TRANSMISSION OF INFECTIOUS AGENTS IN HEALTHCARE SETTINGS: A SYSTEMATIC REVIEW OF HEALTHCARE-ASSOCIATED INFECTIONS

Renata Trajerová, Ladislav Štěpánek
Department of Public Health, Faculty of Medicine and Dentistry, Palacký University Olomouc, Olomouc, Czech Republic
Cent Eur J Public Health 2026; 34 (2): 111–116
https://doi.org/10.21101/cejph.a8870

Authors (year)	Transmission routes	Infectious agents	Source
Szymczyk et al. (2025)	Fomite-mediated	*Klebsiella* spp., *Enterococcus* spp., *S. aureus*, *P. aeruginosa*, *Acinetobacter* spp.,	Reusable tourniquets
Jonas et al. (2025)	Hand-mediated	*K. pneumoniae, P. stutzeri, A. baumannii, E. cloacae/asburiae, E. coli*	Hands of patients and visitors
Quinn and Vollman (2025)	Fomite-mediated	Gram-negative bacilli, VRE, MRSA, *S. aureus*	Reusable healthcare bath basins
Zublenko and Petrusevych (2025)	Hand- and fomite-mediated	*S. aureus, Enterococcus* spp., *E. coli, S. epidermidis, K. pneumoniae*	Hospital environmental surfaces (the most on medical clothing and hands of staff)
Wang et al. (2024)	Hand- and fomite-mediated	*S. epidermidis, A. baumannii, P. aeruginosa, S. mitis, S. oralis*	Hands of patients, waiting chairs, high-contact surface
Duarte Valim et al. (2023)	Hand-mediated	*S. haemolyticus, S. epidermidis, A. ursingii, E. faecalis, C. parapsilosis*	Hands of healthcare workers
Lompo et al. (2023)	Fomite-mediated	*P. stutzeri, E. cloacae complex, A. haemolyticus, K. pneumoniae, V. alginolyticus*	Contaminated antiseptics, disinfectants and hand hygiene products
Adhikari et al. (2023)	Fomite-mediated	*S. aureus*, *Acinetobacter* spp., *Pseudomonas* spp., *Citrobacter* spp., *E. coli, Klebsiella* spp.	Contaminated stethoscopes
Bulwadda et al. (2023)	Hand-mediated	*S. aureus, E. coli*, MRSA, *Klebsiella* spp., *Acinetobacter* spp., *Enterococcus* spp.	Hands of healthcare workers
Tannhäuser et al. (2022)	Fomite-mediated	Coagulase-negative staphylococci (CoNS), *B. cereus, E. faecalis, S. aureus, Pantoea* spp.	Phones of healthcare workers
Rayson et al. (2021)	Hand-mediated	*Citrobacter* spp., MRSA, *P. aeruginosa, Acinetobacter* spp.	Hands of healthcare workers
Rela et al. (2021)	Fomite-mediated	*S. aureus, E. cloacae, P. aeruginosa*	Operating room fomites (patient transfer board, operating table)
Afridayani et al. (2021)	Fomite-mediated	*Staphylococcus* spp., *S. aureus*	Nurse phones
Shakthi and Venkatesha (2021)	Hand-mediated	MRSA, *S. aureus*	Hands of healthcare workers, nasopharyngeal carriage
Schmitz et al., (2020)	Fomite-mediated	*S. aureus, E. coli, E. faecalis, E. faecium, A. baumannii, K. pneumoniae*	Transvaginal ultrasound probes
Yehouenou et al. (2020)	Hand- and fomite-mediated	*S. aureus, MRSA, E. coli, P. aeruginosa, K. pneumoniae, A. baumannii*	Surgical site infections (SSI)
Cruz-López et al. (2020)	Hand- and fomite-mediated	*A. baumannii, K. pneumoniae, E. cloacae*	Environmental surfaces, medical devices, hands of healthcare workers and patients' relatives
Yayan et al. (2020)	Hand-mediated	Coagulase-negative staphylococci (CoNS), *S. aureus, E. coli, A. baumannii*	Hospitalized children's hands
Ravine et al. (2020)	Fomite-mediated	*Bacillus* spp., coagulase-negative staphylococci (CoNS), *S. aureus, Enterococcus* spp., Gram-negative rods	Thermoplastic immobilization forms, water bath
Fernandes et al. (2020)	Hand- and fomite-mediated	MRSA, coagulase-negative staphylococci (CoNS)	Environmental surfaces near patients, hands of healthcare workers

Authors (year)	Transmission routes	Infectious agents	Source
Hikmah and Anuar (2020)	Fomite-mediated	*Bacillus* spp., coagulase-negative staphylococci (CoNS), *S. aureus, K. pneumoniae*	Phones
Lv et al. (2019)	Fomite-mediated	Carbapenem-resistant *Acinetobacter baumannii*	Contaminated faucet aerators
Tang et al. (2019)	Hand- and fomite-mediated	*A. baumannii, Pseudomonas* spp., *E. cloacae*	Environmental surfaces, hands of healthcare workers
Mody et al. (2019)	Hand- and fomite-mediated	MRSA, VRE, resistant gram-negative bacilli (RGNB)	Patient hands, high-touch room surfaces
Haddad et al. (2019)	Fomite-mediated	Coagulase-negative staphylococci (CoNS), *S. aureus, P. aeruginosa, Bacillus* spp.	Contaminated stethoscopes
Brooks et al. (2019)	Fomite-mediated	*B. cepacia*	Contaminated saline flush syringes
Solaimalai et al. (2019)	Fomite-mediated	*B. cepacia*	Contaminated ultrasound gel
Costa et al. (2019)	Fomite-mediated	*E. faecium, S. aureus, K. pneumoniae, A. baumannii, P. aeruginosa, Enterobacter* spp.	High-touched surfaces in intensive care units (computer keyboards, stretcher mattress, new-born feeding bottles)
Afle et al. (2019)	Fomite-mediated	*S. aureus, Staphylococcus* spp. *Bacillus* spp., *E. coli, A. baumannii, S. ficaria, P. oryzihabitans, Pantoea* spp.	Hospital surfaces
Weldegebreal et al. (2019)	Fomite-mediated	*S. aureus*, coagulase-negative staphylococci (CoNS), *Bacillus* spp., *K. pneumoniae, P. aeruginosa, E. coli, Proteus* spp.	Stethoscopes, sphygmomanometers
Troiano et al. (2019)	Fomite-mediated	*Staphylococcus* spp., *Pseudomonas* spp.	Flexible bronchoscopes
Migliara et al. (2019)	Hand- and fomite-mediated	*K. pneumoniae, A. baumannii, P. aeruginosa, S. aureus*	Environmental surfaces, bed edges, (medication charts, mechanical ventilation system touch-screens, PC keyboard and mouse, sink faucets, blood gas analyser touchscreen, patients' hands)
Datta et al. (2018)	Fomite-mediated	*Acinetobacter* spp., *K. pneumoniae, S. aureus, E. coli, Enterococcus* spp.	Contaminated stethoscope membranes
Du et al. (2017)	Fomite-mediated	*Staphylococcus* spp., *E. coli, Klebsiella* spp., *A. lwoffii*, *M. osloensis*	Medical uniforms
Westerway et al. (2017)	Fomite-mediated	*S. haemolyticus, S. warneri, B. subtilis, Terribacillus* spp., *A. lwoffii, Pseudomonas* spp., *E. faecium, B. aurantiaca*	Contaminated ultrasound probes, probe cords, machine keyboards, heated ultrasound gel
La Fauci et al. (2017)	Fomite-mediated	*P. aeruginosa, S. aureus, Enterococcus* spp., *C. albicans, P. mirabilis, S. marcescens*	Reusable oxygen humidifiers
Bingham et al. (2016)	Hand-mediated	MRSA, VRE, multidrug-resistant *Acinetobacter* spp., *C. difficile*	Hands of healthcare workers
Gostine et al. (2016)	Fomite-mediated	*C. perfringens, S. aureus, Enterococcus* spp., *Enterobacter* spp., *Klebsiella* spp., MRSA, VRSA	Contaminated computer keyboards
Ikumapayi et al. (2016)	Fomite-mediated	*S. liquefaciens*	Contaminated normal saline, Ventolin fluid for nebulization, methylated spirit, oxygen concentrator
Vikke and Giebner (2016)	Fomite-mediated	*S. aureus*, *E. faecalis*	Blood pressure cuffs in ambulances
Hefzy et al. (2016)	Fomite-mediated	*S. aureus*, MRSA, coagulase-negative staphylococci (CoNS), *Enterococcus* spp., VRE, gram-negative bacilli	Examination tables, medication tables, doctors' desks, stethoscopes, transducers
Moore et al. (2015)	Hand- and fomite-mediated	MRSA	Healthcare worker hands, contaminated surfaces
Loftus et al. (2015)	Fomite-mediated	*Acinetobacter* spp., *Pseudomonas* spp., *Brevundimonas* spp., *Enterobacter* spp., *Moraxella* spp.	Contaminated anaesthesia work area surfaces
Loftus et al. (2015)	Hand- and fomite-mediated	*S. aureus*	Contaminated anaesthesia work area surfaces, healthcare worker hands