The “Zero Risk” Concept for Hospital-Acquired Infections: A Risky Business!

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Nosocomial infections represent a serious public health problem. Some recent studies, most of which used strong educational programs, showed a dramatic decrease in the rates of nosocomial infections, particularly catheter-related infections in the intensive care unit. Thus, the concept of “zero risk” is flourishing in the recent literature, and some insurance networks have decided to limit reimbursement for treatment of some of the health care–associated infections, on the grounds that most of them are preventable. This viewpoint article emphasizes the risk of such a position and enumerates the reasons why such a philosophy could be counterproductive. In particular, this philosophy does not fit with the concept of self-declaration of severe adverse events and could push clinicians to underreport those events.

The United States Government Accountability Office recently stated that attempts to control health care–associated infections have been ineffective. However, several successful programs for reducing hospital-acquired infection (HAI) rates, particularly in surgical and critical care units, have been reported [1–3]. These programs owe their success to the identification of risk factors for infection and the implementation of packages of multiple preventive measures, often called “bundles.” The goals of current prevention campaigns, such as the “100,000 Lives Campaign,” the “5 Million Lives Campaign,” and the “Never Events” preventable errors mandate, are indeed increasingly ambitious [4, 5]. However, the sharp decrease in HAI rates, sometimes down to near zero for short periods as in the study by Pronovost et al [2], has led to the perilous concepts of “zero risk” and “zero tolerance” [6, 7]. It is our moral duty to reduce the rate of adverse events, particularly HAIs, but we cannot ignore the danger of these 2 concepts that have provoked already a response in the United States but so far little reaction in Europe [8–12].

The first snag of the zero risk concept is that it will become increasingly difficult to educate the public about the sources of risk of healthcare interventions. Risk of infection depends on several factors, such as the patient’s condition, the disease severity score, and the length of hospital stay. A surgical procedure or a stay in an intensive care unit will always be a cause of possible harm to a high-risk patient. In addition, any patient in long-term care may carry multidrug-resistant microorganisms that cause infection. The overall infection rate in an intensive care unit, even when adjusted for length of risk exposure, will depend on the case mix, being closer to zero if most of the patients receive low-risk postoperative care but far higher, even if preventive measures are taken, if care is more invasive (eg, use of mechanical ventilation or central venous catheters) or more long term. The prevalence of HAIs may be as high as 25% in an intensive care unit [3]. Postoperative surgical wound infection rates are <1% in patients without risk factors who undergo short, clean procedures (0.5% for ambulatory units), but >15% in patients with 3 risk factors [12, 13]. The risk is far from zero in these high-risk patients!

A way to compare units and perform benchmarking is to calculate standardized infection ratios. For example, the central venous catheter–related infection rate in a French surveillance network of 158 intensive care units was very low (1 infection per 1000 catheter-days) in 2006 and was decreasing [14]. Although variability among the units initially seemed high, there were in fact few outliers, according to the calculated standardized infection ratios. However, it is not clear whether HAI rates will continue to decrease, because even if hospitals implement prevention measures in an attempt to reach near-zero rates, the risk will remain in units that deal with the most severely ill patients.

The concept of zero tolerance, better defined as no tolerance to passivity, is at first glance easier to grasp than the zero risk concept. However, neither concept is compatible with current risk management.

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principles that include blame-free reporting, collective use of reported events for root-cause analysis, and continuous quality improvement. Accepting the idea of zero tolerance would mean weakening the impact of risk management programs, at a time when they are just starting to be more widely adopted. Practitioners need to discuss potentially harmful procedures with their patients and explain that the risk will not be zero even if all preventive action is taken.

Another reason for rejecting the zero risk concept is our limited understanding of the physiopathology of HAIs. We still do not know why some patients do—and others do not—develop HAIs, even after the delivery of care that complies with good practice guidelines. The same problem applies to surgical wound infections. Most people would consider that a “mistake” has been made somewhere along the line, but nobody knows if this is really the case.

On the basis of the decision of the Centers for Medicare and Medicaid Services, some health maintenance organizations in the United States no longer reimburse costs relating to HAIs, on the grounds that all HAIs are preventable. In France, hospitals are accountable for all HAIs. The occurrence of an HAI presupposes that there has been a mistake, even if the mistake has not been proven, and the patient can demand financial compensation from a public office called ONIAM (Office National d’Indemnisation des Accidents Médicaux, des Affections Iatrogènes et des Infections Nosocomiales) that was established in 2002 and that reports to the Ministry for Health. This is going a bit too far for many reasons. For example, the microorganisms responsible for postoperative infections after orthopedic surgery are rarely those found in wounds at the end of surgery [15]. Patients with nasal carriage of Staphylococcus aureus have an enhanced risk of wound S. aureus infections [15, 16]. Hands and air have been held responsible for transporting the microorganisms from nose to wound, but other routes might well be implicated, particularly those used during anesthesia (eg, intubation or gastric tubing) or other procedures [17–20]. Similarly, bacterial or fungal translocations through highly colonized organs, particularly the gut, could account for some central venous catheter–related infections, especially in severely ill patients in the intensive care unit. The use of systemic antibiotics, the virulence of the strain, and the defenses of the host are obvious confounding factors. Thus, the preventive measures employed will depend on the mechanisms involved and may differ from conventional measures. It is naive to think that HAIs are preventable by just hand washing or surgical skin preparation. The belief that hand washing is the miracle solution has become widespread in France. Such scientific misinformation is counterproductive. In contrast, urgent research is needed to improve our understanding of the pathophysiological mechanisms that lead to colonization and infection, particularly for postoperative wound infections. Preoperative carriage may be an important factor and may need appropriate preventive measures.

In conclusion, minimizing risk is a challenge that has to be met jointly by medical teams, hospital managers, and patients’ associations in a climate of transparency. If the concept of zero risk is not to jeopardize our efforts to improve public health, health care users need to be educated about the magnitude and prevention of risks of health care in comparison to other everyday risks (eg, driving, sex, sports, or an influenza pandemic) and need to learn to distinguish risk reduction from zero risk. Additional preventative measures should be implemented and explained when risks escalate, but these measures will not reduce the risk to zero.

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