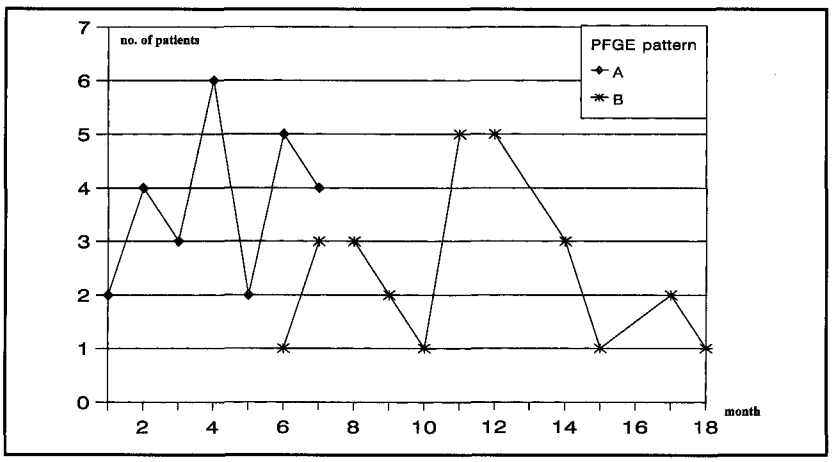

FIGURE. Isolation frequency of outbreak-related *Serratia marcescens* from newly colonized or infected patients, by month.

al irritation regularly observed when using 0.1% vol/vol hexetidine. The preparation of this solution was performed in a corner of a room also used for waste disposal. Since no stock solution was prepared and only disposable cups were used, the previously reported means of transmission[10] by contamination of stock solution and the cups for the diluted hexetidine solution could be excluded in our case. We conclude that primary colonization of patients led, via contaminated hands, to inoculation of the hexetidine solution.

At first glance, reinforcement of hand disinfection measures before preparing this solution seemed to be effective (Figure, month 5). The subsequent increased isolation of *S marcescens* (Figure, months 6 and 7) was thought to be due to compliance problems, understaffing, and continuous rapid rotation of staff. Monthly analysis of PFGE with each new isolate recovered from different specimens of surgical patients revealed that a second outbreak, with banding pattern B, was masking the decline of the first outbreak (Figure, month 7).

Subsequent environmental screening revealed bacterial contamination of bronchoscopes with *S marcescens* of banding pattern B. Bronchoscopies are performed regularly in the SICU for diagnosing pneumonia and for removing mucous. Use of bacterially contaminated bronchoscopes obviously was involved in the second outbreak, whose isolates exhibited banding pattern B. Due to an insufficient number of bronchoscopes, these instruments sometimes were used again after semiautomated reprocessing before being dried completely. Since disinfection is not as effective as sterilization, which is not applicable to flexible bronchoscopes, regrowth of surviving *S marcescens* cells within the storage period of wet instruments may occur. The deployment of a fully automated reprocessor (month 13), which ensured that bronchoscopes were dried completely, brought this second outbreak in the SICU under control.

Isolation of *S marcescens* with typing pattern B from an air-conditioning filter may indicate the ability of *S marcescens* to survive in relatively dry environments, and suggests the extent to which droplets can spread during bronchial toilet in ICUs. Thus, airborne transmission in the case of *S marcescens* cannot be excluded. The discriminatory power of antibiogram typing and biotyping is not always sufficient for epidemiological investigations. In our case, the discriminatory power of PFGE uncovered a second, temporally overlapping outbreak; the banding patterns of the different isolates studied could be readily discriminated visually. Pulsed-field gel electrophoresis is an easy-to-perform method and therefore is advocated for laboratories not experienced in PCR-based methods, which may be error-prone due to cross-contamination problems.

In conclusion, we recommend regular analysis of epidemiologically related bacteria by PFGE to reveal transmission paths in nosocomial outbreaks in order to establish more effective infection control.

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Another Disinfectant for Enterococci

To the Editor:

In the past year, I have read several excellent reports about environmental disinfectants for vancomycin-resistant enterococci. These studies have examined quaternary ammoni-

um compounds,[1-4] phenolics,[1,3,4] alcohols,[4-6] sodium hypochlorite,[4] and iodophor disinfectants.[1,6] In only one of these studies was a hydrogen peroxide compound tested. Saurina et al[4] tested 3% hydrogen peroxide against eight vancomycin-resistant *Enterococcus faecium* using a standard quantitative suspension test and found that insufficient kill occurred at the 3- and 10-minute test times. We too have tested not only *E faecium* (vancomycin-sensitive and -resistant) but also *Enterococcus faecalis* (vancomycin-sensitive and -resistant), *Enterococcus gallinarum,* and *Enterococcus casseliflavus* in the standard Association of Official Analytical Chemists suspension system[7] and found that 10-minute exposure to 3% hydrogen peroxide did not always kill the enterococci. We also tested these same microorganisms in the standard test against a product that is a mixture of hydrogen peroxide, peracetic acid, and acetic acid (Spor-Klenz; Calgon Vestal Division, Steris Corp, St Louis, MO) and found that all enterococci were killed in the 10-minute standard test time.

We then tried testing the efficacy of this product against enterococci on various hospital fabrics, because we were interested in being able to "spot disinfect" items such as drapes in patients rooms. Four types of fabrics were tested: 100% cotton (clothing), 100% cotton terry (towels), 60% cotton-40% polyester blend (scrub suits), and 100% polyester (drapes). Small swatches of fabric were contaminated with 10^6 colony-forming units of these enterococci and allowed to dry. Half of the fabrics were sprayed with Spor-Klenz, and the other half were left untreated. At 10 minutes after spraying, all samples (treated and untreated) were put into growth medium, and the medium was checked for growth at 48 hours. All of the control swatches, which were untreated, showed growth. However, none of the samples sprayed with the hydrogen peroxide–peracetic-acetic acid mixture showed growth for any of the 19 different enterococci tested on any of the four fabrics.

These studies indicate that the hydrogen peroxide–peracetic-acetic acid mixture provides an additional option that meets standards, as well as our laboratory fabric test, for enterococcal control.

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Infection Control Practices of General Dental Practitioners

To the Editor:

I share the concerns of John Hardie[1] published in the December 1998 issue of *Infection Control and Hospital Epidemiology* concerning hand washing, use of gloves, and risks for transmission of infectious disease between patients and dentists. Hidden video cameras have shown that dentists wash their hands 23% of times before donning gloves and change gloves 56% of times between patients.[2] Gloved hands impart a false sense of security to the dentists and the patients, because the gloves do not provide effective protection to the dentist from accidental needlesticks or injuries from sharp instruments and do not protect patients from bloodborne viruses,[3] especially if the dentist gets a needlestick or a sharps injury while working in the mouth.[4,5] Moreover, the patient is at increased risk from bacterial infections during invasive dental procedures if the dentist does not hand wash adequately before donning and using the gloves to handle sharp instruments inside the mouth.[1] Studies of the examination gloves, as currently presented in unsterile boxes of 100 without cuffs folded over the palms, reveal that the external surfaces used on patients and instruments routinely become contaminated with *Staphylococcus aureus,* coagulase-negative staphylococci, or alpha streptococci during the process of donning by persons with unwashed hands.[6] These bacteria are the most common causes of sepsis following dentistry, especially in patients with a history of rheumatic fever, valvular heart disease, or immunosuppression.

Therefore, it would seem prudent for dentists to wash hands more assiduously prior to the performance of most dental procedures, whether or not gloves are donned. Time for adequate hand washing being precious, it might prove less hazardous for patients undergoing invasive procedures if dentists were to use a sterile glove or finger cot on the nondominant hand feeling for landmarks, while the dominant hand manipulates the syringe, scalpel, pique, probe, or power-driven handpiece.

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