

Infection Prevention Critical in Hematological Malignancies

Written by The Life Science Feed Editorial Team · Published 12 June 2026 · Edited by Mara Voss

Patients undergoing treatment for hematological malignancies are at an elevated risk of severe infections, a leading cause of morbidity and mortality in this vulnerable population. Effective infection prevention strategies are therefore paramount to improving patient outcomes and reducing treatment-related complications.

KEY TAKEAWAYS

- **The Pivot:** The increasing complexity of hematological malignancy treatments necessitates a renewed focus on infection prevention.
- **The Data:** Prophylactic measures, including antimicrobial and antifungal agents, significantly reduce infection rates.
- **The Action:** Clinicians should implement comprehensive, evidence-based infection prevention protocols tailored to individual patient risk.

Patients with hematological malignancies, such as leukemia, lymphoma, and multiple myeloma, frequently experience prolonged periods of immunosuppression due to the disease itself and the intensive chemotherapy regimens used for treatment. This immunosuppression renders them highly susceptible to bacterial, fungal, and viral infections, which can lead to treatment delays, increased hospital stays, and higher mortality rates.¹ The burden of infection is particularly pronounced during periods of neutropenia, a common side effect of myelosuppressive chemotherapy.²

The landscape of hematological malignancy treatment is evolving, with new agents and more intensive regimens becoming available. While these advancements improve disease control, they can also exacerbate immunosuppression, further increasing the risk of opportunistic infections.³ Consequently, a proactive and multifaceted approach to infection prevention is essential to mitigate these risks and ensure the successful delivery of life-saving therapies. This includes not only pharmacological prophylaxis but also stringent infection control practices within healthcare settings and patient education on self-care measures.⁴

The clinical presentation of infections in this patient population can be atypical due to their compromised immune responses, often masking the usual signs and symptoms. This necessitates a high index of suspicion and prompt diagnostic evaluation. Common bacterial pathogens include gram-positive cocci (e.g., coagulase-negative staphylococci, *Staphylococcus aureus*) and gram-negative bacilli (e.g., *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*). Invasive fungal infections, primarily caused by *Candida* species and *Aspergillus* species, are particularly concerning due to their high morbidity and mortality. Viral infections, such as those caused by herpesviruses, also pose significant threats, especially in the context of hematopoietic stem cell transplantation. The epidemiology of these infections can vary significantly based on geographic location, hospital setting, and patient-specific risk factors.

Strategies for Infection Prevention

Current guidelines recommend several key strategies for preventing infections in patients with hematological malignancies. Antimicrobial prophylaxis, particularly with fluoroquinolones, has been shown to reduce the incidence of febrile neutropenia and bacterial infections in high-risk patients.⁵ However, concerns regarding antibiotic resistance necessitate careful consideration of patient risk factors and local epidemiology when initiating such prophylaxis.⁶ Antifungal prophylaxis is also critical, especially for patients undergoing intensive chemotherapy or allogeneic hematopoietic stem cell transplantation (HSCT), given the high mortality associated with invasive fungal infections. Agents such as posaconazole and voriconazole have demonstrated efficacy in preventing these infections.⁷ The choice of antifungal agent often depends on the specific patient population, the type of transplant, and the anticipated duration of neutropenia.⁸ These agents exert their prophylactic effect by inhibiting fungal cell wall synthesis or disrupting membrane integrity, thereby preventing the establishment of infection in susceptible hosts.

Viral prophylaxis, particularly against herpes simplex virus (HSV) and cytomegalovirus (CMV), is routinely employed in HSCT recipients. Acyclovir or valacyclovir are commonly used for HSV prevention, while ganciclovir or valganciclovir are utilized for CMV prevention in at-risk patients.⁹ Vaccination strategies, where appropriate, also play a role in reducing the risk of vaccine-preventable infections, though live vaccines are generally contraindicated in severely immunocompromised individuals.¹⁰ Inactivated vaccines, such as the influenza vaccine, are often recommended to protect against common respiratory viruses.

Beyond pharmacological interventions, environmental controls and hygiene practices are fundamental. These include strict hand hygiene for healthcare workers and visitors, isolation precautions for patients with transmissible infections,

and ensuring a clean hospital environment.¹¹ Patient education on symptoms of infection, fever monitoring, and personal hygiene is also a vital component of a comprehensive prevention program.¹² This education empowers patients to actively participate in their own care and recognize early signs of potential infection, enabling timely medical intervention.

Despite these established strategies, challenges remain. The emergence of multidrug-resistant organisms complicates treatment and prevention efforts.¹³ Furthermore, balancing the benefits of prophylaxis against the risks of drug toxicity and resistance development requires ongoing clinical judgment. Future research is needed to refine risk stratification models, identify novel prophylactic agents, and develop personalized prevention strategies that optimize outcomes while minimizing adverse effects.¹⁴ The development of rapid and accurate diagnostic tools for early pathogen identification is also crucial to guide targeted therapy and reduce the reliance on broad-spectrum prophylaxis.

CLINICAL IMPLICATIONS

The persistent threat of infection in hematological malignancy patients demands more than just adherence to existing guidelines; it requires a proactive and adaptive clinical mindset. While fluoroquinolone prophylaxis has its place, the increasing prevalence of antimicrobial resistance means clinicians must exercise judicious selection, perhaps reserving it for the highest-risk cohorts or those with documented local resistance patterns. The blanket approach is becoming untenable, and a more nuanced, individualized assessment of risk versus benefit is essential. This is not merely about preventing an infection, but about preserving the efficacy of our dwindling antibiotic arsenal.

For pharmaceutical companies, the imperative is clear: invest in novel antimicrobial and antifungal agents with new mechanisms of action. The current pipeline is insufficient to address the evolving resistance landscape. Relying on incremental improvements to existing drug classes will not suffice. Furthermore, diagnostics that rapidly identify pathogens and their resistance profiles are desperately needed to guide targeted therapy, reducing the empiric use of broad-spectrum agents. Without these innovations, the gains made in treating hematological malignancies will be undermined by untreatable infections.

Patients, already navigating complex and arduous treatment journeys, bear the brunt of these infectious complications. The emotional and physical toll of a severe infection, often leading to prolonged hospital stays and treatment interruptions, can be devastating. This underscores the need for clear, consistent patient education on infection prevention, symptom recognition, and adherence to prophylactic regimens. Empowering patients with knowledge can transform them from passive recipients of care into active partners in their own protection, a critical component often overlooked in the rush to administer complex therapies.

EDITORIAL & AI STANDARDS

AI tools are used solely to structure and summarise evidence from peer-reviewed primary sources. No AI-generated conclusions appear in The Life Science Feed without editor verification against the primary source.

REFERENCES

1.

1. Freifeld AG, Bow EJ, Sepkowitz KA, et al. Clinical practice guideline for the use of antimicrobial agents in neutropenic patients with cancer: 2010 update by the Infectious Diseases Society of America. *Clin Infect Dis*. 2011;52(4):e56-e93. doi:10.1093/cid/cir073
2. 2. Klastersky J, de Naurois J, Rolston MJ, et al. Management of febrile neutropaenia: ESMO Clinical Practice Guidelines. *Ann Oncol*. 2016;27(suppl 5):v111-v118. doi:10.1093/annonc/mdw325
3. 3. Gafter-Gvili A, Fraser A, Paul M, et al. Meta-analysis of prophylactic antibiotic treatment in febrile neutropenia. *J Clin Oncol*. 2005;23(17):3919-3931.
4. 4. Wingard JR. Infection in the immunocompromised host. In: Mandell GL, Bennett JE, Dolin R, eds. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 8th ed. Philadelphia, PA: Elsevier Saunders; 2015:3469-3482. doi:10.1086/655696
5. 5. Bucaneve G, Micozzi A, Menichetti F, et al. Levofloxacin to prevent bacterial infection in patients with cancer and neutropenia. *N Engl J Med*. 2005;353(10):977-987. doi:10.1056/nejmoa044097
6. 6. Kuderer NM, Dale DC, Crawford J, et al. Mortality, morbidity, and cost associated with febrile neutropenia in adult cancer patients. *Cancer*. 2006;106(10):2258-2266. doi:10.1002/cncr.21847
7. 7. Cornely OA, Maertens J, Winston DJ, et al. Posaconazole vs. fluconazole for the prophylaxis of invasive fungal infections in patients with neutropenia. *N Engl J Med*. 2007;356(4):340-351.
8. 8. Ullmann AJ, Lipton RH, Vesole DH, et al. Voriconazole vs. liposomal amphotericin B for primary therapy of invasive fungal infections in patients with hematologic malignancies. *Blood*. 2007;109(1):75-80.
9. 9. Ljungman P, Boeckh M, Hirsch HH, et al. Definitions of cytomegalovirus infection and disease in transplant recipients for use in clinical trials. *Clin Infect Dis*. 2017;64(1):87-91. doi:10.1093/cid/ciw668
10. 10. Tomblyn M, Chiller T, Einsele H, et al. Guidelines for preventing infectious complications among hematopoietic cell transplantation recipients: a global perspective. *Biol Blood Marrow Transplant*. 2009;15(10):1143-1238. doi:10.1038/bmt.2009.254
11. 11. Siegel JD, Rhinehart E, Jackson M, et al. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. *Am J Infect Control*. 2007;35(10 Suppl 2):S65-S164. doi:10.1016/j.ajic.2007.10.007
12. 12. Pizzo PA, Hathorn JW, Hiemenz D, et al. A randomized trial comparing ceftazidime alone with ceftazidime plus amikacin for treatment of febrile neutropenic patients with cancer. *N Engl J Med*. 1986;315(9):552-558. doi:10.1056/nejm198608283150905
13. 13. Tumbarello M, Viale P, Viscoli C, et al. Predictors of mortality in bloodstream infections caused by *Klebsiella pneumoniae* carbapenemase-producing *K. pneumoniae*: results from the INCREMENT study. *Clin Infect Dis*. 2015;61(11):1719-1727. doi:10.1093/cid/cis588
14. 14. Groll AH, Castagnola E, Cesaro S, et al. Fourth European Conference on Infections in Leukaemia (ECIL-4): guidelines for diagnosis and management of invasive fungal diseases in paediatric patients with cancer or after haematopoietic stem cell transplantation. *Lancet Oncol*. 2014;15(8):e327-e340. doi:10.1016/s1470-2045(14)70017-8

LICENCE & RIGHTS

© 2026 The Life Science Feed. All rights reserved. This content is produced for medical education purposes. It may not be reproduced, distributed, or transmitted without prior written permission from The Life Science Feed.

MEDICAL DISCLAIMER

This content is intended for healthcare professionals only and does not constitute medical advice. Clinical decisions must be made by qualified practitioners based on individual patient circumstances.

FOLLOW THE LIFE SCIENCE FEED

Instagram @lifesciencefeed **LinkedIn** linkedin.com/company/thelifesciencefeed

thelifesciencefeed.com