

Prevention of Healthcare Associated Infection



Rola Husni-Samaha

Division of Infectious Diseases,
Department of Internal Medicine,
LAU Medical Center
Rizk Hospital, Beirut, Lebanon

Prevention and control of infection program is a multidisciplinary systematic approach committed to prevent health care associated infections (HAI) and their related events in order to improve patient care and to minimize infection –related occupational hazards associated with the delivery of health care. One out of 20 hospitalized patients acquire a HAI. Out of 100 hospitalized patients 7 in developed countries and 10 in developing countries have a HAI. These infections are associated with increased mortality varying from 80,000 fatalities in the USA annually to 4m in Europe yearly. Estimated cost for these infections is more than 30 billion per year. According to the WHO, in low to middle-income countries the frequency of ICU- HAI is at least 2-3 times higher than high income countries. Device associated infections are 13 times higher than in the USA. In developing countries the rates of HAI are higher than 15 %. About 4000 children die because of HAI every day. About half of patients admitted to neonatal intensive care units acquire HAIs and half of them die. Thus, the burden of HAIs is enormous and we need to focus all our efforts to prevent these infections (1-2).

It is important to note that HAIs occur in all types of facilities (long-term care facilities, dialysis facilities, ambulatory clinics and surgical centers, as well as hospitals). These include:

1. central line-associated bloodstream infections,
2. catheter-associated urinary tract infections, and

3. ventilator-associated pneumonia.
4. surgical site infections.

So every health care facility needs to monitor and prevent these infections because they are an important threat to patient safety (2).

Both Gram negative bacilli (GNB) and Gram positive cocci (GPC) resistance is trending up especially the Multi-drug resistant organisms (MDRO) GNB according to the epidemiological studies published in Lebanon over the past decade (3). Once MDROs are introduced into a healthcare setting, transmission and persistence of the resistant strain is determined by many factors:

1. the availability of vulnerable patients,
2. selective pressure exerted by antimicrobial use,
3. increased potential for transmission from larger numbers of colonized or infected patients (“colonization pressure”),
4. the impact of implementation and adherence to prevention efforts.

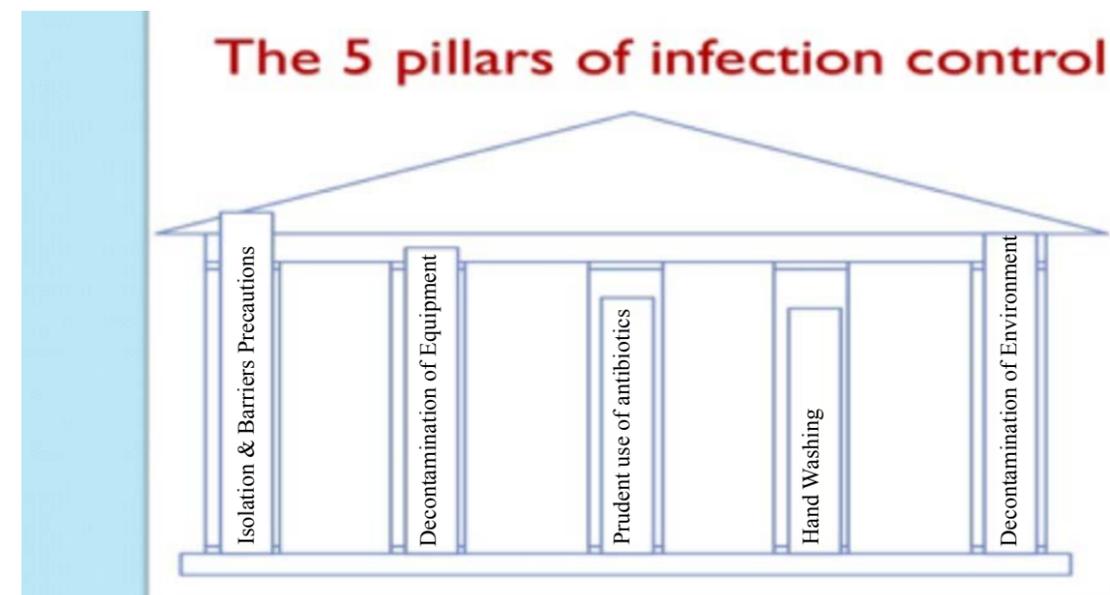
Patients at risk of colonization and infection include those with severe underlying disease, especially if immunocompromised; recent surgery; or indwelling medical devices (e.g., urinary catheters or endotracheal tubes). ICU patients, are at higher risk than non-ICU patients, and have the highest infection rates. For example, the risk that an ICU patient will develop VRE colonization or infection increases significantly once the proportion of ICU patients colonized with VRE is above 50% or the number days of exposure to a VRE-patient exceeds 15 days. A similar effect of colonization pressure has been shown for MRSA in a medical ICU. Increasing numbers of infections with MDROs also have been described in non-ICU areas of hospitals. There is abundant epidemiologic evidence to suggest that MDROs are carried from one person to another via the hands of HCPs. Hands are always contaminated during the process of care-giving or from contact with environment in close proximity to the patient particularly when patients have diarrhea and are colonized with MDRO in the gastrointestinal tract. Therefore, without adherence to hand hygiene and

glove use healthcare professionals (HCP) can transmit MDROs to patients. When a patient has an MDRO related infection, the consequences are numerous. Transmission occurs initially in the hospital, but it extends beyond that. There are ample opportunities for transmission of MDROs beyond the acute care hospital because patients receive care at multiple healthcare facilities and move between acute-care, ambulatory and/or chronic care, and long term facilities. Options for treating patients with these infections are often extremely limited making treatment very difficult with lower success rates. This causes increased length of stay and increased costs, and increased mortality (4-5).

Several factors may have contributed to the spread of MDROs mainly inadequate adherence to infection control practices and inappropriate use of antibiotics. Our only chance in fighting the spread of these infections is prevention. Prevention is a strategy that mandates supportive administrative policies, a well-established and

properly applied and monitored Infection control program, a comprehensive antimicrobial stewardship program together with proper staffing and continuous education to the healthcare givers and the public (5).

The main principles of infection prevention are basically identifying risks for colonization or infection with resistant organisms, screen for such organisms when needed, properly isolating patients with such organisms. An infection control program should establish procedures related to prevention mainly hand hygiene and aseptic techniques, bundles for specific infection preventions, and environmental cleaning procedures according to international standards as demonstrated in the diagram of the five pillars of infection control below (figure1.). Finally, it cannot be emphasized enough that safe healthcare is everyone’s responsibility: HCPs, healthcare facilities, public health officials, consumers, payers and patients, this is an era where all are urged to collaborate for the safety of our patients.



1. [tps://www.cdc.gov/hai/surveillance/index.html](https://www.cdc.gov/hai/surveillance/index.html)
2. WHO Guidelines on Hand Hygiene in Health Care: First Global Patient Safety Challenge Clean Care Is Safer Care
3. Chamoun K, Farah M, Araj G, Daoud Z, Moghnieh R, Salameh P, et al. Surveillance of antimicrobial resistance in Lebanese hospitals: retrospective nationwide compiled data. *Int J Infect Dis.* 2016;46:64-70. doi: 10.1016/j.ijid.2016.03.010. PubMed PMID: 26996458.
4. American Journal of Infection Control Volume 42, Issue 8, August 2014, Pages 820-828 American Journal of Infection Control Practice recommendation A Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals: 2014 Updates Author links open overlay panel Deborah S. Yokoe MD,

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