REFERENCE #	CITATION	EVIDENCE TYPE	SAMPLE SIZE/ POPULATION	INTERVENTION(S)	CONTROL/ COMPARISON	OUTCOME MEASURE(S)	CONCLUSION(S)	CONSENSUS SCORE
1	Cahn, J, Wood, A. Guideline for Sterile Technique. Wood, A, ed. E-Guidelines+ed. Association of periOperative Registered Nurses (AORN);2023.	Guideline	n/a	n/a	n/a	n/a	Provides guidance for sterile technique and wearing of masks.	IVA
2	Wood A. Guideline for Prevention of Transmissible Infections. Wood A, ed. e-Guidelines+ ed. Association of periOperative Registered Nurses (AORN; 2023.	Guideline	n/a	n/a	n/a	n/a	Provides guidance for use of PPE, including wearing of masks.	IVA
3	deKay K. Guideline for Hand Hygiene. Kyle E, ed. E-Guidelines+ ed. Associationg of periOperative Registered Nurses (AORN); 2023.	Guideline	n/a	n/a	n/a	n/a	Provides guidance for hand hygiene, nail polish, and wearing of rings, watches, and bracelets.	IVA
4	West, G. F., Resendiz, M., Lustik, M. B. and Nahid, M. A. Comparing colony-forming units in inpatient nurses: Should military nurses who provide patient care wear hospital-provided scrubs? 2018	Nonexperimental	118 active-duty nurses on 7 units, army medical center, United States	n/a	Hospital provided scrub suits (55% cotton, 45% polyester)	Bacterial counts on 6 designated sites at shift start, 4 h, and 8h (n = 18)	Military uniforms had significantly higher levels of bacteria than hospital-provided scrubs. Researchers concluded that nurses should launder their uniforms daily to reduce bacterial load and minimize risk of nosocomial infection to patients.	IIIB
5	West, Gordon F., Resendiz, Marisol, Lustik, Michael B. and Nahid, Md A. Bacterial Contamination of Military and Civilian Uniforms in an Emergency Department 2019	Nonexperimental	31 active duty and 22 civilian ER nurses, army medical center, United States	n/a	Hospital provided scrub suits (55% cotton, 45% polyester)	Bacterial counts on 6 designated sites three times during each of 3 shifts	Various types of personal owned uniforms, including military issued, had a greater risk for bacterial contamination. Due to high volume of contamination and patients in the ER, researchers recommend wearing of hospital-laundered scrubs.	IIIB
6	Miner MA, Perry D. Guideline for Design and Maintenance of the Surgical Suite. Kyle E, ed. E-Guidelines+ ed. Association of periOperative Registered Nurses (AORN); 2023.	Guideline	n/a	n/a	n/a	n/a	Provides guidance for design and maintenance of surgical suite	IVA
7	Background G. Laundry and Bedding. In: Guidelines for Environmental Infection Control in Health-Care Facilities (2003). Centers for Disease Control and Prevention (CDC) Web site. Updated 2015.	Guideline	n/a	n/a	n/a	n/a	CDC guideline for laundering in health care facilities.	IVA
8	Abu Radwan, M., Ahmad, M. The Microorganisms on Nurses' and Health Care Workers' Uniforms in the Intensive Care Units. *Clin Nurs Res.* 2019;28(1):94-106. doi:10.1177/1054773817708934.	Nonexperimental	115 HCWs in ICUs, 305 cultures, Jordan	n/a	n/a	Microorganisms present	All uniforms carried bacteria. Potentially pathogenic organisms are carried on uniforms and can be transmitted to other people and objects in the environment.	IIIB
9	Colclasure, Victoria J., Soderquist, Thomas J., Lynch, Thomas, et al. Coliform bacteria, fabrics, and the environment. *Am J Infect Control* . 2015;43(2):154-158.	Quasi-experimental	Fabrics (100% cotton. Cotton blend and silk), laboratory, United States	Inoculated with bacterial strains	N/A	Viability of coliform bacteria on the fabrics	Coliform bacteria adheres to fabrics for an extended period of time.	IIB
10	Davidson, Taylor, Lewandowski, Erica, Smerecki, Meghan, et al. Taking your work home with you: Potential risks of contaminated clothing and hair in the dental clinic and attitudes about infection control.*Can J Infect Control.* 2017;32(3):137-142.	Quasi-experimental	Sterile scrub swatches (12-at the waist and 10 at a hair band) dental staff members, dental clinic, United States	Swatches attached to staff members	N/A	Bacteria present and type	Significant amount of bacteria was found on both scrubs and in hair, some were pathogenic. Emphasized importance of laundering and covering hair to prevent cross contamination	IIB
11	Gupta, Priyanka, Bairagi, Nilanjana, Priyadarshini, Richa, Singh, Ashutosh, Chauhan, Deepika and Gupta, Deepti. Bacterial contamination of nurses' white coats after first and second shift. Am J Infect Control. 2017;45(1):86-88.	Quasi-experimental	10 polyester and 10 cotton blend swatches, tertiary hospital, India	Nurses wore the swatches during patient care	Polyester and poly/ cotton were compared	Microorganisms present	The microbial load on the poly/cotton blend had 60% higher bacteria than that on the polyester fabric.	IIC

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12	Gupta, P., Bairagi, N., Priyadarshini, R., Singh, A., Chauhan, D. and Gupta, D. Bacterial contamination of nurses' white coats made from polyester and polyester cotton blend fabrics. *J Hosp Infect* . 2016;94(1):92-94.	Quasi-experimental	180 swatches, poly/cotton blend and polyester, tertiary hospital, India	Nurses wore patches on two shifts during patient care	Poly/cotton blend and polyester were compared	Microorganisms present	Contamination of the blend fabric was significantly higher than the polyester, after the second shift the bacterial colonies increased on both types of fabrics, *E coli* being the most abundant and staph the second most abundant.	IIC
13	Mitchell, A., Spencer, M., Edmiston Jr, C. and Edmiston, C. J. Role of healthcare apparel and other healthcare textiles in the transmission of pathogens: a review of the literature. *J Hosp Infec* t. 2015;90(4):285-292.	Literature Review	n/a	n/a	n/a	n/a	Illustrates that health care worker apparel is a vector for transmission of microorganisms.	VA
14	Thom, Kerri A., Escobar, Daniel, Boutin, Mallory A., Zhan, Min, Harris, Anthony D. and Johnson, J. K. Frequent contamination of nursing scrubs is associated with specific care activities. *Am J Infect Control* . 2018;46(5):503-506.	Quasi-experimental	90 HCWs and 720 scrub samples, 2 hospitals, United States	Participants were given 4 sets of scrubs and randomized to which shift they should be worn. Scrubs were laundered at home. Sampling of the scrubs was done randomly in the last 4 hours of a 12 hour shift.	n/a	Microorganisms present	30% of the scrubs sampled were contaminated with bacteria. Scrubs are a potential reservoir for pathogenic organisms. Scrubs were my likely to be contaminated when caring for patients with a wound.	IIA
15	Sanon, M. A., Watkins, S. Nurses' uniforms: How many bacteria do they carry after one shift? *J Public Health Epidemiol* . 2012;4(10):311-315.	Quasi-experimental	10 nurses working in a telemetry unit in one hospital, United States	Nurses were given sterile scrub tops to wear on day or night shift while caring for patients (12 hours)	Sterile scrub top	Presence of pathogens	Pathogenic organisms were present on all of the tops, more on the night shift. Uniforms can be contaminated and health care workers are wearing them into the public environment with the potential to spread disease	IIC
16	Halliwell, Cindy. Nurses' uniforms: off the radar. A review of guidelines and laundering practices. *HEALTHC INFECT* . 2012;17(1):18-24.	Literature Review	n/a	n/a	n/a	n/a	This literature review describes how uniforms, clothing, linen and inadequate laundering processes have been identified as the primary sources of contamination leading to infection. The paper introduced the concept that nurses' uniforms may act as a secondary source of contamination for hands.	VA
17	Perry, C., Marshall, R. and Jones, E. Bacterial contamination of uniforms. *J Hosp Infect* . 2001;48(3):238-241.	Nonexperimental	57 staff members on five wards, hospital, United Kingdom	n/a	n/a	Bacterial counts on uniforms	*Staphylococcus aureus* , *Clostridium difficile* and vancomycin-resistant enterococci were detected on uniforms both before and after a span of duty. Staff should be provided with written guidance on home laundering of uniforms that should include a minimum temperature and laundering as a separate load.	IIIB
18	Goyal, Shreya, Khot, Sharwin C., Ramachandran, Vignesh, Shah, Kevin P. and Musher, Daniel M. Bacterial contamination of medical providers white coats and surgical scrubs: A systematic review. *Am J Infect Control*	Systematic Review	22 articles, 16 cross-sectional studies, 4 RCTs, and 2 cohort studies	n/a	n/a	n/a	Provider attire is a potential source of pathogenic bacterial transmission in health care settings. There is limited data on the link between provider attire and health care associated infections. The review gave some guidance on strategies to reduce the spread of bacterial pathogens including MDROs that have the potential to cause HAIs.	IIIA

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19	Munk, Signe, Johansen, Charlotte, Stahnke, Louise and Adler-Nissen, Jens. Microbial survival and odor in laundry. Vol 4. ; 2001.	Quasi-experimental	Several experiments on at least 5 different fabric swatches, laboratory, Denmark	At least 3 or 4 experiments were conducted on the fabric swatches that looked at type of microorganism, whether it was removed by laundering.	Compared UK and US	Survival and transfer of microorganisms, odor of textile, effect if temperature and heated drying on survival of microorganisms, odor formation, and analysis	Microorganisms survive laundering at low temperatures in most commercial laundering facilities.	IIB
20	Nordstrom, J. M., Reynolds, K. A. and Gerba, C. P. Comparison of bacteria on new, disposable, laundered, and unlaundered hospital scrubs. *Am J Infect Contr* ol. 2012;40(6):539-543.	Nonexperimental	Unwashed, hospital-laundered, home-laundered, new cloth and new disposable scrub top and pants, laboratory, United States	n/a	n/a	Number and identity of bacteria present	Home laundered scrubs had a significantly higher total bacterial count than facility laundered and found no significant difference in bacterial counts between hospital laundered, unused, or new disposable scrubs	IIIA
21	Callewaert, C., Van Nevel, S., Kerckhof, F. M., Granitsiotis, M. S. and Boon, N. Bacterial Exchange in Household Washing Machines. *Front Microbiol* . 2015;6:1381.	Nonexperimental	5 household washing machines, England	n/a	Before and after the laundering process	Bacterial counts of wash water before	A microbiological exchange takes place in the washing machine.	IIIC
22	Gerba, C. P., Kennedy, D. Enteric virus survival during household laundering and impact of disinfection with sodium hypochlorite. *Appl Environ Microbiol* . 2007;73(14):4425-4428.	Quasi-experimental	4 laundry swatches, laboratory, United States	Swatches inoculated with viruses	n/a	Virus concentration after washing in home laundry	Common laundry did not eliminate enteric and respiratory viruses from clothing.	IIB
23	Wright, S. N., Gerry, J. S., Busowski, M. T., et al. Gordonia bronchialis sternal wound infection in 3 patients following open heart surgery: intraoperative transmission from a healthcare worker. *Infection Control & Hospital Epidemiology.* 2012;33(12):1238-1241.	Case Report	Reported three cases of postoperative Gordonia bronchialis sternal infections after coronary artery bypass surgery, hospital, United States	n/a	n/a	n/a	*G bronchialis* was isolated from the scrub apparel, axilla, hands, and purse of a nurse anesthetist and was implicated as the cause of the SSIs. Cultures taken from her roomate, who was also a nurse, showed the same organism. After notification of the culture results, the nurse anesthetist discarded her front-loading washing machine. During the next year, the nurse anesthetist's and her roommate's scrub apparel, hands, nares, and scalps tested negative for *G bronchialis.* The authors concluded that the home washing machine was the likely bacterial reservoir. Home laundering may not reliably kill all pathogens and the pathogens may survive in the form of biofilm within the washing machine. Biofilms have been implicated in the malodor emitting from wash machines. The author recommended that hospital laundering of scrub apparel be implemented as a measure to reduce patients' risk of developing an SSI. Further research is needed to demonstrate a causal relationship between home laundering and human disease.	VA

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24	Chiereghin, Angela, Felici, Silvia, Gibertoni, Dino, et al. Microbial Contamination of Medical Staff Clothing During Patient Care Activities: Performance of Decontamination of Domestic Versus Industrial Laundering Procedures. *Curr Microbiol* . 2020;77(7):1159-1166.	Quasi-experimental	14 HCWs' white coats and cotton cloth squares artificially contaminated with 5 bacteria, university laboratory, Italy	4 domestic laundering procedures; industrial laundering	No laundering	Bacterial load and type	After all domestic laundering procedures, white coats or artificial contaminated cloths some bacteria remained. Whereas with industrial laundering no bacterial growth was found. Researchers recommend that for areas requiring the highest level of decontamination, industrial laundry services are the preference.	IIB
25	Gattlen, J., Amberg, C., Zinn, M. and Mauclaire, L. Biofilms isolated from washing machines from three continents and their tolerance to a standard detergent. *Biofouling* . 2010;26(8):873-882.	Nonexperimental	11 washing machines from four countries on three continents	n/a	n/a	Biofilms	There were 94 isolated strains, 30% were potential human pathogens. Different detergents were used and were insufficient to completely clean washing machine surfaces from cell debris and esopolymeric substances.	IIIB
26	ST65 2008/(R) 2018: Processing of reusable surgical textiles for use in health care facilities. Association for the Advancement of Medical Instrumentation (AAMI); 2018.	Guideline	n/a	n/a	n/a	n/a	Guideline for processing textiles	IVC
27	29 CFR 1910.1030: Bloodborne Pathogens. 7–1–21 Edition ed. Occupational Safety and Health Administration (OSHA); 2021.	Regulatory	n/a	n/a	n/a	n/a	OSHA Bloodborne Pathogen Standard	n/a
28	29 CFR 1910.132: General requirements. 7–1–21 Edition ed. Occupational Safety and Health Administration (OSHA); 2021.	Regulatory	n/a	n/a	n/a	n/a	OSHA General Requirements	n/a
29	Ilibman Arzi, Y., Assous, M. V., Livnat, K., Yinnon, A. M. and Wiener-Well, Y. Bacterial contamination of surgical scrubs in the operating theater. *Am J Infect Control* . 2020;48(1):56-60. doi:S0196-6553(19)30653-4 [pii]	Nonexperimental	133 surgeons, university hospital, Israel	Clean scrubs, leaving and returning to OR	Clean scrubs remaining in OR	Bacterial growth (commensal skin and pathogenic) on front pocket of scrub shirt upon entrance to OR; questionaire	Higher bacterial count on scrubs leaving OR compared to control scrubs (39 vs 3 CFU), but no difference in amount of pathogenic bacteria present. Participation in medical and non-medical activities was significantly associated with higher number of CFUs. Further research on contamination of scrubs after specific procedures and the hours scrubs were worn is needed.	IIIA
30	Tammelin, A., Domicel, P., Hambraeus, A. and Stahle, E. Dispersal of methicillin-resistant Staphylococcus epidermidis by staff in an operating suite for thoracic and cardiovascular surgery: relation to skin carriage and clothing. *J Hosp Infect* . 2000;44(2):119-126	Quasi-experimental	4 part study , hospital staff, Sweden	Multiple tests in tightly woven scrubs	Conventional scrub suits	Dispersal of *Staphylococcus epidermidis*	Although tightly woven scrub suits significantly reduced the amount of bacteria shed into the air, the amount of MRSE was not significantly reduced.	IIC
31	Tammelin, A., Hambraeus, A. and Stahle, E. Source and route of methicillin-resistant Staphylococcus epidermidis transmitted to the surgical wound during cardio-thoracic surgery. Possibility of preventing wound contamination by use of special scrub suits. *J Hosp Infect* . 2001;47(4):266-276.	Nonexperimental	33 staff wearing conventional scrubs and 32 staff wearing special scrubs during CABG surgeries, Sweden	n/a	Conventional scrubs (cotton/poly, 270x230 thread count per 10 cm) and special scrub suits (cotton/poly, 560x395 per 10 cm)	Bacteria present on wound, skin, hand and in the air	Wearing of the special scrub apparel did not reduce the number of MRSE air samples when compared to conventional apparel, demonstrating that an occlusive scrub was not superior to conventional scrub apparel(tightly woven) at decreasing air contamination.	IIIC
32	Andersen, B. M., Solheim, N. Occlusive scrub suits in operating theaters during cataract surgery: effect on airborne contamination. *Infect Control Hosp Epidemiol* . 2002;23(4):218-220.	Nonexperimental	12 perioperative personnel, two Ors, Norway	n/a	Cotton scrubs and scrubs made of 100% polypropylene	Airborne bacterial colony forming units present	There was a significant reduction in airborne bacteria when the occlusive scrub suits were worn	IIIC

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33	Tammelin, A., Ljungqvist, B. and Reinmüller, B. Comparison of three distinct surgical clothing systems for protection from air-borne bacteria: A prospective observational study. *Patient Safety in Surgery* . 2012;6(1).	Nonexperimental	5-9 OR personnel during 21 orthopedic procedures, all wore 3 different scrub suits, hospital, Sweden	n/a	2 polyester types and one mixed cotton/poly	Colony forming units in the air	Polyester had a better protective capacity than the cotton/poly.	IIIC
34	Tammelin, A., Ljungqvist, B. and Reinmüller, B. Single-use surgical clothing system for reduction of airborne bacteria in the operating room.*J Hosp Infect* . 2013;84(3):245-247.	Nonexperimental	10 operations and sampled in a dispersing chamber, Sweden	n/a	Mixed material reusable scrubs (cotton/poly) and single use scrubs (polypropylene)	Colony forming units in the air	Counts of colony forming units were significantly lower when using single use clothing.	IIIC
35	Tammelin A, Hambraeus A, Stahle E. Routes and sources of Staphylococcus aureus transmitted to the surgical wound during cardio-thoracic surgery. Possibility of preventing wound contamination by use of special scrub suits. 2001. *Inf Control Hosp Epidemiol.* 22(6):338-346.	Nonexperimental	33 staff wearing conventional scrubs and 32 staff wearing special scrubs during CABG surgeries, Sweden	n/a	Conventional scrubs (cotton/poly, 270x230 thread count per 10 cm) and special scrub suits (cotton/poly, 560x395 per 10 cm)	Bacteria present on wound, skin, hand and in the air; strains of *S aureus*	Main source of *S aureus* dispersion was from the perineal area and the number of air samples with *S aureus* was significantly reduced with specially designed scrub suits. Using genetic sequencing (PTFE), two probable cases of *S aureus* transmission to air was from HCWs who wore standard scrub attire, whereas no probable attribution could be found in those wearing special scrub attire.	IIIC
36	Tammelin, A, Kylmanen, P, Samuelsson, A. Comparison of number of airborne bacteria in Ors with turbulent mixing ventilation and unidirectional airflow when using reusable scrub suits and single-use scrub suits. *Journal of Hospital Infection,2023,* 135(), 119-124.	Nonexperimental	Two operating rooms with 7 to 10 personnel performing total hips and knees, university hospital, Sweden	n/a	1. Unidirectional airflow (UDAF) with resusable scrub suits (69% cotton, 30% polyester) 2.Turbulent mixing ventilation (TMV) with reusable scrub suits 3. TMV with single-use scrub suits (polypropylene, considered occlusive)	Number of airborne bacteria inside room	The type of ventilation affects air counts in room when less occlusive (ie, blended) scrub suits are worn. Air counts can be decreased by wearing more occlusive scrubs in a TMV ventilation room.	IIIB
37	Lidwell, O. M., Lowbury, E. J. L., Whyte, W., Blowers, R., Stanley, S. J. and Lowe, D. Airborne contamination of wounds in joint replacement operations: the relationship to sepsis rates. *Journal of Hospital Infection* . 1983;4(2):111-131.	Nonexperimental	14 hospitals' operating rooms during joint replacement surgery, United Kingdom	n/a	Conventional operating rooms and ultraclean operating rooms	Mean air contamination of wounds	Good correlation between air contamination and wound contamination. Air was the route of contamination and was less in ultraclean air rooms.	IIIB
38	Statement on Surgical Attire. Guidelines, Statements, Clinical Resources Web site. https://www.asahq.org/standards-and-guidelines/statement-on-surgical-attire. Updated 2022.	Position Statement	n/a	n/a	n/a	n/a	Consensus on surgical attire for anesthesia personnel to include guidance on implementing policies.	IVB
39	Mariscal, A., Lopez-Gigosos, R. M., Carnero-Varo, M. and Fernandez-Crehuet, J. Antimicrobial effect of medical textiles containing bioactive fibres. *European Journal of Clinical Microbiology & Infectious Diseases* . 2011;30(2):227-232.	Quasi-experimental	Laboratory, Spain	Fabric containing silver	Untreated fabric	Inhibition of bacterial growth (33 strains)	All strains except 2 had inhibition of growth at 72 hours	IIB

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40	Chen-Yu, J. H., Eberhardt, D. M. and Kincade, D. H. Antibacterial and laundering properties of AMS and PHMB as finishing agents on fabric for health care workers' uniforms. *Clothing and Textiles Research Journal* . 2007;25(3):258-272.	Quasi-experimental	12 experiments on 2 antibacterial fabrics, laboratory, United States	Before laundering and after 5, 10, and 25 laundering cycles	Control fabric that does not contain antibacterial properties	Tested the ability of the antimicrobial fabric to reduce levels of *Staphyloccous aureus* and *Klebsiella pneumoniae*	The antibacterial finishes provided a significant reduction o*f Staphylococcus aureus* and *Klebsiella pneumoniae.* The researchers concluded that adding antibacterial finishes to fabric was an effective method of reducing bacterial contamination.	IIA
41	Kasuga, E., Kawakami, Y., Matsumoto, T., et al. Bactericidal activities of woven cotton and nonwoven polypropylene fabrics coated with hydroxyapatite-binding silver/titanium dioxide ceramic nanocomposite Earth-plus. *International journal of nanomedic* ine. 2011;6:1937-1943.	Quasi-experimental	Woven cotton fabrics and nonwoven polypropylene fabrics coated with hydroxyapatite-binding silver/titanium dioxide ceramic composite, laboratory, Japan	9 bacterial isolates were dropped onto the fabric	N/A	Amount of bacteria present on the fabrics	Found that bacterial cell counts of *Staphylococcus aureus* and *Escherichia coli* on both the woven and nonwoven fabrics decreased to below 2-log10 CFU/mL within six hours and were undetectable at the end of the 18 hour incubation period. Bacterial cell counts of *Pseudomonas aeruginosa* could not be detected after three to six hours. The researchers found that bacterial counts on the coated woven fabric decreased more rapidly than counts on the coated nonwoven fabric. The bacterial counts on the uncoated woven and nonwoven fabric did not decrease during the 18-hour incubation period.	IIB
42	Sun, G., Qian, L. and Xu, X. Antimicrobial and medical-use textiles.*Textile A* sia. 2001;32(9):33-35.	Nonexperimental	Laboratory, Asia	n/a	2 fabric types, cotton and poly/cotton treated with antibacterial properties	Tested against *S aureus* and *E coli*	After a contact time of 2 minutes with the bacteria, the fabrics exhibited antibacterial properties resistant to *S aureu* s and *E coli* .	IIIB
43	Gerba, Charles P., Sifuentes, Laura Y., Lopez, Gerardo U., Abd-Elmaksoud, Sherif, Calabrese, Jesse and Tanner, Benjamin. Wide-spectrum activity of a silver-impregnated fabric. *Am J Infect Control* . 2016;44(6):689-690.	Quasi-experimental	Swatches were exposed to bacteria for 2, 4 and 24 hours, laboratory, United States	Silver impregnated cloth	Cotton fabric cloth that did not contain silver	Reduction of bacteria	The silver impregnated cloth exhibited a 3-log reduction of all of the microorganisms tested within 2 hours except MRSA, T. menta, C.diff and 2 viruses. Within 24 hours all vegetative bacteria had reduced by more than 4-logs and were virtually undetectable. C-Diff was the most resistant but decreased by almost 90% in 96 hours.	IIC
44	Bearman, G. M., Rosato, A., Elam, K., et al. A crossover trial of antimicrobial scrubs to reduce methicillin-resistant Staphylococcus aureus burden on healthcare worker apparel. *Infection Control & Hospital Epidemiology* . 2012;33(3):268-275.	RCT	30 antimicrobial scrubs worn in an ICU, university hospital, United States	Antimicrobial scrubs	Untreated scrubs	Log reduction in MRSA, VRE, GNRs	Study scrubs were associated with a 4–7 mean log reduction in MRSA burden but not VRE or GNRs. A prospective trial is needed to measure the impact of antimicrobial impregnated apparel on MRSA transmission rates.	IA
45	Boutin, Mallory A., Thom, Kerri A., Zhan, Min and Johnson, J. K. A Randomized Crossover Trial to Decrease Bacterial Contamination on Hospital Scrubs.*Infect Control Hosp Epidemiol* . 2014;35(11):1411-1413.	RCT	90 ICU HCWs uniforms, 720 samples, university hospital, United States	2 uniform sets treated with the antibacterial agent using a proprietary curing process	2 uniform sets that were untreated	Overall rate of scrub contamination with pathogenic bacteria(*Staphylococcus aureus, Enterococcus* species, or gram-negative bacteria)	Antimicrobial coating of scrubs was not effective in preventing bacterial contamination.	IA

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46	Burden, Marisha, Keniston, Angela, Frank, Maria G., et al. Bacterial contamination of healthcare workers' uniforms: A randomized controlled trial of antimicrobial scrubs.*J HOSP MED.* 2013;8(7):380-385.	RCT	109 HCWs on internal medicine ward, university hospital, United States	Antimicrobial scrubs	Standard cotton poly scrubs	Total bacteria count	No evidence that antimicrobial scrubs decreased bacterial contamination of scrubs or HCW skin.	IA
47	Condo, C., Messi, P., Anacarso, I., et al. Antimicrobial activity of silver doped fabrics for the production of hospital uniforms.*New Microbiol* . 2015;38(4):551-558.	Quasi-experimental	Laboratory, Italy	Subjected to different bacterial strains	2 types of fabrics (plain weave and textile weave) poly/cotton impregnated with silver colloid	Growth of bacteria on the fabrics	Significant differences were not observed between the antimicrobial scrubs and regular scrubs when worn by hospital staff.	IIA
48	Anderson, Deverick J., Addison, Rachel, Lokhnygina, Yuliya, et al. The Antimicrobial Scrub Contamination and Transmission (ASCOT) Trial: A Three-Arm, Blinded, Randomized Controlled Trial With Crossover Design to Determine the Efficacy of Antimicrobial-Impregnated Scrubs in Preventing Healthcare Provider Contamination.*Infection Control & Hospital Epidemiology* . 2017;38(10):1147-1154.	RCT	40 ICU nurses wearing control and intervention scrubs, tertiary hospital, United States	Surgical scrubs with silver alloy imbedded (one arm) surgical scrubs with organosilane based quaternary ammonium and hydrophobic fluoroacrylate copolymer emulsion (arm two)	Standard cotton poly scrubs	Total contamination of scrubs measured as the sum of CFUs on scrubs at each sampled location	Scrub type was not associated with a change in contamination of scrub clothing. Did not support the use of antimicrobial scrubs.	IA
49	Kyle, E. Guideline for medical device and product evaluation. Kyle E, ed. E-Guidelines+ ed. Association of periOperative Registered Nurses (AORN);2023	Guideline	n/a	n/a	n/a	n/a	Provides guidance for evaluating US Food and Drug Administration-cleared medical devices and products for use in the perioperative setting.	IVA
50	Markel, Troy A., Gormley, Thomas, Greeley, Damon, Ostojic, John and Wagner, Jennifer. Wearing long sleeves while prepping a patient in the operating room decreases airborne contaminants.*Am J Infect Control.* 2018;46(4):369-374.	Quasi-experimental	3 hospitals, 3 OR's, United States	Mock skin prep procedures performed with covered arms	Bare arms	Airborne contamination and microbes present	Presence of particulates and shedding was decreased when arms were covered.	IIB
51	Elmously, Adham, Gray, Katherine D., Michelassi, Fabrizio, et al. Operating Room Attire Policy and Healthcare Cost: Favoring Evidence over Action for Prevention of Surgical Site Infections.*Journal of the American College of Surgeons.* 2019;228(1):98-106.	Nonexperimental	25,170 patients undergoing surgery, 2 hospitals, United States	n/a	n/a	SSI rates	SSI rates before and after implementing AORN "policy." No difference in SSI rates before and after the policy and the cost of attire for one person went from $.07-0.12 to $1.11 to 1.38 after the policy change.	IIIB
52	Stapleton, E. J., Frane, N., Lentz, J. M., et al. Association of Disposable Perioperative Jackets With Surgical Site Infections in a Large Multicenter Health Care Organization.*JAMA Surg* . 2020;155(1):15-20.	Nonexperimental	60,009 undergoing all clean (Class I) procedures, 12 hospitals, United States	n/a	n/a	SSI rates per NHSN; jacket cost	The wearing of disposable perioperative jackets did not improve the rate of SSI. During 26 months after policy implementation, 2,010,040 jackets were purchased at a cost of $1,709,898.46.	IIIB
53	Kuritzkes, Benjamin A., Cao, Yiwen, Baser, Onur, Thomas, Nadine, Forde, Kenneth A. and Kiran, Ravi P. New barrier attire regulations in the operating room: A mandate without basis? *Am J Surg.* 2019;218(3):447-451.	Nonexperimental	1122 patients undergoing abdominal surgery, university hospital, United States	n/a	n/a	Use of NSQIP data base for SSI and complication rates before and after implementing new attire regulations	New attire policy was not significantly associated with risk of SSI or any other 30-day postoperative complication.	IIIB

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54	Wills, Bradley W., Smith, Walter R., Arguello, Alexandra M., McGwin, Gerald, Ghanem, Elie S. and Ponce, Brent A. Association of Surgical Jacket and Bouffant Use With Surgical Site Infection Risk.*JAMA Surg* . 2020;155(4):323-328.	Nonexperimental	34,042 inpatient surgical procedures, university hospital, United States	n/a	n/a	SSI rates; postoperative complications; jacket and bouffant cost	No significant difference in SSI rates before and after implementating mandatory surigical jacket and bouffant wear. The estimated annual cost for surgical jackets was $300,000,whereas bouffants were found to be less expensive than surgical skull caps. Researchers conclude that facilities should evaluate their own data to determine if recommendations are beneficial and cost-effective.	IIIB
55	Treakle, A. M., Thom, K. A., Furuno, J. P., Strauss, S. M., Harris, A. D. and Perencevich, E. N. Bacterial contamination of health care workers' white coats.. *Am J Infect Control.* 2009;37(2):101-105.	Nonexperimental	149 Grand Rounds attendees white coats, teaching hospital, United States	n/a	n/a	Contamination of nosocomial pathogens	23% of the white coats tested were contaminated *with S aureu* s, 18% were MRSA, none were contaminated with VRE.	IIIB
56	Munoz-Price, L. S., Arheart, K. L., Lubarsky, D. A. and Birnbach, D. J. Differential laundering practices of white coats and scrubs among health care professionals.*Am J Infect Control* . 2013;41(6):565-567.	Qualitative	Survey of 160 physicians, 3 hospitals, United States	n/a	n/a	Laundering practices	Recommended that lab coats be laundered regularly (ie, at least once or twice per week) and whenever dirty or soiled with body fluids. The researchers also recommended that the lab coats be laundered in hot water with bleach to reduce or eliminate potential pathogens.	IIIA
57	Munoz-Price, L. S., Arheart, K. L., Mills, J. P., et al. Associations between bacterial contamination of health care workers' hands and contamination of white coats and scrubs.*Am J Infect Control.* 2012;40(9):245.	Organizational Experience	119 HCW hands and uniforms, university hospital, United States	n/a	n/a	n/a	Contamination of the hands was associated with a greater likelihood of the presence of pathogens on white coats. Further studies are needed.	VA
58	Kaplan, C., Mendiola, R., Ndjatou, V., Chapnick, E. and Minkoff, H. The role of covering gowns in reducing rates of bacterial contamination of scrub suits. *Am J Obstet Gynecol.* 2003;188(5):1154-1155.	Quasi-experimental	75 obstetric clinicians wearing a covering garment outside designated area, or outside of the hospital, United States	Sampling the fabric after the clinicians participated in routine clinical activity	Not wearing a covering garment	Bacterial growth	150 samples were taken from the uniforms that were worn underneath the covering garment. There was no significant difference in groups that wore a covering garment compared to those that did not. Wearing of a covering garment did not reduce rates of scrub contamination.	IIC
59	Loh, W., Ng, V. V. and Holton, J. Bacterial flora on the white coats of medical students.*J Hosp Infect.* 2000;45(1):65-68.	Nonexperimental	100 medical students, university hospital, United Kingdom	n/a	n/a	Survey to determine when white coats were worn and the degree of bacterial contamination	White coats of medical students were more likely to be contaminated at points of frequent contact with patients such as the sleeve and pocket. The survey demonstrated that the white coats were only laundered occasionally. Study supports the view that the white coat is a potential source of contamination.	IIIB
60	Haun, Nicholas, Hooper-Lane, Christopher and Safdar, Nasia. Healthcare Personnel Attire and Devices as Fomites: A Systematic Review.*Infect Control Hosp Epidemiol* . 2016;37(11):1367-1373.	Systematic Review	72 studies, 3 prospective, 4 correlational, 65 cross-sectional	n/a	n/a	n/a	72 individual studies assessed contamination of a variety of items, including white coats, neckties, stethoscopes, and mobile electronic devices, with varied pathogens including Staphylococcus aureus, including methicillin-resistant S. aureus gram-negative rods, and enterococci. contaminating rates were from 0-32%. Four studies evaluated for possible connection between healthcare personnel contaminants and clinical isolates with no unequivocally direct link identified.	IIIA

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61	Du, Z. Y., Zhang, M. X., Shi, M. H., Zhou, H. Q. and Yu, Y. Bacterial contamination of medical uniforms: a cross-sectional study from Suzhou city, China.*J Pak Med Assoc.* 2017;67(11):1740-1742.	Nonexperimental	122 white coats, university hospital, China	n/a	n/a	Presence of microorganisms	61.5% of the coats were contaminated with bacteria. They are a reservoir for bacteria and potentially a source of infections.	IIIB
62	Van Aartsen, Daniel, Thakur, Manish, Cadnum, Jennifer L., Alhmidi, Heba, John, Amrita R. and Donskey, Curtis J. Use of cauliflower mosaic virus DNA markers to assess the potential for pathogen transmission from physicians white coats.*Am J Infect Control* . 2021. doi:10.1016/j.ajic.2021.10.016.	Nonexperimental	Lab coats with DNA marker on outer sleeve cuff and coat pockets of 20 physicians, VA hospital, United States	n/a	n/a	Direct and indirect contact of coat and patient or environmental surfaces; transfer of DNA marker	DNA markers on sleevess and pockets were frequently transferred to surfaces and patients, suggesting contaminated white coats have potential to transmit pathogens. Strategies to decrease white coat contamination or contact between clothing and patients or surfaces could reduce the risk for pathogen contamination.	IIIB
63	Summers, M.M., Lynch, P. F. and Black, T. Hair as a Reservoir of Staphylococci.*J Clin Pathol* .1965;18:13-15.	Nonexperimental	Patients and staff, hosptial, United Kingdom	n/a	n/a	Presence of *Staph aureu* s	In hospital staff and in-patients, the staphylococci were highly resistant to antibiotics, and phage types usually classified and "hospital staphylococci" predominated. There were more staph post op wound infections in hair carriers than in non-carriers, and in three cases the staph was the same phage type as those that were isolated pre-operatively from the hair.	IIIB
64	Boyce, John M. Evidence in support of covering the hair of OR personnel.. *AORN J* . 2014;99(1):4-8.	Expert Opinion	n/a	n/a	n/a	n/a	Supports covering hair.	VA
65	Berrios-Torres, S. I., Umscheid, C. A., Leas, B., et al. *Supplementary Online Content* . Healthcare Infection Control Practices Advisory Committee, Centers for Disease Control and Prevention; 2017.	Guideline	n/a	n/a	n/a	n/a	Supplementary to CDC SSI guideline- wear a mask, fully cover hair and facial hair, change scrubs when contaminated.	IVA
66	Mase, K., Hasegawa, T., Horii, T., et al. Firm adherence of Staphylococcus aureus and Staphylococcus epidermidis to human hair and effect of detergent treatment.*Microbiol Immuno* l. 2000;44(8):653-656.	Quasi-experimental	3 hair samples, laboratory, Japan	Inoculated with bacterial strains and then washed with detergent	Compared to hair that did not get washed with the detergent	Presence of bacteria after washing with the detergent	Bacteria were present on the surface of the cuticles of the hair and the attached bacteria were not completely removed by repeated washings with detergents demonstrating that the hair could be a source of bacterial contamination.	IIC
67	Beesoon S, Sydora BC, Klassen T, et al. Does the type of Surgical Headwear in Operating Room matter? A review of evidence and opinions.*AORN Journal* . 2023;118(3):157-168.	Literature Review	n/a	n/a	n/a	n/a	Although there is no conclusive evidence that covering the hair prevents SSI, clean attire and daily changing of attire is necessary. Solid-evidence based guidelines and collaboration with stakeholders and surgeons are key to implementing quality improvement inititiatives.	VA
68	Rios-Diaz, Arturo J., Chevrollier, Guillaume, Witmer, Hunter, et al. The art and science of surgery: Do the data support the banning of surgical skull caps?*Surgery* . 2018;164(5):921-925.	Nonexperimental	1,901 patients, 1950 procedures 767 before and 1,183 after implementing headwear policy, hospital, United States	n/a	n/a	SSI rate	The strict implementation of bouffant or helmet headwear, with the removal of skull caps was not associated with decreased SSIs for clean and clean-contaminated cases. Further evidence is required to assess the validity of headwear guidelines.	IIIB
69	Farach, S. M., Kelly, K. N., Farkas, R. L., et al. Have Recent Modifications of Operating Room Attire Policies Decreased Surgical Site Infections? An American College of Surgeons NSQIP Review of 6,517 Patients.*J Am Coll Surg* . 2018;226(5):804-813.	Nonexperimental	6,517 patients undergoing surgery, 2 hospitals, United States	n/a	n/a	Superficial SSIs	SSI rates before and after implementing AORN "policy" on surgical attire. No difference in superficial SSI rates found.	IIIB

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70	Shallwani, Hussain, Shakir, Hakeem J., Aldridge, Ashley M., Donovan, Maureen T., Levy, Elad I. and Gibbons, Kevin J. Mandatory Change From Surgical Skull Caps to Bouffant Caps Among Operating Room Personnel Does Not Reduce Surgical Site Infections in Class I Surgical Cases: A Single-Center Experience With More Than 15 000 Patients.*Neurosurgery* . 2018;82(4):548-554.	Nonexperimental	15,959 undergoing all Class I , spinal, and neurosurgery craniotomy/craniectomy surgical procedures, hospital, United States	n/a	n/a	SSI rates before and after banning of surgical skull caps.	The banning of traditional surgical skull caps did not improve the rate of SSI.	IIIC
71	Parry, Joshua Alan. Karau, Melissa J. Aho, Johnathon M. Taunton,Michael.Patel, Robin. To Beard or Not to Beard? Bacterial Shedding Among Surgeons.*Orthopedics* . 2016;39(2):290.	Quasi-experimental	10 clean shaven and 10 bearded OR male personnel, length was 10mm, 10-19mm and 20mm or longer, empty room, United States	A series of facial motions were done while wearing a mask, unmasked or a hood	Clean shaven compared to bearded	Bacterial shedding	While wearing a mask, bearded and clean shaven did not appear to have an increased likelihood of shedding. Hoods did not decrease the amount of shedding compared with masks alone.	IIA
72	McLure, H. A., Mannam, M., Talboys, C. A., Azadian, B. S. and Yentis, S. M. The effect of facial hair and sex on the dispersal of bacteria below a masked subject.*Anaesthesia* .2000;55(2):173-176.	Quasi-experimental	10 bearded men, laboratory, United Kingdom	Participants wore masks and were asked to perform facial movements to wiggle the mask	10 clean shaven men and 10 female subjects	Amount of bacterial shedding	Wiggling the mask significantly increased the degree of bacterial shedding onto agar plates 15 cm below the lips in bearded men and females but not in clean shaven men. At rest without a mask, wiggling the bearded men shed significantly more bacteria than clean shaven men or women. To reduce the contamination of the sterile filed when masks are worn, females and beaded men should avoid wiggling the face mask and bearded men may consider removing the beards.	IIC
73	Wakeam, E., Hernandez, R. A., Rivera Morales, D., Finlayson, S. R. G., Klompas, M. and Zinner, M. J. Bacterial ecology of hospital workers' facial hair: a cross-sectional study. *J Hosp Infect.* 2014;87(1):63-67.	Nonexperimental	408 subjects, 2 teaching hospitals, United States	n/a	199 bearded men, 199 clean shaven men	Presence of bacteria	Both groups shed bacteria at high rates. The clean shaven group had a higher colonization rate for staph and MRSA. Standard infection control practices to prevent contamination during sterile procedures are recommended.	IIIA
74	El Edelbi, Mostapha, Hassanieh, Joelle, Malaeb, Nancy, et al. Facial microbial flora in bearded versus nonbearded men in the operating room setting: A single-center cross-sectional STROBE-compliant observational study.*Medicine (Baltimore)* . 2022;101(40):e29565.	Nonexperimental	80 male HCWs, operating room, tertiary hospital, Lebanon	n/a	61 bearded, 19 nonbearded	Microbial load with strains and antimicrobial resistance; grooming habits	Bearded HCWs in OR had significantly higher facial bacterial loads, and more resistant strains. Shaving or facial washing methods did not contribute to a significant difference in bacterial growth.	IIIA
75	Brodt, S., Maurer, J, Nowack, D. A retrospective analysis of the association between male facial hair and the incidence of peri-prosthetic infections. 2023. 24(5), 482-487.	Nonexperimental	20,394 primary hip and knee procedures, university hospital, Germany	n/a	n/a	SSI rate of male surgeons with facial hair at time of surgery	No association found between SSIs and presence of facial hair or type of beard, however surgical hood and mask required for all surgeries.	IIIB
76	Markel, Troy A., Gormley, Thomas, Greeley, Damon, et al. Hats Off: A Study of Different Operating Room Headgear Assessed by Environmental Quality Indicators.*Journal of the American College of Surgeons* .2017;225(5):573-581.	Quasi-experimental	2 hospitals, 7 people. One OR in each facility, United States	1 hour long mock surgeries were done, disposable bouffants and disposable skull caps were worn	Cloth skull cap	Air particle counts, microbiologic air counts, and hat permeability, particle transmission and pore size	Disposable bouffants are not superior to either type of skull cap. Did not look at cloth bouffants.	IIC

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77	Malik, A., Qureshi, H., Abdul-Razakq, H., et al. 'I decided not to go into surgery due to dress code': a cross-sectional study within the UK investigating experiences of female Muslim medical health professionals on bare below the elbows (BBE) policy and wearing headscarves (hijabs) in theatre.*BMJ Open.* 2019;9(3):e019954-019954.	Qualitative	Female Muslim health care professionals, medical conference, United Kingdom	n/a	n/a	Views on bare below the elbows (BBE) policy	56.3% felt religouous requirements to cover their arms was not respected and 74.1% were not happy with their BBE uniform policy alternative. Some respondents felt the dress code issue was enough to not specialize in surgery.	IIIB
78	Kanayama Katsuse, Akiko, Takishima, Masako, Nagano, Miyuki, et al. Cross-contamination of bacteria-colonized pierced earring holes and fingers in nurses is a potential source of health care-associated infections.*American Journal of Infection Control* . 2018. doi:10.1016/j.ajic.2018.06.006.	Nonexperimental	200 nurses from 12 wards, university hospital, Japan	n/a	n/a	128 with pierced earring holes and 72 without a pierced earring hole	Pierced earlobes can be a source of health care associated infections via cross-transmission of bacteria from earlobe holes to fingers.	IIIB
79	Rashid, T., Vonville, H., Hasan, I. and Garey, K. W. Mechanisms for floor surfaces or environmental ground contamination to cause human infection: a systematic review.*Epidemiol Infect.* 2017;145(1):347-357.	Systematic Review	30 studies, 19 examined direct pathways of transmission and 11, indirect pathways; 20 were observational and 10 were experimental studies.	n/a	n/a	n/a	Shoe soles are vectors of transmission.	IIIA
80	Buchler, A. C., Wicki, M., Frei, R., et al. Matching *Clostridioides difficile* strains obtained from shoe soles of healthcare workers epidemiologically linked to patients and confirmed by whole-genome sequencing.*J Hosp Infect.* 2022;126:10-15.	Nonexperimental	103 HCWs caring for 42 patients infected with *C difficile* , university hospital, Switzerland	n/a	n/a	Cultures and whole-genome sequencing (WGS) of HCW shoe soles and patient fecal samples	37 (17.8%) HCW shoe soles were positive for *C difficile,* of which 26 (74.3%) *were* epidemiological linked with matching strains, suggesting transmission. Further larger studies needed to evaluate shoe soles as mode for *C difficile* HAI.	IIIB
81	Amirfeyz, R., Tasker, A., Ali, S., Bowker, K. and Blom, A. Theatre shoes - a link in the common pathway of postoperative wound infection?.*Ann R Coll Surg Engl* . 2007;89(6):605-608.	Nonexperimental	Shoes worn only in the surgical suite: 40 at the beginning of the shift and 40 at the end of the shift, United Kingdom	n/a	Shoes worn outside (40)	Number of bacteria	The results of the study demonstrated that 98% of the outdoor shoes were contaminated with coagulase-negative staphylococci, coliform, and *Bacillus* species compared with 56% of the shoes worn only in the surgical suite. Bacteria on the perioperative floor may contribute up to 15% of CFUs dispersed into the air by walking.	IIIB
82	29 CFR 1910.136: *Foot protection* .7–1–21 Edition ed. Occupational Safety and Health Administration (OSHA); 2021.	Regulatory	n/a	n/a	n/a	n/a	Regulations for footwear	n/a
83	ASTM F2412-18a, *Standard Test Methods for Foot Protection* .ASTM International; 2018.	Regulatory	n/a	n/a	n/a	n/a	Guideline for testing shoes and degree of protection.	n/a
84	Bell, Jennifer, Collins, James W., Dalsey, Elizabeth and Sublet, Virginia. S*lips, Trip, and Fall Prevention for Healthcare Workers* .Vol DHHS (NIOSH) Publication Number 2011-123. ; 2010. https://www.cdc.gov/niosh/docs/2011-123/pdfs/2011-123.pdf. Accessed 10/25/2017.	Guideline	n/a	n/a	n/a	n/a	NIOSH Guideline for slips, trips and falls, wear non-skid shoes	IVB

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85	Barr, J., Siegel, D. Dangers of dermatologic surgery: protect your feet.*Dermatol Surg* . 2004;30(12 Pt 1):1495-1497.	Nonexperimental	15 types of shoes were tested in a lab setting, chicken thighs were used to simulate feet	n/a	n/a	The degree of penetration of the shoes from the simulated scalpel.	60% of the shoes allowed the simulated scalpel to penetrate the chicken thigh. Six types were effective in preventing penetration of the simulated scalpel, sneaker suede, suede with inner mesh lining, leather with inner canvas lining, nonpliable leather, rubber with inner lining and new rubber shoes.	IIIB
86	Fafliora, Eleftheria, Bampalis, Vasileios G., Lazarou, Nikolaos, et al. Bacterial contamination of medical devices in a Greek emergency department: Impact of physicians cleaning habits.*Am J Infect Control.* 2014;42(7):807-809.	Nonexperimental	88 physician stethoscopes working in a tertiary hospital, Greece	n/a	n/a	Bacteria present	All of the stethoscopes were contaminated.	IIIB
87	Bernard, L., Kereveur, A., Durand, D., et al. Bacterial contamination of hospital physicians' stethoscopes.*Infect Control Hosp Epidemiol.* 1999;20(9):626-628.	Nonexperimental	355 doctors, general hospital, France	n/a	n/a	Presence of bacteria	Among the 355 stethoscopes tested, 234 carried different bacterial species; 31 carried potentially pathogenic bacteria. Although some bacteria deposited onto membranes could survive 6 to 18 hours, none survived after disinfection.	IIIB
88	Russell, A., Secrest, J. and Schreeder, C. Stethoscopes as a source of hospital-acquired methicillin-resistant *Staphylococcus aureus* .*Journal of PeriAnesthesia Nursing* . 2012;27(2):82-87.	Quasi-experimental	141 stethoscopes, university hospital, United States	Cleaning the stethoscopes	Each stethoscope served as its own control	Bacterial growth before and after cleaning	Bacterial growth was noted in the precleaning group, but no MRSA colonies were detected. The post cleaning group had no bacterial growth. There was not enough data to statistically support that isopropyl alcohol is effective in decreasing bacterial counts; however, these findings suggest that current disinfection guidelines are effective in preventing MRSA colonization on stethoscopes in this setting.	IIA
89	Campos-Murguía A, León-Lara X, Muñoz JM, Macías AE, Álvarez JA. Stethoscopes as potential intrahospital carriers of pathogenic microorganisms. *American Journal of Infection Control.* 2014;42(1):82-83.	Nonexperimental	112 stethoscopes from 12 hospital departments, Mexico	n/a	n/a	Bacterial colonization and presence of pathogenic bacteria	Stethoscope diaphragms are contaminated with bacteria, half of which was pathogenic. Recommend routine cleaning of stethoscopes with 70% alcohol, CHG or triclosan before and after patient use.	IIIB
90	de Queiroz Junior, Josa Reginaldo Alves, Melo, Isadora O., Calado, Gustavo H. d. S., Cavalcanti, Leila R. C. and Sobrinho, Carlos R. W. Identification and resistance profile of bacteria isolated on stethoscopes by health care professionals: Systematic review.*Am J Infec* t *Control* .2021;49(2):229-237.	Systematic Review	22 articles, 7 examined bacterial profile only, 8 examined bacterial profile with identification of resistant bacteria and 7 identified bacteria, the resistance profile and antibiogram.	n/a	n/a	n/a	The stethoscope is a potential source of pathogenic bacterial transmission in health care settings particularly in ICUs, yet majority of HCW do not disinfect them. Education on potential for transmission and proper disinfection, along with evaluation of bacterial profile on stethoscopes is key.	IIIA
91	Napolitani, Margherita, Bezzini, Daiana, Moirano, Fulvio, Bedogni, Corrado and Messina, Gabriele. Methods of Disinfecting Stethoscopes: Systematic Review.*Int J Environ Res Public Health* . 2020;17(6).	Systematic Review	n/a	n/a	n/a	n/a	Cross contamination wit subsequent HAI likelihood can be reduced by proper disinfection of stethoscopes. An inconsistent performance of disinfection, as opposed to the disinfectant product appears to contribute to failure of disinfection.	IIIA

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92	Boulee, David, Kalra, Sarathi, Haddock, Alison, Johnson, T. D. and Peacock, W. F. Contemporary stethoscope cleaning practices: What we haven't learned in 150 years.*Am J Infect Control.* 2019;47(3):238-242.	Nonexperimental	400 HCWs from 3 units, university hospital, United States	n/a	n/a	Cleaning frequency and method	Disinfection occurred in 18% (72 of 400) of encounters, however only 4% followed CDC Guidelines. No stethoscopes were disinfected before examinging patients with open abdominal or chest wounds.	IIIB
93	Datta, Priya, Kaur, Mandeep, Rawat, Sangeeta, Gupta, Varsha and Chander, Jagdish. Stethoscope, the friendly foe - A study to evaluate bacterial contamination of stethoscopes and disinfection practices.. *J infect dev ctries* . 2018;12(10):887-893.	Quasi-experimental	100 stethoscopes, 49 doctors, 15 interns, 36 nurses, inpatient and outpatient departments, university hospital, India	70% isopropyl alcohol with 30 *s* contact time	none	Bacterial contamination; HCW attitude toward cleaning	Before cleaning, at least one pathogenic microorganism was found on 56 stethoscopes. After cleaning, only 5 stethoscopes showed growth. All HCWs were aware of cleaning importance, but only 70% performed regularly.	IIA
94	Alali, Sukaina A., Shrestha, Ekta, Kansakar, Aswin R., Parekh, Amishi, Dadkhah, Shahriar and Peacock, W. F. Community hospital stethoscope cleaning practices and contamination rates.*Am J Infect Control* .2020;48(11):1365-1369.	Quasi-experimental	104 HCWs, community hospital, United States	Self-reported cleaning practices	None	Bacterial contamination	Among the 104 stethoscopes tested, 88 carried bacterial species; of which 39 grew potentially pathogenic bacteria, despite 86% of participants indicating cleaning according to CDC guidelines.	IIB
95	Lee, Raeseok, Choi, Su-Mi, Jo, Sung J., et al. A quasi-experimental study on stethoscopes contamination with multidrug-resistant bacteria: Its role as a vehicle of transmission.*PLoS ONE* . 2021;16(4):e0250455.	Quasi-experimental	100 HCWs from 3 units, university hospital, Korea	Two one-hour education sessions by Infection Prevention department on stethoscope disinfection	Compared to bacterial presence before education	Pathogenic and MDR bacterial presence; pulsed-field gel electrophoresis (PFGE); survey	Various nosocomial pathogens that included MDR bacteria were present, but did not decrease after disinfection education. Carbapenemase-producing *Klebsiella pneumonia* isolate recovered from shared stethoscope was same strain as patients infected on unit. Researchers conclude continuous consistent education using a multifaceted appreach is necessary to reduce transmission.	IIB
96	Rutala WA, Weber DJ; Healthcare Infection Control Practices Advisory Committee. Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008. Atlanta, GA: Centers for Disease Control and Prevention; 2008. Update May 2019.	Guideline	n/a	n/a	n/a	n/a	Provides guidance on the preferred cleaning, disinfection and sterilization of patient care medical devices and the cleaning and disinfecting the healthcare environment.	IVA
97	Vasudevan, Rajiv S., Mojaver, Sean, Chang, Kay-Won, Maisel, Alan S., Frank Peacock, W. and Chowdhury, Punam. Observation of stethoscope sanitation practices in an emergency department setting.*Am J Infect Control* .2019;47(3):234-237.	Nonexperimental	141 physicians and 285 nurses in emergency room, VA hospital, United States	n/a	n/a	Hand hygiene; stethoscope hygiene	The cleaning of stethoscopes was deficient and hand hygiene performance was low. A method for cleaning stethoscopes that is convenient and effective is necessary to interupt potential pathogen transmission.	IIIC
98	Holleck, J L., Campbell, Sheldon, Alrawili, Hedib, et al. Stethoscope hygiene: Using cultures and real-time feedback with bioluminescence-based adenosine triphosphate technology to change behavior.*Am J Infect Control* .2020;48(4):380-385.	Organizational Experience	Medical students and attendings, medical wards, VA hospitall, United States	Stethoscope cultures and ATP bioluminescence before and after disinfection	n/a	Perception of cleaning; cleaning frequency	The viewing of stethoscope cultures and ATP bioluminesce before and after disinfection improved HCWs "buy in" of hygiene practices, although observations did not show an improvement in practices.	VB
99	Caldwell, Nicole W., Guymon, Charles H., Aden, James K., Akers, Kevin S. and Mann-Salinas, Elizabeth. Bacterial Contamination of Burn Unit Employee Identity Cards.*J BURN CARE RES* .2016;37(5):e470-e475.	Nonexperimental	60 HCWs (58 common access cards and 60 ID cards) in a burn unit, United States	n/a	n/a	Presence of pathogenic organisms	75% contamination rate but contamination rate decreased when badges were cleaned. Recommended routine weekly cleaning of badges.	IIIA

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100	Kotsanas, D., Scott, C., Gillespie, E. E., Korman, T. M. and Stuart, R. L. What's hanging around your neck? Pathogenic bacteria on identity badges and lanyard*s.Med J Aust* .2008;188(1):5-8.	Nonexperimental	71 HCWs and 12 infection control staff, university hospital, Australia	n/a	n/a	Presence of pathogenic bacteria on lanyards	The microorganisms recovered from lanyards and identification badges were methicillin-sensitive *Staphylococcus aureu* s, MRSA, Enterococcus species, and *Enterobacteriaceae* . The researchers concluded that identification badges should be clipped on and disinfected regularly and that lanyards should be changed frequently or not be worn.	IIIB
101	Patterson, Charlotte A., Wyncoll, Duncan, Patel, Amita, et al. Cloth Lanyards as a Source of Intermittent Transmission of *Candida auris* on an ICU.*Crit Care Med* .2021;49(4):697-701.	Case Report	n/a	n/a	n/a	n/a	*Candida auris* was isolated from communal cloth lanyard containing key to controlled drug cabinet and was determined as source of transmission of outbreaks in two ICUs.	VA
102	Murphy, C. M., Di Ruscio, F., Lynskey, M., Collins, J., McCullough, E., Cosgrave, R., McDonnell, D., & Fennell, J. (2017). Identification badge lanyards as infection control risk: A cross-sectional observation study with epidemiological analysis. *Journal of Hospital Infection* , 96(1), 63–66.	Nonexperimental	102 lanyards from HCP, university hosptial, Ireland	n/a	n/a	*Staphylococcus aureus* on lanyard and nares; genetic similarilty of samples; survey of lanyard hygiene	Lanyard hygiene is minimial and bacterial clones in nares were the same as bacteria found on lanyards. Combined this represents a risk of transmission to patients, suggesting elimination of lanyards by frontline staff.	IIIB
103	Millar, Beverley C., Moore, John E. Evaluation of a Domestic Steam Disinfector-Dryer Device for Disinfection of Health Care Workers' Identification Lanyards.*Workplace Health Saf* .2021;69(11):517-524.	Quasi-experimental	38 strips of neck lanyards innoculated with bacteria and yeast (n = 31), laboratory, Ireland	Steam disinfector with dryer device	No disinfection	Growth of bacteria and yeast; weight	No growth found after steam disinfection for 5 minutes, followed by drying for 30 minutes. Researchers recommend daily disinfection of lanyards using a steam disinfector with dryer.	IIA
104	Graham, J. G., Chen, A. F., Hickok, N. J., et al. Surgical Loupes Worn by Orthopaedic Surgeons Are a Reservoir for Microorganis*ms.Clin Orthop Relat Res.* 2019;477(6):1508-1513.	Nonexperimental	1) 21 orthopaedic surgeons' loupes, 5 loupe storage cases, 2) 9 loupes at start and end of day, 3) 6 loupes, 1 minute after cleaning, university hospital, United States	n/a	Start and end of day; clean with alcohol swab	Bacterial and fungal growth; cleaning practices	Routine cleaning of loupes and airing of case decreases bacterial load and may decrease risk of surgical field contamination and possible wound infections.	IIIB
105	Chang, Chih-Hsiang, Chen, Szu-Yuan, Lu, Jang-Jih, Chang, Chee-Jen, Chang, Yuhan and Hsieh, Pang-Hsin. Nasal colonization and bacterial contamination of mobile phones carried by medical staff in the operating room. *PLoS ONE* . 2017;12(5):e0175811.	Nonexperimental	216 cultures from 72 ortho OR staff members, Taiwan	n/a	n/a	Mobile phone contamination and colonization of staff members	There was a high rate of bacterial nasal colonization and mobile phone contamination. A mobile phone may be a reservoir for pathogen contamination in the OR.	IIIB
106	Khan, Amber, Rao, Amitha, Reyes-Sacin, Carlos, et al. Use of portable electronic devices in a hospital setting and their potential for bacterial colonization.*Am J Infect Control* .2015;43(3):286-288	Nonexperimental	106 physician personal electronic devices, two medical centers, United States	n/a	n/a	Presence of bacteria	All devices yielded at least 1 positive culture from the cover or screen. Devices can be colonized with a variety of bacteria.	IIIB
107	Kirkby, Sharon, Biggs, Christine. Cell Phones in the Neonatal Intensive Care Unit: How to Eliminate Unwanted Germs.*ADV NEONAT CARE (LIPPINCOTT WILLIAMS & WILKINS*).2016;16(6):404-409	Organizational Experience	18 phones in use by nurses, physicians and parents in a NICU, hosptial, United States	n/a	n/a	Presence of bacteria	Every phone was contaminated with bacteria.	VA

REFERENCE #	CITATION	EVIDENCE TYPE	SAMPLE SIZE/ POPULATION	INTERVENTION(S)	CONTROL/ COMPARISON	OUTCOME MEASURE(S)	CONCLUSION(S)	CONSENSUS SCORE
108	Murgier, J. Coste, J-F. Cavaignac, E. Bayle-Iniguez, X. Chiron, P. Bonnevialle,P.Laffosse, J-M. Microbial flora on cell-phones in an orthopedic surgery room before and after decontamination.*Orthop Traumatol Surg Res* .2016;102(8):1093-1096.	Nonexperimental	52 health care worker cell phones in an ortho surgery, France	n/a	Compared before and after decontamination	CFUs	Cell phone contamination rate was 94% which significantly decreased after decontamination with a disinfectant.	IIIB
109	Shakir, Irshad A., Patel, Nirav H., Chamberland, Robin R. and Kaar, Scott G. Investigation of cell phones as a potential source of bacterial contamination in the operating room.*J BONE JOINT SURG (AM)* .2015;97(3):225-231.	Nonexperimental	53 cell phones belonging to orthopedic surgeons, United States	n/a	n/a	Presence of pathogenic bacteria	83% of the phones had the presence of pathogenic bacteria and are a potential source of nosocomial infections and should be cleaned more that once a week	IIIB
110	De Groote, Pauwel, Blot, Koen, Conoscenti, Elena, Labeau, Sonia and Blot, Stijn. Mobile phones as a vector for Healthcare-Associated Infection: A systematic review.*Intensive Crit Care Nurs* .2022;72:N.PAG.	Systematic Review	50 studies, 38 observational, 12 interventionl (microbial contamination before and after disinfection)	n/a	n/a	n/a	Mobile phones used in health care settings are contaminated with pathogenic organisms. The contamination rate is substantially reduced with disinfection. HCWs should include phone disinfection as part of hand hygiene routine.	IIIA
111	Curtis, Aine, Moore, Zena, Patton, Declan, O'Connor, Tom and Nugent, Linda. Does using a cellular mobile phone increase the risk of nosocomial infections in the Neonatal Intensive Care Unit: A systematic review.*J NEONAT NURS* .2018;24(5):247-252.	Systematic Review	6 articles, 4 cross sectional studies, 1 cohort study,1 organizational experience	n/a	n/a	n/a	Surfaces of mobile phones used in NICUs were found to have a growth or pathogenic contamination rate of 40%-100%. HCWs and families need to be aware of potential transmission from cell phones and prevention methods.	IIIA
112	Simmonds-Cavanagh, R. Viability of hospital pathogens on mobile phone.2022. *AJIC;* 50: 787-791.	Nonexperimental	8 bacteria isolates (4 gram positive, 4 gram negative) inoculated onto sterile mobile phones, laboratory, Great Britain	n/a	n/a	Bacteria viability at timed intervals up to 28 days	Extended duration of bacteria viability was found indicating its ability to remain viable and be transferred to areas within and outside hospital. Phone decontamination should occur at same time as hand hygiene.	IIIB
113	Simmonds, R., Lee, D. and Hayhurst, E. Mobile phones as fomites for potential pathogens in hospitals: microbiome analysis reveals hidden contaminants.*J Hosp Infect* .2020;104(2):207-213.	Nonexperimental	250 HCWs, hospital, Great Britain	n/a	191 Non-HCWs, outside hospital, Great Britain	Presence of bacteria; presence of antibiotic resitant bacteria	Bacteria found on majority of phones from both groups , with HCWs' phones containing higher numbers of bacteria, including MRSA and VRE. Infection control policies on care of mobile phones are needed to mitigate potential cross-contamination.	IIIA
114	Malhotra, S., Wlodarczyk, J., Kuo, C., et al. Shining a light on the pathogenicity of health care providers' mobile phones: Use of a novel ultraviolet-C wave disinfection device.*Am J Infect Control* .2020;48(11):1370-1374.	Quasi-experimental	9 residents and 21 nurses, pediatric medical/surgical unit, United States	UV-C device 30 second cycle at start and end of shift	No UV-C device	Bacterial count before and after device use; survey on device	Both one cycle and two cycle significantly reduced bacterial counts, including pathogenic bacteria, on cell phone. Participants stated that they were willing to use device to reduce infection.	IIB
115	Leong, X. Y. A., Chong, S. Y., Koh, S. E. A., Yeo, B. C., Tan, K. Y. and Ling, M. L. Healthcare workers' beliefs, attitudes and compliance with mobile phone hygiene in a main operating theatre complex.I*nfect Prev Pract* 2019;2(1):100031.	Nonexperimental	HCWS operating room with access to 4 phone hygiene stations, hospital, Singapore	n/a	n/a	Survey on cleaning beliefs, attitudes and self-reported cleaning performance	Hygiene stations improved performance. Researchers concluded that a readily available disinfectant method for HCWs to clean phones daily before entering and/or after leaving the OR is key.	IIIB
116	Galazzi, Alessandro, Panigada, Mauro, Broggi, Elena, et al. Microbiological colonization of healthcare workers' mobile phones in a tertiary-level Italian intensive care uni*t.Intensive Crit Care Nurs* .2019;52:17-21.	Nonexperimental	50 HCWs in ICU, hospital, Italy	n/a	n/a	Bacterial presence before and after work shift	All tested phones had bacterial growth. No difference was found in types and burden of bacteria between the beginning and end of shifts suggesting bacteria alread present before shift begins.	IIIB

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117	Missri, Louai, Smiljkovski, Daniel, Prigent, Gwenole, et al. Bacterial colonization of healthcare workers' mobile phones in the ICU and effectiveness of sanitization*n. J Occup Environ Hyg* .2019;16(2):97-100.	Quasi-experimental	56 ICU HCWs, hospital, France	Bactericidal wipes	42 administrative personnel	Number and identity of bacteria present	The cell phones of HCW and administrative personnel had similar bacterial colonization. Use of wipes significantly decreased the number of bacteria, including pathogenic bacteria but did not completely eliminate bacteria.	IIB
118	Wagoner, Melissa, Snyder, Staci, McCarty, Melanie, et al. Routine Disinfection of Mobile Communication Devices in the Postanesthesia Care Unit.*J Perianesth Nurs* .2019;34(6):1176-1180.	Nonexperimental	6 mobile communication devices,PACU, hospital, United States	Standardized disinfection method at established times	No standarized disinfection method	Adenosine triphosphate (ATP) count	Defined time and method of disinfection obtained and sustained passing level of cleanliness on mobile communication devices.	IIIC
119	Wood, Kari, Ewell, Sandy and Gerstmann, Dale. Cleaning of Cell Phones in the Neonatal Intensive Care Unit.*Neonatology Today* .2022;17(9):3-13.	Case Report	n/a	n/a	n/a	n/a	Education on how to clean cell phones increased cleaning habits of HCP, parents and visitors.	VB
120	Christie, Jacqueline, Walsh, Timothy, Lee, Christopher and Stefanacci, Paul. Process improvement: Use of UV-C for healthcare cell phone disinfection.*Am J Infect Control* .2021;49(10):1292-1294.	Quasi-experimental	Nurses' cell phones from 2 units, hospital, United States	UV-C light device	Germicidal wipes	Efficacy, workflow, staff satisfaction	Similar cumulative reduction using wipes and UV-C device. (99.2 vs. 99.9%). However, UV-C device phones were significantly less contaminated ands staff satisfication was greater. (88 to 52%). More research needed on optimal frequency of disinfection in high-risk departments.	IIB
121	Huffman, Stephanie, Webb, Carly and Spina, Sean P. Investigation into the cleaning methods of smartphones and wearables from infectious contamination in a patient care environment (I-SWIPE).*Am J Infect Control* .2020;48(5):545-549.	Quasi-experimental	HCWs' smartphones and wearable devices, 3 hospitals, Canada	UV-C disinfection device applied at start and end of HCW shift	Individual's usual cleaning practices (measured prior to UV-C use)	Presence of bacteria; survey on device	Significant difference in pathogenic bacterial growth (20% to 4%) after twice daily placement in specially designed UV-C device for 30 second cycle.	IIB
122	Kaiki, Y., Kitagawa, H., Hara, T., et al. Methicillin-resistant Staphylococcus aureus contamination of hospital-use-only mobile phones and efficacy of 222-nm ultraviolet disinfection.*Am J Infect Control* .2021;49(6):800-803.	Quasi-experimental	Physicians' hospital-use-only phones, university hospital, Japan	222-nm UV irradiation for 1.5 minutes	none	MRSA presence; aerobic bacteria reduction	MRSA was present on five of 50 phones. Significant reduction of aerobic bacterial counts on 40 phone surfaces with UVC irradiation. Further studies to determine safety of 222-nm UVC in occupied areas are needed.	IIB