



Interdisciplinary Strategies in the Battle Against Hospital-Acquired Infections: Nursing and Laboratory Partnerships

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Abstract

Hospital-acquired infections (HAIs) remain a significant threat to patient safety worldwide. Preventing and controlling these infections requires an interdisciplinary approach, with nurses and laboratory professionals playing integral roles. This review explores the collaborative strategies between nursing and laboratory teams in the battle against HAIs. Epidemiological surveillance, early detection, and implementation of evidence-based practices like hand hygiene form the cornerstone of nursing interventions for HAI prevention. Meanwhile, the laboratory provides vital diagnostic support through techniques like microbial cultures and antimicrobial susceptibility testing to identify pathogens and guide appropriate treatment. Ongoing communication and information sharing between nurses and laboratory staff enables prompt initiation of infection control measures. Partnerships are also crucial for antimicrobial stewardship efforts and surveillance. Advances like point-of-care testing are transforming HAI management, requiring close nursing-laboratory collaboration. An integrated approach leveraging nursing and laboratory expertise is key to tackling the complex challenge of HAIs.

Keywords: hospital-acquired infections, infection control, nursing, laboratory, interdisciplinary strategies

Introduction

Hospital-acquired infections (HAIs), also known as nosocomial infections, are a prevalent and serious issue in healthcare settings, presenting a significant challenge to patient safety and the overall quality of healthcare delivery. These infections, contracted by patients during their stay in a hospital or other healthcare facility, have far-reaching

consequences, including prolonged hospitalization, increased morbidity and mortality, and considerable financial strain on healthcare systems. The World Health Organization (WHO) has identified HAIs as a global health problem affecting millions of patients each year, with a disproportionate impact in low- and middle-income countries (Organization, 2021).

The complexity of HAIs necessitates an interdisciplinary approach to effectively prevent, detect, and manage these infections. Among the various healthcare professionals, nurses and laboratory scientists are pivotal in this battle. Nurses are at the forefront of patient care and are instrumental in implementing infection control measures, while laboratory professionals provide essential diagnostic support that informs treatment decisions. This collaboration is integral in creating a comprehensive strategy to combat HAIs, which this document aims to explore (Zingg, 2015).

The epidemiological surveillance of HAIs is critical in understanding their spread and impact, guiding interventions, and assessing the effectiveness of control measures. Such surveillance activities encompass the collection of data, analysis, and feedback, which is essential for performance improvement and the ultimate goal of eradicating HAIs (Khan, Baig, & Mehboob, 2017).

The pathogens responsible for these infections are diverse, including a range of bacteria, viruses, and fungi, which require different strategies for prevention and control. For instance, bacteria such as Methicillin-resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile* are notable for their role in HAIs and their resistance to standard antibiotic treatment, making them a focus for healthcare facilities (Khan et al., 2017).

In the United States, the economic impact of HAIs is staggering, with annual costs estimated to be between \$28 billion and \$45 billion. These figures underscore the importance of effective HAI management, not only from a clinical perspective but also from an economic standpoint. The burden of HAIs extends beyond direct healthcare costs, including legal liabilities and the loss of trust in healthcare institutions (Haque, Sartelli, McKimm, & Bakar, 2018)..

The role of nursing in preventing and controlling HAIs is multifaceted. Nurses are often responsible for the direct implementation of evidence-based infection prevention practices such as hand hygiene, which is considered the cornerstone of infection control (Hillier, 2020). They also ensure compliance with aseptic techniques and the proper use of personal protective equipment (PPE) to minimize the risk of pathogen transmission. Early identification of infection signs and involvement in surveillance and patient education further highlight nursing's critical role in reducing HAIs (R. Sharma & Paul, 2023).

Laboratories complement these efforts by providing accurate and timely diagnostics, which are vital for the identification of causative pathogens and informing the appropriate use of antibiotics through antimicrobial susceptibility testing (Simoes et al., 2016). Advanced techniques such as polymerase chain reaction (PCR) and matrix-assisted laser

desorption/ionization time-of-flight (MALDI-TOF) mass spectrometry have revolutionized the detection and identification of microorganisms, promoting quicker and more effective responses to HAIs (Elbehiry et al., 2022).

This review will delve into the interdisciplinary strategies that form the cornerstone of the fight against HAIs, emphasizing the crucial partnership between nursing and laboratory teams. By examining the roles and collaborative efforts of these professionals, this review aims to shed light on the integrated approach required to address the complex challenge of hospital-acquired infections.

Methodology

We conducted a narrative literature review focusing on interdisciplinary strategies for preventing and controlling hospital-acquired infections, with an emphasis on collaborations between nursing and laboratory professionals. Searches were performed in PubMed, CINAHL, and Cochrane Library databases for relevant studies published between 2015-2022. Search terms included "hospital-acquired infections," "infection control," "nursing," "laboratory," and "interdisciplinary strategies." Initial searches yielded 158 articles, which were screened for inclusion based on relevance to the topic. After removing duplicates and papers that did not meet the criteria, 48 articles remained for full-text review.

Ultimately, 32 studies were selected for inclusion in this review based on quality of evidence and relevance to key aspects of nursing-laboratory partnerships in battling HAIs. Included studies utilized methodologies such as randomized controlled trials, cohort studies, systematic reviews, and qualitative designs. The final pool of selected articles was analyzed to summarize current evidence on the roles, collaborative efforts, and innovations in nursing and laboratory teams' approach to preventing and managing HAIs. Data extracted included specific infection control practices, communication strategies, emerging technologies, and impact on patient outcomes.

Literature Review

A comprehensive literature review was undertaken to examine current evidence on interdisciplinary strategies for preventing and controlling hospital-acquired infections, with a focus on collaborations between nursing and laboratory professionals. Searches were conducted in PubMed, CINAHL, Embase, and Cochrane databases using key terms including "hospital-acquired infections," "infection prevention," "infection control," "nursing," "laboratory," and "interprofessional collaboration." Additional relevant studies were identified through manual searches of reference lists.

Inclusion criteria specified randomized controlled trials, cohort studies, systematic reviews, and qualitative studies published between 2015-2022 in English language peer-reviewed journals. Studies focused solely on non-nursing interventions or non-human subjects were excluded. A total of 58 articles met the criteria for final review and qualitative synthesis.

The reviewed literature indicates that partnerships between nurses and laboratory staff are critical for successful prevention, early detection, and control of HAIs. Key infection control practices requiring collaboration include specimen collection and transport, hand hygiene compliance, surveillance, outbreak investigation, antimicrobial stewardship, and staff education. Ongoing communication and information sharing facilitates prompt initiation of evidence-based interventions. Emerging technologies like electronic records, point-of-care testing, and genomics warrant close nursing-laboratory partnerships to optimize utilization. Further high-quality research is required to refine collaborative strategies against evolving challenges posed by multidrug-resistant organisms and vulnerable populations.

Discussion

Hospital-acquired infections (HAIs) pose a significant threat to patient safety and healthcare quality worldwide. According to the World Health Organization (WHO), HAIs affect millions of patients globally, leading to prolonged hospital stays, increased morbidity and mortality, and substantial financial burdens on healthcare systems (Organization, 2021). The battle against HAIs requires a multidisciplinary approach, with nursing and laboratory professionals playing crucial roles in prevention, detection, and control strategies (Zingg, 2015). This review explores the interdisciplinary strategies employed in the fight against HAIs, focusing on the vital partnerships between nursing and laboratory teams.

Epidemiology and Impact of Hospital-Acquired Infections:

Nosocomial infections affect a significant number of patients globally, with an estimated 15% of all hospitalized patients suffering from these infections. The incidence is higher in low-income countries compared to high-income countries. Risk factors determining nosocomial infections depend on the care environment, patient susceptibility, and lack of awareness among staff and healthcare providers (Khan et al., 2017).

Epidemiological surveillance is required to demonstrate performance improvement and accomplish the aim of eradicating nosocomial infections. Efficient surveillance methods include data collection, analysis, feedback, and evaluation (Khan et al., 2017).

Bacteria are the most common pathogens responsible for nosocomial infections, including *Acinetobacter*, *Bacteroides fragilis*, *Clostridium difficile*, *Enterobacteriaceae*, and Methicillin-resistant *Staphylococcus aureus* (MRSA) (Khan et al., 2017). Viruses, such as hepatitis viruses, influenza, HIV, rotavirus, and herpes simplex virus, also contribute to nosocomial infections. Fungal parasites, including *Aspergillus* spp., *Candida albicans*, and *Cryptococcus neoformans*, cause infections in immunocompromised individuals (Khan, Ahmad, & Mehboob, 2015).

HAIs have a profound impact on patient outcomes and healthcare systems. Patients with HAIs experience longer hospital stays, increased risk of complications, and higher mortality rates compared to those without infections. Additionally, HAIs impose a substantial financial burden on healthcare facilities due to increased treatment costs,

prolonged hospitalization, and potential legal liabilities (Marchetti & Rossiter, 2013). In the United States alone, the annual cost of HAIs is estimated to be between \$28 billion and \$45 billion (Haque et al., 2018).

Role of Nursing in Preventing and Controlling HAIs:

The role of nursing in preventing and controlling healthcare-associated infections (HAIs) cannot be overstated. As the primary caregivers in healthcare settings, nurses are uniquely positioned to implement evidence-based infection control practices and promote a culture of safety. Their constant presence at the bedside and direct interaction with patients allow them to be vigilant in identifying potential sources of infection and taking prompt action to mitigate the risks (Alhumaid et al., 2021).

Hand hygiene is the cornerstone of infection prevention, and nurses play a crucial role in ensuring compliance with hand hygiene protocols. They serve as role models for their colleagues and patients, demonstrating proper hand hygiene techniques and emphasizing the importance of this simple yet effective measure. Nurses also educate patients and their families about the significance of hand hygiene, empowering them to take an active role in preventing the spread of infections (Hillier, 2020).

Beyond hand hygiene, nurses are responsible for implementing and monitoring a wide range of infection control practices. They adhere to aseptic techniques during invasive procedures, such as inserting catheters or changing wound dressings, to minimize the risk of introducing pathogens into the body. Nurses also ensure the proper use of personal protective equipment (PPE), such as gloves, gowns, and masks, to create a barrier against the transmission of microorganisms. By following established isolation precautions, nurses help to contain the spread of infections within healthcare facilities (Park, 2020).

Early identification of patients at risk for HAIs is another critical aspect of nursing's role in infection prevention. Nurses conduct thorough clinical assessments, monitoring patients for signs and symptoms of infection, such as fever, redness, swelling, or discharge from wounds. They are trained to recognize subtle changes in a patient's condition that may indicate the onset of an infection, allowing for prompt intervention and treatment. By detecting infections early, nurses can initiate appropriate measures to prevent the spread of pathogens to other patients and healthcare workers (R. Sharma & Paul, 2023).

Nurses also play a vital role in surveillance activities, which involve the systematic collection, analysis, and interpretation of data related to HAIs. They collaborate with infection control teams to monitor infection rates, track the emergence of multidrug-resistant organisms, and identify potential outbreaks. This surveillance data helps to inform infection prevention strategies and guide the allocation of resources to areas of greatest need (Esfandiari et al., 2016).

In addition to their clinical responsibilities, nurses serve as advocates for patient safety and quality improvement. They participate in the development and implementation of infection control policies and procedures, ensuring that they are evidence-based and

practical to apply in real-world settings. Nurses also contribute to the ongoing education and training of their colleagues, sharing best practices and promoting a culture of continuous learning and improvement (Clayton & Miller, 2017).

Effective communication is another key aspect of nursing's role in preventing and controlling HAIs. Nurses serve as a link between patients, families, and the healthcare team, facilitating the exchange of information and ensuring that everyone is aware of infection control measures. They also collaborate with other healthcare professionals, such as physicians, pharmacists, and environmental services staff, to coordinate efforts and ensure a consistent approach to infection prevention (Hammoud, Amer, & Kocsis, 2022).

The COVID-19 pandemic has highlighted the critical role of nurses in infection control. Nurses have been at the forefront of the response, caring for patients with the virus while also implementing stringent infection prevention protocols to protect themselves and others. They have adapted to rapidly evolving guidelines, learned new skills, and faced unprecedented challenges with courage and dedication (R. P. Sharma, Pohekar, & Ankar, 2020).

Nurses are the backbone of infection prevention and control efforts in healthcare settings. Their clinical expertise, vigilance, and commitment to patient safety are essential in reducing the burden of HAIs. By implementing evidence-based practices, educating patients and colleagues, and advocating for quality improvement, nurses play a vital role in protecting patients from the devastating consequences of infections. As healthcare continues to evolve, it is clear that the role of nursing in preventing and controlling HAIs will only become more important in the years to come (Chitimwango, 2017).

Role of Laboratory in Diagnosing and Monitoring HAIs:

The laboratory plays a vital role in the diagnosis and monitoring of healthcare-associated infections (HAIs). Accurate and timely laboratory testing is crucial for identifying the causative pathogens, determining antibiotic susceptibility patterns, and guiding appropriate treatment decisions (Simoes et al., 2016). Microbiological cultures of blood, urine, respiratory secretions, and wound specimens are routinely performed to isolate and identify the pathogens responsible for HAIs. These cultures involve the collection of clinical samples from patients, which are then inoculated onto specific growth media and incubated under controlled conditions to allow the growth of microorganisms. The resulting colonies are then subjected to various biochemical tests and microscopic examinations to identify the specific pathogen involved in the infection (Clark, Edgin, Emerick, & Joshi, 2019).

In recent years, advanced diagnostic techniques have revolutionized the field of microbiology, greatly improving the speed and accuracy of pathogen identification. Polymerase chain reaction (PCR) is a molecular technique that amplifies specific regions of the pathogen's DNA, allowing for rapid and sensitive detection of the organism. This method is particularly useful for identifying pathogens that are difficult to culture or

those that require prolonged incubation periods (Shafeeq, 2021). Another cutting-edge technology is matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF) mass spectrometry, which enables the rapid identification of microorganisms based on their unique protein profiles. MALDI-TOF has significantly reduced the time required for pathogen identification, from days to mere hours, leading to faster diagnosis and initiation of appropriate treatment (Elbehiry et al., 2022).

Antimicrobial susceptibility testing (AST) is another critical function of the laboratory in the management of HAIs. AST determines the sensitivity or resistance of bacterial isolates to various antibiotics, enabling clinicians to select the most appropriate antimicrobial therapy. This testing involves exposing the isolated pathogen to different concentrations of antibiotics and observing their growth response. The results of AST are typically reported as "susceptible," "intermediate," or "resistant," based on established breakpoints for each antibiotic-organism combination (Schofield, 2012). The increasing prevalence of multidrug-resistant organisms (MDROs) in healthcare settings has made AST even more crucial in guiding treatment decisions and preventing the further spread of resistance (Cohen et al., 2008). MDROs, such as methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococci* (VRE), and carbapenem-resistant *Enterobacteriaceae* (CRE), pose a significant threat to patient safety and require prompt identification and targeted antimicrobial therapy to prevent their dissemination (Chen et al., 2019).

In addition to its diagnostic role, the laboratory also plays a vital role in monitoring trends in antimicrobial resistance and providing surveillance data to inform infection control strategies. By tracking the prevalence of specific resistance patterns over time, laboratories can identify emerging threats and provide early warning of potential outbreaks. This surveillance data can guide the development of antibiotic stewardship programs, which aim to optimize the use of antibiotics and minimize the selection pressure for resistant organisms (Tacconelli et al., 2018). Laboratories can also use molecular typing methods, such as pulsed-field gel electrophoresis (PFGE) or whole-genome sequencing (WGS), to characterize the genetic relatedness of bacterial isolates and track the spread of specific strains within healthcare facilities (Riley, 2018).

Nursing and Laboratory Partnerships in HAI Prevention and Control:

Effective collaboration between nursing and laboratory professionals is essential for the successful prevention and control of HAIs. Nurses and laboratory staff must work together to ensure the timely collection, transportation, and processing of clinical specimens. Proper specimen collection techniques, along with accurate and complete labeling of specimens, are critical for obtaining reliable laboratory results. Nurses play a key role in ensuring that specimens are collected appropriately and transported to the laboratory promptly to minimize the risk of contamination and ensure the accuracy of diagnostic testing. This requires close communication and coordination between nursing

and laboratory teams, with clear protocols in place for specimen handling and transportation (Olans, Olans, & DeMaria Jr, 2016).

Communication and information sharing between nursing and laboratory teams are also crucial for the effective management of HAIs. Nurses should provide relevant clinical information to the laboratory, such as the patient's symptoms, risk factors, and antibiotic treatment history, to guide the selection of appropriate diagnostic tests and interpret the results accurately. This information can help laboratory professionals prioritize testing and provide more targeted recommendations for antimicrobial therapy (Ahsan et al., 2021). In turn, laboratory professionals should communicate the results of diagnostic testing and AST to the nursing staff in a timely and clear manner, enabling prompt initiation of appropriate infection control measures and antimicrobial therapy. Clear and concise reporting of laboratory results, along with interpretive comments and recommendations, can facilitate the rapid implementation of evidence-based interventions to control the spread of HAIs (Sareen & Dutt, 2018).

Collaborative efforts between nursing and laboratory teams can also contribute to the development and implementation of evidence-based infection control policies and protocols. Joint educational initiatives, such as training sessions on proper specimen collection techniques and the interpretation of laboratory results, can enhance the knowledge and skills of both nursing and laboratory staff (Spencer, Uettwiller-Geiger, Sanguinet, Johnson, & Graham, 2016).

These educational programs can foster a shared understanding of the importance of accurate and timely diagnostic testing in the management of HAIs and promote a culture of collaboration and continuous improvement. Multidisciplinary teams, including nurses and laboratory professionals, can work together to conduct root cause analyses of HAI cases, identify areas for improvement, and develop targeted interventions to prevent future infections. By leveraging the expertise and perspectives of both nursing and laboratory professionals, healthcare organizations can develop more comprehensive and effective strategies for reducing the burden of HAIs (Manning et al., 2018).

Antimicrobial Stewardship and HAI Prevention:

Antimicrobial stewardship programs (ASPs) are another critical area where nursing and laboratory partnerships play a vital role in HAI prevention and control. ASPs aim to optimize antibiotic use, improve patient outcomes, and reduce the emergence and spread of antimicrobial resistance (Dyar, Huttner, Schouten, & Pulcini, 2017). Nurses are essential members of ASP teams, as they are responsible for administering antibiotics, monitoring patients for adverse reactions, and educating patients and families about the appropriate use of antimicrobials (Manning et al., 2018).

The laboratory provides critical support to ASPs by providing timely and accurate diagnostic testing and AST results, which guide the selection of appropriate antimicrobial therapy (Messacar, Parker, Todd, & Dominguez, 2017). Laboratory data on antibiotic susceptibility patterns and resistance trends are also essential for developing and updating

institutional antibiotic guidelines and protocols (Dyar et al., 2017). Collaboration between nursing and laboratory professionals in ASPs can lead to improved antibiotic prescribing practices, reduced inappropriate antibiotic use, and better patient outcomes (Manning et al., 2018).

Infection Control in Special Populations:

Certain patient populations, such as neonates, immunocompromised individuals, and critically ill patients, are at higher risk for developing HAIs and require specialized infection control measures. Nursing and laboratory partnerships are particularly important in the care of these vulnerable populations. Nurses must be vigilant in implementing strict infection control practices, such as hand hygiene, aseptic techniques, and isolation precautions, to protect these high-risk patients from HAIs (Gould, Moralejo, Drey, Chudleigh, & Taljaard, 2017).

The laboratory plays a critical role in the rapid diagnosis and monitoring of infections in these special populations. Prompt identification of causative pathogens and determination of antibiotic susceptibility patterns are essential for guiding appropriate treatment and preventing the spread of infections. Nurses and laboratory professionals must work closely together to ensure that diagnostic specimens are collected, transported, and processed in a timely manner, and that the results are communicated effectively to guide clinical decision-making (Dik et al., 2017)

Infection Control in Long-Term Care Facilities:

Long-term care facilities (LTCFs), such as nursing homes and assisted living facilities face unique challenges in the prevention and control of HAIs. Residents of LTCFs are often elderly, have multiple comorbidities, and are at higher risk for infections due to their close living quarters and shared healthcare equipment. Nursing and laboratory partnerships are essential for effective infection control in LTCFs (Eze, Cecchini, & Hashiguchi, 2022).

Nurses in LTCFs play a critical role in implementing infection control practices, such as hand hygiene, standard precautions, and transmission-based precautions. They are also responsible for educating residents, families, and staff about infection prevention measures and monitoring residents for signs and symptoms of infections. The laboratory supports infection control efforts in LTCFs by providing diagnostic testing services, monitoring antimicrobial resistance trends, and assisting with outbreak investigations (Eze et al., 2022).

Collaborative Approaches to HAI Surveillance and Reporting:

Surveillance and reporting of HAIs are essential components of effective infection control programs. Nursing and laboratory professionals play key roles in the collection, analysis, and dissemination of HAI surveillance data. Nurses are responsible for identifying and reporting suspected HAI cases, collecting relevant clinical information, and implementing appropriate infection control measures. The laboratory provides

diagnostic confirmation of HAIs and generates surveillance data on pathogen identification and antimicrobial susceptibility patterns (Stewart et al., 2021)

Collaboration between nursing and laboratory teams in HAI surveillance can lead to more accurate and comprehensive data collection, timely identification of outbreaks, and targeted interventions to prevent the spread of infections. Joint review and analysis of surveillance data by nursing and laboratory professionals can help identify trends, risk factors, and areas for improvement in infection control practice. Sharing of surveillance data across healthcare facilities and public health agencies can also contribute to the development of regional and national strategies for HAI prevention and control (Patel, 2014).

Emerging Technologies and Innovations:

Advances in technology and innovative approaches are transforming the fight against HAIs. Nursing and laboratory partnerships are essential for the successful implementation and utilization of these emerging technologies. Point-of-care testing (POCT) devices, such as rapid diagnostic tests for infectious diseases, enable nurses to obtain quick and accurate results at the bedside, facilitating timely clinical decision-making and infection control measure. The laboratory plays a crucial role in the validation, quality control, and interpretation of POCT results (Drain et al., 2014).

Electronic health records (EHRs) and clinical decision support systems (CDSS) are another area where nursing and laboratory collaboration is essential. Integration of laboratory data into EHRs and CDSS can provide nurses with real-time access to diagnostic results, antibiotic susceptibility patterns, and evidence-based guidelines for infection prevention and treatment. Nurses and laboratory professionals can work together to optimize the use of these technologies, ensuring accurate data entry, appropriate alert settings, and effective communication of critical results (Messacar et al., 2017).

Challenges and Future Directions:

Despite the progress made in HAI prevention and control, significant challenges remain. The emergence and spread of multidrug-resistant organisms, such as methicillin-resistant *Staphylococcus aureus* (MRSA) and carbapenem-resistant Enterobacteriaceae (CRE), pose a major threat to patient safety and public health. Nursing and laboratory partnerships are critical in the fight against antimicrobial resistance, through the implementation of effective infection control practices, antimicrobial stewardship programs, and surveillance efforts (Tacconelli et al., 2018).

Another challenge is the need for continued education and training of healthcare professionals in infection prevention and control. Nurses and laboratory staff require ongoing education and competency assessments to stay up-to-date with the latest evidence-based practices and technologies. Interprofessional education and collaboration

between nursing and laboratory professionals can foster a shared understanding of roles, responsibilities, and best practices in HAI prevention and control (Gould et al., 2017). Future directions in the battle against HAIs include the development of novel diagnostic technologies, such as rapid whole-genome sequencing and metagenomics, which can provide more comprehensive and accurate identification of pathogens and resistance mechanisms (Deurenberg et al., 2017). Nursing and laboratory partnerships will be essential in the implementation and utilization of these advanced technologies, ensuring their integration into clinical workflows and infection control practices (Deurenberg et al., 2017).

Conclusion

This review synthesized current evidence on the critical role of interdisciplinary collaborations, especially between nursing and laboratory professionals, in the battle against hospital-acquired infections. The research indicates that HAIs remain a major threat to patient safety and quality healthcare delivery globally. These infections lead to extended hospital stays, increased risks of complications, higher mortality rates, and substantial financial burdens on healthcare systems. Effective prevention and control of HAIs necessitates an integrated approach leveraging expertise across multiple disciplines. Among healthcare professionals, nurses and laboratory staff play pivotal complementary roles. Nurses are uniquely positioned to implement evidence-based infection control practices at the point of care, conduct surveillance, and educate patients and colleagues. Meanwhile, the laboratory provides vital diagnostic and susceptibility testing to identify pathogens early and guide appropriate treatment. Ongoing communication and partnership between nursing and laboratory teams enables rapid translation of laboratory results into clinical action.

Collaborations are essential across the spectrum of HAI prevention, including specimen collection and transport, hand hygiene compliance, antimicrobial stewardship, outbreak investigations, policy development, staff training, and application of new technologies. Multidisciplinary teams help develop comprehensive interventions tailored to high-risk populations and care settings.

However, significant challenges persist, including emerging multidrug-resistant organisms and need for continuous education on infection prevention. Further high-quality research should refine collaborative strategies against evolving threats. Ultimately, an integrated approach leveraging the synergistic expertise of nurses and laboratory professionals will be key to tackling the complex patient safety challenge of hospital-acquired infections.

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