

countries use steam sterilizers for sterilization. The sterilization process has very strict regulatory requirements in developed countries where conducting validation tests such as the Bowie-Dick test, Chamber leak test, air detector test, and load dryness tests are mandatory. Centers for Diseases Control recommendations include biologic monitoring of the sterilization process under Category IB.<sup>5</sup> In developing countries such as India, until some form of process control and documentation becomes mandatory, chemical indicators need supplementation with biologic indicators regularly.

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doi:10.1016/j.ajic.2004.07.005

## No routine surface disinfection

To the Editor:

We write in response to the article by Rutala and Weber<sup>1</sup> in the *American Journal of Infection Control*, on which we wish to comment.

We admire Dr Rutala's continued crusade for routine surface disinfection in hospitals, although the Hospital Infection Control Practices Advisory Committee (HIC-PAC), which he serves as a consultant, suggests and does not recommend routine surface disinfection in noncritical patient areas. In other words, their advice is based on suggestive studies only (category II). W. Rutala

and J. Weber's knowledge of the scientific literature is remarkable. However, their knowledge of the German language and, correspondingly, interpretation of the German literature demand some improvement. By no means does the Robert Koch-Institute in Germany recommend "the use of surface disinfectants for patient equipment surfaces and non-critical house-keeping surfaces in patient care areas." Rather, the Robert Koch-Institute divides the hospitals into different areas, according to infectious risks for patients and recommends cleaning for most surfaces, and surface disinfection only for surfaces in frequent contact with hands and skin of patients and personnel. Thus, most surfaces should be cleaned and not disinfected, even in operating theatres and intensive care and isolation units (see Table 1). Category IB denotes an expert opinion, and category II means neither recommended nor required, but only "suggested" for implementation. Thus, a targeted strategy is recommended, but not routine disinfection of all noncritical patient care surfaces.<sup>2</sup>

May we also correct the authors' interpretation of our German paper.<sup>3</sup> By no means do we recommend "that the MRSA-patient room be disinfected three times a day on intensive care units and once a day on normal wards (including floors)." In this paper, we recommend disinfection only of surfaces frequently touched by patients, which does not include the floors, and we only recommend floor disinfection after discharge of a multidrug-resistant *Staphylococcus aureus* (MRSA) patient.

The main reason we recommend surface disinfection in certain patient areas with MRSA patients is that the United Kingdom and Germany are the 2 countries in Europe with the highest annual increase in MRSA; therefore, we have increased our MRSA-infection control efforts to keep the MRSA level from reaching that of the United States.

We are also intrigued as to the type of computer search used by Dr. Rutala for his review of the literature from 1996 to April 2004, which provided no evidence that the use of low-level disinfectants results in allergic symptoms in health care workers. In just 10 minutes of searching, we found 2 articles describing allergy to benzalkonium chloride in health care workers.

Polish authors examined 223 nurses with suspected occupational dermatoses and found benzalkonium chloride (23.8%), nickel (21.5%), and formaldehyde (20%) as the most frequent sensitizers.<sup>4</sup> Netti et al<sup>5</sup> reviewed their data base from 1994 to 1998 and selected 360 consecutive patients working in health care environments who experienced contact dermatitis on their hands, wrists, and forearms. The major relevant agents that induced occupational allergic contact dermatitis were nickel, glutaraldehyde, benzalkonium chloride, and rubber chemicals.

**Table I.** Surface cleaning and disinfection in various risk areas (translation of the Robert Koch-Institute recommendations, Germany)

Areas without infectious risk (eg, staircases, floors, administration, offices, cafeterias, auditorium)	Areas with possible infectious risk (general wards, outpatient departments, radiology, dialysis units, delivery rooms, intensive care units)	Areas with special infectious risk (operating theatres, burns units, transplantation units, hematology-oncology units)	Areas with patients who could transmit pathogens (isolation units)
All surfaces: cleaning	Surfaces with frequent hand/skin contact: disinfection (Category II); Floors: cleaning; Other surfaces: cleaning	Surfaces with frequent hand/skin contact: disinfection (Category IB); Floors: disinfection (Category II); Other surfaces: cleaning	Surfaces with frequent hand/skin contact: disinfection (Category IB); Floors: disinfection (Category II); Other surfaces: cleaning

David J Weber, one of the authors of the article<sup>1</sup> addressed here, personally saw 5500 employees in 12,500 to 18,000 visits per year in his occupational health service and never found an employee with an allergic reaction to low-level disinfectants in the 11 years he has provided this service. On average, 15,000 visits per year means that he personally sees 60 patients a day. We doubt that that allows enough time for careful "skin history," or even some fundamental tests to detect allergy to any kind of medical products.

The paper by Schnuch et al<sup>6</sup> on contact allergies in health care workers can be interpreted from different perspectives. It is true that there was no statistically increased sensitization to benzalkonium chloride in all groups of health care workers compared with a control group (2% vs 1.6%), but benzalkonium was among the 8 leading allergens in health care personnel: 2.4% of 703 nurses and 2.0% of 159 physicians were sensitive to benzalkonium compared with only 0.6% of 159 receptionists.

Rutala and Weber doubt the evidence that using disinfectants selects for antibiotic-resistant organisms in nature and that mutants survive in nature. Interestingly enough, an article in the same issue of the *American Journal of Infection Control* describes the antibiotic susceptibility of glutaraldehyde-tolerant *Mycobacterium chelonae*.<sup>7</sup> One hundred percent of glutaraldehyde-tolerant isolates and only 11% of the glutaraldehyde-sensitive isolates were either resistant or immediately resistant to 2 or 3 classes of antibiotics. Scherpe and Kaulfers<sup>8</sup> tested the in vitro activity of benzalkonium chloride against 2840 gram-negative clinical isolates and found minimum inhibitory concentrations of benzalkonium chloride higher than 300 µg/mL in 4.5% and of more than 500 µg/mL in 1.1% of the strains (usual in-use concentration 500-1000 µg/mL). Strains with minimum inhibitory concentrations of more than 500 µg/mL benzalkonium chloride increased from 0.4% to 1% from 1994 to 2001.

Citing their own study, Rutala and Weber state that antibiotic-resistant bacteria are as susceptible to

germicides as antibiotic-susceptible strains.<sup>9</sup> However, Aiello and Larson offer quite a different interpretation of Rutala's study, stating that, when resistance to biocides among antibiotic-resistant hospital bacteria were measured, 1 of 5 antibiotic-resistant strains of *K pneumoniae* also turned out to be significantly more resistant to a quaternary ammonium compound at its commonly used dilution.<sup>10</sup> MRSA isolates with decreased susceptibility to benzalkonium chloride have also been shown to be resistant to β-lactam antibiotics.<sup>11</sup>

Although we agree with the Centers for Disease Control and Prevention recommendation that high-level disinfectants should not be used for surface disinfection of critical patient areas, we published our paper in the *American Journal of Infection Control*, which is an international journal, and does not only specifically address the American market or the American infection control situation. Unfortunately, in Germany, there are 459 surface disinfectants on the market, of which 330 contain quaternary ammonium compounds and 128 aldehydes, some of which are also components of high-level disinfectants.

Rutala and Weber recommend that rigorous studies be undertaken to assess any perceived adverse environmental and health consequences of using disinfectants in the hospital, but where are the rigorous studies including "epidemiologic, clinical, or experimental data" that support their recommendation for use of hospital disinfectants on noncritical patient care surfaces such as bedside tables, bed rails, and radiograph machines. Have bed rails and radiograph machines ever been described as being a significant source of nosocomial infection?

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doi:10.1016/j.ajic.2004.07.007