SEPSIS QI RI
A National Programme

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www.hse.ie/sepsis

Issues

- Coroner's report & subsequent investigations
  - Failure to recognise the severity of illness
  - Failure to recognise deterioration
  - Ineffective communication
  - Failure of escalation
- National Sepsis Awareness Survey
  - 25% NCHDs
  - 29% Nurses
    - Didn't know that infection was the trigger for sepsis

NATIONAL CLINICAL EFFECTIVENESS COMMITTEE

Tús Áite do Shábháilteacht Othar
Patient Safety First

National Guideline No. 6: Sepsis Management

Sepsis Management

National Clinical Guideline No. 6

An Roinn Sláinte
DEPARTMENT OF HEALTH

November 2014

Governance

- Sepsis Steering Committee
  - National Sepsis Team
    - Sepsis ADONs
    - Hospital Sepsis Committees
  - Sepsis Audit Team
    - HPO
    - Coders
    - QID
    - Health Intelligence

Implementation: Education

- Under graduate Nursing & Medical
- Postgraduate Nursing & Medical
- National Intern Training Programme
- Hospital based learning
- Mandatory E-learning

Staff education

Do you have your Sepsis E-learning Completed?

RECOGNISE SEPSIS • ENHANCE SURVIVAL •

National Sepsis E-learning now available on Hseland.

NMBI CAT 1 approval.
3 CEUs for completion

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive
Clinical Strategy and Programmes Division

ROYAL COLLEGE OF PHYSICIANS OF IRELAND

hseland.ie
Cúram le Eolas

Certificate of Completion

This Certificate is awarded to

fidelma fitzpatrick

for completing the

National Sepsis Management E-Learning Education Programme

Approved by the Royal College of Physicians of Ireland (RCPI) for 3 External Continuing Professional Development (CPD) credits.
RCPI Approval Ref: 6469
This CPD Recognition is accepted by all Irish Medical Postgraduate Training Bodies.
Nursing and Midwifery Board of Ireland (NMBI) Category 1 Approved, 3 Continuing Education Units (CEUs).

Signed:

Pat O'Boyle
Assistant National Director
HR: Leadership, Education & Development
Health Service Executive

Date of completion 16 January 2017

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Aims

- Ensure every patients has the best opportunity to survive
  - Recognition: infection in high risk patients
  - Receive the modified Sepsis 6 bundle within 1 hour
  - Escalated to appropriate specialist care as indicated
    - Source control
    - Critical care
  - Audit process and outcomes

Implementation: recognition

"Think SEPSIS" at Triage

Clinical suspicion of infection?

YES

Sepsis Screen Required
Identify which of the following 4 groups the patient belongs to and assign appropriate triage category.

1
Unwell and on chemotherapy/ radiotherapy with risk of neutropenia

Follow the 'Febrile Neutropenia' pathway if pathway in operation.

Note: these patients may present without fever

→ Category 2

2
Any 1 of the following signs of acute organ dysfunction:

- Altered Mental State
- RR > 30
- O_2 sat < 90%
- SBP < 100
- HR > 130
- Mottled or ashen appearance
- Non-blanching rash
- Other organ dysfunction

→ Category 2

3
≥ 2 SIRS criteria

- RR ≥ 20
- HR > 90
- T > 38.3°C or < 36°C
- BSL > 7.7 mmol/l (in non-diabetic patient)

PLUS ≥ 1 co-morbidity → Category 2

4
No co-morbidity

These patients may require re-triage and sepsis screening if they deteriorate prior to medical review or if lactate >2.

→ Category 3

Category 2

Category 3

START SEPSIS FORM

Co-morbidities associated with increased mortality with Sepsis
Age ≥ 75 years | Frailty | Diabetes Mellitus | Cancer | COPD | Chronic kidney disease | Chronic liver disease
HIV/ AIDS infection | Immunosuppressed | Major trauma and surgery in the past 6 weeks

Give 3	Take 3
1.**OXYGEN:** Titrate O_2 to saturations of 94 -98% or 88-92% in chronic lung disease.	1. **CULTURES:** Take blood cultures *before giving antimicrobials* (if no significant delay i.e. >45 minutes) and consider source control.
2. **FLUIDS:** Start IV fluid resuscitation if evidence of hypovolaemia. 500ml bolus of isotonic crystalloid over 15mins & give up to 30ml/kg, reassessing for signs of hypovolaemia, euvolaemia, or fluid overload.	2.**BLOODS:** Check point of care lactate, FBC, U&E, LFTS, +/- Coag. Other tests and investigations as per history and examination.
3. **ANTIMICROBIALS:** Give IV antimicrobials according to local antimicrobial guidelines.	3. **URINE OUTPUT:** Assess urine output and consider urinary catheterisation for accurate measurement in patients with severe sepsis/septic shock.

Implementation: clinical decision support

Sepsis Form - Emergency Department Adult

ALWAYS USE CLINICAL JUDGEMENT

There are separate sepsis criteria for maternity patients and children

Complete this form and apply if a patient presents to the Emergency Department with symptoms and/or signs of infection.

Section 1: Sepsis screen for Nursing Staff

Suspicion of infection ☐

AND

Patient presentation ☐**1** ☐**2 or** ☐**3** (see Section 3 and "Think Sepsis" poster).

If both identified, triage as Category 2/Orange and commence Sepsis Form

Date: ______ Triage Time: ______ Triage Category: ______

Signature: ______ NMBI PIN: ______

Addressograph here

Section 2: Sepsis diagnosis for Medical Staff

Document site of suspected infection after medical review

☐ Respiratory Tract ☐ Intra-abdominal ☐ Urinary Tract
☐ Skin ☐ Catheter/Device Related ☐ Intra-articular/Bone
☐ Central Nervous System ☐ Unknown
☐ Other suspected site: ______

☐ **No clinical suspicion of INFECTION**: terminate form and sign at bottom.

Section 3:

Who needs to get the "Sepsis 6" – infection plus any one of the following:

1. ☐ Patients who present unwell who are on treatment that puts them at risk of neutropenia, e.g. on anti-cancer treatment.

2. ☐ Clinically apparent new onset organ failure, e.g. altered mental state, respiratory rate >30, hypoxia, heart rate ≥130, hypotension, oligo or anuria, non-blanching rash, pallor/mottling with prolonged capillary refill.

3. ☐ Patients with co-morbidities plus ≥2 SIRS criteria

Modified SIRS criteria: Note - physiological changes should be sustained ≥30mins.

☐ Respiratory rate ≥ 20 breaths/min ☐ WCC < 4 or > 12 x 10^9/L ☐ New onset confusion
☐ Heart rate > 90 beats/min ☐ Temperature <36 or >38.3°C ☐ Bedside glucose >7.7mmol/L *(in the absence of diabetes mellitus)*

Co-morbidities associated with increased mortality in sepsis.

☐ COPD ☐ DM ☐ Chronic liver disease ☐ Cancer ☐ Chronic kidney disease
☐ Immunosuppressant medications ☐ Age ≥75 years ☐ Frailty ☐ HIV/AIDS

Section 4

☐ **If YES** after medical review to Section 2 **PLUS** 1,2 or 3 in Section 3.

Start SEPSIS 6 (Section 6)

Time Zero: ______

Section 5

☐ **If NO** to infection with a high-risk presentation (1, 2 or 3), tick NO and sign off. If uncomplicated infection, continue usual infection treatment as appropriate and review diagnosis if patient deteriorates.

☐ **Infection**

Antimicrobial given: ______

Has a decision been made to apply a relevant treatment limitation plan.

☐ Do not proceed with Sepsis pathway. Document limitations in clinical notes.

Doctor's Name: ______ **Doctor's Signature:** ______

MCRN: ______ **Date:** ______ **Time:** ______

Sepsis 3 Form ED - 18/08/2017

Continue overleaf

Sepsis-3 Adult ED Sepsis Management Algorithm

Pre-Assessment Screen

'Think Sepsis at Triage' algorithm

Suspicion of infection? → NO: Sepsis screen not required

Yes – screen for high risk of sepsis → 1,2 or 3

1. On Chemotherapy/ radiotherapy - risk of neutropenia — ***Start Sepsis Form***
2. Clinical evidence of **new onset** single organ dysfunction — ***Start Sepsis Form***
3. Co-morbidites PLUS ≥ 2 modified SIRS — ***Start Sepsis Form***

Yes to high risk of sepsis → Category 2

No to high risk of sepsis → Category 3

1hr from Time Zero

- Medical examination supports infection – this is 'Time Zero'
- Start Sepsis Six 1 hour bundle

ACTIONS
Complete Sepsis Six within 1 hour

TAKE 3	GIVE 3
• Blood cultures	• Oxygen
• Blood tests	• IV fluids
• Urine output	• Antimicrobials

Use local antimicrobial guideline

By 3 hours from Time Zero

By 3hr - Patient Review

- *Confirm or out-rule sepsis diagnosis.*
- *Assess response to 'Sepsis 6' bundle.*
- *Repeat Lactate if 1st abnormal*
- *Continue fluid resuscitation as required to restore tissue perfusion*
- *Escalate care if deteriorating or septic shock*

DETERIORATION ACTIONS

- *Seek senior input*
- *Review diagnosis & treatment*
- *Consider source control*

By 6 hours from Time Zero

By 6hr - Patient Review

- *Start pressors if haemodynamic stability not achieved with IV fluids*
- *Critical care consult for patients with acute organ failure*
- *Document septic shock if requiring pressors to achieve MAP ≥ 65mmHg*

DETERIORATION ACTIONS

- *Review diagnosis, treatment and need for source control with senior input and results of tests and investigations*
- *Critical Care consult for acute organ support if required*
- *Consider Microbiology review for complex cases*

Daily Review

Daily Review

Response to treatment

- *Improvement – follow 'Start Smart then Focus' Policy*
- *No change – review diagnosis & treatment and consider source control*
- *Deterioration – consider 'Deterioration Actions' under 6hr Patient Review*

Antimicrobial Management

Review diagnosis with laboratory & radiology results and:

- *Stop – if alternate diagnosis or no evidence of infection*
- *Change antimicrobials - narrow or broaden spectrum as indicated by clinical response and culture result*
- *Continue - review in 24 hrs*

Sepsis-3 Adult In-Patient Sepsis Management Algorithm

Pre-Assessment Screen

NEWS ≥ 4 (or ≥ 5 on oxygen)
Or Exercising clinical judgement

Suspicion of infection?

NO – Sepsis screen not required

Yes – screen for high risk of sepsis → 1,2 or 3

1. On Chemotherapy/radiotherapy - risk of neutropenia
2. Clinical evidence of **new onset** organ dysfunction
3. Co-morbidites PLUS ≥ 2 modified SIRS

Yes - *Start Sepsis Form*

No - Usual management

1hr from Time Zero

- Medical examination supports infection – this is 'Time Zero'
- Start Sepsis Six 1 hour bundle

ACTIONS

Complete Sepsis Six within 1 hour

TAKE 3	GIVE 3
Blood cultures	Oxygen
Blood tests	IV fluids
Urine output	Antimicrobials

Use local antimicrobial guideline

By 3 hours from Time Zero

By 3hr - Patient Review

- *Confirm or out-rule sepsis diagnosis.*
- *Assess response to 'Sepsis 6' bundle.*
- *Repeat Lactate if 1st abnormal*
- *Continue fluid resuscitation as required to restore tissue perfusion*
- *Escalate care if deteriorating or septic shock*

DETERIORATION ACTIONS

- *Seek senior input*
- *Review diagnosis & treatment*
- *Consider source control*

By 6 hours from Time Zero

By 6hr - Patient Review

- *Start pressors if haemodynamic stability not achieved with IV fluids*
- *Critical care consult for patients with acute organ failure*
- *Document septic shock if requiring pressors to achieve MAP ≥ 65mmHg*

DETERIORATION ACTIONS

- *Review diagnosis, treatment and need for source control with senior input and results of tests and investigations*
- *Critical Care consult for acute organ support if required*
- *Consider Microbiology review for complex cases*

Daily Review

Daily Review

Response to treatment

- *Improvement – follow 'Start Smart then Focus' Policy*
- *No change – review diagnosis & treatment and consider source control*
- *Deterioration – consider 'Deterioration Actions' under 6hr Patient Review*

Antimicrobial Management

Review diagnosis with laboratory & radiology results and:

- *Stop – if alternate diagnosis or no evidence of infection*
- *Change antimicrobials - narrow or broaden spectrum as indicated by clinical response and culture result*
- *Continue - review in 24 hrs*

Sepsis-3 Maternity Sepsis Management Algorithm

Pre-Assessment Screen

Infection concern? (Check signs & symptoms & risk factors)

YES – Screen for sepsis risk, i.e. the presence of 1, 2 or 3

1. IMEWS trigger for immediate review > 2 YELLOWS Or ≥ 2 PINKS
2. SIRS response i.e. 2 modified SIRS criteria
3. At risk of neutropenia e.g. anti-cancer treatment

Positive – If sepsis suspected following screening - escelate to medical review. Use ISBAR as outlined & start sepsis maternity form

Negative - Usual management

1hr from Time Zero (2hrs)

Medical examination supports infection diagnosis.

Complete the Sepsis Six 1-hour bundle if infection is clinically suspected and sepsis screen is positive 1, 2 or 3.

TAKE 3	GIVE 3
• Blood cultures	• Oxygen
• Blood tests	• IV fluids
• Urine output	• Antimicrobials

Use local antimicrobial guideline If required

By 3 hours from Time Zero (3hrs)

3hr bundle - Review blood tests and other investigations

- Assess response to 'Sepsis 6' bundle.
- Repeat Lactate if 1st abnormal
- Review blood test and other investigation and confirm or out rule sepsis diagnosis
- Continue fluid resuscitation as required to restore tissue perfusion
- Escelate care if sepsis diagnosed
- Assess fetal well being if pregnant

Deterioration Actions

- Seek urgent senior input including anaesthesia/critical care
- Review diagnosis & treatment
- Consider source control

By 6 hours from Time Zero (6hrs)

6hr bundle – Review woman

- For the haemodynamically unstable or deteriorating women
- Critical care/anaesthesia consult
- Have started pressors for fluid resistant shock
- Document septic shock if pressors required
- Assess fetal wellbeing if pregnant

Deterioration Actions

- Review diagnosis, treatment and need for source control with senior input and results of tests and investigations
- Request microbiology review

Daily Review (24hrs)

Daily Review - Start Smart then focus

- Assess clinical and biochemical response to treatment
- Improvement – Follow 'Start Smart then Focus' policy
- No change – review diagnosis & treatment and consider source control
- Deteriorating – manage as per 6hr deterioration Actions

Antimicrobial Management

Follow local antimicrobial guideline

- Stop – if alternate diagnosis and no evidence of infection
- Rationalise antibiotics according to clinical response and microbiology results
- Switch from IV to oral (when appropriate)
- Daily review of woman

Sepsis Predisposition & Recognition

(ALWAYS USE CLINICAL JUDGEMENT)

There is separate sepsis criteria for non-pregnant adult patients

MATERNITY PATIENTS

Complete this form and apply if there is a clinical suspicion of infection.

I

Section 1:

Midwife Name:
Midwife Signature:
NMBI PIN:
IMEWS:
Date: Time:

Patient label here

Maternal Sepsis is a life-threatening condition defined as organ dysfunction resulting from infection during pregnancy, childbirth, post-abortion or postpartum period (WHO 2016).

S

Section 2: Are you concerned that the woman could have infection

- ☐ History of fevers or rigors
- ☐ Cough/sputum/breathlessness
- ☐ Flu like symptoms
- ☐ Unexplained abdominal pain/distension
- ☐ Pelvic pain
- ☐ Vomiting and/or diarrhoea
- ☐ Line associated infection/redness/swelling/pain
- ☐ Possible intrauterine infection
- ☐ Myalgia/back pain/general malaise/headache
- ☐ New onset of confusion
- ☐ Cellulitis/wound infection/perineal infection
- ☐ Possible breast infection
- ☐ Multiple presentation with non-specific malaise
- ☐ Others

B

Section 3: Obstetric History

Para:
Gestation:
Pregnancy related complaints:

Days post-natal:
Delivery:
- ☐ Spontaneous vaginal delivery (SVD)
- ☐ Vacuum assisted delivery
- ☐ Forceps assisted delivery
- ☐ Cesarean section

Risk factors

Pregnancy Related
- ☐ Cerclage
- ☐ Pre-term/prolonged rupture of membranes
- ☐ Retained products
- ☐ History pelvic infection
- ☐ Group A Strep. infection in close contact
- ☐ Recent amniocentesis

Non Pregnancy Related
- ☐ Age > 35 years
- ☐ Minority ethnic group
- ☐ Vulnerable socio-economic background
- ☐ Obesity
- ☐ Diabetes, including gestational diabetes
- ☐ Recent surgery
- ☐ Symptoms of infection in the past week
- ☐ Immunocompromised e.g. Systemic Lupus
- ☐ Chronic renal failure
- ☐ Chronic liver failure
- ☐ Chronic heart failure

Record observations on the Irish Maternity Early Warning (IMEWS) chart.

Request immediate medical review
if you are concerned the woman has INFECTION plus ANY 1 of the following:

A

Section 4:

1. ☐ IMEWS trigger for immediate review, i.e. **>2 YELLOWS** or **≥2 PINKS**
2. ☐ SIRS Response, i.e. ≥2 modified SIRS criteria listed below.
   Modified SIRS criteria: Note - physiological changes must be sustained ≥30mins
   - ☐ Respiratory rate ≥ 20 breaths/min
   - ☐ Heart rate ≥ 100bpm
   - ☐ Fetal heart rate >160bpm
   - ☐ WCC < 4 or > 16.9 x 10^9/L
   - ☐ Temperature <36° or ≥ 38°C
   - ☐ Acutely altered mental status
   - ☐ Bedside glucose > 7.7mmol/L *(in the absence of diabetes mellitus)*
3. ☐ At risk of neutropenia, e.g. on anti-cancer treatment.

R

Section 5:
If sepsis suspected follow screening and escalate to Medical review. Use ISBAR as outlined.

Doctor's Name: **Time Doctor Contacted:**

Midwife's Signature:

Sepsis Form - Maternity

(ALWAYS USE CLINICAL JUDGEMENT)

There is separate sepsis criteria for non-pregnant adult patients

If infection suspected following History and Examination, Doctor to complete and sign sepsis screening form

Section 6: Clinical Suspicion of Infection

Document site:
- ☐ Genital Tract
- ☐ Respiratory Tract
- ☐ Central Nervous System
- ☐ Other suspected site:
- ☐ Urinary Tract
- ☐ Intra-abdominal
- ☐ Intra-articular/Bone
- ☐ Skin
- ☐ Catheter/Device Related
- ☐ Unknown

☐ **No clinical suspicion of INFECTION**: proceed to section 9. **Doctor's Initials**

Section 7: Who needs to get the "Sepsis 6":

1. ☐ Infection plus: circle either **a** or **b** as appropriate.
   a. SIRS Response, i.e. ≥2 modified SIRS criteria listed on page 1. Note - physiological changes must be sustained ≥30mins.
   b. Clinically or biochemically apparent new onset organ dysfunction due to infection.
2. ☐ Patients who present unwell who are on treatment that puts them at risk of neutropenia, e.g. on anti-cancer treatment.

Doctor's Initials

☐ **YES. Start Maternal Sepsis 6 + 1** Time Zero: **Doctor's Initials**

Section 8 **TAKE 3** **SEPSIS 6 + 1* – complete *within 1 hour*** **GIVE 3**

- ☐ **BLOOD CULTURES:** Take blood cultures before giving antimicrobials (if no significant delay i.e. >45 minutes) and other cultures as per examination.
- ☐ **BLOODS:** Check point of care lactate & full blood count, U&E +/- LFTs +/- Coag. Other tests and investigations as per history and examination. Other test and investigations and source control as indicated by history and examination.
- ☐ **URINE OUTPUT:** Assess urine output and consider urinary catheterisation for hourly measurement in sepsis/septic shock.
- ☐ **OXYGEN:** Titrate O_2 to saturations of 94 -98% or 88-92% in chronic lung disease. N/A ☐
- ☐ **FLUIDS:** Start IV fluid resuscitation if evidence of hypovolaemia. 500ml bolus of isotonic crystalloid over 15mins & give up to 2 litres, reassessing for signs of hypovolaemia, normovolaemia, or fluid overload. Caution in pre-eclampsia. N/A ☐
- ☐ **ANTIMICROBIALS:** Give IV antimicrobials according to the site of infection and following local antimicrobial guidelines.

Type:	Dose:	Time given:
Type:	Dose:	Time given:
Type:	Dose:	Time given:

*** +1 If Pregnant, Assess Fetal Wellbeing** ☐

Laboratory tests should be requested as EMERGENCY aiming to have results available and *reviewed within 1 hour* **Doctor's Initials**

Section 9 Following history and examination, and in the absence of clinical criteria or signs. Sepsis 6 is not commenced. If infection is diagnosed, proceed with usual treatment pathway for that infection.

☐ **NO** Doctor's Name: Date: Time:

Section 10: Look for signs of new organ dysfunction - any one is sufficient:

- ☐ Lactate > 2 mmol/L (following adequate initial fluid resuscitation, typically 30mls/kg in the first hour unless fluid intolerant)
- ☐ Cardiovascular - Systolic BP < 90 or Mean Arterial Pressure (MAP) < 65 or Systolic BP more than 40 below patient's normal
- ☐ Respiratory - New or increased need for oxygen to achieve saturation > 90% (note: this is a definition, not the target)
- ☐ Renal - Creatinine > 170 micromol/L **or** Urine output < 500mls/24 hrs – despite adequate fluid resuscitation
- ☐ Liver - Bilirubin > 32 micromol/L
- ☐ Glucose > 7.7 mmol/L (in the absence of diabetes)
- ☐ Haematological - Platelets < 100 x 10^9/L
- ☐ Central Nervous System - Acutely altered mental status

One or more new organ dysfunction due to infection:
☐ **This is SEPSIS.** Inform Registrar, Consultant and Anaesthetics immediately. Reassess frequently in 1st hour. Consider other investigations and management +/- source control if patient does not respond to initial therapy as evidenced by haemodynamic stabilisation then improvement.

No new organ dysfunction due to infection:
☐ **This is NOT SEPSIS:** If infection is diagnosed proceed with usual treatment pathway for that infection. **Doctor's Initials**

Section 11: Look for signs of septic shock (following adequate initial fluid resuscitation, typically 2 litres in the first hour unless fluid intolerant)

AND

☐ Requiring inotropes/pressors to maintain MAP ≥ 65

☐ **This is SEPTIC SHOCK**

☐ Inform consultant
☐ Contact CRITICAL CARE/Anaesthesia

Doctor's Initials

Pathway Modification

All Pathway modifications need to be agreed by the Hospital's Sepsis Steering Committee and be in line with the National Clinical Guideline No 6 Sepsis Management.

Section 12 **Clinical Handover. Use ISBAR$_3$ Communication Tool**

This section only applies when handover occurs before the form is completed and is then signed off by the receiving doctor.

Doctor's Name (PRINT): Doctor's Signature: **Doctor's Initials** **MCRN**

Patient care handed over to: Time: Sections completed:

File this document in patient notes - Document management plan.

Doctor's Name: **Doctor's Signature:** **MCRN:** **Date:** **Time:**

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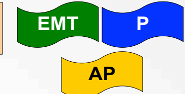
4/5/6.4.24
Version 4, 03/2016

Sepsis – Adult



Patient unwell

Signs of Systemic Inflammatory Response Syndrome (SIRS)
- Temperature < 36 or > 38.3°C
- Heart rate > 90
- Respiratory rate > 20
- Acutely confused
- Glucose > 7.7 (not diabetic)

Has the patient two or more signs (SIRS) — No → (go to transport) / Yes

If temperature > 38.3°C consider
Paracetamol, 1 g PO
or
Paracetamol, 1 g IV

Could this be a severe infection?
For example
- Pneumonia
- Meningitis/ meningococcal disease
- UTI
- Abdominal pain or distension
- Indwelling medical device
- Cellulitis/ septic arthritis/ infected wound
- Chemotherapy < 6 weeks
- Recent organ transplant
- On immune-suppressant medication

No → (go to transport) / Yes

If meningitis suspected ensure appropriate PPE is worn; Mask and goggles

ECG, SpO_2 & BP monitoring

Give three
O_2 titrate to sats > 94%
IV fluids
IV antimicrobials

Oxygen therapy

Risk stratifier
SBP < 90 mmHg or MAP < 65 mmHg
Signs of poor perfusion

Request ALS

NaCl 0.9%, 500 mL, IV/IO

Indication for antibiotic — Yes → Ceftriaxone, 2 g, IV/IO/IM; No

Indication for antibiotic
Septic shock
Severe sepsis
Meningitis suspected
At risk of neutropenia

If history of penicillin allergy assess the severity of the reaction and if not life-threatening, i.e. rash, proceed with Ceftriaxone.

Signs of poor perfusion — Yes → NaCl 0.9%, 500 mL IV/IO Repeat x 3 prn; No

Signs of shock/ poor perfusion
Mottled/ cold peripheries
Central capillary refill > 2 sec
SBP < 90 mmHg
Purpuric rash
Absent radial pulse
Heart rate > 130
RR > 30
Altered mental status
Oligo or anuria

If Sys BP < 100 mmHg consider aliquots
NaCl 0.9%, 250 mL, IV/IO

Pre alert ED if;
- **severe sepsis**
- **septic shock**
- **meningitis suspected**
- **at risk of neutropenia**

If SIRS + infection advise Triage nurse

Antimicrobial stewardship

- Antimicrobials
  - Antibiotic
  - Anti-viral
  - Anti-fungal
- Local guideline
  - Includes no antimicrobial if that is what the guideline says!
- Site
  - Respiratory > Abdominal > Urinary tract > Skin > Others
- Source
  - Community
  - Healthcare associated
  - Hospital acquired
- Patient characteristics
  - Colonisation
  - Exposure
  - Allergies

Balancing measures

- Health protection surveillance centre
  - National antimicrobial usage
    - Decrease in prescriptions – 'undertheweather.ie'
  - Monitor usage of different classes of antibiotics
    - Decrease in carbepenems, increase in cephalosporins/ penicillins
  - Monitor prevalence of MDROs and outbreaks
    - No associations
- Antimicrobial pharmacist
  - Recommend they are a member of hospital sepsis committee
- Compliance audit
  - Audit compliance with Hospital Antimicrobial Guideline
  - Feedback to hospital sepsis committee, group leadership and national team

CDI notifications

hpsc.ie

CDI case count

300
250
200
150
100
50
0

2008 2009 2010 2011 2012 2013 2014 2015 2016

New Recurrent Unknown Underlying trend

Figure 1. Numbers of CDI notifications by month and case type (2008 – 2016).

AMR

hpsc.ie

3500
3000
2500
2000
1500
1000
500
0

Number of isolates

14%
12%
10%
8%
6%
4%
2%
0%

%3GC-R/ESBL+ve

2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

Year

Total E. coli
%3GC-R
%ESBL+ve

Figure 1. Trends for E. coli – total numbers of E. coli and percentage resistance to 3rd generation cephalosporins (3GC)/ESBL-positive

National hospital antimicrobial consumption, 2016

hpsc.ie

Rate (DDD per 100 BDU)

100
80
60
40
20
0

2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

- Tetracyclines, Amphicols and Other Systemic Antimicrobials
- Glycopeptides, Imidazoles and Nitrofurans (J01X)
- Quinolones (J01M)
- Aminoglycosides (J01G)
- Macrolides, Lincosamides and Streptogramins (J01F)
- Sulfonamides and Trimethoprims (J01E)
- Cephalosporins, Monobactams and Carbapemes (J01D)
- Penicillins (J01C)

Figure 3. Annual national hospital antimicrobial consumption rate (DDD per 100 BDU) by pharmacological subgroup (ATC level 3).

National Sepsis Reports

Database

- ICD-10 8th Edition
- Sepsis form designed to facilitate coding
- Sepsis workshops for coders > 95% trained
  - R57.2 Septic Shock
  - R65.1 SIRS of infectious origin with acute organ failure
  - T81.42 Sepsis following a procedure
  - B37.7 Candidal Sepsis
  - A40 Streptococcal Sepsis
  - A41 Other sepsis
  - A02.1 Salmonella sepsis
  - A22.7 Anthrax sepsis
  - A26.7 Erysipelothrix sepsis
  - A32.7 Listerial sepsis
  - A42.7 Actinomycotic sepsis

Epidemiology 2016

- 14000 cases (60% capture)
  - 19.1% age standardised sepsis-associated hospital mortality rate
  - 31.3% hospital mortality rate in the subset admitted to a critical care area
  - 3.5% Paediatric hospital mortality rate
  - 0% Maternal hospital mortality rate
    - Surgical DRG 24.1%
    - Medical DRG 17.4%

Epidemiology

67% increase in recognition

FIGURE 1: The trend in number of sepsis cases 2011 -2016

Number of Inpatients

16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0

2011 2012 2013 2014 2015 2016

Number of cases ↑ with age

FIGURE 15: Number of inpatients with a diagnosis of sepsis (excluding SIRS of infectious origin & septic shock) and without admission to a critical care area, 2016.

Number of Inpatients

3,500
3,000
2,500
2,000
1,500
1,000
500
0

16-24 25-34 35-44 45-54 55-64 65-74 75-84 85+

Mortality ↑ with age

FIGURE 2: In-hospital mortality for inpatients with a diagnosis of sepsis by age groups, 2016

With co-morbidities

FIGURE 3: In-hospital mortality rate for inpatients with a diagnosis of sepsis and selected co-morbidities, 2016.

Seasonal variation

FIGURE 8: In-hospital crude mortality for inpatients with a diagnosis of SIRS of infectious origin, sepsis, severe sepsis & septic shock, monthly data, 2014 -2016.

Crude Mortality Rate
Mean
Upper & Lower Control Limits

Crude Mortality Rate

29% 27% 25% 23% 21% 19% 17% 15% 13%

Jan-14 Feb-14 Mar-14 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

No gender difference

FIGURE 5: Age-standardised in-hospital mortality rates for males and females with a diagnosis of sepsis, 2011-2016.

Age-standardised Mortality Rate per 100 Inpatients

30
25
20
15
10
5
0

2011 2012 2013 2014 2015 2016

Males
Females

Risk stratification

TABLE 5: Incidence of and crude mortality rates for SIRS of infectious origin, sepsis, severe sepsis and septic shock, 2016

	Number of cases	Crude hospital mortality Rate
SIRS of infectious origin	725	8.1%
Sepsis	12,516	16.8%
Severe sepsis	643	30.8%
Septic shock	920	41.4%
Total	14,804	18.5%

3.2% hospital cases
25% hospital deaths

TABLE 7: Inpatients & deaths with a diagnosis of sepsis (including SIRS of infectious origin) or infection, 2016.

Diagnosis	Number of inpatients	% of total inpatients	Number of deaths	% of total deaths	Crude mortality rate
Sepsis	14,804	3.4%	2,735	24.8%	18.5%
Infection	108,314	24.6%	4,514	41.0%	4.2%
All other diagnoses	316,739	72.0%	3,774	34.2%	1.2%
Total	439,857	100%	11,023	100%	2.5%

28.5%↓ aLOS

FIGURE 11: Number of bed days and average length of stay for inpatients with a diagnosis of sepsis, 2011-2016.

Number of Bed Days (left axis: 0 – 350,000); Average Length of Stay in Days (right axis: 0 – 35)

Years: 2011, 2012, 2013, 2014, 2015, 2016

Legend: Number of Bed Days; Average Length of Stay in Days

30% ↓ Mortality

FIGURE 6: Age-standardised in-hospital mortality rate for inpatients with a diagnosis of SIRS of infectious origin and sepsis, 2011-2016.

Age-standardised mortality rate per 100 Inpatients

30
25
20
15
10
5
0

2011 2012 2013 2014 2015 2016

Audit results 2016
n= 1489

	With form	Without form
Diagnosis made and documented	87%	44%
Risk stratification correct	74%	24%
1st dose antimicrobials within 1 hour	74.5%	46.5%

Only 56% of sepsis cases were documented as sepsis in the case notes

Compliance with Sepsis 6 2016

Process audit	National Compliance
Sepsis documented correctly	60%
Antibiotics within the 1st hour	72%
Antibiotic as per guideline	64%
Blood cultures before antibiotic	80%
Lactate taken	75%
Repeat lactate (when indicated)	71%
Fluid bolus	42%

2017 process audit

Process	Compliance
Average age	73.4
% Sepsis documented	52.4 ↓(S>ED>M)
% Sepsis forms used	36.5 (EM>S>M)
Average number of co-morbidities per patient	1.3
% cultures taken before 1st dose	70.6 ↓ (EM>M>S)
% antibiotics within 1 hour	77.4 ↑
% Antimicrobials as per guideline	84.7 ↑
% Lactates taken	88.5 ↑
% 2nd lactates taken when indicated	65 ↑
% Fluid boluses given when indicated	71.6 ↑

NQAIS Sepsis

FIGURE 19: In-hospital Crude Mortality Rate for Inpatients with a Diagnosis of Sepsis and Admission to a Critical Care Area, by hospital, 2016

www.hse.ie/sepsis

http://www.hse.ie/eng/about/Who/cspd/ncps/sepsis/

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Sepsis

Sepsis is a common time-dependent medical emergency. It can affect a person of any age, from any social background and can strike irrespective of underlying good health or concurrent medical conditions.

Internationally, approaches to sepsis management care based on early recognition of sepsis with resuscitation and timely referral to critical care have reported reductions in mortality from severe sepsis/septic shock in the order of 20-30%.

This website supports the implementation of the Sepsis Management: National Clinical Guideline No. 6, which was quality assured by the National Clinical Effectiveness Committee (NCEC) and launched by the Minister for Health in November 2014.

In this section

- Programme Documents & Resources
- Programme News
- The Team / Contact Us
- National Sepsis Summit

Feedback

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Programme Documents & Resources

Related Files

Adult In-Patient Sepsis Screening Form

Format:PDF | **File Size:**944KB

Sepsis Form - Emergency Department Adult

Format:PDF | **File Size:**1.01MB

Sepsis Form - Maternity Patients

Format:PDF | **File Size:**928KB

Feedback

Hello, we're HSELive. How can I help you today?

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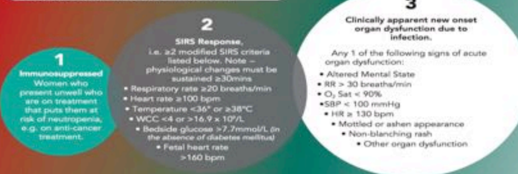
Tools

MATERNAL SEPSIS

Maternal Sepsis is a life-threatening condition defined as organ dysfunction resulting from infection during pregnancy, childbirth, post-abortion or postpartum period *(WHO 2016)*.

So who needs to get the Sepsis 6?
Women with infection +1,2 or 3



Just by doing these six simple things **in the 1st hour** you can double the woman's chance of survival

Sepsis 6 + 1 (If pregnant, assess fetal wellbeing)

Take 3	Give 3
Bloods Cultures (before 1st dose antimicrobial)	Oxygen (if required)
Blood Tests (including POC Lactate)	I.V. Fluid (if deficit)
Urine Output (as part of perfusion status assessment)	I.V. Antimicrobials (local guidelines)

1ST HOUR BUNDLE:
- Sepsis 6 completed (O_2, Fluids, Antimicrobials, Cultures, Tests, UOP)

Assess the woman's response

3-HOUR BUNDLE:
- Diagnosis and treatment reviewed with blood and other test results
- Sepsis/Septic shock diagnosed and documented as appropriate
- Lactate repeated if 1st abnormal
- Assess need for Source Control
- Care escalated to specialist care as required

6-HOUR BUNDLE:
- Diagnosis and treatment reviewed
- Is the woman responding, stablising or deteriorating?
- Pressors commenced in women with fluid resistant shock

For more information visit: www.hse.ie/sepsis

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive
Clinical Strategy and Programme Division

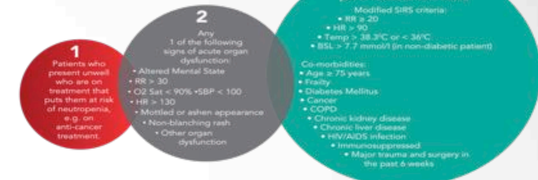
Tús Áite do Shábháilteacht Othar
Patient Safety First

NATIONAL CLINICAL EFFECTIVENESS COMMITTEE

SEPSIS

A life-threatening condition triggered by infection that affects organ function.
It is treated most effectively if recognised early

So who needs to get the Sepsis 6?
Patients with infection +1,2 or 3



Just by doing these six simple things **in the 1st hour** you can double your patient's chance of survival

Sepsis 6

Take 3	Give 3
Bloods Cultures (before 1 dose antimicrobial)	Oxygen (if required)
Blood tests (including POC Lactate)	I.V. Fluid (if deficit)
Urine Output (as part of perfusion status assessment)	I.V. Antimicrobials (local guidelines)

1ST HOUR BUNDLE:
- Sepsis 6 completed (O_2, Fluids, Antimicrobials, Cultures, Tests, UOP)

Assess your patient's response

3-HOUR BUNDLE:
- Diagnosis and treatment reviewed with blood and other test results
- Sepsis/Septic shock diagnosed and documented as appropriate
- Lactate repeated if 1st abnormal
- Assess need for Source Control
- Patient care escalated to specialist care as required

6-HOUR BUNDLE:
- Patient diagnosis and treatment reviewed
- Is your patient responding, stablising or deteriorating?
- Pressors commenced in patients with fluid resistant shock

For more information go to **www.hse.ie/sepsis**

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Patient Safety First

Sepsis is a life-threatening organ dysfunction caused by a dysregulated immune response to infection.

Give the sepsis 6 bundle within 1 hour of assessment to:
Patients with a presenting complaint suspicious of infection AND one of the following

1. Immunosuppressed due to medical/surgical condition or treatment
2. Clinically or biochemically apparent acute organ dysfunction
3. A SIRS response and ≥ 1 co-morbidity
   - Frail
   - Age ≥ 75
   - Cancer
   - Diabetes
   - COPD
   - Chronic kidney disease
   - Chronic liver disease
   - Excess alcohol use
   - HIV/AIDS
   - Recent surgery/trauma

Public information

SEPSIS INFORMATION BOOKLET

SEPSIS *is*

A life-threatening condition triggered by infection

It affects the function of the organs and is most effectively treated if recognised early

If you have infection and feel very unwell, suspect sepsis. Seek urgent medical advise

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INFORMATION BOOKLET FOR MATERNITY PATIENTS

SEPSIS *is*

A life-threatening condition triggered by infection

It is a rare but important diagnosis during and 42 days after pregnancy, because pregnancy affects the body's ability to respond to infection leading to an increased risk of sepsis

Whilst most women do not suffer from infection or sepsis during or after pregnancy, sepsis, if it occurs, is best treated when recognised early

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Sepsis Information Leaflet

Sepsis is a life-threatening condition triggered by infection that affects the function of the organs. It is treated most effectively if recognised early.

Signs & symptoms of infection:

Infections are often suspected when a person develops a temperature and feels unwell.

A high temperature is > 38°C. A low temperature, ≤ 35.5°C, is also of concern but do check your technique.

Watch out for loved ones who have taken paracetamol as while it may lower the temperature it does not treat any underlying infection. Look for the other signs and symptoms of infection listed in the table.

Respiratory tract / lung infection	Cough with or without green sputum and you may or may not be breathless.
Abdominal Infection	Unexplained abdominal (tummy) pain with or without a swollen tummy. You may have worse pain when your tummy is pressed.
Urinary tract infection	Burning sensation on passing urine with intense urge, flank (side) pain may be present.
Genital tract infection	Lower tummy discomfort or pain with or without stinky discharge.
Skin	Pain, swelling, redness and hot to touch. There may be a pus or fluid ooze.
Bones and joints	Pain, swelling, redness and hot to touch. There may be a pus, fluid ooze or stiffness.
Brain & meningitis	Severe headache, neck stiffness, not able to tolerate bright lights. You may or may not have a rash. You may or may not be agitated or confused.
Device related *(applies to materials in the body that are not a normal part of it e.g. medical tubes or metal work)*	Pain, swelling, redness and hot to touch in the area of the device. There may be a pus or fluid ooze. *Examples are a cannula in your vein (for fluids or medicine like antibiotics), or a catheter (tube in your bladder to drain urine) which can cause infection. A cannula in your vein may cause redness, swelling and pain and/or pus at the point of entry to the vein. The catheter may cause a urinary tract infection (see above).*
Blood stream infection or blood poisoning	Severe nonspecific signs.
Exposure	Have any close contacts been very sick recently with similar symptoms? Has your loved one had a recent operation or infection? Are they known to have a multi-drug resistant bacteria (bug)? Have they recently travelled to tropical areas or to an area with an outbreak?

www.hse.ie/sepsis

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Any Questions?