

Healthcare-Associated Infections: What Can Be Done To Reduce Risk To Our Patients?

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Approximately two million patients develop a hospital-acquired infection each year in the USA, contributing to approximately 100,000 deaths.¹ To put this into perspective, there are an estimated 70,000 deaths in the US each year due to accidents of all causes. Thus, hospital-acquired infections are one of the leading causes of death in the US. Until recently, there was little in the public domain regarding the scope of the problem and a limited amount of federal funding to improve our understanding of why such infections occur and how to prevent them. Nevertheless, most states, including Rhode Island, now mandate public reporting of hospital-acquired infections (http://www.apic.org/scriptcontent/custom/dyncontent/legislation/index.cfm?section=government_advocacy).^{2,3} In October 2008, the Centers & Medicare and Medicaid Services (CMS) started a program of non-payment for some hospital-acquired infections, and some non-federal insurance plans are following suit. Yet hospitals have not felt the full impact of this intervention, in part due to inaccurate ICD-9 coding for hospital-acquired infections.⁴

Today, an ever increasing number of hospital-acquired infections are caused by multi-drug resistant microbes.⁵ Some of these pathogens are resistant to most, if not all, FDA-approved antibiotics.^{6,7} In this era of Andromeda strains of microbial pathogens, prevention of hospital-acquired infections is of paramount importance. There is convincing evidence that hospital-wide,⁸ statewide,⁹ and national coordinated efforts^{10,11} implementing evidence-based infection control initiatives can reduce the risk of hospital-acquired infections. Most hospital epidemiologists know what to do to mitigate risk. The challenge remains to do the job in the current economic climate with competing priorities and limited dollars.

What can we do to reduce the incidence of hospital-acquired infections?

1) The intervention with the greatest impact is hand hygiene.^{12,13} Since most patient-to-patient microbe transmission occurs on the transiently-colonized hands of healthcare workers, hand hygiene is the cornerstone of an effective infection control program. In general, alcohol hand hygiene products are more effective at reducing the microbial bioburden on hands than soap and water.^{12,13} Alcohol hand hygiene products also contain emollients, so there is greater moisture retention in the skin with these products rather than soap and water.¹⁴ The Achilles heel of alcohol products, most of which contain around 60% alcohol in the USA, is the reduced efficacy against *Clostridium difficile* (*C. difficile*) spores,¹⁵ described in a companion article in this issue, and norovirus.¹⁶

Nevertheless, there are many reasons to use a single agent for routine hand hygiene in hospitals, rather than recommending alcohol products for some patients and soap and water for others. Hand hygiene compliance is likely to be greatest when one agent is used routinely—and highest with alcohol products compared with soap and water.^{12,13} If healthcare workers comply with isolation precautions (e.g., wearing gowns and gloves to go into rooms of patients with *C. difficile* who are in contact precautions), there should be minimal risk of *C. difficile* or other microbes on their hands after removing their gloves upon leaving the patients' rooms and then using an alcohol product for hand hygiene. Also, healthcare workers may be compliant with using soap and water, but contaminate their hands when turning off water faucets.¹⁷ Notably, soap and water should be used if hands are visibly soiled, rather than alcohol hand hygiene products.

2) Another intervention to reduce risk to patients is compliance with isolation precautions.^{18,19} The rooms of patients infected with *C. difficile*, vancomycin-resis-

tant enterococci (VRE), and other microbes are often heavily contaminated with these pathogens.^{20,21} As such, entering the room of a patient in contact precautions requires donning a gown and gloves, even if healthcare workers or other staff are not touching the patient, because there is a high likelihood of touching a contaminated surface, such as the bed stand, bed rail, etc., while in the room.

3) Appropriate cleaning of the environment in patient rooms and cleaning of medical equipment that comes in contact with patients are both important to prevent these surfaces from becoming microbial reservoirs, leading to transmission of microbes in the healthcare setting.^{20,21}

4) Infected healthcare workers can transmit pathogens to patients,^{22,23} but hospitals can minimize the risk by not allowing them to work if they have a febrile, diarrheal or respiratory illness, as well as by requiring all healthcare workers to receive influenza vaccinations yearly.^{24,25}

5) Lastly, prudent antibiotic use can minimize the evolutionary pressure on microbes to develop multi-drug resistance. Recent guidelines promote antibiotic stewardship programs in hospitals—and such programs have had a significant impact.^{26,27} Prudent antibiotic prescribing practice is our responsibility, as there are very few new antibiotics in the development pipeline and, as noted above, we have already entered the era in which bacterial pathogens infecting humans are resistant to our entire antibiotic armamentarium.

In closing, a pragmatic approach to infection control can make healthcare settings safer for patients and staff. Consistent hand hygiene, compliance with isolation precautions, yearly influenza vaccination, appropriate cleaning of the environment, and careful antibiotic prescribing practices improve patient safety through the reduced risk of life-threatening healthcare-associated infections.

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The author and/or significant other have no financial interests to disclose.

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