University Hospitals of Morecambe Bay NHS Foundation Trust

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|---|---|
| **Document Type:**<br>**Protocol** | **Unique Identifier:**<br>CORP/PROT/004 |
| **Document Title:**<br><br>**Neutropenic Sepsis in Adult Patients – Management of** | **Version Number:**<br>5 |
| | **Status:**<br>Ratified |
| **Scope:**<br>Medical and Nursing staff, and allied health professionals at UHMBT | **Classification:**<br>Organisational |
| **Author / Title:**<br>Rachel Simpson, Nurse Practitioner Acute Oncology | **Responsibility:**<br>Acute Oncology Team |
| **Replaces:**<br>Version 4, Management of Neutropenic Sepsis in Adult Patients, Corp/Prot/004 | **Head of Department:**<br>Dr Moon, Consultant Oncologist |
| **Validated By:**<br>Medicine Procedural Documents Group<br>Medicine Governance and Assurance Group | **Date:**<br>07/04/2022<br>29/04/2022 |
| **Ratified By:**<br>Procedural Document and Information Leaflet Group | **Date:**<br>11/05/2022 |
| **Review dates may alter if any significant changes are made** | **Review Date:**<br>01/04/2025 |

- Does this document meet the requirements under the Equality Act 2010 in relation to age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex, and sexual orientation? **Yes**
- Does this document meet our additional commitment as a Trust to extend our public sector duty to carers, veterans, people from a low socioeconomic background, and people with diverse gender identities? **Yes**

**Document for Public Display: No**

**Reference Check Completed by Kerry Booth** **Date: 07.04.22 (2022-2023/12)**

**To be completed by Library and Knowledge Services Staff**

## CONTENTS

## 1. SUMMARY

NEUTROPENIC SEPSIS IS AN ACUTE MEDICAL EMERGENCY.
SUSPECTED NEUTROPENIC SEPSIS MUST BE TREATED WITH ANTIBIOTICS WITHIN 1 HOUR OF ARRIVAL IN THE HOSPITAL.

FAILURE TO INITIATE ANTIBIOTICS EARLY MAY RESULT IN OVERWHELMING SEPSIS AND DEATH.

Advice may be obtained from the acute oncology team on bleeps 1257 (FGH) and 3301 (RLI) (M-F 9-5pm) or from the consultant or registrar on call for oncology/haematology (via LTH hospital switchboard – 01772 716565).

A report by the National Confidential Enquiry into Patient Outcome and Death ('Systemic anti- cancer therapy: For better for worse?' (2008)) and a follow-up report by the National Chemotherapy Advisory Group ('Chemotherapy services in England: ensuring quality and safety' (2009)) highlighted problems in the management of neutropenic sepsis in adults receiving chemotherapy. In response to these concerns the National Institute of Health and Clinical Excellence (NICE) issued clinical guidance: Prevention and treatment in people with cancer (2012) [1].

This protocol is based on this guidance and proposed NICE pathways and is consistent with guidance on febrile neutropenia from both the European Society of Medical Oncology and The American Society of Clinical Oncology.

Patients with cancer have an increased risk of infection. The degree of risk is dependent on the extent of the disease, as well as the chemotherapy or radiotherapy given to treat the cancer. Reversible bone marrow suppression is a consequence of many chemotherapy regimens. Neutropenic sepsis is a potentially fatal complication of anticancer treatment (particularly chemotherapy). Mortality rates ranging between 2% and 21% have been reported in adults. Aggressive use of inpatient intravenous antibiotic therapy has reduced morbidity and mortality rates and intensive care management is now needed in fewer than 5% of cases in England.

The risk of infection increases with reducing neutrophil count. Patients with neutrophil count <0.5 are at particularly high risk of developing sepsis. Other patients at increased risk include age >60 years, haematology patients, patients with indwelling central catheters and those with poor general health and/or co-morbidities.

All patients presenting with suspected neutropenic sepsis should be assessed by a healthcare professional with competence in managing complications of anticancer treatment within 24 hours of presentation to secondary care.

Patients having anticancer treatment and their carers are provided with written and oral information, both before starting and throughout their anticancer treatment, on:

- neutropenic sepsis
- how and when to contact 24-hour specialist oncology advice
- how and when to seek emergency care

## 2. PURPOSE

The purpose of this protocol is to ensure patients with suspected neutropenic sepsis are treated appropriately and efficiently in-line with NICE guidelines.

## 3. SCOPE

All medical and nursing staff, and allied health professionals working across the University Hospital of Morecambe Bay NHS Foundation Trust.

## 4. PROTOCOL

### 4.1 Definition of Neutropenic Sepsis

Diagnose neutropenic sepsis in patients having anticancer treatment whose neutrophil count is 0.5 × 109 per litre or lower and who have either:

a temperature higher than 38°C or >37.5°C for > 1 hr
OR
other signs or symptoms consistent with clinically significant sepsis.

NOTE: The absence of a fever does NOT rule out neutropenic sepsis especially if the patient is unwell and has recently received chemotherapy. Neutropenic sepsis could present with non-specific symptoms such as confusion in the elderly or rigors without pyrexia. Patients may have taken medication which could mask the fever, i.e. paracetamol or steroids.

Symptoms and signs of red flag sepsis may include -:

- Responds only to voice or pain/unresponsive
- Acute confusional state
- Systolic B.P <90 mmHg (or drop of >40 from normal)
- Heart rate >130 per minute
- Respiratory rate >25 per minute
- Needs oxygen to keep SpO2 >92%
- Non-blanching rash, mottled/ashen/cyanotic
- Not passed urine in last 18h / UO <0.5ml/kg/hr
- Lactate >2 mmol/l
- Recent chemotherapy

The presentation of sepsis is variable and all of these signs do NOT need to be present to diagnosis sepsis. You might also expect specific signs to be absent in certain patient groups (patients on beta-blockers, for example, may not be tachycardia).

However, neutropenia alone is not an indication for antibiotics in a stable patient with no new symptoms suggestive of sepsis.

## 4.2 Management

### 4.2.1 Suspected Neutropenic Sepsis

Neutropenic sepsis is a medical emergency and can be fatal**.**

**IF NEUTROPENIC SEPSIS IS SUSPECTED ANTIBIOTICS SHOULD BE GIVEN WITHIN 1 HOUR OF ARRIVAL AT THE HOSPITAL.**
**IV ANTIBIOTICS MAY BE GIVEN BEFORE A FULL HISTORY IS TAKEN OR THE FBC IS KNOWN.**

### 4.2.2 History

Determine if the patient is on chemotherapy and find out the date of the last chemotherapy cycle.

IF WITHIN 28 DAYS THEN FOLLOW SEPSIS TREATMENT ALOGRITHM
(see Appendix 1 for inpatients, Appendix 2 for community).

- Check underlying diagnosis, disease status, date/type of recent chemotherapy
- Note symptoms of infection: rigors, cough, sore throat, diarrhoea, dysuria, skin lesions.
- Check for presence of central venous access device.
- List all drugs and allergies

### 4.2.3 Examination

Remember basic ABC + refer to sepsis care pathway dependent upon place of care. Appendix 1 for inpatients, Appendix 2 for community (see Section 6 for links).

- Temperature, BP, heart rate, oxygen saturation, respiratory rate, peripheral perfusion, altered mental state.
- Search for source of infection i.e. chest examination, check central line devices, any wounds or skin lesions, mouth and throat.
- Record any sepsis red or amber flags

### 4.2.4 Action

**Outpatients**

If symptoms of red or amber flag sepsis present, refer patient immediately to hospital for full assessment.

**Inpatients**

Initiate SEPSIS 6, including:

- URGENT FULL BLOOD COUNT (Suspected neutropenic sepsis DO NOT wait for results before IV antibiotics).
- U&E, LFT, CRP, glucose, lactate.
- CULTURES: Blood cultures-peripheral and central line, MRSA screen, MSSU/CSU if symptomatic, sputum if available, stool culture if diarrhoea, wound swabs.
- CXR only if clinically indicated e.g. if hypoxic or clinical signs in chest.
- Arterial blood gases if hypoxic.
- Do not access central lines unless trained to do so. Insert peripheral cannula if not

trained to use central line. Refer to trust policy on use of central lines (see Section 6 for link).

- All patients should be reviewed by a member of the oncology team within 24 hours of presentation (this can be the following day if patient stable) or call oncology registrar at weekend or evenings if urgent review is required (via Preston switchboard).
- The acute oncology teams can be contacted via:

**RLI** - Bleep: 3301
Tel: 01524 583087
E-mail: RLI.AcuteOncology@mbht.nhs.uk

**FGH** – Bleep: 1257
Tel: 01229 491289
E-mail: FGH.AcuteOncology@mbht.nhs.uk

**First line antibiotics should be given within 1 hour of arrival.**
**It is vital that time of admission and time of first dose of antibiotics is accurately recorded.**

**If patient meets septic shock criteria-follow septic shock guidelines as per sepsis policy and consider referral to critical care.**

### 4.2.5 Antibiotic Guidance (Inpatients)

**NB:** Consult BNF for dose reductions in liver and renal impairment and UHMBT antibiotic guidance available on intranet (See section 6 for link).

**If no penicillin allergy: IV Tazocin 4.5g QDS.**
**If penicillin allergic but NOT anaphylaxis: IV Meropenem 1g TDS**
**If penicillin allergic with features of anaphylaxis: IV Ciprofloxacin 400mg bd + IV teicoplanin 400mg BD (for first 3 doses then OD).**

**NB:** if patient has received prophylactic Ciprofloxacin prior to admission substitute : **Ciprofloxacin for Gentamicin (dose will depend on renal function).**

**If known MRSA or if central line is in-situ and known MRSA or signs of exit site or line infection add IV Teicoplanin 400mg BD for first 3 doses then 400mg once daily).**

**If patient has diarrhoea** consider addition of IV Metronidazole 500mg tds or oral Metronidazole 400 mg tds if risk of Clostridium difficile infection (for example previous C Diff infection or recent prolonged antibiotic use) or in presence of perianal infection.

IF A SENIOR MEMBER OF THE TEAM HAS ANY DOUBTS REGARDING ANTIBIOTIC CHOICE, SHOULD DISCUSS WITH MICROBIOLOGY

### 4.2.6 Unresolving Pyrexia (Inpatients)

Consider taking further cultures if pyrexia continues or condition deteriorates.

If fever persists > 48 hours despite IV antibiotics, the patient is not clinically improving or deteriorates they should be reviewed by a senior member of the medical team who may wish to seek advice from the Consultant Microbiologist.

If after 5 days the patient is still febrile consider the addition of antifungal therapy.

SEEK ADVICE FROM MICROBIOLOGY IF THERE IS PERISTENT FEVER OR PROGRESSION OF INFECTION.

### 4.2.7 Ongoing Management (Inpatients)

- Ensure any oral chemotherapy drugs are discontinued.
- Daily FBC until neutrophils > 1.0.
- Monitor temperature, BP, pulse, respiratory rate, oxygen saturations 4 hourly (or more frequently if required). Record early warning score.
- Monitor urine output.
- Patients should be reviewed at least daily and prompt action taken if the clinical picture deteriorates or no improvement. These patients should have a senior medical review.
- Inform the acute oncology team of admission within 24 hours.
- Specific antibiotics should be guided by sensitivities on any positive microbiology cultures.
- Central venous access can be used to administer antibiotics if staff are trained to use the line. If the central line is thought to be the source of infection it may need to be removed especially if signs of septic shock. Please discuss with oncology..
- Consider commencing granulocyte stimulating colony factor (GCSF) only in cases of septic shock, fungal infections or prolonged neutropenia – must be discussed with oncology.
- Antibiotics should be given until the neutrophil count is > 1.0 or until the patient has been afebrile for >24 hours, whichever is longer. Antibiotics may need to be continued for a longer duration if complicated sepsis, high risk patient or positive blood cultures.
- However, the acute oncology team may decide to discharge patient's earlier who are classed as low risk using the validated MASCC risk index score (Appendix 3) – ONLY A MEMBER OF THE ACUTE ONCOLOGY TEAM CAN MAKE THIS ASSESSMENT.

## 4.3 Patient Group Directives (PGD) (Inpatients)

PGD's are in use for some nurses in Oncology day unit to give the first dose of antibiotics for patients with suspected neutropenic sepsis.

Only staff members that have had training and been signed off as competent can use the PGD.

**PGD's are available for tazocin, meropenem and ciprofloxacin for Oncology staff within the acute hospital setting– check the PGD for authorised staff. (PGDs for antibiotics are not use in ED).**

### 4.4 Implementation

The Sepsis Pathway is available on the oncology intranet site and the trusts procedural documents library available on-line.

All band 6 and above nurses working in oncology areas, acute assessment wards and emergency departments are trained in the acute oncology service and treatment of neutropenic sepsis. All consultants on the on-call medical rota and in the emergency department are trained in the acute oncology service and treatment of neutropenic sepsis.

There is a continuous audit programme to document the 1 hour door to needle time for patient with suspected neutropenic sepsis. The sepsis pathway document should be fully completed on Lorenzo (found in forms section) and this will form part of the patients EPR (Electronic Patient Record). Please ensure times are corrected when data is being entered to reflect the time the interventions have been performed/administered NOT the time they are being documented on the electronic pathway. Paper copies (if used) can be scanned into the patients EPR.

| **5. ATTACHMENTS** | |
|---|---|
| **Number** | **Title** |
| 1 | Treatment Algorithm |
| 2 | Community Sepsis Algorithm |
| 3 | MASCC risk index score |
| 4 | Behavioural Standards Framework |
| 5 | Equality & Diversity Impact Assessment Tool |

| **6. OTHER RELEVANT / ASSOCIATED DOCUMENTS**<br>The latest version of the documents listed below can all be found via the Trust Procedural Document Library intranet homepage. | |
|---|---|
| **Unique Identifier** | **Title and web links from the document library** |
| | UHMB Adult Antimicrobial Guide: |
| Corp/Guid/082 | Sepsis Management in Adults |
| Corp/Proc/028 | Vascular Access Devices |
| PGD113 | PGD113 - Ciprofloxacin 400mg for Neutropenic Sepsis |
| PGD114 | PGD114 - Meropenem 1g for Neutropenic Sepsis |
| PGD115 | PGD115 - Tazocin 4,5g for Neutropenic Sepsis (Oncology) |

| **7. SUPPORTING REFERENCES / EVIDENCE BASED DOCUMENTS**<br>**References in full** | |
|---|---|
| **No** | **References** |
| 1 | NICE (2012) 'Neutropenic sepsis: prevention and management in people with cancer,' Available from: https:/ww.nice.org.uk/guidance/cg151 (accessed 07.04.22) |

| **8. DEFINITIONS / GLOSSARY OF TERMS** | |
|---|---|
| **Abbreviation or Term** | **Definition** |
| NICE | National Institute for Clinical Health and Excellence |

| | |
|---|---|
| MASCC | Multinational Association of Supportive Care in Cancer |
| | |

| **9. CONSULTATION WITH STAFF AND PATIENTS** | | |
|---|---|---|
| Enter the names and job titles of staff and stakeholders that have contributed to the document | | |
| **Name/Meeting** | **Job Title** | **Date Consulted** |
| Louise Deighton | Acute Oncology nurse | 19/12/2018 |
| Sarah Cotter | Acute Oncology nurse | 19/12/2018 |
| Dr Fyfe | Medical Oncologist | 19/12/2018 |
| Dr Eaton | Medical Oncologist | 19/12/2018 |
| Dr Thompson | Clinical Oncologist | 19/12/2018 |
| Dr Moon | Medical Oncologist | 19/12/2018 |
| Jenny Bowler | Oncology pharmacist | 19/12/2018 |
| Nicola White | Acute Oncology nurse | 14/05/2019 |
| Charlotte Helm | Sepsis Practice Educator | 14/05/2019 |
| Craig Williams | Consultant Microbiologist | 06/08/2019 |
| Tom Kerry | Oncology Pharmacist | 23/04/2022 |

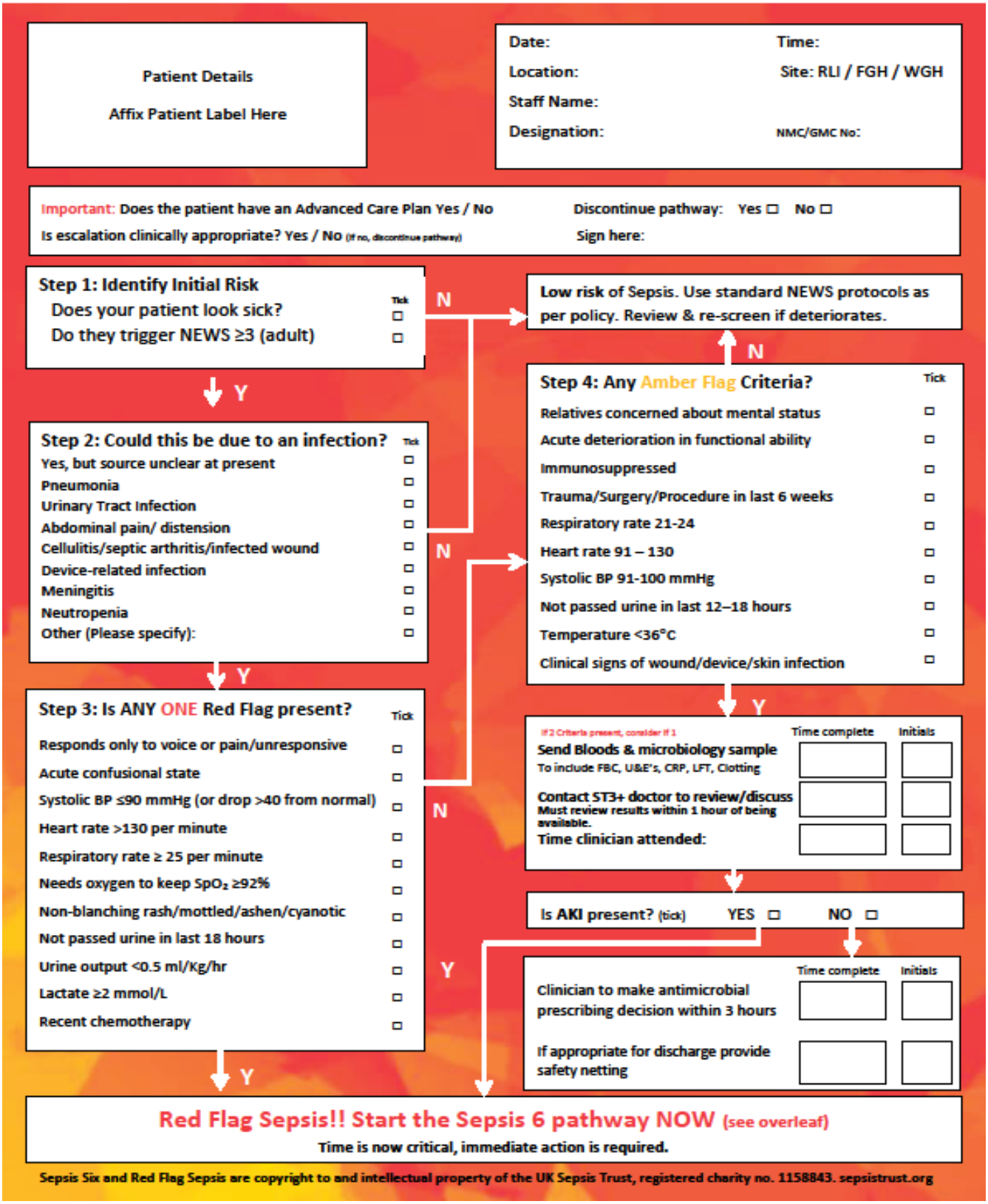
| **10. DISTRIBUTION & COMMUNICATION PLAN** | |
|---|---|
| Dissemination lead: | Rachel Simpson/Nicola White |
| Previous document already being used? | Yes |
| If yes, in what format and where? | |
| Proposed action to retrieve out-of-date copies of the document: | Team meetings, Sepsis Practice Educators, Chemo meeting. |
| **To be disseminated to:** | |
| Document Library | |
| Proposed actions to communicate the document contents to staff: | Include in the UHMB Weekly News – New documents uploaded to the Document Library |

| **11. TRAINING** | | |
|---|---|---|
| Is training required to be given due to the introduction of this procedural document? **Yes** | | |
| **If 'Yes', training is shown below:** | | |
| **Action by** | **Action required** | **To be completed (date)** |
| Rachel Simpson | Emergency care staff to complete e-learning training | Ongoing |
| | | |

| **12. AMENDMENT HISTORY** | | | | |
|---|---|---|---|---|
| **Version No.** | **Date of Issue** | **Page/Selection Changed** | **Description of Change** | **Review Date** |
| 2 | April 2015 | 4.1.4 | IV tazocin changed from TDS to QDS. | April 2016 |
| 3 | May 2016 | Appendix 1 | Change of algorithm | 01/01/2019 |
| 3.1 | Nov 2017 | Page 3 | BSF Page added | 01/01/2019 |
| 3.2 | 10/04/2019 | Page 1 | Review Date extended – form 064/2019 | 01/07/2019 |
| 3.3 | 14/08/2019 | Page 1 | Review Date extended – form 140/2019 | 01/12/2019 |

| | | | | |
|---|---|---|---|---|
| 4 | 06/06/2019 | All pages | Full review | 01/06/2022 |
| 5 | 11/05/2022 | Full document review | Head of department changed to Dr Moon | 01/04/2025 |
| | | | | |

## Appendix 1: Inpatient Treatment Algorithm



# Adult Sepsis Screening and Action Tool

To be applied to all patients over 18 years of age with suspected OR confirmed Red Flag Sepsis. Also to be applied to patients with Amber Flag criteria in the presence of AKI.

University Hospitals of Morecambe Bay NHS

| Document & implement an appropriate treatment plan & decide CPR status | Time Zero | Consultant informed | Sign |
|---|---|---|---|
| Inform consultant (Using SBAR) that patient has Red Flag Sepsis | : | Yes / No | |

## ACTION (Complete ALL within 1 hour)

Reason not done/Variance

**1. Administer Oxygen**
Aim to keep saturations >94%
88-92% if at risk of $CO_2$ retention e.g.COPD
Once stable prescribe $O_2$ therapy appropriately

Time: _____ Sign:

**2. Take blood cultures**
At least one peripheral set. Consider all other appropriate samples.
Consider CXR/imaging as appropriate. Perform urinalysis for all adults.
Think Source Control – call surgeons/radiologist if required

Time: _____ Sign:

**3. Administer IV antibiotics**
According to Trust protocol. (MicroGuide). Check allergies prior to prescribing.
**Prescribe first dose as stat dose** . DO NOT delay antibiotics if unable to obtain Culture samples within 45 minutes.

Time: _____ Sign:

**4. Give an IV Fluid Challenge** (0.9% Sodium Chloride or Compound Sodium Lactate).....
If hypotensive/lactate over 2mmol/L give
**ADULTS:** 500mls Stat
May be repeated if clinically indicated.
Give up to 30ml/KG reassessing regularly

Time: _____ Sign:

**5. Check serial lactates**
Corroborate a high VBG with an arterial sample

If lactate >4mmol/L discuss with critical care and re-check lactate after each 10ml/Kg IV fluid challenge

Not applicable. Initial Lactate mmol/L

Time: _____ Sign:

**6. Measure urine output**
Commence fluid balance chart & complete hourly until stable
Consider urinary catheter
If not appropriate provide receptacles/continence products

Time: _____ Sign:

**If after delivering the Sepsis Six, patient still has:**

- Systolic BP < 90 mmHg
- Reduced level of consciousness despite resuscitation
- Respiratory rate >25 breaths per minute
- Lactate not reducing

Or if patient is clearly critically ill at any time
Then contact on call anaesthetist/ICU

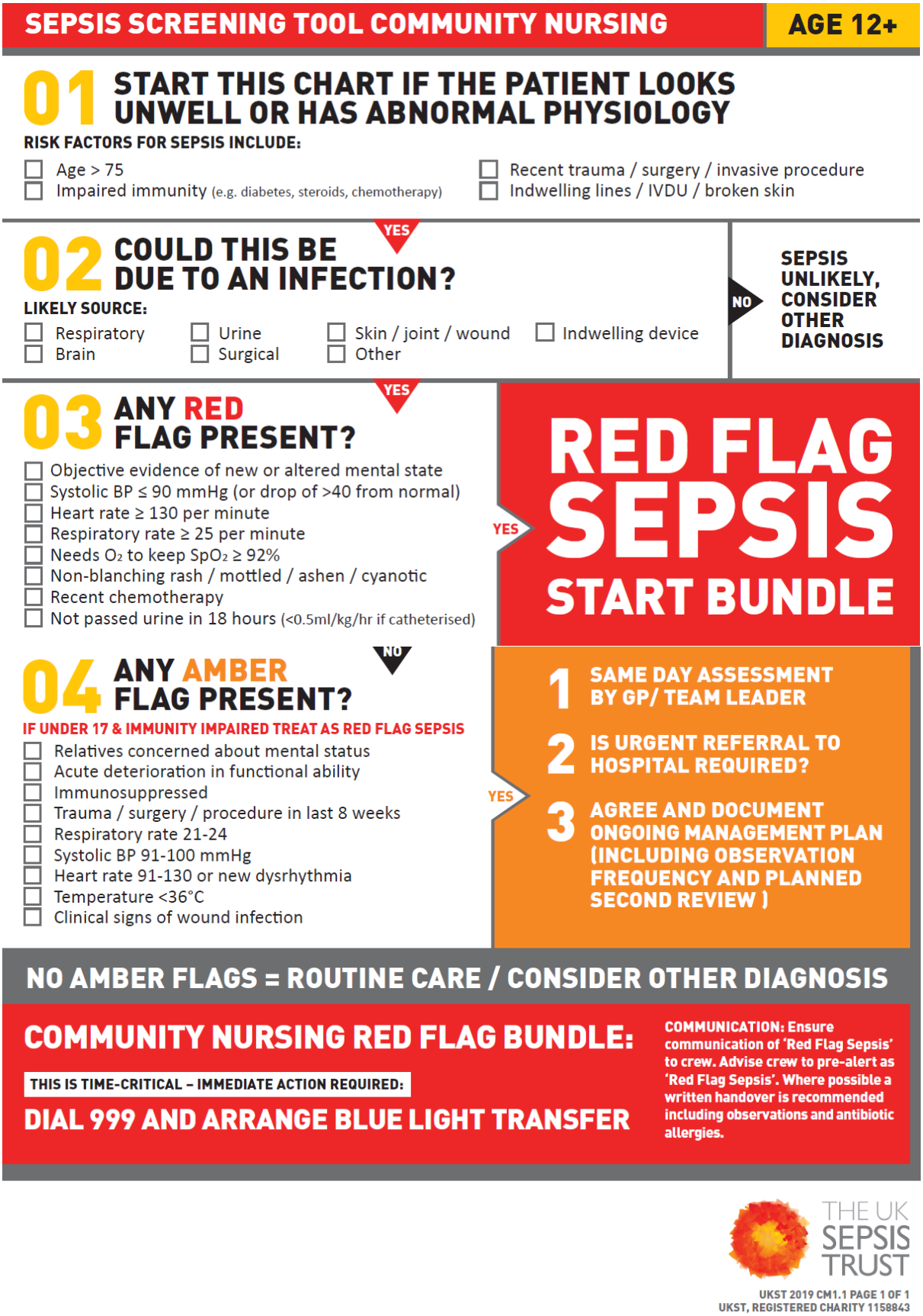
Refer to local formulary for antibiotics prescribing.

All antibiotics should be reviewed within 72 hours.

MBH2099 Rev 30416

Sepsis Six and Red Flag Sepsis are copyright to and intellectual property of the UK Sepsis Trust, registered charity no. 1158843. sepsistrust.org

## Appendix 2: Community Sepsis Algorithm



## Appendix 3: MASCC risk index score

| Category | Weight |
|---|---|
| Burden of illness: no or mild symptoms | 5 |
| No hypotension | 5 |
| No chronic obstructive pulmonary disease | 4 |
| Solid tumour or no previous invasive fungal infection | 4 |
| Outpatient status | 3 |
| Burden of disease: moderate symptoms | 3 |
| No dehydration | 3 |
| Aged <60 years | 2 |

Abbreviation: MASCC=Multinational Association of Supportive Care in Cancer.

The maximum theoretical score is 26. A MASCC score $\geqslant$21 identifies low-risk patients with a positive predictive value of 91%, specificity of 68% and sensitivity of 71% (Klastersky *et al*, 2000).

## Appendix 4: Behavioural Standards Framework

To help create a great place to work and a great place to be cared for, it is essential that our Trust policies, procedures and processes support our values and behaviours. This document, when used effectively, can help promote a workplace culture that values the contribution of everyone, shows support for staff as well as patients, recognises and celebrates the diversity of our staff, shows respect for everyone and ensures all our actions contribute to safe care and a safe working environment - all of which are principles of our Behavioural Standards Framework.

### Behavioural Standards Framework – Expectations 'at a glance'

## Appendix 5: Equality & Diversity Impact Assessment Tool

University Hospitals of Morecambe Bay NHS Foundation Trust

# Equality Impact Assessment Form

| | | |
|---|---|---|
| Department/Function | Oncology | |
| Lead Assessor | Rachel Simpson | |
| What is being assessed? | Neutropenic Sepsis is Adults | |
| Date of assessment | 21/03/2022 | |
| What groups have you consulted with? Include details of involvement in the Equality Impact Assessment process. | Network for Inclusive Healthcare? | NO |
| | Staff Side Colleague? | NO |
| | Service Users? | NO |
| | Staff Inclusion Network(s)? | YES |
| | Personal Fair Diverse Champions? | NO |
| | Other (including external organisations):<br>Acute Oncology Business Meeting, Sepsis Clinical Nurse Specialists | |

1) **What is the impact on the following equality groups?**

| **Positive:** | **Negative:** | **Neutral:** |
|---|---|---|
| ➢ Advance Equality of opportunity<br>➢ Foster good relations between different groups<br>➢ Address explicit needs of Equality target groups | ➢ Unlawful discrimination / harassment / victimisation<br>➢ Failure to address explicit needs of Equality target groups | ➢ It is quite acceptable for the assessment to come out as Neutral Impact.<br>➢ Be sure you can justify this decision with clear reasons and evidence if you are challenged |

| **Equality Groups** | **Impact** (Positive / Negative / Neutral) | **Comments**<br>➢ Provide brief description of the positive / negative impact identified benefits to the equality group.<br>➢ Is any impact identified intended or legal? |
|---|---|---|
| **Race** (All ethnic groups) | Neutral | |
| **Disability** (Including physical and mental impairments) | Neutral | |
| **Sex** | Neutral | |
| **Gender reassignment** | Neutral | |
| **Religion or Belief** | Neutral | |
| **Sexual orientation** | Neutral | |
| **Age** | Positive | Adult patients |
| **Marriage and Civil Partnership** | Neutral | |
| **Pregnancy and maternity** | Positive | Specialist input required for Pregnant and breastfeeding patients. |
| **Other** (e.g. carers, veterans, people from a low socioeconomic background, | Neutral | |

| | | |
|---|---|---|
| people with diverse gender identities, human rights) | | |

| | |
|---|---|
| 2) In what ways does any impact identified contribute to or hinder promoting equality and diversity across the organisation? | |
| | |

3) If your assessment identifies a negative impact on Equality Groups you must develop an action plan **to avoid discrimination and ensure opportunities for promoting equality diversity and inclusion are maximised.**

- This should include where it has been identified that further work will be undertaken to further explore the impact on equality groups
- This should be reviewed annually.

Action Plan Summary

| **Action** | **Lead** | **Timescale** |
|---|---|---|
| | | |
| | | |
| | | |

*This form will be automatically submitted for review for Policies and Procedures once approved by Policy Group. For all other assessments, please return an electronic copy to EIA.forms@mbht.nhs.uk once completed.*