log reduction,[5] whereas the Sterinis aHP system resulted in an approximately 4-log reduction.[2] Similarly, in the studies cited by Po and Carling,[1] only the Bioquell HPV system resulted in complete inactivation of *C. difficile* from hospital surfaces.[3] In the studies of the Sterinis aHP system by Shapey et al[4] and Barbut et al,[2] *C. difficile* was cultured from 2.9% of 383 surfaces, with 1 or more positive culture results from 32% of the 25 rooms studied.[7] Therefore, because of the fundamental differences in the disinfecting solution, delivery method, and microbiological impact, we believe that it is inappropriate to group together data from the 2 systems or to refer to them both as "HPV."[1]

Po and Carling also state that "we also believe that the conclusion by Otter et al. that HPV technology should be considered for routine use to decontaminate patient rooms is premature,"[1, p 776–777] whereas our conclusion[9] from the study cited was that the use of HPV decontamination for selected patient rooms after patient discharge is feasible in a busy hospital. Currently, 3 studies have provided evidence that the use of HPV for selected patient rooms is associated with superior microbial efficacy over conventional cleaning and that it reduced acquisition of hospital pathogens. HPV was found to be associated with a significant reduction in *C. difficile* infection by Boyce et al[3] and with a significant reduction in the risk of acquiring vancomycin-resistant enterococci by Passaretti et al.[10] Most recently, Manian et al[11] reported statistically significant reductions in the year-on-year incidence of vancomycin-resistant enterococcal infection (a 50% reduction; $P < .001$) and *C. difficile* infection (a 42% reduction; $P < .001$) and large but not significant reductions in the incidence of methicillin-resistant *Staphylococcus aureus* infection (a 24% reduction; $P = .059$) and multidrug-resistant *Acinetobacter baumannii-calcoaceticus* infection (a 54% reduction; $P = .2$) associated with the implementation of HPV.

Therefore, we believe that the use of HPV decontamination for selected rooms should indeed be considered along with other innovative methods, such as other whole-room disinfection methods and methods to improve the conventional cleaning (eg, adeno triphosphate bioluminescence and the Dazo method devised by Dr Carling),[7] to improve hospital cleaning and disinfection. We echo the conclusion of Po and Carling[1] that additional investigation of room decontamination processes through well-designed—and, preferably, head-to-head—studies of microbiological and clinical impact is needed.

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High Clonal Diversity of *Staphylococcus aureus* Isolates in Nasal Swab Samples of Medical Students in Turkey

To the Editor—Hospital personnel who are colonized with

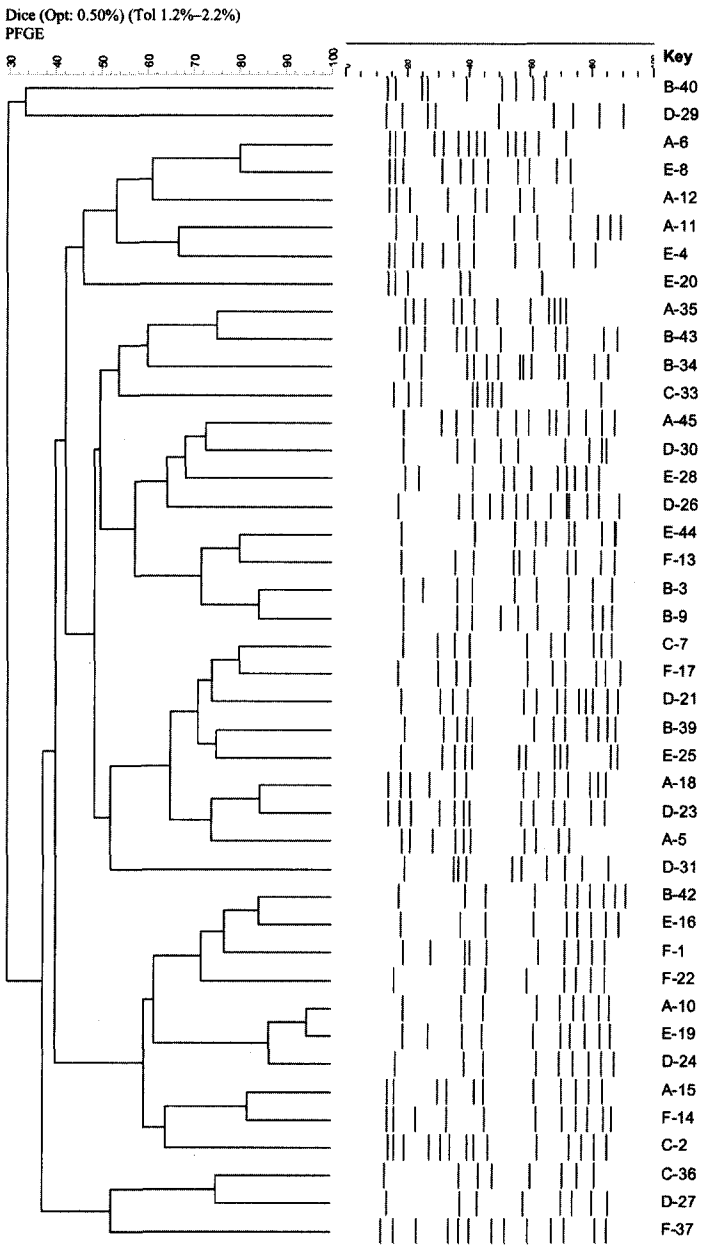

FIGURE 1. Banding patterns determined by pulsed-field gel electrophoresis (PFGE) and a dendrogram showing the genetic relatedness of *Staphylococcus aureus* isolates recovered from 45 medical students in Turkey. The different letters represent students in different phases of the medical school: *A*, first phase; *B*, second phase; *C*, third phase; *D*, fourth phase; *E*, fifth phase; and *F*, sixth phase. Dice, Dice coefficient; Opt, optimization value; Tol, tolerance value.

Staphylococcus aureus, particularly methicillin-resistant *S. aureus* (MRSA), have the potential to infect patients.[1] In this respect, the rate of *S. aureus* carriage in medical students is of importance. Rates of carriage of 14% to 75% are reported among medical students.[2,3] Although there are reports indicating that rates of carriage in medical students are comparable with rates in the normal population,[2,4] there are also studies that have found higher rates of carriage for this particular population.[3,5] Some authors reported similar carriage rates but increasing drug resistance in isolates recovered from groups with increasing clinical exposure, whereas others noted increasing rates of *S. aureus* carriage and of MRSA carriage with increasing clinical exposure.[6,7] One group of researchers demonstrated a predominant pulsotype circulating in their study group of medical students.[2] However, studies that include molecular epidemiological interpretations are few.

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In the present study, surveillance for *S. aureus* carriage and interpretation of the clonal relatedness of the isolates by pulsed-field gel electrophoresis (PFGE) was undertaken among 236 (66.1%) of 357 medical students attending Zonguldak Karaelmas University, Faculty of Medicine, in Turkey. This research was performed with the approval of the University's Training and Research Hospital Ethics Committee. A self-administered questionnaire collected information on the demographic characteristics and medical history of the students. For the screening, nasal swab samples were cultured on blood agar and mannitol-salt agar plates. The methicillin resistance was assessed using oxacillin (1-μg) and sefoxitin (30-μg) disks in combination with oxacillin screening agar plates, in accordance with the guidelines of the Clinical and Laboratory Standards Institute.[8] The clonal relatedness of the isolates obtained from the carriers was assessed using PFGE of the genomic DNA.[9] The results were evaluated in accordance with the interpretative criteria used by Tenover et al.[10] Statistical analyses were performed with SPSS, version 11.0 (SPSS), by means of the χ^2 test.

A total of 45 students were found to be carriers. Of the 236 study participants, 112 were female and 124 were male; the rate of *S. aureus* carriage was significantly higher in the male population (32 male and 13 female students were carriers; $P = .009$). The age of the students ranged from 17 to 28 years (mean $\pm$ standard deviation, 21.51 $\pm$ 2.26 years); there was no statistically significant difference between rates of carriage with respect to age ($P > .05$). There were 61 students from the first phase, 39 from the second phase, 28 from the third phase, 47 from the fourth phase, 34 from the fifth phase, and 27 from the sixth phase; no statistically significant difference in rates of carriage was present among the groups. The number of students with a history of hospitalization was low (4 students), and we could not find an interpretable statistical difference in carriage with respect to hospital admission. History of chronic disease, having a close relative working in the hospital, smoking, and living in a house or student residence did not create a significant difference. Carriage in students who had not used antibiotics in the previous 2 weeks was observed more often than carriage in those who had used antibiotics. No significant difference in carriage was found according to the clinical courses taken or according to the internship. None of the isolates obtained in the study was resistant to methicillin.

The results of the molecular studies with PFGE showed no evident cluster among the *S. aureus* isolates obtained; 33 different genotypes were established for the 45 carriage isolates, demonstrating a high clonal heterogenecity and a lack of relatedness among isolates from students in the same phases (Figure 1). We conclude that, although the rates of carriage and clonal relatedness of the isolates in our group of medical students were not high, determination of carriage status in medical students, as well as in other hospital staff, will reduce the spread of infections in hospitals.

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