

## HOSPITAL AND HEALTHCARE-ASSOCIATED INFECTIONS: IMPORTANCE OF HYGIENE

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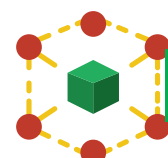
### Abstract

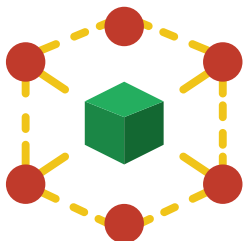
Hospital and healthcare-associated infections (HAIs) remain one of the most persistent challenges to safe patient care. Patients enter hospitals to receive treatment, yet exposure to microorganisms can sometimes lead to infections that were not present or incubating when care began. These infections increase suffering, prolong hospital stays, raise costs, complicate treatment, and can contribute to antimicrobial resistance. Although modern hospitals use sophisticated diagnostic and therapeutic technologies, basic hygiene remains one of the most dependable foundations of infection prevention. Hand hygiene, environmental cleaning, safe use of personal protective equipment, appropriate reprocessing of reusable equipment, respiratory hygiene, safe injection practices, linen and waste management, and reliable water, sanitation and hygiene services work together rather than in isolation. This narrative review discusses how hygiene interrupts transmission, why healthcare workers and patients share responsibility, and how hospitals can turn hygiene from a routine task into a visible culture of safety. Current guidance from the World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) emphasizes that infection prevention and control (IPC) is an essential part of quality healthcare and that many HAIs are preventable when evidence-based measures are consistently implemented.

**Keywords:** healthcare-associated infections; hospital-acquired infections; hygiene; hand hygiene; infection prevention and control; environmental cleaning; personal protective equipment; patient safety; antimicrobial resistance; WASH.

### 1. Introduction

Healthcare is built around trust. A patient expects that a hospital will make them safer, not expose them to another illness. HAIs challenge that expectation because healthcare environments contain many conditions that can favor transmission: vulnerable patients, invasive procedures, frequent contact between people, shared equipment, high patient turnover, and microorganisms that may be resistant to several antibiotics. WHO describes IPC as a practical, evidence-based approach that protects patients and health workers from avoidable infections and notes that it is relevant to every





healthcare interaction. HAIs are not limited to major outbreaks; they can occur during ordinary care in hospitals, clinics, dialysis units, long-term care facilities and other settings.

The importance of hygiene is therefore broader than simply keeping a ward visibly clean. Hygiene is a coordinated set of behaviors and systems designed to break the chain by which microorganisms move from a source to a susceptible person. Good hygiene does not mean that every microorganism must be eliminated. Instead, it reduces unnecessary microbial exposure at the moments when transmission is most likely. This distinction is important because effective infection prevention depends on consistent, risk-based practices rather than appearance alone.

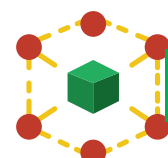
## 2. Burden and Significance of HAIs

HAIs are among the most common adverse events associated with healthcare delivery. WHO's 2024 global IPC report reports that, on average, about 7 of every 100 patients in acute-care hospitals in high-income countries and 15 of every 100 patients in low- and middle-income countries acquire at least one HAI during a hospital stay. These figures illustrate an important equity issue: infection prevention is needed everywhere, but resource constraints can make reliable IPC and WASH services more difficult to maintain. HAIs can result in additional treatment, longer admission, loss of productivity, emotional stress for families, and increased pressure on already busy health systems.

The clinical burden also intersects with antimicrobial resistance. An infection that is preventable may become more difficult to manage when the causative organism is resistant to commonly used medicines. Consequently, hygiene is not merely a housekeeping concern. It is part of antimicrobial stewardship and patient safety because preventing an infection avoids the need for some antibiotic exposure in the first place.

## 3. How Hygiene Breaks the Chain of Transmission

Microorganisms can move through direct contact, contaminated hands, shared equipment, environmental surfaces, respiratory particles, contaminated food or water, and unsafe procedures. In a busy ward, one missed opportunity for hand hygiene can be followed by many contacts. Likewise, a poorly cleaned high-touch surface can become a link between patients and staff. CDC guidance emphasizes that hand hygiene and environmental cleaning are complementary: contaminated surfaces can contribute to transmission, while hands and gloves can carry organisms from the environment to patients and back again.



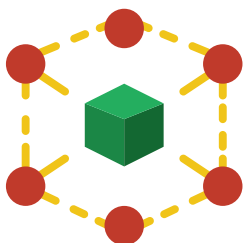


Figure 2. Simplified chain of transmission and points for hygiene intervention

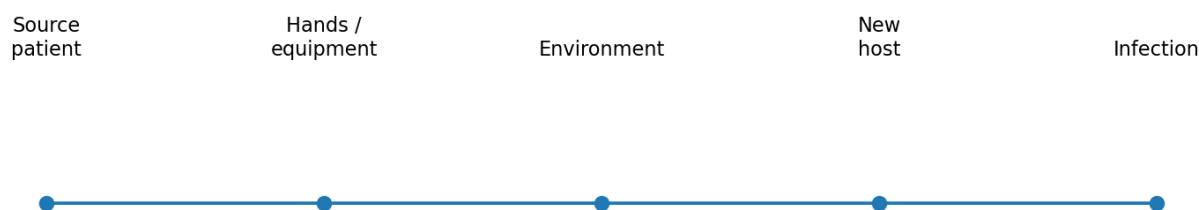


Figure 2. Simplified chain of transmission and hygiene points that can interrupt spread. Conceptual illustration based on IPC principles; not a measured epidemiological model.

#### 4. Hand Hygiene: The First Line of Defense

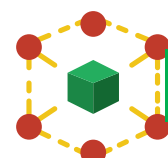
Among all routine hygiene behaviors, hand hygiene is especially visible because hands connect people, equipment and surfaces. Healthcare workers may touch a patient, adjust a device, handle a bedside object and then approach another patient within a short period. Without appropriate hand hygiene, microorganisms can travel along that sequence. CDC identifies hand hygiene as a core component of Standard Precautions and recommends cleaning hands at key clinical moments, including before patient contact, before aseptic tasks, after contact with the patient or the patient's environment, after exposure to body fluids, and after glove removal.

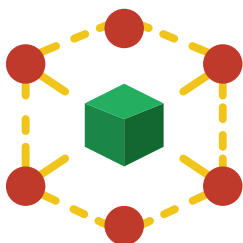
Alcohol-based hand rub is generally preferred when hands are not visibly soiled because it is convenient and supports rapid access to hand hygiene. Soap and water remain important when hands are visibly dirty and in situations specified by local infection-control guidance. Importantly, gloves do not replace hand hygiene. Gloves can become contaminated, and their removal can transfer organisms if hands are not cleaned afterward.

Improving hand hygiene is not simply a matter of telling staff to wash their hands more often. Hospitals need accessible sinks or hand-rub dispensers, adequate supplies, training, reminders, observation, feedback and supportive leadership. A respectful culture also matters: staff should be able to remind one another about hand hygiene without embarrassment or blame.

#### 5. Environmental Cleaning and Disinfection

A clean-looking room is not necessarily a microbiologically safe room. High-touch surfaces such as bed rails, bedside tables, call buttons, door handles and frequently handled equipment may receive repeated contact. CDC guidance describes environmental cleaning as a fundamental IPC intervention





and recommends structured programs with trained personnel, appropriate supplies, standardized procedures, monitoring and feedback.

Cleaning removes dirt and organic material and can reduce microbial contamination; disinfection is used when indicated by the risk and the surface or equipment involved. The process should follow the product manufacturer's instructions, including correct dilution and contact time. High-touch areas and rooms used by vulnerable patients generally require greater attention than low-touch surfaces.

Environmental services staff should be recognized as members of the infection-prevention team. Their work is often less visible than clinical procedures, but it directly supports safe care. Clear schedules, adequate staffing, training, checklists and feedback can make cleaning more reliable and reduce variation between shifts.

Figure 1. Illustrative hygiene-related prevention priorities

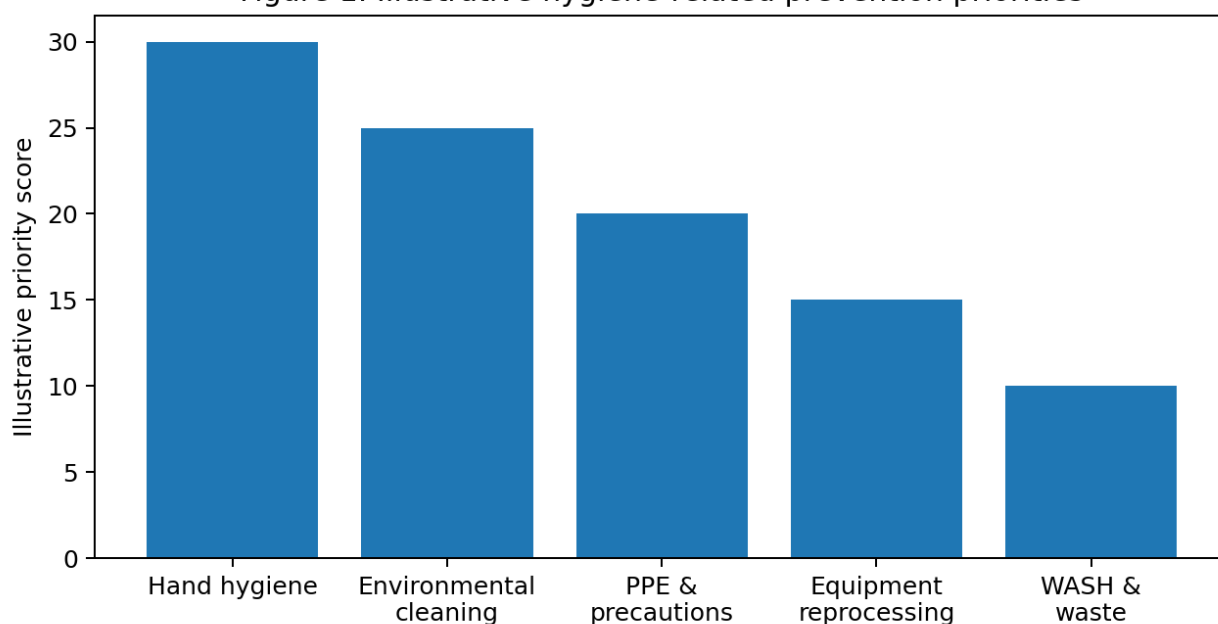
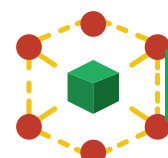
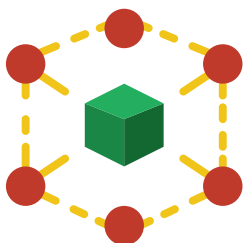


Figure 1. Illustrative hierarchy of hygiene-related prevention priorities. Values are a conceptual scoring device for presentation, not measured estimates of HAI reduction.

## 6. Other Essential Hygiene Measures

| Measure                             | Why it matters                                                                 | Practical focus                                                      |
|-------------------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Personal protective equipment (PPE) | Reduces exposure to blood, body fluids and infectious material when indicated. | Choose correctly, put on/remove safely, and avoid unnecessary reuse. |





|                                      |                                                                            |                                                                                                                      |
|--------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Reusable equipment                   | Shared devices can carry organisms between patients.                       | Clean, disinfect or sterilize according to the item's risk and manufacturer guidance.                                |
| Respiratory hygiene                  | Coughing and respiratory secretions can spread infection.                  | Provide tissues/masks when appropriate, encourage covering coughs, and separate symptomatic patients when indicated. |
| Safe injections                      | Unsafe injection practices can transmit bloodborne pathogens.              | Use aseptic technique and single-use items as required.                                                              |
| Linen and waste                      | Improper handling can spread contamination to people and surfaces.         | Segregate, transport and process materials using facility procedures.                                                |
| Water, sanitation and hygiene (WASH) | Reliable water and sanitation enable hand hygiene, cleaning and safe care. | Maintain infrastructure, supplies, drainage and waste systems.                                                       |

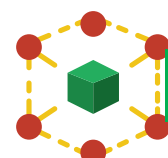
## 7. Hygiene as a Team Responsibility

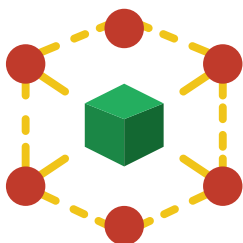
Infection prevention cannot be assigned to one department. Nurses, physicians, cleaners, laboratory personnel, technicians, students, patients, caregivers, administrators and visitors all influence the infection risk of a healthcare environment. The most successful programs therefore make hygiene part of everyday work rather than a special activity performed only during outbreaks.

Leadership is particularly important. If supplies are frequently unavailable, staffing is inadequate, or staff are punished for reporting problems, compliance is unlikely to improve sustainably. By contrast, visible leadership, realistic workloads, reliable supplies, training and feedback can turn hygiene expectations into habits. Patients can also participate by asking whether hands have been cleaned before a procedure or contact, provided that such conversations are encouraged respectfully and do not place responsibility for infection prevention on patients.

## 8. Common Barriers to Effective Hygiene

Several barriers repeatedly weaken IPC. These include overcrowding, high workload, staff shortages, lack of sinks or hand-rub dispensers, shortages of gloves or cleaning supplies, inadequate training,





inconsistent supervision, unclear responsibilities and weak feedback systems. In some settings, infection prevention may be viewed as an additional task rather than a core part of clinical care. Another challenge is that compliance can fall when staff are tired or when workflow is poorly designed.

These problems should be approached as system problems rather than simply blaming individuals. If a dispenser is empty, the correct response is not only to remind workers to clean their hands; the hospital must also examine supply chains, placement, maintenance and accountability. A human-centered approach asks what makes the safe action easy, visible and realistic during a busy shift.

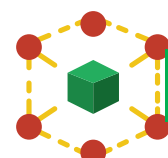
## 9. Monitoring, Feedback and Quality Improvement

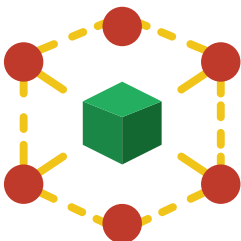
Measurement helps hospitals understand whether their IPC systems work in practice. Useful indicators can include availability of hand hygiene products, observed hand hygiene opportunities, environmental cleaning performance, healthcare-associated infection rates, device-associated infection measures, and completion of staff training. However, measurement should lead to improvement rather than punishment.

Feedback is most useful when it is timely, specific and constructive. A ward that receives information showing where hand hygiene opportunities are being missed can test small changes, such as moving dispensers closer to the point of care, improving signage or changing workflow. Repeated measurement then shows whether the change made a difference. This quality-improvement cycle is more sustainable than one-time campaigns.

## 10. Practical Hygiene Checklist for Healthcare Facilities

| Area                   | Minimum expectation                                                      | Monitoring idea                        | Common failure point                     |
|------------------------|--------------------------------------------------------------------------|----------------------------------------|------------------------------------------|
| Hand hygiene           | Products available at points of care; staff follow clinical indications. | Routine observation and supply checks. | Empty dispensers or poor placement.      |
| Environmental cleaning | Written schedules and risk-based cleaning of high-touch areas.           | Checklist/audit with feedback.         | Incomplete cleaning during busy periods. |
| Equipment              | Reusable equipment reprocessed                                           | Spot checks and documentation.         | Unclear responsibility.                  |





|           |                                                       |                                            |                                          |
|-----------|-------------------------------------------------------|--------------------------------------------|------------------------------------------|
|           | between patients as required.                         |                                            |                                          |
| PPE       | Correct PPE available and used when indicated.        | Training and observation.                  | Incorrect selection or removal.          |
| WASH      | Safe water, sanitation and waste systems functioning. | Facility rounds and maintenance logs.      | Infrastructure interruptions.            |
| Education | Regular orientation and refresher IPC training.       | Training completion and competency checks. | Training treated as a one-time activity. |

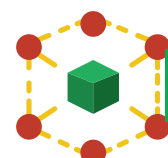
## 11. Discussion

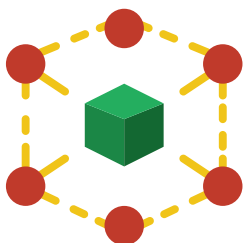
The central lesson is that hygiene works best as a system. Hand hygiene alone cannot compensate for contaminated equipment, inadequate cleaning, unsafe injections or unreliable water. Conversely, excellent environmental cleaning cannot fully protect patients if hands repeatedly transfer microorganisms between care activities. WHO's global IPC strategy places IPC at the center of patient safety, health emergency preparedness and efforts to address antimicrobial resistance. This integrated view reflects the reality of modern healthcare: prevention measures overlap and reinforce one another.

Another important lesson is that the human side of hygiene matters. People are more likely to follow practices that are convenient, understood and supported by their workplace. Staff need time, supplies, training and psychological safety to speak up about risks. Patients and families need clear information without being frightened. Cleaners need recognition and training. Managers need reliable data rather than assumptions. When these pieces align, hygiene becomes part of the identity of the organization.

## 12. Conclusion

Hospital and healthcare-associated infections remain a major patient-safety concern, but they are not an unavoidable price of modern healthcare. A substantial proportion of infection risk can be reduced through consistent infection prevention and control practices supported by good hygiene and WASH services. Hand hygiene is central, yet it is only one component of a broader safety system that includes environmental cleaning, appropriate PPE, safe equipment reprocessing, respiratory hygiene, injection safety, linen and waste management, and strong organizational leadership.





The most practical way forward is to make the safe behavior the easy behavior: provide supplies where care occurs, train staff repeatedly, monitor performance, give constructive feedback, maintain the environment, and treat every member of the healthcare team as part of infection prevention. Ultimately, hygiene is not simply about cleanliness. It is about protecting people at their most vulnerable and making every healthcare interaction safer.

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