Dissecting a Multi-Intervention Methicillin-Resistant Staphylococcus aureus Prevention Bundle May Miss Emergent Properties

To the Editor—Gurieva et al’s recent dissection of findings from the Veteran Affairs (VA) methicillin-resistant Staphylococcus aureus (MRSA) prevention program [1] suggested that policymakers rethink the use of universal screening and isolation, which, according to their modeling, contributed little to observed declines. This conclusion is of particular relevance given the patient and financial burdens associated with these strategies. However, is discontinuing such core elements of current control programs justified?

First, questions may be raised about model assumptions and the generalizability of findings. The authors acknowledge conditions of high admission prevalence of MRSA colonization and low levels of transmission preintervention. At lower importation pressures, nosocomial transmissions may play a much greater role; a study from Scotland suggested that approximately 50% of healthcare-associated MRSA infections, or colonizations, occurred in patients not colonized at admission [2]. Given the importance of frequent hospital readmissions of MRSA-positive patients [3], declining importation pressures have been observed during intensified screening [4]. Gurieva et al’s sensitivity analysis allowed for an “extreme” scenario in which the effectiveness of identifying acquisition preintervention was only 80%, yet the proportion of patients (unselectively) screened at transfer or discharge in the last month preintervention was 77% of that by the end of intervention. Likewise, the baseline assumption that risk of infection was equivalent in those colonized at admission vs during hospitalization is questionable. In a study in pediatric intensive care unit, children who acquired MRSA were at more than
5 times greater risk of infection than those colonized at admission [5]. Risk of invasive MRSA infection increases steeply with duration of hospitalization, reflecting exposures and vulnerability in patients with extended hospital stays [4].

Second, Gurieva et al’s conclusions suggest that the only (or principal) function of universal screening and isolation is to reduce nosocomial transmissions. Knowledge of positive MRSA status may prompt patients to question health workers’ hand-hygiene compliance [6]. This knowledge may also prompt healthcare workers to change antibiotic prescribing (and hence selective pressures) [7] and improve perioperative care [8]. Moreover, the authors did not examine existing evidence of what makes these strategies successful and important in multi-intervention programs. Decolonization is a typical, and perhaps essential, component of cost-effective screening and isolation programs [9]. As the cluster randomized control trial on barrier precautions in intensive therapy unit revealed [10], nonadherence to essential components, including hand hygiene and use of personal protective equipment, may undermine effectiveness; the presence of leadership and culture change in the VA initiative is likely to have been important.

Third, we should not ignore entire categories of benefits from screening programs not captured in the VA study including the connection between nosocomial and community burdens from MRSA [3], reduction in enduring risks of infection and transmission beyond hospitalization, and improved patient outcomes after MRSA infection [4].

The desire to isolate the effects of components of infection-control strategies is appreciable. However, burdens from resistant organisms arise from a complex of patient-level and ecological factors that may be synergistic, mutually dependent, antagonistic, distal, or proximal. Trends reveal stochastic rather than deterministic behavior [3], and a dissection of a multi-interventional strategy risks finding less than the sum of its parts. Practitioners and policymakers should be grateful for the information that models and forecasts provide. But is it really safe to leave the umbrella at home?

Notes

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