Table B.32: MDRO, Hand Hygiene—Systematic Reviews

Note: Full references are available in [Section 5.2 reference list](#Section5point2refs).

| Author, Year | Description of Patient Safety Practice | Setting/s, Population/s | Summary of Systematic Review Findings | Implementation  Themes/Findings | Notes |
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| **Ellingson et al., 201416** | General hand hygiene guidelines: what to use, in which circumstances, and how to incentivize hand hygiene compliance | General healthcare settings  Multiple countries included in reviewed studies and policies | Opportunities for hand hygiene include: before touching the patient, before a clean/aseptic procedure, after body fluid exposure, after touching the patient, and after touching patient surroundings. Many studies and policies compress this list to two moments: entry and exit of a patient room.  The main method for measuring hand hygiene compliance is direct (overt or covert) observation, but using multiple methods (such as product volume, technological systems for automatic monitoring, or even self-report) can strengthen measurement against any single mode’s limitations.  Alcohol-based hand rubs are generally superior to soap and water, with the major exception being spore-forming organisms such as *C. difficile*. The main drawback of hand rubs is contact dermatitis, which is positively associated with the number of hand hygiene events. For *C. difficile* and other spore-forming organisms, soap and water is the preferred method. Hot water, which can irritate skin, should be avoided. Artificial and long nails are recommended against, on the basis of microbial carriage and risk of glove puncture. | Recommendations for increasing hand hygiene compliance include:  1. Choose the appropriate products: alcohol-based hand rub with at least 62% alcohol, antimicrobial and nonantimicrobial soak, and antisepsic solutions specifically formulated for surgical use.  2. Provide convenient access to hand hygiene equipment and ensure it is refilled routinely.  3. Involve healthcare personnel in choosing products.  4. Perform hand hygiene at the five moments mentioned above (before touching the patient, before a clean/aseptic procedure, after body fluid exposure, after touching the patient, and after touching patient surroundings).  5. Perform hand hygiene when hands are visibly soiled.  6. Assess unit- or institution-specific barriers to hand hygiene.  7. Implement multimodal (“bundle”) approaches to address those barriers.  8. Educate, motivate, and ensure competency of healthcare personnel.  9. Measure hand hygiene by direct observation and one other method (product volume, automatic monitoring).  10. Provide feedback to healthcare personnel on hand hygiene compliance. | Organisms/  Outcomes  General bacteria and viruses, with specific instructions for *C. difficile* |
| **Graveto et al., 20188** | Cell phone use and hand hygiene | Hospitals, ICUs, operating theaters, dialysis units, burn centers  Multiple countries included in reviewed studies | An integrative review of the literature was carried out following the PICOD Method. Thirteen studies met the defined criteria for this review. Cell phones from health care personnel working in ICUs showed a higher rate of bacterial contamination than those working in other units. Cell phones used by doctors posed the highest risk of contamination and of infection rates, compared with nurses or other health technicians, but one study showed that administrative/clerical professionals had higher contamination rates than those of personnel involved in patient care.  One study found that 96.7% of health care professionals never disinfected their phone. Another found that 45% of professionals “never” washed their hands before and after using their cell phones, 38% “occasionally” and only 17% said “consistently,” and (from a third study) 97% never washed their hands after using their phone.  The most common organisms isolated in the reviewed studies were coagulase-negative *Staphylococcus* species (from 48.7% to 95.6% of all samples tested), *S.* *aureus* species (from 6.7% to 66.7% of all samples), and *Acinetobacter* species (1% to 33% of all samples). Between 9.5% and 52% of *S. aureus* samples across studies were resistant to methicillin, and a high percentage of Gram-negative bacteria (31.3%) was resistant to ceftazidime.  Larger phones were associated with a larger number of colonies and a higher probability of pathogenic organism colonies. However, there is a lack of data about the connection between contaminated phones and health care-associated infections (HAIs). | Cell phone use represents a threat to successful hand hygiene, but the ubiquity and utility of cell phones does not support their ban in health care settings. (There is also limited data on the connection between cell phone contamination and HAIs.) Instead, the authors recommend that cell phone use be incorporated into hand hygiene promotion, including handwashing before and after use and regular, standardized disinfection of cell phones.  Technological innovation can be a strong ally for healthcare personnel and organizations by creating new equipment such as antibacterial covers and films or ultraviolet light for sanitary purposes. | Organisms/  Outcomes  *Staphylococcus aureus, Acinetobacter* species, multidrug-resistant Gram-negative bacteria (MDR-GNB)  Hand hygiene compliance after using cell phones, HAIs |
| **Luangasanatip et al., 201526** | Hand hygiene compliance | Hospitals  Multiple countries included in reviewed studies | Search of databases for studies published between 2009 and February 2014. Included studies were studies implementing an intervention to improve compliance with hand hygiene among healthcare workers in hospital settings and measuring compliance or appropriate proxies that met predefined quality inclusion criteria. Forty-one met the inclusion criteria (6 randomized controlled trials, 32 interrupted time series, one nonrandomized trial, and two controlled before-and-after studies).  Meta-analysis of two randomized controlled trials showed the addition of goal setting to WHO “5 Moments” was associated with improved compliance (pooled odds ratio 1.35, 95% confidence interval 1.04 to 1.76; I2=81%). Nineteen studies reported clinical outcomes; data from these were consistent with clinically important reductions in rates of infection resulting from improved hand hygiene for some but not all important hospital pathogens. Reported costs of interventions ranged from $225 to $4,669 (£146-£3,035; €204- €4,229) per 1,000 bed-days.  There is strong evidence supporting the efficacy of the WHO “5 Moments” multicomponent intervention. The clinical outcomes of hand hygiene interventions are not always consistent across all MDROs, and the authors hypothesize that this variation is due to the epidemiology of the organisms and whether strains are acquired outside or inside the care setting. To further increase compliance, the authors also suggest adding supplemental elements such as goal setting, reward incentives, and ways to increase staff accountability (e.g., direct observation). | The WHO “5 Moments” campaign effectively increases hand hygiene compliance among health care workers. Specifically, goal setting, incentives, and accountability can increase compliance and support it over time. | Organisms/  Outcomes:  Hand hygiene compliance |
| **Tacconelli et al., 20146** | Contact precautions, environmental cleaning, hand hygiene, antimicrobial stewardship | General healthcare setting  Multiple countries included in reviewed studies | Articles presenting data pertaining to the control of the spread, in hospitalized patients, of MDR-*Pseudomonas aeruginosa*, *A. baumannii*, and Enterobacteriaceae and organisms intrinsically resistant to broad-spectrum antimicrobial agents, such as *Stenotrophomonas maltophilia* and *Burkholderia cepacia*, were identified through computerized literature searches. The search was restricted to full articles published in English up to November 2011 and including adult patients (>16 years of age). Hands of any healthcare worker are vulnerable to colonization, although the type and count of MDR Gram-negative bacteria (MDR-GNB) are related to exposure from patients and their environment, as well as the ability of the microbe to successfully colonize on transient contact. Many MDR-GNB can also survive several hours on healthcare workers’ hands, depending on the species.  Both soap and water as well as alcohol-based hand rubs are equally effective in reducing carriage of MDR-GNB. However, alcohol-based hand rubs are less effective at removing MDR-GNB from artificial nails compared to natural nails. The use of gloves in place of hand hygiene is not sufficient, as one study found contamination of a sizable percentage (29.3% for MDR-*A. baumannii* and 17.4% for MDR-*P. aeruginosa*) after glove removal but before hand hygiene. | Correct hand hygiene before and after patient contact, as well as before and after contact with patient environment (regardless of gown and glove use), is strongly recommended for preventing MDR-GNB transmission in both epidemic and endemic settings. | Organisms/  Outcomes  MDR-GNB  MDR-GNB carriage |