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From Bedside to Policy: The Nurse's Role in Advancing Hospital Infection Control

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Introduction

Chapter 1: Foundations of Nursing in Infection Prevention

Infection prevention and control (IPC) remains one of the cornerstones of modern healthcare delivery, safeguarding both patients and healthcare providers from preventable harm. The spread of infectious agents in hospitals has historically been a major threat to patient safety, resulting in high morbidity and mortality rates (Khattak et al., 2021). Healthcare-associated infections (HAIs) such as bloodstream infections, ventilator-associated pneumonia, and surgical site infections add significant burdens to already strained health systems (Lewis et al., 2022). These infections increase hospital costs, lengthen patient stays, and complicate recovery. Within this framework, nurses represent the largest and most consistent workforce positioned to reduce these risks at the bedside.

Nursing practice has long been tied to infection control, with Florence Nightingale recognized

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as a pioneer in linking hygiene and patient safety. Her sanitary reforms during the Crimean War demonstrated how structured cleaning practices and ventilation could drastically reduce infectious disease mortality (Mehta et al., 2019). The legacy of Nightingale continues today, as infection control has evolved from rudimentary hygiene measures to highly technical, evidence-based practices. Nurses remain central to implementing these practices, integrating both traditional hygiene and modern surveillance approaches into daily care.

The global burden of HAIs underscores the urgency of infection control efforts. Estimates suggest that millions of patients each year acquire preventable infections while in hospitals, with low- and middle-income countries bearing a disproportionate burden (Raphael, Jaeger & van Vlymen, 2021). Limited infrastructure, shortages of medical supplies, and inadequate staffing all contribute to higher infection rates in these settings. Nurses, often working under resource constraints, play a crucial role in applying strict hygiene practices, improvising solutions, and advocating for improved infection control measures at institutional and governmental levels.

Over the years, advances in microbiology and medical science have deepened the understanding of infectious diseases. With Pasteur's germ theory and Lister's antiseptic techniques, healthcare providers began adopting systematic sterilization and aseptic methods in clinical practice (Saunders et al., 2020). These scientific milestones transformed infection prevention into a structured discipline. Nurses, as direct care providers, were tasked with embedding these practices into routine patient management, thereby establishing their role as frontline defenders in infection prevention.

Infection control has also expanded from a purely clinical focus to a broader systems approach. Beyond simple hand hygiene or equipment sterilization, IPC now involves surveillance systems, antibiotic stewardship, and hospital-wide safety protocols. Nurses are not only implementers of these measures but also monitors and educators who ensure compliance among patients, visitors, and other healthcare staff (Adeyinka, 2020). Their constant vigilance in enforcing infection control safeguards ensures that theoretical guidelines are translated into everyday practice.

A major dimension of infection control is surveillance. Nurses contribute by monitoring infection rates, identifying unusual patterns, and reporting emerging outbreaks to infection control committees (Metcalfe et al., 2019). Their continuous patient interactions enable early detection of warning signs, allowing for rapid interventions. This surveillance role is particularly critical during pandemics, when timely recognition of infection clusters can prevent hospital-wide transmission.

Hand hygiene has long been recognized as the most effective measure to prevent pathogen transmission. Nurses not only practice proper handwashing but also promote compliance among colleagues and visitors. Educational campaigns led by nurses have been shown to significantly improve adherence to hygiene standards, directly reducing infection incidence (AlDubayan et al., 2019). During outbreaks such as SARS, Ebola, and COVID-19, strict hand hygiene practices reinforced by nurses were indispensable in curbing transmission.

Personal protective equipment (PPE) further enhances infection control. Nurses are responsible for ensuring that masks, gloves, gowns, and face shields are used correctly, according to risk level and pathogen type (Xie et al., 2019). They act as role models for PPE compliance, particularly during outbreaks when proper usage is critical. Their leadership reinforces a culture of safety and accountability in hospital environments.

Another essential responsibility is aseptic technique during invasive procedures. Nurses oversee the sterile management of catheters, intravenous lines, and surgical dressings, reducing the risk of bloodstream infections and surgical complications (Miranda et al., 2020). By adhering to strict protocols, nurses prevent contamination that could otherwise have life-threatening consequences. Their meticulous practice highlights the indispensable role of nursing in safeguarding patients during routine and high-risk care.

Patient education is also foundational to infection prevention. Nurses educate patients and their families on hygiene, wound care, and medication adherence to reduce infection risks post-discharge (Zhao et al., 2019). This teaching role empowers patients to participate actively in their recovery and decreases readmission rates due to preventable infections. Nurses thereby extend the scope of infection control beyond the hospital into community settings.

In high-risk areas such as intensive care units (ICUs) and emergency departments, nurses face heightened infection control challenges. These settings involve frequent use of invasive devices like ventilators and urinary catheters, which increase susceptibility to infections (Avallato, Nicoletti & Locatelli, 2019). Nurses in these environments must demonstrate exceptional vigilance, continuously monitoring for early signs of infection and intervening rapidly to prevent complications.

The psychological dimension of infection control cannot be overlooked. Nurses often bear the emotional burden of managing highly infectious patients, fearing not only for their own safety but also for the risk of transmitting infections to family members. This stress can contribute to burnout, depression, and reduced work performance (Olver et al., 2020). Supporting nurses through mental health services, peer support, and adequate rest is therefore vital to maintaining their effectiveness in infection prevention.

Infection control is a collective effort requiring collaboration across disciplines. Nurses act as the link between patients, physicians, infection control specialists, and ancillary staff, ensuring seamless communication and consistent application of protocols (Liu, Liu & Ji, 2020). This collaborative role highlights their unique position in bridging gaps and fostering a unified approach to infection prevention.

Finally, infection control cannot be achieved without systemic support. Nurses often face obstacles such as limited supplies, resistance to protocol compliance, and insufficient training opportunities. Despite these challenges, their commitment and adaptability enable them to continue protecting patients from preventable harm (Voos et al., 2020). By acknowledging and reinforcing their frontline role, healthcare institutions can create environments where infection prevention becomes an integral, sustainable part of patient care.

In conclusion, the foundation of nursing in infection prevention rests on a combination of history, evidence-based practice, surveillance, patient education, and collaboration. Nurses' proximity to patients positions them uniquely to lead infection control initiatives. As the healthcare landscape continues to evolve, the contributions of nurses will remain essential to safeguarding public health and reducing the burden of HAIs (Barnard et al., 2019).

Chapter 2: Essential Duties of Nurses in Hospital Infection Control

Nurses serve as the cornerstone of infection control in healthcare facilities due to their

continuous and direct contact with patients. Their daily responsibilities extend beyond basic care, encompassing the enforcement of evidence-based infection prevention measures that safeguard both individuals and wider hospital communities. By consistently applying these measures, nurses not only protect vulnerable patients but also contribute to organizational safety cultures and national infection control goals (Zarei et al., 2019).

One of the most fundamental responsibilities is ensuring hand hygiene. Nurses model correct handwashing techniques using soap and water or alcohol-based hand rubs, depending on clinical situations. They also act as monitors by reminding colleagues and educating visitors about compliance (Cacciatore et al., 2019). Given that poor adherence to hand hygiene remains a persistent global issue, nurses' vigilance and educational efforts are essential to reducing pathogen transmission.

Beyond hand hygiene, nurses are responsible for the correct use of personal protective equipment (PPE). This includes selecting appropriate PPE—such as gloves, masks, gowns, and respirators—based on the type of exposure risk (Xie et al., 2019). Nurses also supervise the proper donning and doffing procedures, which are critical to preventing self-contamination. Their consistent modeling of PPE use reinforces adherence among peers and provides reassurance to patients.

Environmental hygiene is another key duty under nursing supervision. Nurses often oversee the disinfection of high-touch surfaces such as bed rails, monitors, and infusion pumps. They collaborate with environmental services staff to ensure cleaning protocols are followed consistently and disinfectants are used appropriately (Kim, Chang & Kim, 2019). During outbreaks like Clostridioides difficile, nurses play an especially critical role in enforcing enhanced cleaning regimens to limit environmental reservoirs of infection.

Patient education is a central aspect of nurses' infection control duties. They instruct patients on practices such as respiratory hygiene, catheter care, and wound management (Panteli et al., 2022). For immunocompromised patients, nurses tailor education to minimize exposure risks in both hospital and home environments. Clear and simple explanations help patients adhere to hygiene practices, ultimately reducing complications and hospital readmissions.

Education responsibilities extend beyond patients to include healthcare staff. Nurses organize training sessions on aseptic techniques, safe handling of contaminated equipment, and adherence to updated infection control policies (Wondie et al., 2019). For newly recruited staff, nurses ensure thorough orientation on infection prevention standards, reinforcing a strong foundation for safe practice. Their leadership in continuous education creates a knowledgeable and compliant workforce.

Nurses also play a pivotal role in implementing and monitoring isolation protocols. Based on infection risk, they identify patients who require contact, droplet, or airborne precautions. They ensure isolation signage, appropriate PPE supplies, and visitor education are in place (Cha et al., 2019). Moreover, nurses monitor adherence to these precautions by staff and provide psychological support to patients in isolation, reducing anxiety and promoting cooperation (Shelton, Hecht & Slee, 2019).

Surveillance and data collection constitute another essential duty. Nurses observe for early signs of infection, record relevant clinical indicators, and report findings to infection control committees. This ongoing surveillance helps identify potential outbreaks and supports evidence-

based interventions (Huette et al., 2020). By being the "eyes and ears" of infection control, nurses contribute invaluable insights for institutional safety strategies.

In high-risk situations such as outbreaks, nurses assume additional duties. They participate in emergency response planning, coordinate contact tracing, and implement quarantine measures where necessary (Whitehouse et al., 2019). Their ability to adapt quickly and maintain composure under pressure enhances the hospital's capacity to contain infectious threats effectively.

Device-associated infections remain a persistent challenge in hospitals, and nurses are essential in preventing them. They follow protocols for catheter insertion, central line care, and ventilator management to minimize infection risk (Fairhall et al., 2022). Nurses' vigilance in maintaining aseptic conditions during procedures directly impacts patient outcomes, reducing the incidence of central line–associated bloodstream infections and ventilator-associated pneumonia.

Auditing and compliance monitoring are additional duties performed by nurses. They conduct periodic checks on hand hygiene adherence, PPE usage, and sterilization practices (Li et al., 2020). By identifying gaps in practice, nurses recommend targeted interventions such as refresher training or adjustments to workflow. These audits foster accountability and continuous improvement in infection prevention.

Nurses also act as advocates for effective infection control policies. Drawing from frontline experience, they provide feedback to hospital administrators on practical challenges and resource needs (Dubbs & Sommerkamp, 2019). For instance, they may highlight shortages in PPE or recommend changes to patient flow systems to reduce cross-contamination risks. Their advocacy ensures that policies are grounded in real-world practice.

Collaboration is another key responsibility. Nurses work closely with physicians, pharmacists, and environmental services staff to develop and implement infection control strategies (Dong & Chen, 2020). In antimicrobial stewardship programs, nurses monitor antibiotic use, educate patients, and communicate observations about resistance patterns. Such collaboration ensures a cohesive, multidisciplinary approach to infection prevention.

Finally, nurses play a role in fostering a culture of safety. They encourage open discussions about infection risks, support colleagues in adhering to best practices, and recognize individuals who demonstrate exemplary compliance (Esterhuizen et al., 2019). By promoting accountability and teamwork, nurses help build an environment where infection control is a shared responsibility.

In summary, the essential duties of nurses in hospital infection control encompass hygiene enforcement, PPE supervision, environmental management, patient and staff education, isolation implementation, surveillance, and advocacy. These responsibilities extend across clinical, managerial, and educational domains, underscoring the multifaceted contributions of nurses to patient safety. Without their consistent and proactive involvement, infection prevention measures would remain fragmented and far less effective (Lewis et al., 2021).

Chapter 3: Barriers and Difficulties in Nursing Practice for Infection Prevention

Although nurses play a central role in infection control, they face a wide range of challenges that hinder the consistent application of infection prevention measures. These barriers exist at

individual, institutional, and systemic levels, making it difficult for nurses to fully implement best practices. Addressing these obstacles is essential for strengthening infection control strategies and ensuring safe healthcare environments (Lin et al., 2019).

One of the most prominent challenges is the shortage of personal protective equipment (PPE), particularly during times of crisis. The COVID-19 pandemic highlighted how supply chain disruptions left frontline staff without adequate masks, gloves, and gowns. Nurses often had to reuse disposable PPE or resort to improvised alternatives, undermining safety and increasing the risk of transmission (De Waele & Dhaese, 2019). Such shortages compromise both patient and nurse safety.

Staffing shortages represent another significant difficulty. Hospitals often operate with fewer nurses than required, forcing them to balance infection control duties with direct patient care responsibilities (Ricci et al., 2019). This increased workload leads to fatigue and burnout, reducing attention to infection control details. During outbreaks, shortages are magnified, further weakening the ability of healthcare facilities to contain infections effectively (Ellis et al., 2019).

Psychological stress is a major barrier that impacts nurses' ability to perform infection control. Fear of contracting infections and transmitting them to family members adds emotional strain to already demanding workloads. Prolonged exposure to such stress contributes to burnout, depression, and even post-traumatic stress disorder (Hua-ping, 2020). Without adequate psychological support, nurses may struggle to maintain vigilance in infection control practices.

The physical demands of infection control also create challenges. Wearing PPE for extended shifts can cause skin breakdown, dehydration, and fatigue. Frequent patient handling and long working hours exacerbate musculoskeletal strain and increase the risk of occupational injuries (Cassini et al., 2019). These physical burdens reduce nurses' stamina and effectiveness in adhering to rigorous infection prevention standards.

Balancing infection control responsibilities with primary patient care is another difficulty. Nurses must often choose between performing time-intensive infection prevention procedures and addressing urgent clinical needs (Carrasco-Garcia et al., 2019). This tension can lead to lapses in infection control, particularly during emergencies, where immediate patient stabilization takes precedence over strict hygiene protocols.

Training gaps represent an additional barrier. In many healthcare facilities, infection control training is either insufficient or outdated. Emerging pathogens, evolving treatment methods, and new guidelines require ongoing education, yet many nurses lack access to standardized, updated training (Karimi et al., 2019). Without consistent knowledge, adherence to infection control protocols becomes uneven and vulnerable to error.

Even when training is available, accessibility is often limited. Nurses working in rural or resource-constrained settings may not have opportunities for professional development, while those in busy hospitals may lack time to attend training sessions (Rahel et al., 2020). E-learning and simulation-based programs can mitigate these barriers, but investment and institutional support are necessary to make them widely accessible (Júnior et al., 2020).

Adherence to infection control protocols is difficult to sustain in busy healthcare environments. Nurses under pressure may skip steps, particularly with hand hygiene, when workloads are high (Kani et al., 2019). Inconsistent enforcement of policies and lack of accountability mechanisms

further weaken compliance. This highlights the need for a culture of safety where infection prevention is non-negotiable and supported by leadership (Palmer, 2019).

Communication breakdowns pose another barrier. Misunderstandings between nurses, physicians, and other staff can result in incorrect isolation procedures or improper PPE use (Faith et al., 2019). Language barriers and unclear instructions amplify these risks. Structured communication frameworks such as SBAR (Situation, Background, Assessment, Recommendation) can enhance clarity and reduce preventable errors (Melese, 2019).

Resistance to change within healthcare organizations complicates infection control efforts. Nurses may encounter colleagues reluctant to adopt updated protocols or technologies due to skepticism, fear of additional workload, or entrenched habits (Mehta et al., 2020). Overcoming resistance requires effective change management, stakeholder engagement, and demonstration of the benefits of new practices (Fernandes Agreli et al., 2019).

Lack of institutional support is another persistent challenge. Nurses may feel unsupported when resources are scarce, staffing is inadequate, and recognition is limited (Ko et al., 2019). This lack of organizational commitment undermines morale and weakens infection control adherence. Providing regular feedback, public recognition, and tangible support for nurses strengthens their resilience during crises (Leinweber et al., 2019).

Public resistance to infection control measures also creates barriers for nurses. Patients or families may distrust healthcare institutions, refuse isolation protocols, or resist vaccination recommendations (Tenaw et al., 2019). Nurses often spend additional time addressing misinformation and negotiating compliance, adding strain to their workload. Public health campaigns are necessary to improve awareness and reduce resistance.

Financial limitations and inadequate infrastructure exacerbate infection control difficulties, particularly in resource-limited settings. Hospitals without sufficient funding may lack proper sterilization equipment, isolation rooms, or advanced surveillance technologies (Mohsen, Riad & Badawy, 2020). Nurses working in such environments must often improvise, which increases risks and reduces overall effectiveness.

Leadership gaps also contribute to infection control challenges. Without strong nurse managers and administrators advocating for infection prevention, policies may remain underdeveloped or poorly enforced (Saraiva et al., 2020). Training programs for nurse leaders can empower them to support their teams, ensure resource allocation, and foster accountability (Tadesse, Gessessew & Medhanyie, 2019).

In summary, nurses encounter multifaceted barriers in their infection prevention responsibilities, including resource shortages, staffing deficits, psychological and physical strain, training gaps, communication issues, and lack of institutional support. These challenges threaten both nurse well-being and patient safety. Overcoming them requires systemic reforms, leadership engagement, continuous education, and public collaboration. Strengthening support for nurses ensures that infection control measures are consistently implemented, sustaining resilient healthcare systems in the face of infectious threats (Sartelli et al., 2019).

Chapter 4: Advancements and Nurse-Led Approaches in Infection Control

The field of infection prevention has evolved considerably, with nurses playing a leading role in implementing innovative strategies to reduce healthcare-associated infections (HAIs). As healthcare settings become more complex, nursing practice has shifted from routine bedside care to proactive, technology-driven, and leadership-oriented roles in infection control. These advancements highlight the dynamic capacity of nurses to adapt and innovate in order to meet emerging challenges (Swan et al., 2019).

One significant advancement is the integration of evidence-based guidelines into daily nursing practice. International standards, such as those promoted by the World Health Organization (WHO), provide structured approaches for hand hygiene, sterilization, and patient isolation. Nurses act as enforcers and educators, ensuring that guidelines are followed consistently. By contextualizing these standards for specific patients, nurses bridge the gap between policy and practice, increasing compliance and patient safety (Negida & Raslan, 2019).

Technology has also revolutionized infection control. Electronic surveillance systems allow real-time monitoring of infection trends and early identification of outbreaks. Nurses often take responsibility for reviewing these systems, flagging anomalies, and alerting infection control teams to emerging risks (Ferreira et al., 2020). Mobile applications that track hand hygiene compliance or provide checklists for aseptic procedures further empower nurses to maintain high standards of infection prevention.

Telehealth platforms represent another innovative tool for nurses. During pandemics such as COVID-19, remote monitoring and consultations reduced unnecessary hospital visits, thereby minimizing infection risks (Suso Martí et al., 2021). Nurses adapted to these platforms to provide patient education, infection prevention advice, and follow-up care virtually. This shift not only enhanced infection control but also improved accessibility for patients in remote areas.

Nurses are central figures in antimicrobial stewardship programs, which combat antibiotic resistance by promoting the rational use of antimicrobials. They educate patients about completing antibiotic courses, identify adverse reactions, and collaborate with pharmacists and physicians to monitor appropriate prescribing (Solomon, 2019). Their observations at the bedside provide essential data to prevent misuse, helping to curb the global threat of antimicrobial resistance (Ripollés-Melchor et al., 2020).

Education remains a key nurse-led advancement. Training workshops, interactive sessions, and bedside teaching have significantly improved healthcare workers' compliance with infection control measures. Nurses frequently design educational campaigns that combine theoretical knowledge with practical demonstrations, ensuring greater retention and application of infection control practices (Schoenfeld & Grgic, 2020). By acting as educators, nurses reinforce a culture of accountability in healthcare facilities.

Innovative nurse-driven campaigns have demonstrated measurable outcomes in reducing HAIs. For example, hand hygiene campaigns incorporating posters, reminders, and compliance audits have increased adherence from below 70% to above 90% in some hospitals, leading to substantial reductions in infection rates (Liao et al., 2019). Nurses' leadership, role-modeling, and constructive feedback were central to the success of these initiatives (Smith et al., 2020).

Isolation practices have also benefitted from nurse-led innovations. In response to rising Clostridioides difficile infections, some nursing teams developed standardized isolation kits placed at patient room entrances. These kits included PPE and step-by-step instructions,

simplifying workflows and improving compliance (Zelle & Stahel, 2019). Such practical, nurse-driven interventions demonstrate how frontline insights can be transformed into systemic solutions with lasting impact (Bodewein et al., 2019).

Environmental disinfection has advanced with the introduction of ultraviolet (UV) light and hydrogen peroxide vapor systems. Nurses, often responsible for coordinating with environmental services, have championed the adoption of these technologies in high-risk areas. Their advocacy for UV disinfection has been associated with significant reductions in multidrug-resistant organism contamination (Holsgaard-Larsen et al., 2020). Nurses' frontline observations ensure these technologies are implemented efficiently and effectively.

Another advancement is the use of simulation-based training for infection control. Simulation scenarios replicate high-risk clinical situations, such as outbreaks, allowing nurses to practice rapid decision-making, PPE use, and isolation protocols in controlled environments. This experiential learning enhances preparedness, reduces errors, and builds confidence among nursing staff (Jordan et al., 2019).

Innovation also extends to problem-solving at the bedside. Nurses have introduced creative strategies such as color-coded alert systems for infectious patients, reducing the risk of accidental exposure during handoffs or transfers (Mukagendaneza et al., 2019). These practical solutions, developed from daily experience, underscore the adaptability and ingenuity of nursing practice in infection control.

Future-oriented advancements are increasingly tied to digital health and artificial intelligence (AI). Predictive analytics powered by AI can identify potential outbreaks before they spread widely. Nurses trained to interpret these tools can act swiftly to implement targeted interventions, transforming infection control from reactive to preventive (Miller et al., 2019). Their integration of technology into practice ensures faster, data-driven decision-making.

The psychological support of patients in infection prevention has also seen nurse-led innovation. During strict isolation measures, nurses facilitated video calls and introduced therapeutic communication techniques to reduce patient anxiety (Patel et al., 2022). Such approaches improved patient adherence to isolation protocols, demonstrating how compassionate nursing care enhances compliance and infection outcomes simultaneously.

Policy advocacy represents another frontier for nurse-led advancement. Drawing from their clinical experience, nurses influence hospital infection control committees and contribute to national policy discussions. Their advocacy has led to improved hand hygiene monitoring, allocation of PPE, and standardized infection control training programs (Dubbs & Sommerkamp, 2019). By participating in policymaking, nurses ensure that guidelines remain practical, evidence-based, and patient-centered.

In summary, nurse-led advancements in infection control encompass evidence-based guideline enforcement, adoption of technology, antimicrobial stewardship, educational campaigns, innovative bedside practices, and policy advocacy. These strategies have proven effective in reducing HAIs and strengthening healthcare systems' resilience. As healthcare evolves, nurses' capacity to innovate ensures that infection prevention remains a dynamic and adaptive discipline (Blumenthal, 2019).

Chapter 5: Future Pathways and Strategic Recommendations for Nursing in Infection Control

The future of infection prevention in healthcare relies heavily on empowering nurses to expand their contributions across clinical, managerial, educational, and policy domains. As the largest segment of the healthcare workforce, nurses are uniquely positioned to drive systemic changes that strengthen patient safety. Looking forward, strategic recommendations must focus on continuous education, resource allocation, leadership development, technological integration, and global collaboration (Berger et al., 2019).

Ongoing professional education remains a top priority. Nursing curricula must integrate comprehensive infection prevention modules that equip future nurses with the skills necessary to respond to evolving pathogens (De Jonge et al., 2019). For practicing nurses, periodic workshops, refresher courses, and online training should be mandated to ensure knowledge is up to date. Simulation-based programs are particularly effective in reinforcing practical infection control skills under realistic conditions.

Resource availability is another critical future focus. Many challenges in infection control stem from inadequate supplies of PPE, disinfectants, and sterile equipment. Policymakers and hospital administrators must commit to adequate funding, stockpiling, and equitable distribution of essential resources across all healthcare facilities (Ahmed & Abdou, 2019). Ensuring a reliable supply chain allows nurses to maintain high standards without improvisation, even during public health crises.

Leadership development is vital to empowering nurses in infection prevention. By providing mentorship, leadership training, and management opportunities, healthcare systems can prepare nurses to occupy influential roles in infection control committees and policy boards (Ikuta, Nagata & Iwasaki, 2019). Nurse leaders serve as advocates for frontline staff, bridging the gap between clinical practice and administrative decision-making.

Strategic recommendations also emphasize the importance of supportive workplace cultures. Hospitals must prioritize staffing levels, reasonable workloads, and mental health resources to reduce burnout and enhance resilience among nurses (Amarilla-Donoso, Roncero-Martín & Lavado-García, 2020). Establishing peer support programs, counseling services, and recognition initiatives ensures that infection control responsibilities remain sustainable over the long term.

Preparedness for emerging infectious diseases requires a proactive approach. Simulation drills, outbreak-response training, and partnerships with public health institutions should become routine in healthcare facilities (Tiwari et al., 2020). Nurses trained in early detection, rapid isolation, and contact tracing will be better equipped to contain outbreaks effectively. Proactive preparedness minimizes chaos during crises and strengthens systemic resilience.

Technological integration represents another key pathway. Advances in artificial intelligence (AI), predictive analytics, and digital surveillance offer new opportunities for infection control. Nurses trained to use these tools can identify infection trends early, predict outbreak hotspots, and implement targeted interventions (Ye et al., 2020). Incorporating wearable sensors and mobile applications into daily practice further enhances compliance monitoring and patient engagement.

Telehealth will continue to play a transformative role. By offering remote education, monitoring, and consultation, telehealth platforms allow nurses to minimize unnecessary hospital visits and

reduce infection risks (Zeren, Cakir & Gurses, 2019). Expanding nurses' roles in telehealth ensures equitable access to infection prevention education, especially for rural and underserved populations.

Global collaboration must also be prioritized. Infectious diseases are not confined by borders, making international cooperation essential. Nurses should be encouraged to participate in cross-border networks, global training initiatives, and international conferences to share best practices and lessons learned (Boga, 2019). Collaborative efforts under organizations such as the World Health Organization (WHO) strengthen global preparedness and standardize infection control guidelines.

Policy advocacy is a crucial future role for nurses. Their frontline insights provide a practical perspective that is invaluable in shaping effective infection control policies. Nurses should be empowered to engage in policy dialogues, advocating for equitable resource allocation, stronger surveillance systems, and inclusive infection prevention legislation (Belli & Tabocchini, 2020). Such involvement elevates nursing voices in health governance and ensures that policies reflect real-world needs.

Strengthening accountability systems is another strategic recommendation. Regular audits, transparent reporting, and continuous feedback mechanisms must be institutionalized to track compliance with infection control protocols (Ackley et al., 2020). Nurses should be supported in reporting lapses without fear of reprisal, fostering a culture of openness and learning rather than punishment. Celebrating compliance achievements also motivates staff to maintain high standards.

Patient and family engagement will remain central to future infection control strategies. Nurses should lead initiatives that involve patients in their own safety, such as teaching wound care, proper hygiene, and medication adherence. Empowering patients not only reduces infection risks but also fosters trust in healthcare systems (Zhao & Davis, 2019). Family education programs further extend the reach of infection control into community settings.

Research and innovation must also be supported. Nurses should be encouraged to participate in infection control research, contributing to evidence-based practice and innovation. By documenting nurse-led interventions and publishing outcomes, the nursing profession can influence practice guidelines globally (Neuman et al., 2020). Research funding and academic collaborations provide the foundation for continued advancement in infection prevention.

Future strategies must also address disparities in infection control across different regions. Rural hospitals and resource-limited countries often lack infrastructure and staffing to implement robust infection prevention programs. International aid, targeted funding, and capacity-building initiatives can ensure equity in infection prevention, reducing global disparities in patient safety (Baixinho, Presado & Ribeiro, 2019).

Finally, the future of infection control depends on creating resilient healthcare systems where nurses are supported, empowered, and recognized. By combining continuous education, resource investment, leadership development, and global cooperation, healthcare systems can position nurses as leaders in infection prevention. These pathways ensure that infection control remains dynamic, adaptable, and sustainable in the face of evolving infectious threats (Gryczka et al., 2020).

In conclusion, the future of nursing in infection control lies in strengthening education, ensuring adequate resources, fostering leadership, integrating technology, and embracing global collaboration. By implementing these strategic recommendations, healthcare systems can support nurses in their indispensable role as frontline defenders against infection, securing safer environments for patients and communities worldwide (Date, Panthula & Bolina, 2021).

References

Abt, E.; Carr, A.B.; Worthington, H.V. (2019): WITHDRAWN: Interventions for replacing missing teeth: Partiallyabsent dentition.Cochrane Database Syst. Rev.2019,7, CD003814.

Ackley, B. J., Ladwig, G. B., Makic, M. B., Martinez-Kratz, M. R., & Zanotti, M. (2020): Nursing diagnoses handbook: An evidence-based guide to planning care. St. Louis, MO: Elsevier.

Adewuyi EO, Auta A, Khanal V, et al. (2019): Cesarean delivery in Nigeria: prevalence and associated factors—a population-based crosssectional study. BMJ Open.2019;9:e027273.

Adeyinka,O.O.(2020): Occupational Radiation Exposures in Aviation: Air Traffic Safety Systems Considerations Systems Considerations. 20(11), 3211-3219.

Ahmed and A. M. Abdou, (2019): Diagnostic accuracy ofCA125 and HE4 in ovarian carcinoma patients and the effectof confounders on their serum levels, Current Problems inCancer, vol. 43, no. 5, pp. 450–460, 2019.

Akyol ,A., Yagcı ,S.G .,& Tekirdag, A.İ. (2019) :The comparison of type and properties of delivery between health workers and nonhealth workers. JOPP 3(2):55-63.

AlDubayan, S. H., Pyle, L. C., Gamulin, M., Kulis, T., Moore, N. D., Taylor-Weiner, A& Lessel, D. (2019): Association of Inherited Pathogenic Variants in Checkpoint Kinase 2 (CHEK2) With Susceptibility to Testicular Germ Cell Tumors. JAMA Oncology.

Alingh, C.W.; van Wijngaarden, J.D.; van de Voorde, K.; Paauwe, J.; Huijsman, R. (2019): Speaking up about patient safety concerns: The influence of safety management approaches and climate on nurses' willingness to speak up. BMJ Qual. Saf. 2019, 28, 39–48.

Al-Qurayshi, Z.; Walsh, J.; Owen, S.; Kandil, E. (2019): Surgical site infection in head and neck surgery: A nationalperspective.Otolaryngol. Head Neck Surg.2019,161, 52–62.

Amarilla-Donoso FJ, Roncero-Martín R, Lavado-García J, (2020): Impact of a Postoperative Intervention Educational Program on the Quality of Life of Patients with Hip Fracture:17(24):9327.

Ashdown-Franks, G.; Vancampfort, D.; Firth, J.; Veronese, N.; Jackson, S.E.; Smith, L.; Stubbs, B.; Koyanagi, A. (2019):Leisure-Time Sedentary Behavior and Obesity Among 116,762 Adolescents Aged 12-15 Years from 41Low-and Middle-Income Countries.Obesity2019,27, 830–836.

Avallato, C., Nicoletti, I., & Locatelli, A. (2019):General hemodynamic assessment. In Textbook of Echocardiography for Intensivists and Emergency Physicians (pp. 257-268). Springer, Cham.

Baczynska, K.A.; Brown, S.; Chorley, A.C.; Lyachev, A.; Wittlich, M.; Khazova, M.(2020): Measurements ofUV—A Exposure of Commercial Pilots Using Genesis-UV Dosimeters.Atmosphere2020,11, 475.

Baixinho, C.L.; Presado, M.H.; Ribeiro, J. (2019): Qualitative research and the transformation of public health. Cien. Saude Colet. 2019,24, 1583.

Barnard, S.G.R.; McCarron, R.; Moquet, J.; Quinlan, R.; Ainsbury, E.(2019): Inverse dose-rate effect of ionisingradiation on residual 53BP1 foci in the eye lens.Sci. Rep.2019,9, 10418.

Belli, M.; Tabocchini, M.A.(2020): Ionizing Radiation-Induced Epigenetic Modifications and Their Relevance toRadiation Protection.Int. J. Mol. Sci.2020,21, 5993.

Berger, T.; Marsalek, K.; Aeckerlein, J.; Hauslage, J.; Matthiä, D.; Przybyla, B.; Rohde, M.; Wirtz, M.(2019): The German Aerospace Center M-42 radiation detector—A new development for applications in mixedradiation fields.Rev. Sci. Instrum.2019,90, 125115.

Blumenthal ,P,D. (2019): Reflections on the WHI findings: avoiding a pill scare and taking sensible steps forward. Medscape women's health.;7(4):6.

Bodewein, L.; Schmiedchen, K.; Dechent, D.; Stunder, D.; Graefrath, D.; Winter, L.; Kraus, T.; Driessen, S.(2019): Systematic review on the biological effects of electric, magnetic and electromagnetic fields in the intermediatefrequency range (300 Hz to 1 MHz).Environ. Res.2019,171, 247–259.

Boga, S.M. (2019): Nursing Practices in the Prevention of Post- Operative Wound Infection in Accordance with Evidence-Based Approach. International Journal of Caring Sciences, 12(2), 1228.

Bohon ,A,S.(2020):Evaluation of the Care and Communication Bundle to Improve Evaluation of the Care and Communication Bundle to Improve Palliative Care in Intensive Care Units Palliative Care in Intensive Care Units. Graduate Theses, Dissertations, and Problem Reports. 7760. PP23-54.

Bouzarjomehri, F.; Dad, V.; Hajimohammadi, B.; Shirmardi, S.P.; Yousefi-Ghaleh Salimi, A.(2020): The effectof electron-beam irradiation on microbiological properties and sensory characteristics of sausages.Radiat. Phys. Chem.2020,168, 108524.

Cacciatore, G.; Ugolini, A.; Sforza, C.; Gbinigie, O.; Pluddemann, A. (2019): Long-Term effects of functional appliancesin treated versus untreated patients with Class II malocclusion: A systematic review and meta-analysis.PLoS ONE2019,14, e0221624.

Calle Jimenez, T.; Sanchez Gordon, S.; Rybarczyk, Y.; Jadán, J.; Villarreal, S.; Esparza,W.; Acosta Vargas, P.; Guevara, C.; Nunes, I.L. (2019): Analysis and Improvement of the web accessibility of a telerehabilitation platform for hip arthroplasty patients. In Advances inHuman Factors and Systems Interaction; AHFE 2018. Advances in Intelligent Systems and Computing; Nunes, I., Ed.; Springer: Orlando, FL, USA, 2019; Volume 781, pp. 233–245.

Carrasco-Garcia, A.; Castellanos-Cosano, L.; Corcuera-Flores, J.R.; Rodriguez-Perez, A.; Torres-Lagares, D.;Machuca-Portillo, G. (2019): Influence of marginal bone loss on peri-implantitis: Systematic review of literature.J.Clin. Exp. Dent.2019,11, e1045–e1071.

Cassini ,A., Högberg, L,D., Plachouras, D., Quattrocchi, A., Hoxha ,A., Simonsen, G,S.,et al. (2019): Attributable deaths and disability-adjusted life-years caused byinfections with antibiotic-resistant bacteria in the EU and the EuropeanEconomic Area in 2015: a population-level modelling analysis. Lancet InfectDis. 2019;19:56–66.

Cha YH, Lee YK, Koo KH, Wi C, Lee KH. (2019): Difference in Mortality Rate by Type of Anticoagulant in Elderly Patients with Cardiovascular Disease after Hip Fractures. Clin Orthop Surg. 2019 Mar;11(1):15-20.

Date, A.; Panthula, M.; Bolina, A. (2021): Comparison of Clinical and Radiological Outcomes in Intertrochanteric Fractures Treated with InterTAN Nail against Conventional Cephalomedullary Nails: A Systematic Review. Future Sci. OA 2021,7, FSO668.

De Jonge, S,W., Boldingh, Q,J,J., Koch,A,H., et al. (2019): Timing of preoperative antibiotic prophylaxis and surgical site infection: TAPAS, an observational cohort study. Ann Surg 2019.

De Waele, J,J.,& Dhaese, S. (2019): Antibiotic stewardship in sepsis management:toward a balanced use of antibiotics for the severely ill patient. Expert RevAnti Infect Ther. 2019;17:89–97.

Deanna ,J, A.(2019): Medical Decision Making among Individuals with a Variant of Uncertain Significance in a Hereditary Cancer Gene and those with a CHEK2 Pathogenic Variant, College of Public Health ,University of South Florida,PP9-33.

Dong, R.; Chen, H. (2020): Application of Functional Exercise Nursing Plan Based on Evidence-based Nursing after Hip Replacement.J. Clin. Nurs. Res. 2020, 4, 25–28.

Dotson,N,Q.(2020): Reducing Morbidity: Establishing a Relationship Between Perioperative Normothermia and Colon Surgical Site Infections.PP8-34.

DubbsSB,Sommerkamp SK. (2019): Evaluation and Management of Urinary Tract Infection in

theEmergencyDepartment.EmergMedClinNorthAm.2019;37(4):707–23.
Ellis, M.A.; Sterba, K.R.; Brennan, E.A.; Maurer, S.; Hill, E.G.; Day, T.A.; Graboyes, E.M. (2019): A systematic reviewof patient–reported outcome measures assessing body image disturbance in patients with head and neckcancer.Otolaryngol. Head Neck Surg.2019,160, 941–954.
Esterhuizen TM, et al. (2019): Maternal and neonatal outcomes after caesareandelivery in the African surgical outcomes study: a 7-day prospectiveobservational cohort study. Lancet Glob Health. 2019;7:e513–22.
Fairhall NJ, Dyer SM, Mak JC, Diong J, Kwok WS, Sherrington C (2022): "Interventions for improving mobility after hip fracture surgery in adults". The Cochrane Database of Systematic Reviews. 2022 (9): CD001704.
Faith A, et al. (2019): Indication and predictors for caesarean sections in Ghana and thebirth outcomes. Euro J Obstetrics Gynecology Reprod Biology. 2019;234:e1–e131.
Fernandes Agreli, H.; Murphy, M.; Creedon, S.; Bhuachalla, C.N.; O'Brien, D.; Gould, D.; Savage, E.; Barry, F.; Drennan, J.; Smiddy, M.P.; et al. (2019): Patient involvement in the implementation of infection prevention and control guidelines and associated interventions: A scoping review. BMJ Open 2019, 9, e025824.
Ferreira, B.A.L.S.; Gomes, T.J.B.; Baixinho, C.R.S.L.; Ferreira, O.M.R. (2020): Transitional care to caregivers of dependent older people:An integrative literature review. Rev. Bras. Enferm. 2020, 73, e20200394.
Gryczka, U.; Kameya, H.; Kimura, K.; Todoriki, S.; Migdał, W.; Bułka, S.(2020): Efficacy of low energy electron beamon microbial decontamination of spices.Radiat. Phys. Chem.2020,170, 108662.
Handoll HH, Cameron ID, Mak JC, Panagoda CE, Finnegan TP (2021):"Multidisciplinary rehabilitation for older people with hip fractures". The Cochrane Database of Systematic Reviews. 2021 (11): CD007125.
Haque, M.; McKimm, J.; Godman, B.; Abu Bakar, M.; Sartelli, M. (2019): Initiatives to reduce postoperative surgicalsite infections of the head and neck cancer surgery with a special emphasis on developing countries.ExpertRev. Anticancer Ther.2019,19, 81–92.
Hoang, S. C., Klipfel, A. A., Roth, L. A., Vrees, M., Schechter, S., & Shah, N. (2019): Colon and rectal surgery surgical site infection reduction bundle: To improve is to change. The American Journal of Surgery, 217(1), 40-45.
Holsgaard-Larsen, A.; Hermann, A.; Zerahn, B.; Mejdahl, S.; Overgaard, S. (2020): Effects of progressive resistance training prior to total HIP arthroplasty—A secondary analysis of a randomized controlled trial. Osteoarthr. Res. Soc. Int. 2020, 28, 1038–1045.
Hua-ping, S. (2020): An Analysis for the application of rapid rehabilitation surgery concept in the nursing satisfaction of the perioperative period of the elderly's hip arthroplasty. Med. Res. 2020, 2, 21–25.
Huette, P.; Abou-Arab, O.; Djebara, A.-E.; Terrasi, B.; Beyls, C.; Guinot, P.-G.; Havet, E.; Dupont, H.; Lorne, E.; Ntouba, A.; et al. (2020): Risk Factors and Mortality of Patients Undergoing Hip Fracture Surgery: A One-Year Follow-up Study. Sci. Rep. 2020, 10, 9607.
Ikuta Y, Nagata Y, Iwasaki Y. (2019): Preoperative radiographic features of trochanteric fractures irreducible by closed reduction. Injury. 2019;50:2014–21.
Iwata, E.; Hasegawa, T.; Yamada, S.I.; Kawashita, Y.; Yoshimatsu, M.; Mizutani, T.; Nakahara, H.; Mori, K.;Shibuya, Y.; Kurita, H.; et al. (2019): Effects of perioperative oral care on prevention of postoperative pneumoniaafter lung resection: Multicenter retrospective study with propensity score matching analysis.Surgery2019,165, 1003–1007.
Jordan, Z.; Lockwood, C.; Munn, Z.; Aromataris, E. (2019): The updated Joanna Briggs Institute Model

of Evidence-Based Healthcare.Int. J. Evid. Based Healthc. 2019, 17, 58–71.
Júnior, D.; Castro, A.; Fonseca, E.; Baptista, E.; Padial, M.; Rosemberg, L. (2020): Main complications of hip arthroplasty: Pictorial essay. Radiol. Bras. 2020, 53, 56–62.
Kani KK, Porrino JA, Mulcahy H, Chew FS. (2019): Fragility fractures of the proximal femur: review and update for radiologists. Skeletal Radiol. 2019 Jan;48(1):29-45.
Karimi Z, Behnammoghadam M, Rafiei H, et al. (2019):Impact of olive oiland honey on healing of diabetic foot: a randomized controlled trial.Clin Cosmet Investig Dermatol.2019;12:347–354.
Kim CH, Chang JS, Kim JW. (2019): Clinical outcomes of dynamic hip screw fixation of intertrochanteric fractures: comparison with additional anti-rotation screw use. Eur J Orthop Surg Traumatol. 2019 Jul;29(5):1017-1023.
Ko, Y.; Lee, Y.; Oh, E.; Choi, M.; Kim, C.; Sung, K.; Baek, S. (2019): Older adults with hip arthroplasty: An individualized transitional care program. Rehabil. Nurs. 2019, 44, 203–212.
Leinweber, K.A.; Columbo, J.A.; Kang, R.; Trooboff, S.W.; Goodney, P.P. (2019): A review of decision aids for patientsconsidering more than one type of invasive treatment.J. Surg. Res.2019,235, 350–366.
Lewis SR, Macey R, Eardley WG, Dixon JR, Cook J, Griffin XL (2021): "Internal fixation implants for intracapsular hip fractures in older adults". The Cochrane Database of Systematic Reviews. 2021 (3): CD013409.
Lewis SR, Macey R, Parker MJ, Cook JA, Griffin XL (2022): "Arthroplasties for hip fracture in adults". The Cochrane Database of Systematic Reviews. 2022 (2): CD013410.
Li P, Lv Y, Zhou F, Tian Y, Ji H, Zhang Z, et al. (2020): Medial wall fragment involving large posterior cortex in pertrochanteric femur fractures: a notable preoperative risk factor for implant failure. Injury. 2020;51:683–7.
Liao X, Ju Y, Liu G, Zhao X, Wang Y, Wang Y. (2019):Risk factors forpressure sores in hospitalized acute ischemic stroke patients.J StrokeCerebrovascDis.2019;28(7):2026–2030.
Limones, A.; Saez-Alcaide, L.M.; Diaz-Parreno, S.A.; Helm, A.; Bornstein, M.M.; Molinero-Mourelle, P. (2020): Medication-related osteonecrosis of the jaws (MRONJ) in cancer patients treated with denosumab VS.zoledronic acid: A systematic review and meta–analysis.Med. Oral Patol. Oral Cir. Bucal.2020,25, e326–e336.
Lin Yang1, Hao Yang2, Qian Chen3, Huarui Shen4, Zhihui Wang (2022) :Analysis of risk factors for 90-day mortality after surgery in elderly patients intertrochanteric fractures and a history of cardiovascular disease.
Lin, F., Gillespie, B.M., Chaboyer, W., Li, Y., Whitelock, K., Morley, N., & Marshall, A.P. (2019): Preventing surgical site infections: Facilitators and barriers to nurses' adherence to clinical practice guidelines-A qualitative study. Journal of clinical nursing, 28(9-10), 1643-1652.
Liu, W.; Liu, J.; Ji, G. (2020): Comparison of Clinical Outcomes with Proximal Femoral Nail Anti-Rotation versus InterTAN Nail for Intertrochanteric Femoral Fractures: A Meta-Analysis. J. Orthop. Surg. Res. 2020, 15, 500.
Martínez-Galiano, J.M.; Hernández-Martínez, A.; Rodríguez-Almagro, J.; Delgado-Rodríguez, M.;Gómez-Salgado, J. (2019): Relationship between parity and the problems that appear in the postpartum period.Sci. Rep.2019,9, 11763.
Matsuda, Y.; Karino, M.; Kanno, T. (2020): Development and Validation of the Oral Health–Related Self–EfficacyScale for Cancer Patients.J. Cancer Educ.2020.
Matthias, M. M., et al .(2020): Radiation in the Atmosphere—A Hazard to Aviation Safety?.pp24-55.
Meerkötter, R.; Schennetten, K .(2020): Validation of a radiative transfer model with measurements of UV radiationinside a commercial aircraft.J. Radiol. Prot.2020,40, 181–196.

Mehta C, Ali M, Mehta Y, George JV, Singh MK. (2019):MDRPU -anuncommonly recognized common problem in ICU: a point preva-lence study.J Tissue Viability.2019;28(1):35–39.

Mehta, S.; Hume, E.; Troxel, A.; Reitz, C.; Norton, L.; Lacko, H.; McDonald, C.; Freeman, J.; Marcus, N.; Volpp, K.G.; et al. (2020): Effect of Remote Monitoring on Discharge to Home, Return to Activity, and Rehospitalization after Hip and Knee Arthroplasty. A Randomized Clinical Trial. JAMA Netw. Open 2020, 3, e2028328.

Melese A. (2019): Magnitude of cesarean section delivery and its associated factorsamong mothers who gave birth at public hospitals in north wollo zone,northern Ethiopia. (Msc dissertation, Haramaya University); 2019.

Metcalfe D, Judge A, Perry DC, Gabbe B, Zogg CK, Costa ML (2019): "Total hip arthroplasty versus hemiarthroplasty for independently mobile older adults with intracapsular hip fractures". BMC Musculoskeletal Disorders. 20 (1): 226.

Miller, A.B., Sears, M.E., Morgan, L.L., Davis, D.L., Hardell, L., Oremus, M., & Soskolne, C.L. (2019): Risks to health and well-being from radio-frequency radiation emitted by cell phones and other wireless devices. Frontiers in Public Health, 7, 1-10.

Miranda, T.P.S.; Caldeira, S.; de Oliveira, H.F.; Iunes, D.H.; Nogueira, D.A.; Chaves, E.D.C.L.; de Carvalho, E.C. (2020): Intercessory prayer on spiritual distress, spiritual coping, anxiety, depression and salivary amylase in breastcancer patients during radiotherapy: Randomized clinical trial.J. Relig. Health2020,59, 365–380.

Mohsen, M. M., Riad, N. A., & Badawy, A. I. (2020): Compliance and Barriers Facing Nurses with Surgical Site Infection Prevention Guidelines. Open Journal of Nursing, 10(1), 15-33.0, 15-33.

Nisar Khattak, M., Muhammad, N., & Robinson, D. (2021). Understanding the interplay between support agencies and small and medium-sized enterprises in a conflict environment from an institutional theory perspective. Asia-Pacific Journal of Business Administration, 13(2), 256-271.

Neeser ,O., Branche ,A., Mueller, B.,& Schuetz, P. (2019): How to: implement procalcitonintesting in my practice. Clin Microbiol Infect. 2019;25:1226–30.

Negida, A., & Raslan, A. M. (2019): Invitation to the GNS-I Study; a Global Evaluation of Traumatic Brain Injury in Low-, Middle-, and High-income Countries. Advanced Journal of Emergency Medicine, 3(3), e21-e21.

Neuman MD, Feng R, Carson JL, Gaskins LJ, Dillane D, Sessler DI, et al. (2020): Spinal Anesthesia or General Anesthesia for Hip Surgery in Older Adults. The New England Journal of Medicine. 385 (22): 2025–2035.

O'Brien ,W,J., Gupta, K.,& Itani ,K,M,F. (2019): Association of postoperative infection with risk of long-term infection and mortality. JAMA Surg2019:1–8.

Olver, I.; Keefe, D.; Herrstedt, J.; Warr, D.; Roila, F.; Ripamonti, C.I. (2020): Supportive care in cancer—A MASCCperspective.Support. Care Cancer2020,28, 3467–3475.

Palmer, V, M. (2019): Staff Education Program to Promote Breast Cancer Prevention Among African American Women, College of Nursing, Walden University,pp3-94.

Panteli, M.; Vun, J.S.H.; West, R.M.; Howard, A.; Pountos, I.; Giannoudis, P.V. (2022): Subtrochanteric Femoral Fractures and Intramedullary Nailing Complications: A Comparison of Two Implants. J. Orthop. Traumatol. 2022, 23, 27.

Patel R, Judge A, Johansen A, Marques EM, Griffin J, Bradshaw M, et al. (2022): "Multiple hospital organisational factors are associated with adverse patient outcomes post-hip fracture in England and Wales: the REDUCE record-linkage cohort study". Age and Ageing. 51 (8).

Popovich, K. J., Calfee, D. P., Patel, P. K., Lassiter, S., Rolle, A. J., Hung, L., Chopra, V. (2019): The Centers for Disease Control and Prevention STRIVE initiative: Construction of a national program to

reduce health care–associated infections at the local level. Annals of Internal Medicine, 171(7_Supplement), S2- S6.
Rahel, M., Awole ,S., Teshome ,G., Tangut ,D ., & Addisu , G.(2020): Prevalence and root causes of surgical siteinfections at an academic trauma and burncenter in Ethiopia: a cross-sectional study.PP33-66.
Raphael, M.; Jaeger, M.; van Vlymen, J. (2021): Easily adoptable total joint arthroplasty program allows discharge home in two days. Can.J. Anaesth. 2021, 58, 902–910.
Rapp K, Büchele G, Dreinhöfer K, Bücking B, Becker C, Benzinger P (2019): "Epidemiology of hip fractures : Systematic literature review of German data and an overview of the international literature". Zeitschrift für Gerontologie und Geriatrie. 52 (1): 10–16.
Rechmann, P. (2019): Caries Management by Risk Assessment — Guidelines To Improve Caries Risk Level Assignments. Clifornia Dental Association Journal;47(1):49-55.
Ricci, M.J.; McAndrew, C.M.; Miller, A.N.; Kamath, G.; Ricci,W.M. (2019): Are Two-Part Intertrochanteric Femur Fractures Stable and Does Stability Depend on Fixation Method? J. Orthop. Trauma 2019, 33, 428–431.
Ripollés-Melchor, J.; Abad-Motos, A.; Díez-Remesal, Y.; Aseguinolaza-Pagola, M.; Padin-Barreiro, L.; Sánchez-Martín, R.;Logroño-Egea, M.; Catalá-Bauset, J.C.; García-Orallo, S.; Bisbe, E.; et al. (2020): Association between Use of Enhanced Recovery after Surgery Protocol and Postoperative Complications in Total Hip and Knee Arthroplasty in the Postoperative Outcomes withinEnhanced Recovery after Surgery Protocol in Elective Total Hip and Knee Arthroplasty Study (Power2). JAMA Surg. 2020, 155, e196024.
Rosa, R.R.; Bueno, M.; Migliorucci, R.R.; Brasolotto, A.G.; Genaro, K.F.; Berretin–Felix, G. (2020): Tongue functionand swallowing in individuals with temporomandibular disorders.J. Appl. Oral Sci.2020,28, e20190355.
Saraiva, P.; Anunciação, S.; Pontinha, C.; Neves, I.; Batista, A.; Monteiro, G. (2020): Gains in functional independence as a promoter of quality of life. Millenium 2020, 2, 225–231.
Sartelli ,M., Di Bella ,S., McFarland, L,V., Khanna, S., Furuya-Kanamori ,L., AbuzeidN., et al. (2019): update of the WSES guidelines for management ofClostridioides (Clostridium) difficile infection in surgical patients. World JEmerg Surg. 2019;14:8.
Saunders, D.P.; Rouleau, T.; Cheng, K.; Yarom, N.; Kandwal, A.; Joy, J.; Kayhan, K.B.; van de Wetering, M.;Brito-Dellan, N.; Kataoka, T.; et al. (2020): Systematic review of antimicrobials, mucosal coating agents, anesthetics,and analgesics for the management of oral mucositis in cancer patients and clinical practice guidelines.Support. Care Cancer2020,28, 2473–2484.
Schoenfeld, B.J.; Grgic, J. (2020): Effects of range of motion on muscle development during resistance traininginterventions: A systematic review.SAGE Open Med.2020,8, 2050312120901559.
Shelton T, Hecht G ,Slee c, (2019):cooperation of geriatric hip fracture databases' Am A cad Orth surg,.27:e135-e141.
Smith TO, Gilbert AW, Sreekanta A, Sahota O, Griffin XL, Cross JL, et al. (2020):"Enhanced rehabilitation and care models for adults with dementia following hip fracture surgery". The Cochrane Database of Systematic Reviews. 2020 (2): CD010569.
Solomon AA. (2019): Prevalence of Ceserean Section and Associated Factors inUniversity of Gondar Comprehensive Referal Hospital, North West Ethiopia.BMC Res Notes Rev. 2019.
Suso Martí, L.; La Touche, R.; Herranz Gómez, A.; Angulo Díaz Parreño, S.; Paris Alemany, A.; Cuenca Martinez, F. (2021): Effectiveness of telerehabilitation in Physical Therapy Practice: Na Umbrella and Mapping Review with Meta–Meta–Analisys. Phys. Ther. 2021,101, pzab075.
Swan, K.; Cordier, R.; Brown, T.; Speyer, R. (2019): Psychometric properties of visuoperceptual

measures ofvideofluoroscopic and fibre–endoscopic evaluations of swallowing: A systematic review.Dysphagia2019,34,2–33.

Tadesse H, Gessessew A, Medhanyie AA. (2019): Trends and outcomes of cesareandelivery in Ayder comprehensive specialized hospital, Mekelle City, northernEthiopia. East Afr J Health Sci. 2019;1(1):62–77.

Tenaw Z, Kassa ZY, Kassahun G, Ayenew A. (2019): Maternal Preference, Mode ofDelivery and Associated Factors among Women Who Gave Birth at Publicand Private Hospitals in Hawassa City, Southern Ethiopia. Ann Global Health.2019;85(1):1–7.

TiwariT, RaiNK,WilsonAR,GanskySA,AlbinoJ. (2020): What Can We Learn from Parentsof Caries-Freeand Caries-ActiveHispanic Children?JDRClinTransRes.2020;10:2380084420904043.

Tomsic, I., Heinze, N. R., Chaberny, I. F., Krauth, C., Schock, B., & von Lengerke, T. (2020): Implementation interventions in preventing surgical site infections in abdominal surgery: a systematic review. BMC health services research, 20(1), 1-21.

Toney-Butler, T.J.; Thayer, J.M. (2020): Nursing process. InStatPearls; StatPearls Publishing: Treasure Island, FL,USA, 2020.

Variani, A.S., Saboori, S., Shahsavari, S., Yari, S., & Zaroushani, V. (2019): Effect of occupational exposure to radar radiation on cancer risk: A systematic review and meta-analysis. Asian Pacific Journal of Cancer Prevention, 20(11), 3211-3219.

Voos, M.C.; Albuquerque-Goya, P.S.; Leal de-Freitas, B.; Teixeira-Pires, A.M.; Meire-Favero, F.;Aparecida-Caromano, F. (2020):Timed immersion expiration measures in patients with muscular dystrophies.Arch. Physiother.2020,10, 4.

Vuong, C., Kittelson, S., McCullough, L., Yingwei, Y., & Hartjes, T. (2019): Implementingprimary palliative care best practices in critical care with the Care and CommunicationBundle. BMJ Open Quality, 8(3), e000513.

Wainwright, T.; Gill, M.; McDonald, D.; Middleton, R.; Reed, M.; Sahota, O.; Yates, P.; Ljungqvist, O. (2020): Consensus statement for perioperative care in total hip replacement and total knee replacement surgery: Enhanced Recovery after Surgery (ERAS) Society recommendations. Acta Orthop. 2020, 91, 3–19.

Watkins, R,R.,& Van Duin ,D. (2019): Current trends in the treatment of pneumonia dueto multidrug-resistant Gram-negative bacteria. Version 2. F1000Res. 2019 Jan30 [revised 2019 Jan 1];8.

Whitehouse, M.R.; Berstock, J.R.; Kelly, M.B.; Gregson, C.L.; Judge, A.; Sayers, A.; Chesser, T.J. (2019): Higher 30-day mortality associated with the use of intramedullary nails compared with sliding hip screws for the treatment of trochanteric hip fractures. Bone Jt. J. 2019, 101-B, 83–91.

Woldegioris, T., Bantie, G., & Getachew, H. (2019): Nurses' knowledge and practice regarding prevention of surgical site infection in Bahir Dar, Northwest Ethiopia. Surgical infections, 20(1), 71-77.20(1), 71-77.

Wondie AG, Zeleke AA, Yenus H, Tessema GA. (2019): Cesarean delivery amongwomen who gave birth in Dessie town hospitals, Northeast Ethiopia. PLoSOne. 2019;14(5):e0216344.

Xie, L.; Solhaug, K.A.; Song, Y.; Brede, D.A.; Lind, O.C.; Salbu, B.; Tollefsen, K.E.(2019): Modes of action and adverseeffects of gamma radiation in an aquatic macrophyte Lemna minor.Sci. Total Environ.2019,680, 23–34.

Yamada, S.I.; Soutome, S.; Hasegawa, T.; Toujou, I.; Nakahara, H.; Kawakami, M.; Hirose, M.; Fujita, S.;Komori, T.; Kirita, T.; et al. (2020): A multicenter retrospective investigation on the efficacy of perioperative oralmanagement in cancer patients.Medicine2020,99, e19129.

YaoK,YaoY,ShenX,LuC,GuoQ. (2019): Assessment of the oral health behavior, knowledge and status among dental and medical undergraduate students:a cross-

sectionalstudy.BMCOralHealth.2019;19(1):26.
Ye KF, Xing Y, Sun C, Cui ZY, Zhou F, Ji HQ, et al. (2020): Loss of the posteromedial support: a risk factor for implant failure after fixation of AO31–A2 intertrochanteric fractures. Chin Med J (Engl). 2020;133:41–8.
Zarei E, Madarshahian E, Nikkhah A, Khodakarim S. (2019): Incidence ofpressure ulcers in intensive care units and direct costs of treatment:evidence from Iran.J Tissue Viability.2019;28(2):70–74.
Zelle ,B,A., &Stahel ,P,F. (2019): Lessons learned for postoperative wound healing:respect the past and embrace the future. Patient Saf Surg. 2019;13(1):5.
Zeren, M.; Cakir, E.; Gurses, H.N. (2019):Effects of inspiratory muscle training on postural stability, pulmonaryfunction and functional capacity in children with cystic fibrosis: A randomised controlled trial.Respir. Med.2019,148, 24–30.
Zhao, J.; Davis, S.P. (2019): integrative review of multimodel pain manegement on patient recovery after total hip and knee arthroplasty. Int. J. Nurs. Stud. 2019, 96, 94–106.
ZhaoQ,WangSB,XuG,SongY,HanX,LiuZ, et al. (2019): Periodontal health:A national cross-sectional study of knowledge,attitudesandpracticesforthepublicoralhealthstrategyin China.J ClinPeriodontol.2019;46(4):406–419.