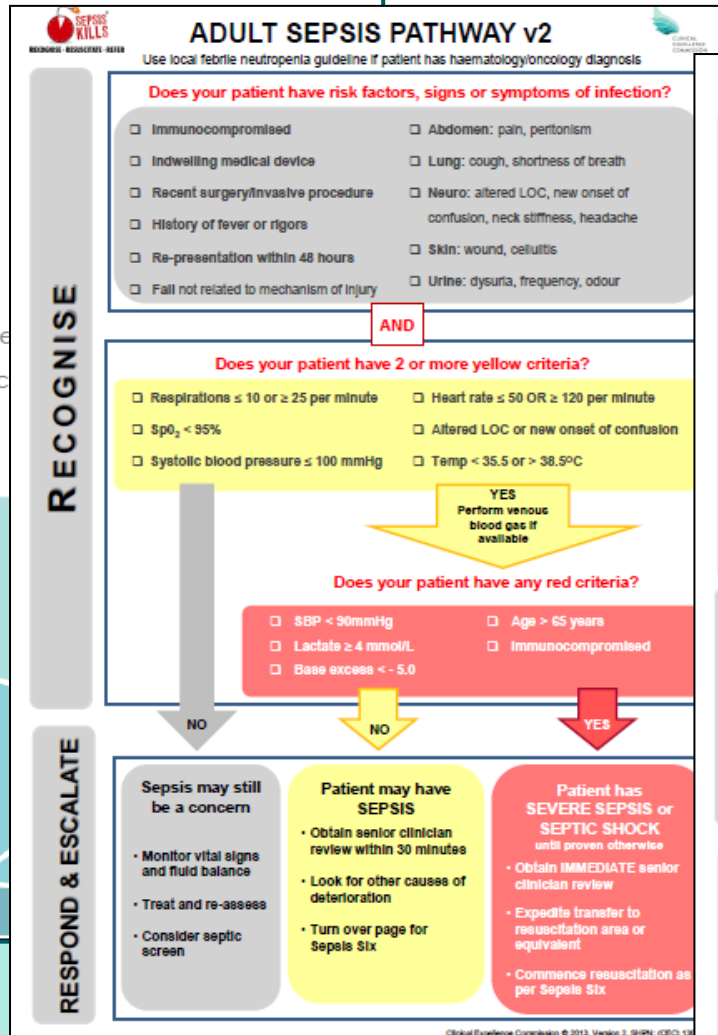
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Sepsis Toolkit

Sepsis Program Imple  
NSW Healthcare Fac

May 2013 Version 3



**ADULT SEPSIS PATHWAY v2**

Does the patient have an Advance Care Directive; are there any treatment limitations?

**Sepsis Six**  
Acknowledgement: The Sepsis Six in this document is an adaptation of the Sepsis Six by Ron Daniels, UK Sepsis Trust.

|                          |   |
|--------------------------|---|
| <b>1. OXYGEN</b>         | Administer oxygen to maintain $SpO_2 > 95\%$  |
| <b>2. BLOOD CULTURES</b> | Take blood cultures (2 aerobic, 2 anaerobic), FBC, EUC, LFTs, coags, glucose, +/- wound, urine, sputum or other cultures  |
| <b>3. LACTATE</b>        | Take blood for formal lactate or VBG  |
| <b>4. IV FLUIDS</b>      | Give 20mL/kg 0.9% sodium chloride fluid challenge STAT<br>Aim to achieve MAP of $> 65$ mmHg or SBP $> 100$ mmHg<br>If no response, repeat 20mL/kg 0.9% sodium chloride unless there are signs of pulmonary oedema<br>If no response commence Inotropes as per local protocol and in consultation with senior doctor |
| <b>5. IV ANTIBIOTICS</b> | Prescribe and commence within 60 MINUTES from triage/time of diagnosis or within 30 MINUTES if haematology/oncology patient (refer to local guidelines and seek specialist advice)<br>Do not wait for results of investigations   |
| <b>6. MONITORING</b>     | Monitor respiratory rate, blood pressure, heart rate, temperature, LOC, fluid balance, urinary output<br>Review antibiotics when blood/specimen results available   |

**RE-ASSESS**

**SIGNS OF IMPROVEMENT**

- $SpO_2 > 95\%$
- Decreasing tachycardia
- Improving LOC
- MAP  $> 65$  mmHg or SBP  $> 100$  mmHg
- Decreasing serum lactate level
- Urine output  $> 0.5$  mL/kg/hr

**IF IMPROVING TAKE THE FOLLOWING ACTION**

- Refer to admitting team/ICU
- Continue monitoring vital signs and fluid balance closely
- Investigate and treat the source of infection

**REFER**

**IF NO IMPROVEMENT THIS PATIENT NEEDS INTENSIVE CARE MANAGEMENT**

- Reassess suitability to continue resuscitation
- Request review by ICU doctor to occur within 30 minutes
- If no ICU at your facility, seek advice immediately from the ADULT MEDICAL RETRIEVAL SERVICE 1800 650 004 or local Critical Care Advisory Service

**Minimum patient monitoring requirements:**

- Respiratory rate, blood pressure, heart rate, temperature, LOC
- Repeat serum lactate every 4 hours
- Fluid balance, consider measuring urine output via IDC

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# Antibiotics in sepsis



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- IV broad spectrum antibiotics within **60 minutes**
- Delay leads to increased mortality - Kumar 2006
- Critical decisions often made without definitive data
- Inappropriate initial antimicrobial therapy for septic shock reduces survival five-fold (52% - 10.3%) - Kumar 2009
- Prevent Rx failure, toxicity, C-diff, resistance
- Most of the antibiotics prescribed by junior doctors



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# Variations in culture & practice

- Delays in prescribing and administration
- Investigations and specimens
- Emphasis on infusion
- Gentamicin particular issue
- Communication

Table 1: Antibiotic Prescribing

| Apparent source of sepsis  | Empirical antibiotic regimen  | Penicillin allergic – not immediate hypersensitivity   | Penicillin allergic – immediate hypersensitivity (anaphylaxis)  |
|--|---|--|---|
| Severe sepsis, no obvious source of infection and the patient is immunocompetent               | flucloxacillin 2g IV, 6-hourly<br><i>plus</i><br>gentamicin** 7mg/kg IV, for 1 dose (max 640 mg)                  | cephazolin 2g IV, 8-hourly<br><i>plus</i><br>gentamicin** 7mg/kg IV, for 1 dose (max 640 mg) | vancomycin* 1 to 1.5g IV 12-hourly<br><i>plus</i><br>gentamicin** 7mg/kg IV, for 1 dose (max 640 mg)  |
| Meningococcal or pneumococcal infection suspected  | <i>ADD</i><br>benzyl penicillin 1.8g IV, 4-hourly   | <i>ADD</i><br>ceftriaxone 2g IV, 12-hourly   | <i>ADD</i><br>moxifloxacin 400mg IV daily   |
| If toxin mediated shock present or likely  | <i>ADD</i><br>linecomycin 600mg IV, 8-hourly<br><i>OR</i><br>clindamycin 900mg IV, 8-hourly                       | <i>ADD</i><br>linecomycin 600mg IV, 8-hourly<br><i>OR</i><br>clindamycin 900mg IV, 8-hourly  | <i>ADD</i><br>linecomycin 600mg IV, 8-hourly<br><i>OR</i><br>clindamycin 900mg IV, 8-hourly           |
| Febrile neutropaenic (neutrophils < 1.0)   | piperacillin 4g & tazobactam 500mg IV, 8-hourly<br><i>plus</i><br>gentamicin** 7mg/kg IV, for 1 dose (max 640 mg) | cefepime 2g IV, 8-hourly<br><i>plus</i><br>gentamicin** 7mg/kg IV, for 1 dose (max 640 mg)   | vancomycin* 1 to 1.5g IV, 12-hourly<br><i>plus</i><br>gentamicin** 7mg/kg IV, for 1 dose (max 640 mg) |
| If in shock, known MRSA colonised or clinical evidence for vascular catheter related infection | <i>ADD</i><br>vancomycin* 1 to 1.5g IV, 12-hourly   | <i>ADD</i><br>vancomycin* 1 to 1.5g IV, 12-hourly  |   |
| Severe pneumonia (community acquired)  | ceftriaxone 1g IV, daily<br><i>plus</i><br>azithromycin 500mg IV, daily   | ceftriaxone 1g IV, daily<br><i>plus</i><br>azithromycin 500mg IV, daily                      | moxifloxacin 400mg IV, daily<br><i>plus</i><br>azithromycin 500mg IV, daily                           |
| Urinary tract infection  | ampicillin 2g IV, 6-hourly<br><i>plus</i><br>gentamicin** 7mg/kg IV, for 1 dose (max 640 mg)                      | ceftriaxone 1g IV, daily<br><i>plus</i><br>gentamicin** 7mg/kg IV, for 1 dose (max 640 mg)   | Seek ID/MICRO advice  |





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|  |  |  |

ACI/CEC Sepsis Adult First Dose Empirical Intravenous Antibiotic Guideline v1  
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# Sepsis Antibiotic Guideline

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**SEPSIS KILLS**

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- Introduction
- Antibiotic Prescribing
- Antibiotic Administration
- Reference
- Disclaimer

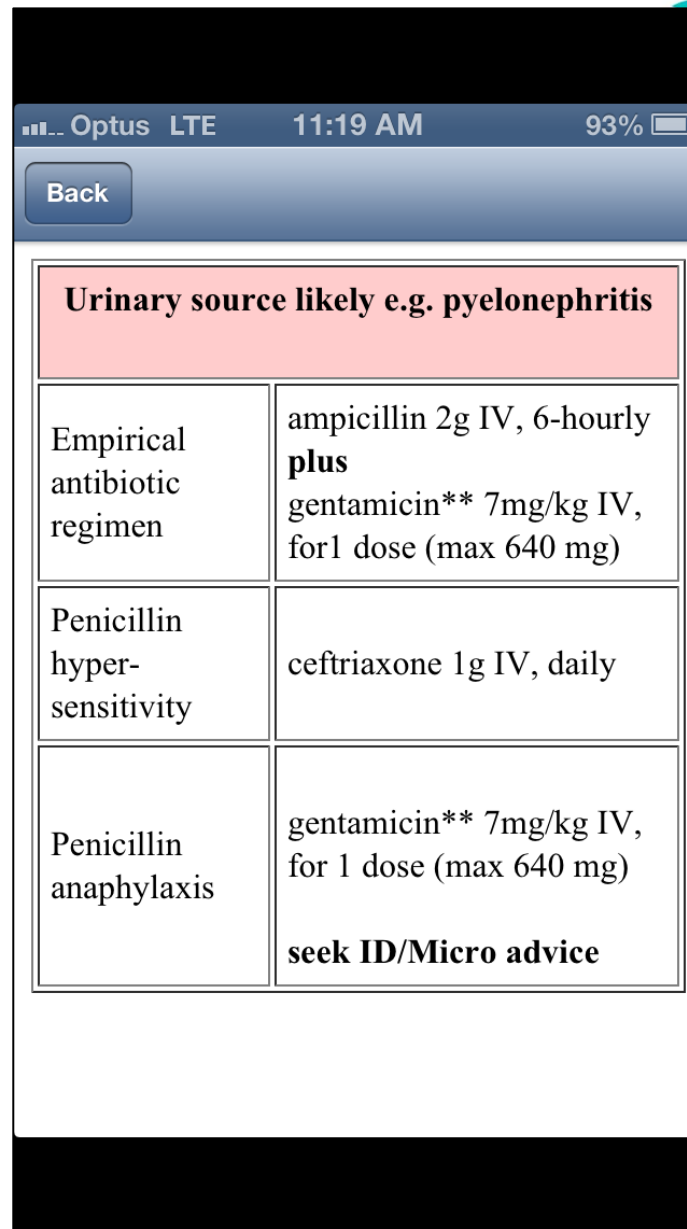
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Back

### ampicillin

|  |   |
|--|---|
| <b>Presentation(adult)</b>                 | <b>Vial<br/>1 g</b>                           |
| <b>Reconstitution<br/>fluid / volume</b>   | <b>10 mL<br/>Water For<br/>Injection(WFI)</b> |
| <b>Final volume*</b>                       | <b>10 - 20 mL</b>                             |
| <b>Minimum<br/>administration<br/>time</b> | <b>3-5 minutes</b>                            |
| <b>Notes</b>                               | <b>Penicillin class<br/>antibiotic</b>        |

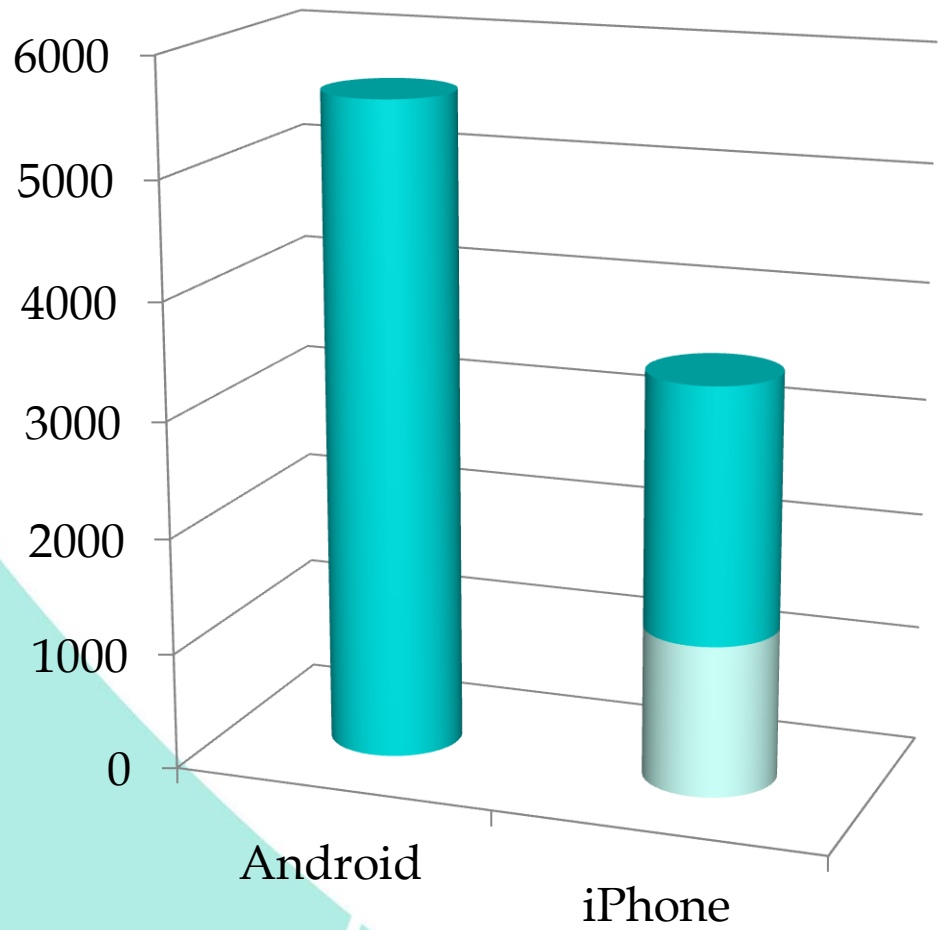


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## Point-of-care information

- Created by clinicians for clinicians
- Combines evidenced based science with technology
- Provides on-the-spot clinical decision support for prescribing and administration
- Reduces reliance on memory, paper or electronic versions of CEC guidelines or TG
- Plans to expand to wider Sepsis Toolkit information
- Apple, GooglePlay, Twitter *@sepsiskills*

# Who is using it?



- Worldwide 2013
- Australia 2013



## Does it make a difference?

- Improved accessibility
  - Anecdotal evidence that there is now greater knowledge and consistency in prescribing
  - One study on PDAs & POC information....
    - Increased self-reported drug knowledge 78.9%
    - Improved drug related decisions – 80.3%
    - Reduced potential ADEs – 63.1%
    - Estimated frequency of reduced ADEs
      - None – 50.2%
      - 1-2/week 42.8%
      - >2/week – 7%
- Rothschild J Am Med Inform Ass 2002



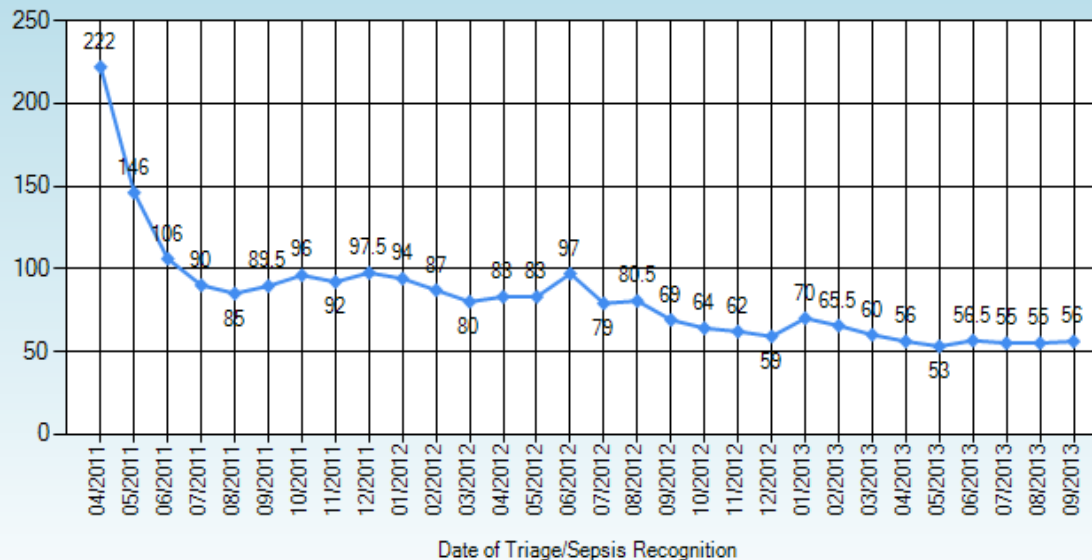


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# CEC data: NSW median time to administration of first IV antibiotic

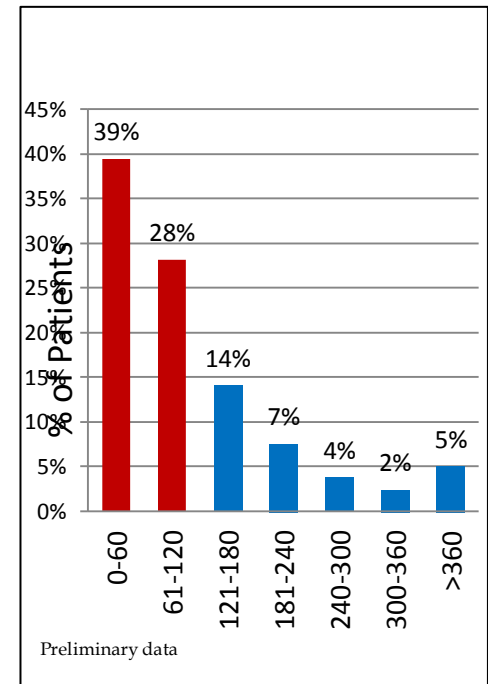
MEDIAN TIME TO ADMINISTRATION OF FIRST ANTIBIOTIC - MINUTES

Source: NSW Clinical Excellence Commission Sepsis Database



— NSW Level

Generated on: 03/10/2013



Preliminary data

Reduced LOS from 8.66 to 6.54 days



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## Final thoughts...

- Sepsis is a medical emergency
- Delay to antibiotics impacts on mortality
- Prescribe it – get it – give it – NOW!
- How long does it take for antibiotics to be given in your health facility?

**Don't turn your back on the bomb!**