

# Infection Prevention and Control

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### November 2024

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## 1. The Effect of Catheter-Related Infection Control Education on Surgical Nurses' Knowledge Levels and Attitudes: A Randomized Controlled Trial

**Authors:** Akdemir, Habibe Filiz and Gezginci, Elif

**Publication Date:** 2024

**Journal:** Journal of Continuing Education in Nursing 55(10), pp. 479–486

**Abstract:** Background: Catheters are commonly used in health care. As nurses play an active role in the prevention of catheter-related infections, their knowledge and attitudes on this subject are important. The goal of this study was to determine the effect of an educational intervention about catheter-related infection control precautions on nurses' knowledge levels and attitudes. Method: This study was a single-center randomized controlled trial. The intervention group (n = 35) received evidence-based face-to-face education. The control group (n = 35) received routine in-service training. The nurses' knowledge and attitudes were assessed before, immediately after, and 3 months after the education. Results: After the training, the intervention group had statistically higher total scores than the control group on both scales immediately after the training (p <.001 and p =.008, respectively) and 3 months after the training (p =.001 and p <.001, respectively). Conclusion: The evidence-based structured educational intervention about catheter-related infection prevention practices positively affected the knowledge and attitudes of surgical nurses. J Contin Educ Nurs. 2024;55(10):479–486.]

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## 2. Becoming Hand Hygiene Heroes: implementation of an infection prevention and control campaign for patient and family hospital safety

**Authors:** Cheng, Brooke;Chan, Mavis;AbiFarrage, Danielle;Braschel, Melissa;Harrison, Pamela and Srigley, Jocelyn A.

**Publication Date:** 2024

**Journal:** American Journal of Infection Control

**Abstract:** Background: The COVID-19 pandemic highlighted that hand hygiene is key in preventing healthcare-associated infections. Patients and families are understudied targets for infection prevention and control practices. Previous campaigns to change hand hygiene behavior have been effective, but often face systemic challenges with implementation.; Methods: The "Hand Hygiene Heroes" educational campaign was developed to improve patient and family hand hygiene at two tertiary care pediatric and obstetrics hospitals. Its multiple phases included visual materials, tailored activities for nine hospital units, and long-term evaluation during a two-year period. Hand hygiene rates among patients/families and healthcare workers were measured at baseline and throughout the campaign via direct observation.; Results: Overall, hand hygiene significantly increased for both patients/families (OR 1.82, p 0.041) and healthcare workers (OR 2.15, p <0.001) after campaign initiation. However, individual units had varying degrees of sustainment on follow-up evaluations.; Discussion: Duration of intervention, activity simplicity, active participation, and resource availability may affect success of campaign initiatives. Positive prognostic factors included

mixed leadership support from administration and front-line workers, pre-determined sustainability plans, and tailored activities by target audience.; Conclusions: Implementation of hospital educational campaigns can be resource-intensive but can positively impact patient and family hand hygiene. (Copyright © 2024. Published by Elsevier Inc.)

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### **3. Antimicrobial surface coating in the emergency department as protective technology for infection control (ASEPTIC): a pilot randomized controlled trial**

**Authors:** Cheng, Lenard;Low, Shun Yee;Boon, Yuru;Goh, Carmen;Ng, Abigail;Ng, Alexander Jet Yue;Teo, Joshua;Johari, Nur Humaira;Pua, Yong Hao;Chua, Mui Teng and Kuan, Win Sen

**Publication Date:** 2024

**Journal:** Antimicrobial Resistance and Infection Control 13(1), pp. 129

**Abstract:** Study Objective: We examined the effectiveness of an antimicrobial surface coating for continual disinfection of high touch-frequency surfaces in the emergency department (ED).; Methods: Following a preliminary observation identifying stretcher rails as the surface with highest touch-frequency in the ED, we conducted a pilot randomized controlled trial involving 96 stretcher rails. The stretchers were randomized to receive an antimicrobial surface coating or placebo coating. Routine cleaning of stretchers subsequently continued as per hospital protocol in both arms. Sampling for total aerobic, gram-positive halophilic, gram-negative and methicillin-resistant *Staphylococcus aureus* bacteria was performed pre- and post-treatment at 24 h, 7 days and 180 days. Individuals who applied the coating and outcome assessors were blinded to the allocated arms. The primary outcome is contamination of antimicrobial versus placebo rails measured as colony forming units per cm<sup>2</sup> (CFU/cm<sup>2</sup>).; Results: Baseline total aerobic bacteria was comparable between placebo and intervention arms (0.84 versus 1.32 CFU/cm<sup>2</sup>, P = 0.235). Total aerobic bacteria contamination was significantly lower on antimicrobial versus placebo rails at 24 h (0.61 versus 1.01 CFU/cm<sup>2</sup>, median difference 0.40 CFU/cm<sup>2</sup>, 95% confidence interval CI] 0.01 to 1.01 CFU/cm<sup>2</sup>). There was a non-statistically significant tendency for contamination to be lower on antimicrobial versus placebo rails at 7 days (1.15 versus 1.50 CFU/cm<sup>2</sup>, median difference 0.35 CFU/cm<sup>2</sup>, 95% CI -0.64 to 1.28 CFU/cm<sup>2</sup>), but higher at 180 days (2.06 versus 1.84 CFU/cm<sup>2</sup>, median difference -0.22 CFU/cm<sup>2</sup>, 95% CI -1.19 to 0.78 CFU/cm<sup>2</sup>).; Conclusion: This is the first double-blinded, placebo-controlled, randomized trial to evaluate an antimicrobial surface coating on high touch-frequency surfaces in the emergency department. Total aerobic bacteria found on antimicrobial-coated patient transport stretcher rails was significantly lower than placebo rails at 24 h. (© 2024. The Author(s).)

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### **4. Surgical site infection prevention care bundles in colorectal surgery: a scoping review**

**Authors:** Cunha, Tiago;Miguel, Susana;Maciel, João;Zagalo, Carlos and Alves, Paulo

**Publication Date:** 2024

**Journal:** The Journal of Hospital Infection

**Abstract:** Background: Surgical site infection preventions bundles have been used to reduce infection rate in most types of surgery. In colorectal surgery they have been used with success as well, with tailored care bundles designed for that purpose.; Aim: To identify and review the individual interventions that constitute each infection prevention care bundle in colorectal surgery, and the surgical site infection rate reduction related to their implementation.; Methods: A scoping review was conducted in PUBMED, CINAHL; Web of Science Core Collection and Scopus databases, during December 2022.; Results: This review analysed 48 of 164 identified studies on surgical site infection (SSI) prevention in colorectal surgery from 2011 to 2022. It revealed an average of 11 interventions per study, primarily in preoperative (mechanical bowel preparation, oral antibiotic bowel decontamination, hair removal, CHG showers, normoglycemia), intraoperative (antibiotic prophylaxis, normothermia, CHG skin preparation, antibiotic prophylaxis re-dosing, gown/glove change), and postoperative phases (normothermia, normoglycemia, dressing removal, oxygen optimization, incision cleansing). Despite these interventions, SSI rates remain high, indicating a need for further research to optimize intervention bundles and improve compliance across surgical stages.; Conclusions: The implementation of Surgical Site Infection prevention bundles, tailored to Colorectal surgery, have shown a reduction in surgical site infection rates and costs. Grouping intervention according to the perioperative phase, may contribute to increased compliance rates.; Competing Interests: Declaration of Competing Interest None to declare. (Copyright © 2024. Published by Elsevier Ltd.)

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## 5. Central venous catheter insertion site and infection prevention in 2024

**Authors:** de Grooth, Harm-Jan;Hagel, Stefan and Mimoz, Olivier

**Publication Date:** 2024

**Journal:** Intensive Care Medicine 50(11), pp. 1897–1899

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## 6. Analysis of the relationship between fear of coronavirus and hand hygiene beliefs and practices of surgical nurses: A descriptive and cross-sectional study

**Authors:** Eksici, Ilayda and Tastan, Sevinc

**Publication Date:** 2024

**Journal:** International Journal of Nursing Practice (John Wiley & Sons, Inc.) 30(5), pp. 1–8

**Abstract:** Aim: This study aimed to analyse the relationship between fear of COVID-19 and hand hygiene beliefs and practices of surgical nurses. Method: This article is a descriptive correlational study. It was conducted between February and May 2021 with 306 surgical nurses working at public and private hospitals in Northern Cyprus. A personal information form, Fear of COVID-19 Scale, Hand Hygiene Belief Scale and Hand Hygiene Practices Inventory were used for data collection. Results: Of the participants in the study, 25.41% were 29 years old or younger and 85.15% were female. The mean scores obtained from the Fear of COVID-19 Scale, Hand Hygiene Belief Scale and the Hand Hygiene Practices Inventory were  $23.12 \pm 8.03$ ,  $81.33 \pm 7.67$  and  $69.15 \pm 1.94$ , respectively. The Fear of COVID-19 Scale scores

were negatively correlated with the Hand Hygiene Belief Scale scores and positively correlated with the Hand Hygiene Practices Inventory scores. Conclusion: Hand hygiene practices were better for nurses with higher level of COVID-19 fear. Therefore, a high level of seriousness and awareness of nurses about hand hygiene, which was achieved during the COVID-19 pandemic, should be sustained to maintain proper hand hygiene practices. Summary statement: What is already known about this topic? Hand hygiene is one of the primary ways to control the COVID-19 pandemic. Adherence to hand hygiene may be influenced by various factors, including personal traits. Hand hygiene adherence among health professionals was low prior to the COVID-19 pandemic. What this paper adds? The Fear of COVID-19 Scale scores of surgical nurses were above average. This study found that the fear of COVID-19 was positively linked to hand hygiene practices of surgical nurses. The implications of this paper: Seriousness and awareness of nurses about hand hygiene during the COVID-19 pandemic should be sustained in order to maintain good hand hygiene practices. Visual and printed education materials may emphasize disease and mortality rates during the COVID-19 pandemic. Health institutions have the responsibility to provide appropriate antiseptic products to prevent hand skin problems.

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## **7. Variable sensitivity of clinical *Candida auris* strains to Biocides: implications for infection control in Healthcare Settings**

**Authors:** Erganis, Sidre; Ozturk, Ali; Uzuntas, Sema Turan; Kirca, Fusun; Dogan, Alper; Dinc, Bedia and Kalkanci, Ayse

**Publication Date:** 2024

**Journal:** BMC Microbiology 24(1), pp. 447

**Abstract:** Purpose: *Candida auris*, a multidrug-resistant yeast, poses significant challenges in healthcare settings due to its ability to form biofilms and resistance to common disinfectants. Understanding its susceptibility to biocides used in hospital disinfection practices is crucial for infection control. We investigated the biocide sensitivity of eight clinical *C. auris* strains from different patients and one reference strain (CDC B11903) using the biocide activity tests.; Methods: Species identification was confirmed through MALDI-TOF MS, while clade differentiation and phylogenetic classification were determined via whole-genome sequencing. Biofilm formation was assessed using the MTT assay. Antifungal susceptibilities were tested according to CLSI standards. The effectiveness of biocides, including chlorine, chlorhexidine, and benzalkonium chloride, was evaluated through broth microdilution following CLSI standards and quantitative suspension and carrier tests, following EN standards.; Results: All clinical strains were identified as clade 1, and the reference strain as clade 4, with all exhibiting biofilm formation. Clade 1 strains showed resistance to fluconazole, with MIC values ranging from 8 to 32 µg/ml, while being susceptible to other antifungals. Broth microdilution MIC assays for biocides demonstrated that all strains exhibited resistance to benzalkonium chloride. Chlorine and chlorhexidine showed variable efficacy, dependent on concentration and environmental cleanliness. Alcohol-based hand sanitizers demonstrated effectiveness against *C. auris* from the first minute of application.; Conclusion: The study highlights the variable susceptibility of *C. auris* to different biocides, underscoring the challenge in eradicating this pathogen from healthcare environments. Our findings advocate for the careful selection of disinfectants in hospital settings, emphasizing the need for high-concentration chlorine and

chlorhexidine solutions to combat *C. auris*, even in especially clean environments. (© 2024. The Author(s).)

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## 8. Infection prevention and control: critical strategies for nursing practice

**Authors:** Hill, Barry; Lamichhane, Geeta and Wamburu, Amsale

**Publication Date:** 2024

**Journal:** British Journal of Nursing 33(17), pp. 804–811

**Abstract:** Infection prevention and control (IPC) is essential in nursing practice to safeguard patient health and reduce healthcare-associated infections. This article explores IPC strategies, including hand hygiene, the use of personal protective equipment, environmental cleaning, safe injection practices, and antimicrobial stewardship. It discusses the implementation challenges and solutions, such as ensuring compliance through education, monitoring and strong leadership. IPC measures are crucial in preventing infections such as catheter-associated urinary tract infections, central line-associated bloodstream infections, surgical site infections, and ventilator-associated pneumonia. By integrating personalised IPC strategies into nursing practice, healthcare providers can significantly improve infection control outcomes and enhance overall patient safety and quality of care.

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## 9. Risk assessment and the use of personal protective equipment in an emergency department: Differing perspectives of emergency and infection control clinicians. A video-vignette survey

**Authors:** Hor, Su-Yin; Wyer, Mary; Barratt, Ruth; Turnbull, Margo; Rogers, Kris; Murphy, Margaret; Urwin, Rachel; Jorm, Christine and Gilbert, Gwendolyn L.

**Publication Date:** 2024

**Journal:** American Journal of Infection Control 52(10), pp. 1114–1121

**Abstract:** Background: The use of personal protective equipment (PPE) in emergency departments (EDs) is an important defense during infectious disease emergencies. However, what counts as appropriate PPE in EDs is contentious and inconsistently implemented in practice.; Methods: An online scenario-based video survey was distributed through purposive sampling, and completed by 270 ED and infection prevention and control clinicians in Australia. A descriptive content analysis was performed on the data, and differences between groups were tested using Fisher exact test.; Results: Participants agreed that most items were required in both scenarios. Eye protection, mask use, and hand hygiene frequency were more contentious. Physicians were more likely than nurses, and ED clinicians more likely than infection prevention and control clinicians, to regard items or actions as optional rather than essential. Many ED clinicians, particularly physicians, regarded sequences as too time-consuming to be practical in a busy ED.; Discussion: Our findings likely reflect differences in professional roles, competing priorities, and risks, and highlight important contextual characteristics of EDs, such as diagnostic uncertainty, equipment inaccessibility, and resource constraints.; Conclusions: To be feasible, practicable, and thereby effective, PPE guidance in

the ED must be designed collaboratively with frontline ED staff, and reflects the complexities of their practice. (Copyright © 2024 The Authors. Published by Elsevier Inc. All rights reserved.)

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## 10. Infection prevention and control: understanding the fundamentals

**Authors:** McCloy, Oonagh;McGuinness, Ashley and Craig, Stephanie

**Publication Date:** 2024

**Journal:** Nursing Standard (Royal College of Nursing (Great Britain) : 1987) 39(10), pp. 39–44

**Abstract:** Infection prevention and control is crucial to prevent patients and healthcare staff from being harmed by avoidable infections, including healthcare-associated infections. This article outlines the main elements of standard precautions for infection prevention and control, as set out by the World Health Organization. Nurses and other healthcare professionals can use this information to refresh their knowledge of infection prevention and control, understand the appropriate practices that should be adopted to reduce the risk of infection transmission, and increase their awareness of the importance of sustainability and education.; **Competing Interests:** None declared (© 2024 RCN Publishing Company Ltd. All rights reserved. Not to be copied, transmitted or recorded in any way, in whole or part, without prior permission of the publishers.)

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## 11. Infection prevention and control professionals: Stress, resilience, personality traits and views about their workforce and profession

**Authors:** Mitchell, Brett G. and Russo, Philip L.

**Publication Date:** 2024

**Journal:** Infection, Disease & Health

**Abstract:** **Background:** The COVID-19 pandemic placed considerable strain on the infection control professional workforce, who were at the forefront of pandemic response in their organisations and beyond. In order to support infection control professionals and inform future initiatives, it is important to further understand the infection control workforce. The objective of this study was to determine stress and resilience levels, personality traits and workforce intentions of infection control professionals in Australia and New Zealand.; **Methods:** We undertook an anonymous, cross-sectional online survey of infection control professionals in Australia and New Zealand. Validated tools, the brief resilience tool, workforce stressor tool and the Big Five personality test, were used to evaluate levels of stress, resilience and personality traits.; **Results:** Three hundred and fifty-six infection control professionals started the survey, with representation from all Australian jurisdictions and New Zealand. The mean stress score was 4.28 (SD 3.39) and 3.34 (SD 0.65) for resilience. Younger participants and those with less experience in infection control had higher levels of stress and lower levels of resilience. Individual personality traits vary by age, level of education and credentialing status. Approximately one-fifth of participants indicated that they planned to leave the IC workforce in the next three years.; **Conclusions:** Our study was the largest published study involving infection control professionals in Australia and New Zealand. Findings highlight the need for

mentoring, peer support and wellbeing initiatives to support the profession. Understanding personality traits may also be beneficial for further enhancing communication and interpersonal relationships.; Competing Interests: Conflict of interest Two authors have an editorial affiliation with the journal. They played no role whatsoever in the peer review process or decisions relating to this paper. (Copyright © 2024 The Author(s). Published by Elsevier B.V. All rights reserved.)

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## **12. Lateral effects of infection prevention measures during COVID-19 pandemic on hospital-acquired *Clostridioides difficile* infection**

**Authors:** Mylona, Eleni;Kostourou, Sofia;Veini, Fani;Kolokotroni, Chrysoula;Belesiotou, Eleni;Kaziani, Katerina;Argyropoulou, Athina and Papastamopoulos, Vasileios

**Publication Date:** 2024

**Journal:** Journal of Infection Prevention 25(6), pp. 247–250

**Abstract:** Background: Systematic surveillance of *Clostridioides difficile* infection (CDI) in our institution showed a reduction in the incidence of healthcare associated CDI (HA-CDI) during COVID-19 pandemic. Aim: Our objective was to search for factors related to this reduction. Methods: We retrospectively studied the trend of the incidences of HA-CDI, Multidrug Resistant (MDR) organisms, total antibiotic and chlorine consumptions as well as the influence of the last two on the incidence of HA-CDI. Results: During COVID-19 pandemic, the HA-CDI incidence was reduced with respect to the previous years, although total antibiotic consumption was found to increase ( $p < .01$ ). MDR organisms' incidence was found to increase ( $p < .01$ ), as well as the chlorine consumption ( $p = .04$ ) which was the only factor to be related to the decreased rates of HA-CDI ( $r = -0.786$ ,  $p < .05$ ). Discussion: In our institution, COVID-19 epidemic overlapped with the reduction in the HA-CDI's incidence. This could be due to faithful compliance with the contact precaution measures but then, we would expect the incidence of MDR organisms to decrease as well. Chlorine usage for environmental cleaning was generalized during pandemic. It was the only factor to be related to the decreased rates of HA-CDI, highlighting the importance of environmental cleaning as a measure for HA-CDI prevention.

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## **13. Simulation as a tool for promoting infection control measures during a carbapenemase-producing *Enterobacterales* outbreak: lessons learned**

**Authors:** Otu, A.;Richards, A.;Buckle, N.;Blackmore, A.;Adams, K. and Wearmouth, D.

**Publication Date:** 2024

**Journal:** Journal of Hospital Infection 153, pp. 1–2

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## **14. Development and Implementation of Learning Collaboratives for Infection Prevention and Control Education in Long-Term Care Facilities**

**Authors:** Prins, Cindy;Khan, Mishal;Marlow, Nicole M.;Bollinger, Avery;Johnson, Cassandra



L.;Pomeranz, Jamie L.;Bethart, Sally M.;Cherabuddi, Kartikeya;Horgas, Ann L.;Venugopalan, Veena;Agdas, Duzgun;Wu, Chang-Yu;Jutla, Antarpreet Singh;Charles, Argentina and Lee Revere, F.

**Publication Date:** 2024

**Journal:** American Journal of Infection Control

**Abstract:** Infections in long-term care facilities (LTCFs) pose a critical challenge, with one to three million serious infections annually and up to 380,000 associated deaths. The vulnerability of aging populations and inadequate infection prevention and control (IPC) programs underscore the need for intervention. This initiative provided tailored continuing education through eight virtual learning collaboratives serving 541 infection preventionists. The project also developed nine IPC toolkits and a manual to further support LTCFs' infection prevention efforts. (Copyright © 2024. Published by Elsevier Inc.)

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### **15. Implementation and barriers to waterless care: a questionnaire study of infection prevention and control practitioners, clinicians, and engineers**

**Authors:** Pybus, S. and Inkster, T.

**Publication Date:** 2024

**Journal:** The Journal of Hospital Infection 152, pp. 122–125

**Abstract:** Background: Water and wastewater in healthcare settings are recognized to represent a risk to patients. However, waterless care has not been widely implemented in UK healthcare settings.; Aim: To identify barriers to implementation of waterless care.; Methods: A questionnaire study of infection prevention and control (IPC) practitioners, non-IPC clinicians, and estates managers and engineers was undertaken.; Findings: Alternatives to water present challenges in perceived acceptability to patients, particularly cleansing wipes for bathing and dry shampoo. There are concerns about cleansing wipes in terms of storage, disposal, sustainability and contamination during manufacture. Estates and engineering concerns include relative water tank size for water turnover and clinical disruption due to works.; Conclusion: Further work is required on acceptability of reduced water scenarios and patient views but the results of this questionnaire provide a grounding for sentiment from healthcare workers on waterless care. (Copyright © 2024 The Healthcare Infection Society. Published by Elsevier Ltd. All rights reserved.)

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### **16. The experience of infection prevention and control nurse (IPCN) in conducting post-discharge surveillance (PDS) of surgical site infections (SSI): A qualitative study**

**Authors:** Rahmawati, Siti;Setyawati, Andina and Tahir, Takdir

**Publication Date:** 2024

**Journal:** Infection, Disease & Health 29(4), pp. 218–226

**Abstract:** Background: Surgical Site infections (SSI) are healthcare-associated infections (HAI) resulting from surgical procedures, which can increase morbidity, mortality, and economic burden. SSI surveillance is useful for detecting the magnitude of SSI cases and evaluating the impact of SSI prevention implementation. Post-discharge surveillance (PDS) of SSIs may identify more significant cases. To the best of our knowledge, there is no research exploring the experiences of Infection Prevention and Control Nurse (IPCN) in conducting PDS of SSI.; Methods: To explore the experience of IPCN in conducting PDS of SSI. A qualitative transcendent phenomenological (descriptive) research, using a purposive sampling technique with 15 informants from 9 hospitals in Indonesia. Data were collected through in-depth direct and semi-structured interviews and analyzed using thematic analysis through Nvivo 12 plus software.; Results: Five themes were generated, including the stages of PDS of SSI, the collaborative role of PDS of SSI officers, inhibiting factors of PDS of SSI, supporting factors of PDS of SSI, and optimization of PDS of SSI.; Conclusion: This study provides a deep understanding of the implementation PDS of SSI through an exploration of IPCN experiences, offering insights into the execution and various challenges faced by hospitals in conducting PDS of SSI. (Copyright © 2024 Australasian College for Infection Prevention and Control. Published by Elsevier B.V. All rights reserved.)

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### **17. What can building information modeling do for you? A perspective on integration into infection prevention and control programs for patient safety**

**Authors:** Roberts, Scott C.;Mathew, Trini A.;Tanner, Windy D. and Martinello, Richard A.

**Publication Date:** 2024

**Journal:** Infection Control and Hospital Epidemiology , pp. 1–2

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### **18. Determinants of compliance with infection prevention measures by physicians: a scoping review**

**Authors:** Schutte, M.;van Mansfeld, R.;de Vries, R. and Dekker, M.

**Publication Date:** 2024

**Journal:** Journal of Hospital Infection 153, pp. 30–38

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### **19. Infection prevention and control among paramedics: A scoping review**

**Authors:** Taylor, Nicholas;Simpson, Maree;Cox, Jennifer;Ebbs, Phillip and Vanniasinkam, Thiru

**Publication Date:** 2024

**Journal:** American Journal of Infection Control 52(10), pp. 1128–1134

**Abstract:** Background: Paramedics are exposed to many infectious diseases in their professional activities, leading to a high risk of transmitting infectious diseases to patients in

out-of-hospital settings, possibly leading to health care associated infections in hospitals and the community. The COVID-19 pandemic highlighted the importance of infection prevention and control in health care and the role of paramedics in infection control is considered even more critical. Despite this, in many countries such as Australia, research into infection prevention and control research has mainly been focused on in-hospital health care professionals with limited out-of-hospital studies.; Methods: This scoping review was based upon Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines. Literature on knowledge and awareness of infection prevention and control in paramedics in Australia and other countries was evaluated.; Results: Based upon selection criteria applied, six papers were identified for inclusion in this review. In many studies, infection prevention and control was identified as being important, however compliance with hand hygiene practices was low and most studies highlighted the need for more education and training on infectious disease for paramedics.; Conclusion: Current evidence suggests that paramedics have poor compliance with recommended IPC practices. The profession needs to improve IPC education, training, and culture. (Copyright © 2024 Association for Professionals in Infection Control and Epidemiology, Inc. Published by Elsevier Inc. All rights reserved.)

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## **20. Longitudinal analysis of the skin microbiome in association with hand eczema, hand hygiene practices and moisturizer use**

**Authors:** Vindenes, H. K.;Drengenes, C.;Amin, H.;Irgens-Hansen, K.;Svanes, C. and Bertelsen, R. J.

**Publication Date:** 2024

**Journal:** Journal of the European Academy of Dermatology and Venereology : JEADV 38(11), pp. 2118–2129

**Abstract:** Background: The skin microbiota maintains a physical and immunological barrier to the environment. Little is known about how the microbiome changes over time or the effect of hand hygiene practices and moisturizer use.; Objectives: To assess sex-specific changes in skin bacteria over time, and how the microbiome is related to self-reported hand eczema, hand hygiene practices and use of moisturizers.; Methods: Swab samples from the dorsal hand were collected at baseline and 6.5 years later during the COVID-19 pandemic, in 168 participants from the RHINESSA study in Bergen, Norway. The skin samples were analysed by 16S rRNA amplicon sequencing.; Results: The alpha diversity of the hand microbiome increased from baseline to follow-up, and beta diversity differed by sex at both time points. The relative abundance increased for several bacteria from baseline to follow-up, with sex-specific differences. Current hand eczema and aggravating hand eczema during the COVID-19 pandemic were associated with an increase in *Staphylococcus*. High hand washing frequency at home was associated with lower alpha diversity and with higher abundance of *Staphylococcus*, *Corynebacterium*, *Fingoldia*, and *Pseudomonas* and lower abundance of *Propionibacterium* and *Pelomonas*. The alpha diversity increased with increasing time passing between hand washing and sampling, whereas more frequent moisturizer use was associated with significantly lower alpha diversity, and a change in abundance for some bacteria, such as more *Pseudomonas*.; Conclusions: This longitudinal study revealed an overall increase in skin microbial diversity over a 6-year period, which was unexpected since follow-up was performed during the COVID-19 pandemic when vigorous hand hygienic practices were introduced. Sex-

specific differences were identified at both time points. Individuals with hand eczema seem to develop a more dysbiotic skin bacterial community over time. Hand washing and use of moisturizers, with typically gender-specific habitual patterns, may lead to change in bacterial composition. (© 2024 The Authors. Journal of the European Academy of Dermatology and Venereology published by John Wiley & Sons Ltd on behalf of European Academy of Dermatology and Venereology.)

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## 21. Revolutionising infection control: building the next generation of phage banks

**Authors:** Wahid, Braira;Tiwana, Muhammad Salman and Ali, Akhtar

**Publication Date:** 2024

**Journal:** Drug Resistance Updates : Reviews and Commentaries in Antimicrobial and Anticancer Chemotherapy 77, pp. 101143

**Abstract:** The escalating global burden of antimicrobial resistance (AMR) represents a critical public health challenge. This rise in antibiotic resistance is concomitant with heightened antibiotic consumption, with an estimated annual usage of 100,000 to 200,000 tons. A recent systematic review, which analysed data from 204 countries, reported that AMR was responsible for 4.95 million deaths in 2019 (Murray et al., 2022). The growing threat of AMR is imposing a significant financial burden on the global economy, with the CDC reporting an additional annual cost of \$20 billion in the U.S. and €9 billion in Europe. The emerging field of bacteriophage therapy offers promising potential as a game-changer in the era of AMR. However, existing literature reveals numerous research gaps and technological challenges, including insufficient information on phage pharmacology, genomics, and a lack of preclinical and clinical data. In addition to conducting further research to address existing knowledge gaps, establishing phage banks in clinical facilities could be a transformative advancement in the fight against AMR.; Competing Interests: Declaration of Competing Interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. (Copyright © 2024 Elsevier Ltd. All rights reserved.)

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## 22. Barriers to Effective Infection Prevention in the Neonatal Intensive Care Unit

**Authors:** Weser, Veronica U.;Crocker, Abigail;Murray, Thomas S.;Wright, Jayson;Truesdell, Erin J. K.;Ciaburri, Rebecca;Marks, Asher M.;Martinello, Richard A. and Hieftje, Kimberly D.

**Publication Date:** 2024

**Journal:** Advances in Neonatal Care (Lippincott Williams & Wilkins) 24(5), pp. 475–484

**Abstract:** Background: Infection prevention (IP) behaviors such as hand hygiene (HH) and mobile device disinfection are important to reduce the risk of infection transmission from both family members and hospital staff to critically ill neonates. Purpose: To inform the design of educational interventions to improve both patient family and staff IP behaviors, we engaged separate groups of nurses and family members to understand perceptions about the spread of infection and barriers to implementing effective IP strategies. Methods: This was a qualitative

study using focus groups to gather data from neonatal nurses and patient family members. Data were triangulated with hospital-wide survey data and analyzed using inductive content analysis. Results: Twelve nurses and 4 patient family members participated. Themes related to communication about IP between staff and family members emerged: stakeholders expressed discomfort with the timing and nature of just-in-time HH education. These communication challenges contributed to stress levels within the neonatal intensive care unit. This finding was reflected in the hospital-wide survey. Implications for Practice and Research: Steps should be taken to improve communication about IP behaviors between patient family members and frontline staff. Reducing nurse burden of providing just-in-time HH reminders to patient family members through increased IP education may decrease stress and facilitate IP behaviors. This has the potential to decrease infection spread and improve patient outcomes. The development of interventions targeting stakeholder communication is therefore warranted, but additional research is needed to understand the timing and process for delivery of the educational material. Video Abstract available for more insights from the authors (see the Video, Supplemental Digital Content available at <http://www.w3.org/1999/xlink>).

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### 23. To see, or not to see... pathogens in virtual reality hand hygiene training

**Authors:** Wolfensberger, Aline; Désiron, Juliette, C.; Domenech-Jakob, Beatrice; Petko, Dominik and Zingg, Walter

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**Abstract:** Background: ViRTUE, a virtual reality (VR) hand hygiene trainer, offers users the option of visualizing pathogen transfers during virtual patient care either in "real-time" or at the end of a level as a "summary" visualization. In this study, we aimed to evaluate the effect of different timings of pathogen visualization ("real-time" vs "summary") on in-trainer performance and user's immersion.; Methods: The study included first-year medical students undergoing hand hygiene training with ViRTUE, randomized to one of three visualization set-ups: set-up 1 ("on-off-off", with "real-time" visualization at the first level only, and "summary" visualization at level 2 and 3), set-up 2 ("off-on-off"), and set-up 3 ("off-off-off"). In-trainer performance was defined by number of pathogen transmission events (=contaminations) in level 3. The virtual experience of user's (among others: immersion) was assessed with a questionnaire.; Results: 173 medical students participated in the study, with 58, 54, and 61 assigned to set-up 1, set-up 2, and set-up 3, respectively. Users assigned to set-up 3 with "summary" visualization at all levels, performed best with 1.02 (standard deviation (SD) +/- 1.86) contaminations, compared to 2.34 (SD +/- 3.09) and 2.07 (SD +/- 2.52) contaminations of users assigned to the other set-ups. "Summary" visualization at all levels also resulted in higher immersion of users.; Conclusions: "Real-time" visualization of pathogen transmission during VR hand hygiene training with ViRTUE may negatively affect in-trainer performance and user immersion. This emphasizes the importance of pilot testing the effect of VR-based trainings in order to understand their impact on users.

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