‘Winter 2017’ CCLG Audit of NICE CG151 Neutropenic Sepsis in Children and Young Adults
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Introduction
Febrile neutropenia is the commonest life-threatening complication of treatment for childhood cancer.[1] In 2012, the National Institute for Health and Care Excellence (NICE) published national guidance entitled “Neutropenic sepsis: prevention and management in people with cancer”, which covers both children and adult patients.[2] This guidance aimed to provide an evidence based approach to febrile neutropenia care, and to start to reduce the variations in practice seen within the UK.

Since 2005, the Children’s Cancer and Leukaemia Group (CCLG) have been undertaking audits of febrile neutropenia care in the UK. The original audits in 2005 and 2012, prior to the use of NICE CG151, generally audited centre policies only and found many different ways of defining and managing paediatric febrile neutropenia.[3] Since the introduction of the NICE guidelines, there have been two further CCLG febrile neutropenia audits in 2015 and 2016.[4,5] These have shown some improvements in terms of assessments and ongoing management of episodes of febrile neutropenia but many variations in care still persisted, particularly in regards to defining febrile neutropenia and in empirical antibiotic choices.

This ‘Winter 2017’ Febrile Neutropenia audit used the NICE recommendations as the standard of care and aimed to assess current care provision across the UK. The methods used are similar to that used in previous years to allow for comparison with earlier data, though the timing of the audit has changed in an attempt to capture data over the winter period when units might be expected to have more cases of febrile neutropenia presenting, and when the causative organisms might potentially be different.

Methods
All centres treating febrile neutropenia in children and young adults within the UK were eligible to participate, including both Primary Treatment Centres (PTCs) and Paediatric Oncology Shared Care Units (POSCUs). They were invited through various CCLG groups, including the Paediatric Oncology Trainees Group and the Supportive Care Group. PTCs were also encouraged to disseminate information about the audit to their respective POSCUs.

Within the audit, participating centres were invited to complete two different surveys, each designed to assess performance against NICE CG151 recommendations:

- A centre information survey collecting data on the protocol for the management of febrile neutropenia within the centre, including definitions of fever, neutropenia and standard antibiotic choices. This was to be completed once for each centre.

- An episode information survey collecting data on individual episodes of febrile neutropenia, their management and outcomes. This was to be completed for each episode of febrile neutropenia presenting within the two-week audit period. Episodes which were already being treated prior to the audit period were excluded. All episodes of febrile neutropenia in
children with malignancies were eligible to be included, as were episodes following stem cell transplant. Febrile neutropenia due to benign haematological conditions were excluded.

The audit period was open from 27th November to 10th December 2017. Data were collected using Qualtrics software, with episode data anonymised by the submitting centre. Data were eligible for inclusion in the audit if entered before the 26th January 2018 to allow for analysis prior to presentation at the CCLG Winter Meeting on 29th January 2018. This allowed for submission of outcome data for the febrile neutropenia episodes by the centres. Centres were contacted if there was incomplete data entry or queries about the information provided. Following analysis, all participating centres received personalised reports of their performance compared with other centres. This report will be published on the CCLG website, and the data submitted for publication in a peer reviewed journal.

Results

25 centres participated in the centre information survey, including 11 PTCs and 14 POSCU (see Appendix 1). One unnamed centre was excluded from the data as it could not be identified by the information provided.

25 centres provided episode information during the audit period, including 10 PTCs and 15 POSCU (see Appendix 2). They provided data on a total of 80 episodes of febrile neutropenia. 5 duplicate entries were excluded. An additional 3 episodes were excluded as they were not neutropenic during their admission. 3 were excluded due to incomplete data entries. The number of episodes provided per centre are demonstrated in Figure 1.

![Number of episodes per centre](image)

*Figure 1 - Number of episodes per centre*

Centre information

**Providing written information**

Of the 25 centres participating in the centre information survey, 16 (64%) document providing written information about febrile neutropenia to families of children and young people at risk of febrile neutropenia. All participating PTCs documented providing this information. Of these 16, 5 centres (31%, 3 PTCs and 2 POSCU) stated that they provide this information in different languages (two centres did not answer this question). Interestingly 2 of the 9 centres who said they do not give written information to families, answered that they gave information in different languages.
Use of proformas and risk stratification tools
48% of the participating centres (5 PTCs and 7 POSCUs) use a specific febrile neutropenia proforma for documenting attendances, 24% (1 PTC and 5 POSCUs) use a generic paediatric proforma, 8% (two PTCs) use a generic oncology proforma, and 20% do not use a proforma (3 PTCs and 2 POSCUs).

When considering the use of up front risk stratification ‘tools’, 56% of centres (7 PTCs and 7 POSCUs) do not use a risk stratification ‘tool’, 28% (2 PTCs and 5 POSCUs) use the Modified Alexander Rule, 1 PTC (4% of centres) uses the SPOG rule, and 12% use other rules (2 unspecified, one uses a local children’s early warning score).

Definitions of febrile neutropenia
96% of participating centres used a definition of fever consistent with the NICE CG151 guideline. Definitions of neutropenia were more varied, with 68% using a cut off of <0.5 x10⁹/L, 4% using <0.75 x10⁹/L, 20% using <1 x10⁹/L and 8% using <0.5 x10⁹/L or <1 x10⁹/L and falling. In total, 64% (16/25) of participating centres were using the NICE definition of febrile neutropenia.

Assessment of competency
The NICE CG151 guidance states that patients with febrile neutropenia should be assessed and managed by “a healthcare professional with competence in managing complications of anticancer treatment”. The way in which competence should be assessed is not defined. This audit therefore sought to discover how competence is evaluated in each of the participating centres. In 36% of centres, doctors were presumed competent if they were working at ST4 level or above, in 16% competence was presumed at ST1 level or above, and in 32% professionals were assessed as competent by another measure. 16% of centres did not answer this question.

Future research
New to this year’s audit, the information survey asked centres if they would be willing to participate in future febrile neutropenia research studies. 48% of centres said they would be willing to participate, 32% said they might be willing to participate, and 20% of centres left this question unanswered.

The survey also asked what research questions the centres had about the care of children and young people with febrile neutropenia. Their responses are outlined in Appendix 3 but can be broadly split into 8 key themes: prevention and prophylaxis; diagnostics; risk stratification; initiation of antibiotics; antibiotic choice; treatment of non-bacterial infections; reducing therapy in low risk patients; other or unclear questions.

Episode information
Episode characteristics
Of the 80 episodes included in the survey, 64% had an underlying diagnosis of Acute Lymphoblastic Leukaemia (ALL). The remaining episodes were associated with various other underlying diagnoses, as outlined in Figure 2.

16% of episodes occurred in patients who were inpatients at the time of developing febrile neutropenia. 83% occurred in outpatients, with information not provided for a final episode.
Figure 2 - Underlying diagnoses for each of the febrile neutropenic episodes

Time to antibiotics
For episodes where the febrile neutropenia developed in an outpatient setting, the mean time from attendance at hospital to antibiotics was 55 minutes (range 8-240 minutes).

All episodes of febrile neutropenia developing in inpatients were treated with antibiotics within one hour of fever. One patient received antibiotics 6 hours prior to developing a fever due to clinical concerns about their condition.

Figure 3 - Time to antibiotics by centre. Bars represent percentage of episodes where TTA was ≤60 minutes (left axis). Circles and lines represent mean and range of TTA in minutes (right axis)
Considering all episodes (both inpatient and outpatient), 66% received antibiotics within 60 minutes, 16% received antibiotics after 60 minutes and for 18% the time to antibiotics was not provided. Time to antibiotics by centre is demonstrated in Figure 3.

**Initial antibiotics**

![Initial antibiotics](image)

**Figure 4 - Initial antibiotics given in each episode of febrile neutropenia**

36% of episodes were treated with piperacillin/tazobactam monotherapy, as per the NICE 151 guideline. An additional 45% received piperacillin/tazobactam with an aminoglycoside. The remaining empirical antibiotic choices for the included episodes are outlined in Figure 4.

**Initial assessments**

![Initial assessments](image)

**Figure 5 - Percentage of patients with documented risk stratification within 24 hours of admission, stratified by centre**
The NICE CG151 guidelines recommend that the risk of septic complications is assessed within 24 hours of presentation, using a validated risk stratification tool, and documented in the notes. 72% of the participating centres risk stratified all the episodes they recorded, whilst 12% of centres did not risk stratify any episodes. The remaining centres risk stratified a proportion of their episodes included in the audit, as shown in Figure 5.

21% of episodes were documented as using a validated risk assessment tool, and 50% were documented as not using a validated ‘tool’. This question was not answered in 29% of episodes.

We also collected data about the highest grade of healthcare professional who assessed the child within the first 24 hours of their admission. This was to assess whether centres are meeting the RCPCH Facing the Future Standards 2015, which state:

“Every child who is admitted to a paediatric department with an acute medical problem is seen by a consultant paediatrician* within 14 hours of admission, with more immediate review as required according to illness severity or if a member of staff is concerned.”[6]

In this audit, 53% of episodes were seen by a paediatric oncology consultant and 14% by another paediatric consultant within 24 hours of admission. The remaining 33% of patients were seen by healthcare professionals working at lower than consultant grade, as shown in Figure 6.

![Highest grade professional who assessed within 24 hours of admission](image)

**Figure 6 - highest grade professional who assessed each episode within 24 hours of admission**

**Investigations**

Only 13% of episodes had all six of the recommended initial investigations performed (full blood count, kidney and liver function tests, CRP, lactate and blood cultures). The main reason for not having all initial investigations performed was a failure to obtain a lactate measurement, which was recorded in 15% of episodes. 75% of episodes had a CRP performed. 30% of episodes had a urinalysis performed, which is recommended in all children under the age of 5 years. This audit did not collect the ages of the patients at the time of each episode so it is not possible to comment fully on the performance of this standard. Only 12% of episodes had peripheral blood cultures performed at presentation, although this is recommended in all patients with a central venous access device in
situ. The performance of tests was noted to generally be centre specific, with patients in each centre being likely to receive similar investigation panels to each other.

**Ongoing assessment of the episode**

In 83% of episodes, patients had a daily clinical assessment by a competency assessed professional, and in 13% they had a daily clinical assessment by a non-competency assessed professional. In 3% of episodes the patient was not assessed daily. In one episode this question was not answered.

In 30% of episodes, the patients had daily risk stratification performed by a competency assessed professional, and in 9% of episodes this was done by a non-competency assured professional. 49% of episodes were not risk stratified daily. In 12% of episodes information was not provided for this question.

Only 43% (34/80) of patients had a risk assessment performed after 48 hours of treatment for febrile neutropenia. Of these 32% were deemed high risk and 68% were deemed low risk.

**Ongoing management of the episode**

Of the 23 episodes deemed low risk after 48 hours of treatment, 52% were switched to oral antibiotics or had their antibiotics stopped. 39% continued on IV antibiotics. In one episode, the patient commenced ambulatory IV antibiotics and the management of the final patient was unknown.

In 70% of the 80 included episodes, the fever responded within 48-72 hours of commencing antibiotics. In the remaining 24 episodes, where the fever was unresponsive, 50% of patients continued on their original antibiotics (as recommended by the NICE CG151 guidance). 17% of episodes had their antibiotics changed due to a clinical deterioration and 25% were changed due to microbiological reasons. In 8% of the episodes the antibiotics were changed for other indications. In these situations where the antibiotics were changed, the changes made are demonstrated in Table 1

**Table 1 - Antibiotic amendments made in the setting of unresponsive fever at 48-72 hours**

<table>
<thead>
<tr>
<th>Antibiotic amendments made</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Teicoplanin</td>
<td>6</td>
</tr>
<tr>
<td>Additional aminoglycoside</td>
<td>1</td>
</tr>
<tr>
<td>Change to Meropenem</td>
<td>1</td>
</tr>
<tr>
<td>Change to Meropenem + another agent</td>
<td>4</td>
</tr>
</tbody>
</table>

In 89% of included episodes, antibiotics were continued until the patient became afebrile. In 9% of cases antibiotics were stopped because an alternative cause of fever was identified. In 2% of cases the antibiotics were stopped without a reason being given.

In patients whose febrile neutropenia responds to treatment (i.e. they become afebrile), the NICE CG151 guidance recommends discontinuation of antibiotic therapy irrespective of the neutrophil count. In this audit, in 73% of episodes the antibiotics were discontinued, 10% had their antibiotics continued as an organism was identified requiring a particular course of treatment, 14% had their antibiotics continued for another reason, and for one patient the duration of treatment was unknown (as they were transferred to another Trust before their febrile neutropenia had responded).
Outcomes
Of the 66 patients known to be outpatients at presentation, 5% remained inpatients after their FN episode for other reasons and 5% had an unknown length of stay. The length of stay of the remainder is shown in Figure 7.

Figure 7 - duration of stay for children admitted from the outpatient setting for febrile neutropenia

There were no deaths or PICU admissions reported during the audit period. After 70% of episodes, the patients were discharged and did not return within a week, in 14% of episodes the patients were discharged and returned within a week, 14% remained in hospital for another reason and in two episodes the outcome was unknown.

Discussion
The findings of this audit are summarised and compared with the NICE CG151 standards and the CCLG audit results of 2015 and 2016, in Appendix 4.

One clear area of progress this year can be found in the fact that more centres are using the NICE definition of febrile neutropenia, implying that professionals are more likely to be speaking about the same clinical condition when discussing the management of this complication of treatment. The importance of this within both clinical and research fields cannot be underestimated.

Another area worthy of celebration relates to that of the timing of antibiotic administration following the presentation of an episode of febrile neutropenia. This is considerably improved from previous years.

The increasing use of risk stratification within patients’ assessment and management also helps in informing the care of children and young people, although there is still some work to do in encouraging the use of validated risk stratification ‘tools’ and in increasing the awareness of professionals of the validated nature of the ‘tools’ that they are currently using.

The more challenging aspects of the audit results surround four key areas. The first is in the investigation of episodes of febrile neutropenia, where compliance with the current guidelines is low. This may reflect a need to reconsider the guidance provided, and its applicability to all patient groups – as clinicians may feel that lactate measurement in a child who has low risk febrile
neutropenia is unnecessary. Further research and assessment as to the utility of all investigations in all patients may be appropriate.

The second challenge within this year’s audit relates to the seniority of the professional assessing children with an acute medical problem on admission to the hospital. Although the NICE guideline does not state who is the most appropriate person to perform this assessment, the RCPCH are clear that there should be a consultant level review within 14 hours in all acute medical conditions. Discussions within the paediatric haematology and oncology community about the appropriateness of this recommendation in the setting of febrile neutropenia should be considered.

The third challenge relates to the choice of empirical antibiotics, which in many cases go against that recommended by the NICE CG151 guidance, and the systematic review which it is based upon. Although changes to empirical antibiotic therapy may be justified by patient and local microbiological factors, it seems unlikely that these are appropriate in almost two-thirds of the UK population.

The final challenge relates to the definition of competence to assess and manage febrile neutropenia in the paediatric haematology and oncology workforce. It is clear that there is variation in how this is determined, and national strategies may need to be considered to ensure that high quality care is provided at all centres. It may be that the CCLG, or other national organisations, wish to develop standardised training and assessment for those involved in caring for children and young people.

The key strengths of this audit lie in its use as a regular measure against which to assess national practice. The findings have already been presented at the CCLG Winter meeting; this early sharing and rapid feedback increase the impact of the work. Centres also receive individualised feedback in the hope of allowing reflection on performance compared to national norms. Finally, we plan to work to produce a “your febrile neutropenia research questions answered” information sheet to increase knowledge about the existing evidence surrounding febrile neutropenia care as well as the current research gaps.

The main limitation of the audit is in the fact that only half of all PTCs and a small number of POSCUs provided data, including fewer episodes than might be anticipated given the time of year. Future audit cycles will consider using more diverse methods to increase uptake, perhaps including the use of key centre contacts and engaging with the patient population through social medial. Further work should also consider ensuring that all included episodes clearly meet the NICE definition of febrile neutropenia, which was not a feature of this year’s survey.

Conclusions
In conclusion, the ‘Winter 2017’ CCLG Audit of NICE CG151 found that there have been substantial improvements in some areas of care, including the definition of febrile neutropenia, the early administration of empirical antibiotics and the use of risk stratification in assessments. Further work is still to be done on investigating episodes of febrile neutropenia, consultant level assessments at presentation, the choice of empirical antibiotics and the assessment of competencies in febrile neutropenia management. Further audit cycles will be performed as deemed necessary by the CCLG Supportive Care Group.
References


Appendices

Appendix 1 - Contributing centres for centre data

Aberdeen (PTC)
Addenbrookes Hospital (PTC)
Alder Hey Children's Hospital (PTC)
Ashford and St Peters Hospital
Belfast (PTC)
Colchester
Croydon University Hospital
East Lancashire Hospitals NHS Trust
Edinburgh (PTC)
Great Ormond Street Hospital for Children NHS Foundation Trust (PTC)
Ipswich
Kingston
Leeds (PTC)
Lister Stevenage
Maidstone and Tunbridge Wells
Medway NHS foundation trust
Milton Keynes
Norwich
Nottingham University Hospitals (PTC)
Royal Devon and Exeter
Royal Hospital for Children (Glasgow) (PTC)
Royal Manchester Children's Hospital (PTC)
Royal Marsden (PTC)
Surrey & Sussex NHS Trust
Wexham Park Hospital
Appendix 2 - Contributing centres for episode data

Aberdeen (PTC)
Addenbrookes (PTC)
Alder Hey (PTC)
Ashford and St Peter’s
Belfast Sick Children’s (PTC)
Blackpool
Colchester
Croydon University Hospital
East Lancashire Hospitals NHS Trust
Edinburgh (PTC)
Great Ormond Street Hospital for Children NHS Foundation Trust (PTC)
Kingston
Leeds (PTC)
Lister Stevenage
Maidstone and Tunbridge Wells
Medway
Milton Keynes
Norwich
Nottingham (PTC)
Royal Devon and Exeter
Royal Manchester Children’s Hospital (PTC)
Royal Marsden (PTC)
St George’s NHS Trust
Surrey and Sussex NHS Trust
William Harvey
Appendix 3 - Research questions proposed during survey, grouped by key themes

Prevention and prophylaxis

- What else can we do to prevent admission?
- I would be interested in the variation or not in regard to advice given to families of neutropenic children regarding school, nursery, activities. Are we all saying totally different things? What is the evidence base for what we say?
- Use of prophylactic antibiotics in high risk patients
- Role of primary prophylaxis in children/TYA – in who and with what?
- Are there any tools/measures to prevent neutropenic sepsis in children?

Diagnostics

- How to test for fungus (use of biomarker screens and imaging and role of PCR)?
- Are there any emerging markers useful in identifying children that are in early sepsis?
- Use of early near-patient diagnostics?
- How to diagnoses fungal infections?

Risk stratification

- Most accurate risk stratification tool in UK and when should it be done (at presentation, 8-12 hours, after 24 hours) before 'step-down'?
- Use of up-front risk stratification
- How safe, common and uniform is the use of up front stratification in the UK - we don't use it and I would like to.
- Is it possible to stratify low vs high risk at initial presentation?
- Are there any useful risk stratification tools to identify children at most risk of either developing neutropenic sepsis or becoming unwell from it?
- Can we stratify clinically for low risk group?
- Any associated risk factor?

Initiation of antibiotics

- Are we delivering antibiotics within 60 minutes of recognition?
- In a clinically well child can antibiotics be slightly delayed (1-2 hours) until urgently requested full blood count result is available?
- In special circumstances where children have shown a repetitive pattern of one fever spike following chemotherapy administration, can these children be observed without giving any intravenous antibiotic?
- Does giving upfront IV monotherapy on suspicion of FN (i.e. without FBC result) hinder confidence in risk stratification (by masking symptoms at point of risk stratification)?
- Does giving upfront IV monotherapy on suspicion of FN (i.e. without FBC result) increase drug resistance (i.e. is it better to wait for FBC to ensure only neutropenic patients are given IV abx)?

Antibiotic choice

- Are previous culture sensitivities taken into account when starting antibiotics for FN?
- Can a single intravenous antibiotic be used as first line as recommended by NICE?
- Rationalisation of antibiotics. Is it possible in practice?

Treatment of non-bacterial infections

- Type of antifungal to be used and duration?
- Use of anti-fungal agents
- Treatment of viral infections
- Impact of viruses on length of stay/and antibiotic rationalisation

Reducing therapy in low risk patients

- If patients are deemed low risk could we administer Orals rather than Intravenous antibiotics?
- Can oral abx in outpatient setting be delivered safely for low risk FN?
- Can we reduce the number of people admitted - OP rx?
- Can we safely shorten duration of therapy?
- Safety of oral outpatient treatment for low risk individuals
- Can we use oral antibiotics for low risk group?
- Can we treat low risk group as outpatients?
- Is outpatient based management of low risk FN a safe option – at what stage and with what service provision?
- Other parameters to help reduce 'unnecessary' admission even when febrile and neutropenic

Other or unclear questions:

- Could we look at all febrile admissions on treatment not just Neutropenia as majority of admissions are Non Neutropenic?
- How are we assessing antibiotic treatment length?
- Duration of temperature prior to admission?
- Can we prevent death from FN with abx in high risk groups?
- Stepping down antibiotic therapy?
### Appendix 4 - Compliance with NICE CG151 recommendations by year of audit

<table>
<thead>
<tr>
<th>NICE CG151 recommendation</th>
<th>Guideline reference</th>
<th>Target (%) and Exceptions (A, B,C)</th>
<th>2015 compliance, %</th>
<th>2016 compliance, %</th>
<th>2017 compliance, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide patients having anticancer treatment and their carers with written and oral information, both before starting and throughout their anticancer treatment, on neutropenic sepsis</td>
<td>1.1.1.1</td>
<td>100%, None</td>
<td>Unknown</td>
<td>71%</td>
<td>64%</td>
</tr>
<tr>
<td>Treat suspected neutropenic sepsis as an acute medical emergency and offer empiric antibiotic therapy immediately.</td>
<td>1.4.1.1</td>
<td>100%, None</td>
<td>(used &lt;60 minutes) 62%</td>
<td>(used &lt;60 minutes) 52%</td>
<td>(used &lt;60 minutes) 80%</td>
</tr>
<tr>
<td>Include in the initial clinical assessment of patients with suspected neutropenic sepsis: • history and examination • full blood count, kidney and liver function tests (including albumin), C-reactive protein, lactate and blood culture.</td>
<td>1.4.1.2</td>
<td>100%, None</td>
<td>Unknown</td>
<td>100% (history and examination) 16% (with all investigations)</td>
<td>Data not collected for history/exam. 12.5% (with all investigations)</td>
</tr>
<tr>
<td>After completing the initial clinical assessment (see recommendation 1.4.1.2) try to identify the underlying cause of the sepsis by carrying out: • additional peripheral blood culture in patients with a central venous access device if clinically feasible • urinalysis in all children aged under 5 years.</td>
<td>1.4.2.1</td>
<td>A – peripheral blood culture is not clinically feasible B – patient doesn’t have a central venous access device C – patient is aged 5 years or over</td>
<td>19% peripheral blood cultures</td>
<td>6% peripheral blood cultures 36% urinalysis (in all episodes; ages unknown)</td>
<td>12.5% peripheral BCs 30% urinalysis (in all episodes; ages unknown)</td>
</tr>
<tr>
<td>Offer beta lactam monotherapy with piperacillin with tazobactam as initial empiric antibiotic therapy to patients with suspected neutropenic sepsis who need intravenous treatment unless there are patient-specific or local microbiological contraindications.</td>
<td>1.4.3.1</td>
<td>A – patient specific contraindication B – local microbiological indications</td>
<td>37%</td>
<td>A = 1 episode sites allergy 55% compliance</td>
<td>36% compliance</td>
</tr>
<tr>
<td>Do not offer an aminoglycoside, either as monotherapy or in dual therapy, for the initial empiric treatment of suspected</td>
<td>1.4.3.2</td>
<td>A – patient specific contraindication</td>
<td>Piperacillin/tazo bactam and</td>
<td>Piperacillin/taz obactam and</td>
<td>Piperacillin/taz obactam and</td>
</tr>
</tbody>
</table>
Diagnose neutropenic sepsis in patients having anticancer treatment whose neutrophil count is \(0.5 \times 10^9\) per litre or lower and who have either:
- a temperature higher than \(38.5^\circ C\) or
- other signs or symptoms consistent with clinically significant sepsis.

A healthcare professional with competence in managing complications of anticancer treatment should assess the patient’s risk of septic complications within 24 hours of presentation to secondary or tertiary care, basing the risk assessment on presentation features and using a validated risk scoring system.

For patients with confirmed neutropenic sepsis and a high risk of developing septic complications, a healthcare professional with competence in managing complications of anticancer treatment should daily:
- review the patient’s clinical status
- reassess the patient’s risk of septic complications, using a validated risk scoring system.

Do not switch initial empiric antibiotics in patients with unresponsive fever unless there is clinical deterioration or a microbiological indication.
Switch from intravenous to oral antibiotic therapy after 48 hours of treatment in patients whose risk of developing septic complications has been reassessed as low by a healthcare professional with competence in managing complications of anticancer treatment using a validated risk scoring system

| 1.5.3.3 | 100%, None | 64% | 43% (went to oral antibiotics or stopped antibiotics) | 52% (went to oral antibiotics or stopped antibiotics) |

Continue inpatient empiric antibiotic therapy in all patients who have unresponsive fever unless and alternative cause of fever is likely

| 1.5.4.1 | A – alternative cause of fever | Unknown | 99% | 98% |

Discontinue empiric antibiotics therapy in patients whose neutropenic sepsis has responded to treatment, irrespective of neutrophil count

| 1.5.4.2 | 100%, None | 75% | 89% | 85% |