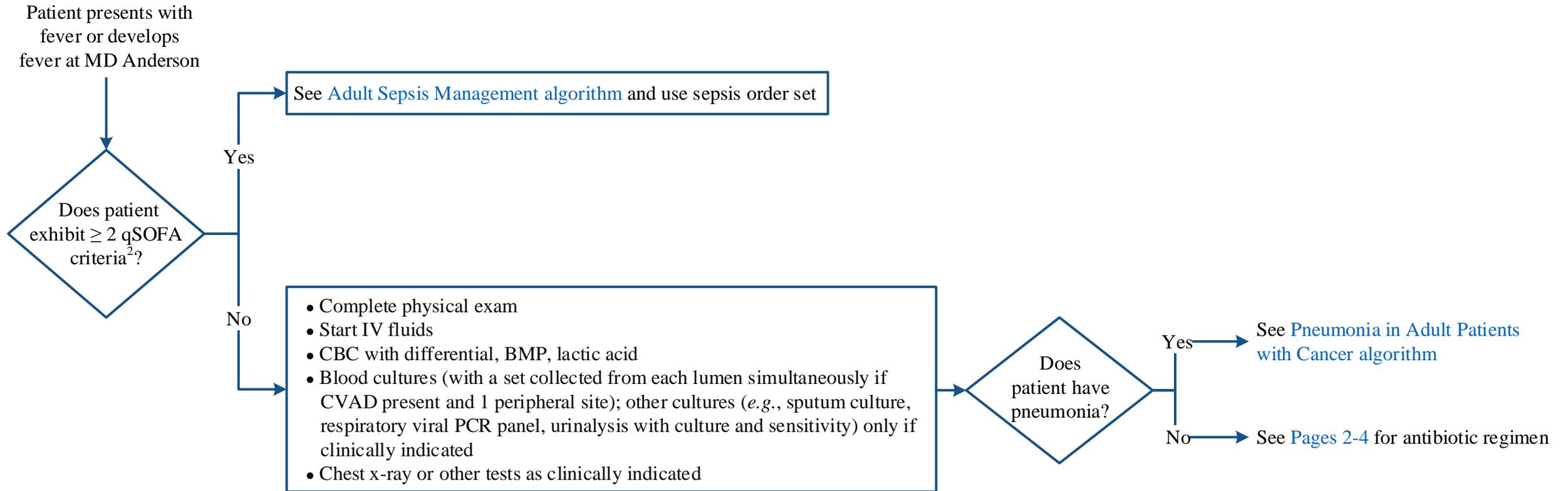


# Neutropenic Fever<sup>1</sup> Inpatient Adult Treatment (Hematologic Cancers including Lymphoma/Myeloma)

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. Local microbiology and susceptibility/resistance patterns should be taken into consideration when selecting antibiotics. This algorithm should not be used to treat pregnant women.

**Note:** This algorithm should not be used for patients receiving chimeric antigen receptor (CAR) cell therapy.



CVAD = central venous access device

<sup>1</sup> ANC < 1 K/microliter and temperature either ≥ 38.3°C or equal to 38°C for 1 hour or longer

<sup>2</sup> qSOFA criteria:

- Altered mental status
- Respiratory rate ≥ 22 bpm
- Systolic blood pressure ≤ 100 mmHg

# Neutropenic Fever Inpatient Adult Treatment (Hematologic Cancers including Lymphoma/Myeloma)

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**Consider the following when selecting antibiotics:**

- Recent culture and sensitivity results
- History of multi-drug resistant organism (MDRO)<sup>1</sup> infection or colonization
- Suspected line infection<sup>2</sup>
- Antibiotic history and prophylaxis
- Source of infection if identified
- Antibiotic allergies (see [Page 4](#) for beta-lactam allergy)
- Organ dysfunction
- Mucositis
- Routine use of therapeutic G-CSF is not recommended<sup>3</sup>

<sup>1</sup> MDROs include:

- Enterococcus resistant to vancomycin
- Staphylococcus aureus resistant to methicillin (oxacillin)
- *S. pneumoniae* resistant to penicillin and streptococci resistant to ceftriaxone
- Stenotrophomonas maltophilia
- Any extended spectrum beta-lactamase (ESBL)-producing gram negative bacilli
- Any carbapenem resistant gram negative bacilli
- All other gram negative bacilli that are resistant to usual recommended first-line agents

<sup>2</sup> Chills, rigors with infusion through catheter, cellulitis or discharge around the line entry site

<sup>3</sup> Continue G-CSF if patient was receiving as daily prophylaxis. Consider therapeutic use if risk factor(s) present: sepsis, age > 65 years old, pneumonia or other documented infection, invasive fungal infection, ANC < 100 K/microliter, expected neutropenia duration > 10 days, uncontrolled primary disease, hospitalization at the time of fever or prior episode of NF.

<sup>4</sup> Consider adding metronidazole 500 mg IV every 8 hours to cefepime for possible intra-abdominal infection or if anaerobic coverage is necessary

<sup>5</sup> Consider meropenem if patient has any of the following:

- Non-IgE-mediated allergy to alternative agents
- Recent treatment (≥ 3 days duration) with cefepime or piperacillin/tazobactam within past 30 days
- Infection with ESBL organism
- Infection with organism only susceptible to carbapenem

<sup>6</sup> Double gram negative coverage should be considered with complicated tissue-based infections, neutropenic enterocolitis, and perirectal infections

<sup>7</sup> Not preferred for blood stream infections

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**FINDINGS**

**ANTIMICROBIAL THERAPY RECOMMENDATIONS**

(Adjust dose for patients with renal/hepatic dysfunction)

**Gram negative coverage antibiotics should be given first**

**Antibiotics should be given within 2 hours**

Neutropenic fever

**Choose one:**

- Cefepime<sup>4</sup> 2 grams IV every 8 hours **or**
- Piperacillin and tazobactam 4.5 grams IV every 6 hours **or**
- Meropenem<sup>5</sup> 1 gram IV every 8 hours

**If indicated for double gram negative coverage<sup>6</sup>, add either:**

- Amikacin 15 mg/kg IV once and then repeat per pharmacokinetic data **or**
- Ciprofloxacin 400 mg IV every 8 hours only if no quinolone prophylaxis

**Documented beta-lactam allergy (i.e., hives or anaphylaxis): see [Page 4](#)**

Suspected line infection<sup>2</sup> and/or bacteremia

**Choose one:**

- Cefepime<sup>4</sup> 2 grams IV every 8 hours **or**
- Piperacillin and tazobactam 4.5 grams IV every 6 hours **or**
- Meropenem<sup>5</sup> 1 gram IV every 8 hours

**Plus:**

- Vancomycin 15 mg/kg (round to nearest 250 mg dose) IV every 12 hours **or**
- Daptomycin 6 mg/kg IV every 24 hours (if no evidence of pneumonia)

**If indicated for double gram negative coverage<sup>6</sup>, add either:**

- Amikacin 15 mg/kg IV once and then repeat per pharmacokinetic data **or**
- Ciprofloxacin 400 mg IV every 8 hours only if no quinolone prophylaxis

**Documented beta-lactam allergy (i.e., hives or anaphylaxis): see [Page 4](#)**

MRSA colonization/skin and soft tissue infection/mucositis greater than or equal to grade 2

**Choose one:**

- Piperacillin and tazobactam 4.5 grams IV every 6 hours **or**
- Cefepime<sup>4</sup> 2 grams IV every 8 hours **or**
- Meropenem<sup>5</sup> 1 gram IV every 8 hours

**Plus:**

- Vancomycin 15 mg/kg (round to nearest 250 mg dose) IV every 12 hours **or**
- Daptomycin 6 mg/kg IV every 24 hours (if no evidence of pneumonia) **or**
- Linezolid<sup>7</sup> 600 mg IV every 12 hours

**If indicated for double gram negative coverage<sup>6</sup>, add either:**

- Amikacin 15 mg/kg IV once and then repeat per pharmacokinetic data **or**
- Ciprofloxacin 400 mg IV every 8 hours only if no quinolone prophylaxis

**Documented beta-lactam allergy (i.e., hives or anaphylaxis): see [Page 4](#)**

- See [Pages 3 and 4](#) for additional findings and antibiotic options
- See [Page 5](#) for re-assessment

# Neutropenic Fever Inpatient Adult Treatment (Hematologic Cancers including Lymphoma/Myeloma)

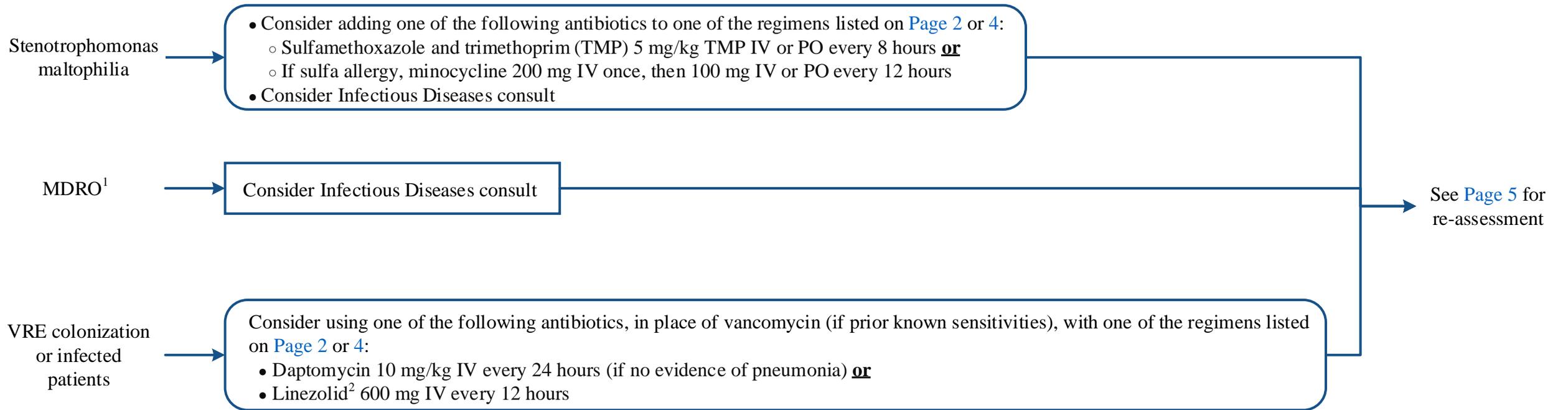
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## FINDINGS

## ANTIMICROBIAL THERAPY RECOMMENDATIONS

(Adjust dose for patients with renal/hepatic dysfunction)

Gram negative coverage antibiotics should be given first



<sup>1</sup>MDROs include:

- Enterococcus resistant to vancomycin
- Staphylococcus aureus resistant to methicillin (oxacillin)
- *S. pneumoniae* resistant to penicillin and streptococci resistant to ceftriaxone
- Stenotrophomonas maltophilia
- Any extended spectrum beta-lactamase (ESBL)-producing gram negative bacilli
- Any carbapenem resistant gram negative bacilli
- All other gram negative bacilli that are resistant to usual recommended first-line agents

<sup>2</sup>Not preferred for blood stream infections

# Neutropenic Fever Inpatient Adult Treatment (Hematologic Cancers including Lymphoma/Myeloma)

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## FINDINGS

## ANTIMICROBIAL THERAPY RECOMMENDATIONS

(Adjust dose for patients with renal/hepatic dysfunction)

Gram negative coverage antibiotics should be given first

Serious documented  
 beta-lactam allergy  
 (i.e., hives or  
 anaphylaxis)

Neutropenic fever

Suspected line  
 infection<sup>3</sup> and/or  
 bacteremia

MRSA  
 colonization/  
 skin and soft tissue  
 infection

Mucositis greater  
 than or equal to  
 grade 2

**Choose:**

- Aztreonam<sup>1</sup> 2 grams IV every 6 hours

**Plus:**

- Amikacin 15 mg/kg IV once and then repeat per pharmacokinetic data **or**
- Ciprofloxacin 400 mg IV every 8 hours only if no quinolone prophylaxis

**Plus:**

- Vancomycin 15 mg/kg (round to nearest 250 mg dose) IV every 12 hours **or**
- Linezolid<sup>2</sup> 600 mg IV every 12 hours

**Choose:**

- Aztreonam<sup>1</sup> 2 grams IV every 6 hours

**Plus:**

- Amikacin 15 mg/kg IV once and then repeat per pharmacokinetic data **or**
- Ciprofloxacin 400 mg IV every 8 hours only if no quinolone prophylaxis

**Plus:**

- Vancomycin 15 mg/kg (round to nearest 250 mg dose) IV every 12 hours **or**
- Daptomycin 6 mg/kg IV every 24 hours (if no evidence of pneumonia)

**Choose:**

- Aztreonam<sup>1</sup> 2 grams IV every 6 hours

**Plus:**

- Amikacin 15 mg/kg IV once and then repeat per pharmacokinetic data **or**
- Ciprofloxacin 400 mg IV every 8 hours only if no quinolone prophylaxis

**Plus:**

- Vancomycin 15 mg/kg (round to nearest 250 mg dose) IV every 12 hours **or**
- Linezolid<sup>2</sup> 600 mg IV every 12 hours **or**
- Daptomycin 6 mg/kg IV every 24 hours (if no evidence of pneumonia)

**Choose:**

- Aztreonam<sup>1</sup> 2 grams IV every 6 hours **and**
- Metronidazole 500 mg IV every 8 hours **and**

- Amikacin 15 mg/kg IV once and then repeat per pharmacokinetic data **or**
- ciprofloxacin 400 mg IV every 8 hours only if no quinolone prophylaxis

**Plus:**

- Vancomycin 15 mg/kg (round to nearest 250 mg dose) IV every 12 hours **or**
- Linezolid<sup>2</sup> 600 mg IV every 12 hours

See Page 5 for  
 re-assessment

<sup>1</sup> Double gram negative coverage recommended due to reduced gram negative pathogen susceptibility to aztreonam according to local antibiograms

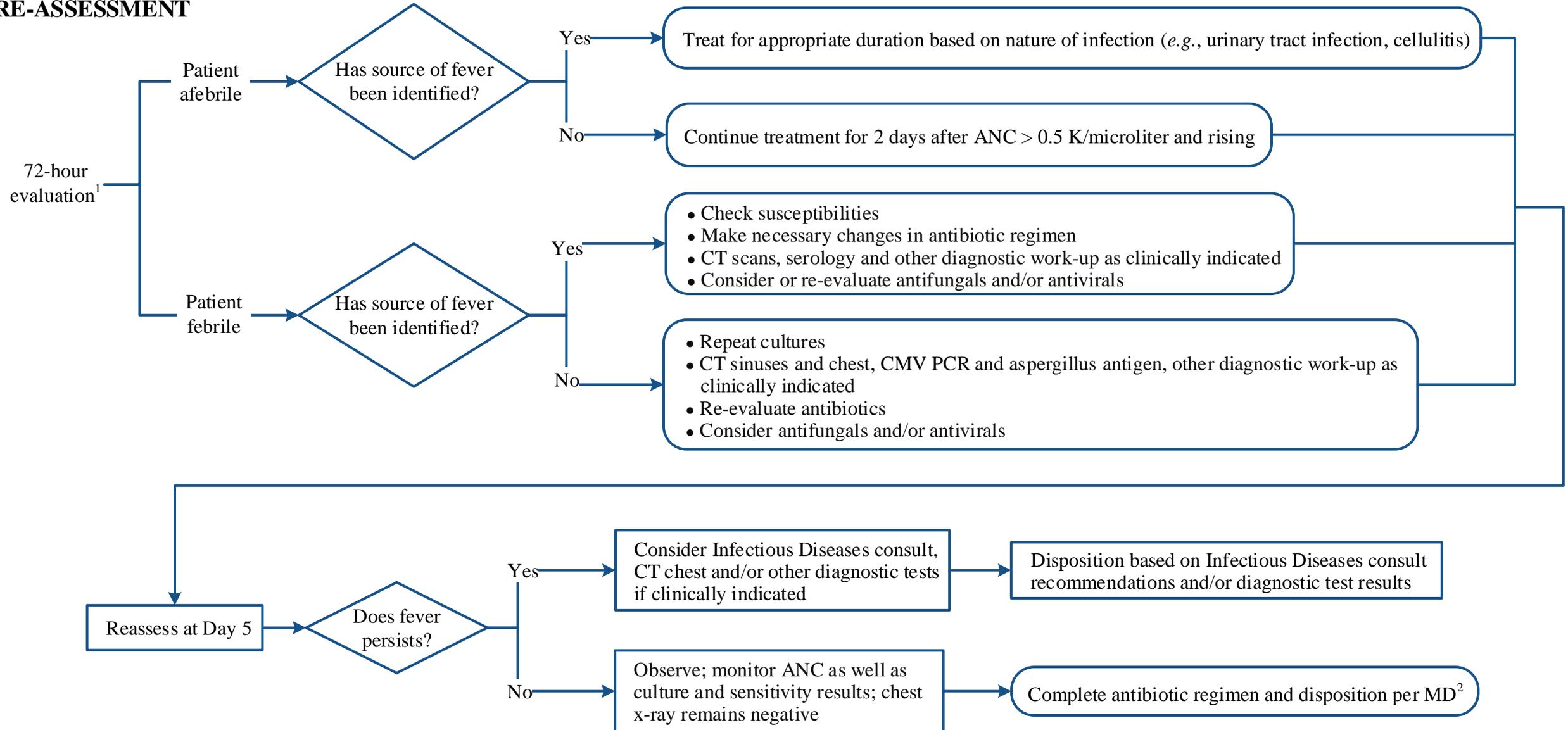
<sup>2</sup> Not preferred for blood stream infections

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# Neutropenic Fever Inpatient Adult Treatment (Hematologic Cancers including Lymphoma/Myeloma)

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## RE-ASSESSMENT



<sup>1</sup> Consider narrowing therapy based on cultures and sensitivities (e.g., discontinue anti-MRSA or anti-VRE agents if no gram positive organisms are identified and patient does not have cellulitis)

<sup>2</sup> Consider transition to antimicrobial prophylaxis if otherwise indicated and no clear infectious source of fever was identified

# Neutropenic Fever Inpatient Adult Treatment (Hematologic Cancers including Lymphoma/Myeloma)

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# Neutropenic Fever Inpatient Adult Treatment (Hematologic Cancers including Lymphoma/Myeloma)

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# Neutropenic Fever Inpatient Adult Treatment (Hematologic Cancers including Lymphoma/Myeloma)

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# Neutropenic Fever Inpatient Adult Treatment (Hematologic Cancers including Lymphoma/Myeloma)

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## DEVELOPMENT CREDITS

This practice consensus algorithm is based on majority expert opinion of the Neutropenic Fever Work Group at the University of Texas MD Anderson Cancer Center for the patient population. These experts included:

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<sup>♦</sup> Clinical Effectiveness Development Team