

Editorial

Special Issue: Recent Research on Hospital-Acquired Bloodstream Infections

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Hospital-acquired infections (HAIs) are infections that occur in patients 48 h after admission to hospital. They represent a significant cause of morbidity, mortality, and increased hospital costs [1–3]. In the last few decades, these infections have been the focus of clinicians, infection control nurses, and administrative agencies in attempts to reduce their incidence [4]. Point prevalence surveys in different hospitals and settings have demonstrated HAI rates between 5% and 12% [5–9], with bloodstream infections (BSIs) being the most common infections among HAIs [5–9]. BSIs can lead to death or significant complications if left untreated, such as endocarditis, spondylodiscitis, and meningitis [10].

Hospital-acquired BSIs (HABSI) can possess a mortality rate of up to 20%, even though this largely depends on the origin of the infection [10,11]. The microbiology of such infections most commonly involves *Staphylococcus aureus* and very commonly methicillin-resistant *S. aureus* (MRSA), as well as *Enterococcus*, including vancomycin-resistant *Enterococcus* (VRE) and Gram-negative bacteria such as *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Acinetobacter baumannii*, [5,12]. Antimicrobial resistance complicates the treatment of patients with HABSI, since pathogens that are multidrug-resistant (MDR), extensively-drug-resistant (XDR), and even pan-drug-resistant (PDR) are increasingly prevalent and are associated with high mortality rates [13,14].

Studies providing data on HABSI, such as point prevalence surveys and epidemiological studies are of increasing importance as they provide data that help to increase our understanding of the problems caused by these significant infections. Understanding the magnitude of the problem is the first step toward its management. Infection control practices and even antimicrobial stewardship interventions may lead to a reduction in the incidence of HABSI and a reduction in their antimicrobial resistance, thus reducing mortality and associated hospital costs [15,16]. Furthermore, studies on the microbiology of these infections are of practical value since they provide important information on their etiology and patterns of antimicrobial resistance. These studies can help clinicians choose appropriate empirical treatment before the results of cultures are available [17].

This Special Issue aims to bring together original studies as well as comprehensive narrative or systematic reviews related to epidemiology, microbiology, clinical characteristics, treatment, and outcomes of patients with HABSI. Moreover, studies emphasizing infection control and antimicrobial stewardship of these infections are additionally welcome.

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References

1. Gidey, K.; Gidey, M.T.; Hailu, B.Y.; Gebreamlak, Z.B.; Niriayo, Y.L. Clinical and economic burden of healthcare-associated infections: A prospective cohort study. *PLoS ONE* **2023**, *18*, e0282141. [\[CrossRef\]](#) [\[PubMed\]](#)
2. Umscheid, C.A.; Mitchell, M.D.; Doshi, J.A.; Agarwal, R.; Williams, K.; Brennan, P.J. Estimating the Proportion of Healthcare-Associated Infections That Are Reasonably Preventable and the Related Mortality and Costs. *Infect. Control. Hosp. Epidemiol.* **2011**, *32*, 101–114. [\[CrossRef\]](#) [\[PubMed\]](#)
3. Stone, P.W. Economic burden of healthcare-associated infections: An American perspective. *Expert Rev. Pharm. Outcomes Res.* **2009**, *9*, 417–422. [\[CrossRef\]](#) [\[PubMed\]](#)
4. Boev, C.; Kiss, E. Hospital-Acquired Infections: Current Trends and Prevention. *Crit. Care Nurs. Clin. N. Am.* **2017**, *29*, 51–65. [\[CrossRef\]](#) [\[PubMed\]](#)
5. Ioannou, P.; Astrinaki, E.; Vitsaxaki, E.; Bolikas, E.; Christofaki, D.; Salvaraki, A.; Lagoudaki, E.; Ioannidou, E.; Karakostas, S.; Saplamidou, S.; et al. A Point Prevalence Survey of Healthcare-Associated Infections and Antimicrobial Use in Public Acute Care Hospitals in Crete, Greece. *Antibiotics* **2022**, *11*, 1258. [\[CrossRef\]](#) [\[PubMed\]](#)
6. Cai, Y.; Venkatachalam, I.; Tee, N.W.; Tan, T.Y.; Kurup, A.; Wong, S.Y.; Low, C.Y.; Wang, Y.; Lee, W.; Liew, Y.X.; et al. Prevalence of Healthcare-Associated Infections and Antimicrobial Use Among Adult Inpatients in Singapore Acute-Care Hospitals: Results from the First National Point Prevalence Survey. *Clin. Infect. Dis.* **2017**, *64*, S61–S67. [\[CrossRef\]](#) [\[PubMed\]](#)
7. Morioka, H.; Hirabayashi, A.; Iguchi, M.; Tomita, Y.; Kato, D.; Sato, N.; Hyodo, M.; Kawamura, N.; Sadomoto, T.; Ichikawa, K.; et al. The first point prevalence survey of health care-associated infection and antimicrobial use in a Japanese university hospital: A pilot study. *Am. J. Infect. Control.* **2016**, *44*, e119–e123. [\[CrossRef\]](#) [\[PubMed\]](#)
8. Cairns, S.; Gibbons, C.; Milne, A.; King, H.; Llano, M.; MacDonald, L.; Malcolm, W.; Robertson, C.; Sneddon, J.; Weir, J.; et al. Results from the third Scottish National Prevalence Survey: Is a population health approach now needed to prevent healthcare-associated infections? *J. Hosp. Infect.* **2018**, *99*, 312–317. [\[CrossRef\]](#) [\[PubMed\]](#)
9. Russo, P.L.; Stewardson, A.J.; Cheng, A.C.; Bucknall, T.; Mitchell, B.G. The prevalence of healthcare associated infections among adult inpatients at nineteen large Australian acute-care public hospitals: A point prevalence survey. *Antimicrob. Resist. Infect. Control.* **2019**, *8*, 114. [\[CrossRef\]](#) [\[PubMed\]](#)
10. Mortensen, V.H.; Sogaard, M.; Mygind, L.H.; Wolkewitz, M.; Kristensen, B.; Schønheyder, H.C. Incidence and mortality of hospital-acquired bacteraemia: A population-based cohort study applying a multi-state model approach. *Clin. Microbiol. Infect.* **2022**, *28*, 879.e9–879.e15. [\[CrossRef\]](#) [\[PubMed\]](#)
11. Sogaard, M.; Nørgaard, M.; Dethlefsen, C.; Schønheyder, H.C. Temporal Changes in the Incidence and 30-Day Mortality associated with Bacteremia in Hospitalized Patients from 1992 through 2006: A Population-based Cohort Study. *Clin. Infect. Dis.* **2011**, *52*, 61–69. [\[CrossRef\]](#) [\[PubMed\]](#)
12. Kollef, M.H.; Zilberberg, M.D.; Shorr, A.F.; Vo, L.; Schein, J.; Micek, S.T.; Kim, M. Epidemiology, microbiology and outcomes of healthcare-associated and community-acquired bacteremia: A multicenter cohort study. *J. Infect.* **2011**, *62*, 130–135. [\[CrossRef\]](#) [\[PubMed\]](#)
13. Magiorakos, A.-P.; Srinivasan, A.; Carey, R.B.; Carmeli, Y.; Falagas, M.E.; Giske, C.G.; Harbarth, S.; Hindler, J.F.; Kahlmeter, G.; Olsson-Liljequist, B.; et al. Multidrug-resistant, extensively drug-resistant and pandrug-resistant bacteria: An international expert proposal for interim standard definitions for acquired resistance. *Clin. Microbiol. Infect.* **2012**, *18*, 268–281. [\[CrossRef\]](#) [\[PubMed\]](#)
14. Kofteridis, D.P.; Andrianaki, A.M.; Maraki, S.; Mathioudaki, A.; Plataki, M.; Alexopoulou, C.; Ioannou, P.; Samonis, G.; Valachis, A. Treatment pattern, prognostic factors, and outcome in patients with infection due to pan-drug-resistant gram-negative bacteria. *Eur. J. Clin. Microbiol. Infect. Dis.* **2020**, *39*, 965–970. [\[CrossRef\]](#) [\[PubMed\]](#)
15. Aiesh, B.M.; Nazzal, M.A.; Abdelhaq, A.I.; Abutaha, S.A.; Zyoud, S.H.; Sabateen, A. Impact of an antibiotic stewardship program on antibiotic utilization, bacterial susceptibilities, and cost of antibiotics. *Sci. Rep.* **2023**, *13*, 5040. [\[CrossRef\]](#) [\[PubMed\]](#)
16. Reed, D.; Kemmerly, S.A. Infection control and prevention: A review of hospital-acquired infections and the economic implications. *Ochsner J.* **2009**, *9*, 27–31. [\[PubMed\]](#)
17. Diekema, D.J.; Hsueh, P.-R.; Mendes, R.E.; Pfaller, M.A.; Rolston, K.V.; Sader, H.S.; Jones, R.N. The Microbiology of Bloodstream Infection: 20-Year Trends from the SENTRY Antimicrobial Surveillance Program. *Antimicrob. Agents Chemother.* **2019**, *63*, e00355-19. [\[CrossRef\]](#) [\[PubMed\]](#)

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