

# Chlorhexidine Gluconate to Cleanse Patients in a Medical Intensive Care Unit

The Effectiveness of Source Control to Reduce the Bioburden of Vancomycin-Resistant Enterococci FREE

Michael O. Vernon, DrPH; Mary K. Hayden, MD; William E. Trick, MD; Robert A. Hayes, BSc; Donald W. Blom, RN; Robert A. Weinstein, MD ; Chicago Antimicrobial Resistance Project (CARP)

[+] Author Affiliations

*Arch Intern Med.* 2006;166(3):306-312. doi:10.1001/archinte.166.3.306.

## Abstract

**Background** Historically, methods of interrupting pathogen transmission have focused on improving health care workers' adherence to recommended infection control practices. An adjunctive approach may be to use source control (eg, to decontaminate patients' skin).

**Methods** We performed a prospective sequential-group single-arm clinical trial in a teaching hospital's medical intensive care unit from October 2002 to December 2003. We bathed or cleansed 1787 patients and assessed them for acquisition of vancomycin-resistant enterococci (VRE). We performed a nested study of 86 patients with VRE colonization and obtained culture specimens from 758 environmental surfaces and 529 health care workers' hands. All patients were cleansed daily with the procedure specific to the study period as follows: period 1, soap and water baths; period 2, cleansing with cloths saturated with 2% chlorhexidine gluconate; and period 3, cloth cleansing without chlorhexidine. We measured colonization of patient skin by VRE, health care worker hand or environmental surface contamination by VRE, and patient acquisition of VRE rectal colonization.

**Results** Compared with soap and water baths, cleansing patients with chlorhexidine-saturated cloths resulted in 2.5 log<sub>10</sub> less colonies of VRE on patients' skin and less VRE contamination of health care workers' hands (risk ratio [RR], 0.6; 95% confidence interval [CI], 0.4-0.8) and environmental surfaces (RR, 0.3; 95% CI, 0.2-0.5). The incidence of VRE acquisition decreased from 26 colonizations per 1000 patient-days to 9 per 1000 patient-days (RR, 0.4; 95% CI, 0.1-0.9). For all measures, effectiveness of cleansing with nonmedicated cloths was similar to that of soap and water baths.

**Conclusion** Cleansing patients with chlorhexidine-saturated cloths is a simple, effective strategy to reduce VRE contamination of patients' skin, the environment, and health care workers' hands and to decrease patient acquisition of VRE.

Hospitals provide an environment conducive to the rapid spread of pathogens, especially antimicrobial-resistant bacteria. Factors that influence transmission include low rates of hand washing by hospital personnel and colonization pressure, that is, frequency of bacterial carriage by adjacent patients.<sup>1</sup> Strategies to minimize the spread of pathogens have relied on improving adherence to hand hygiene recommendations and isolation precautions for colonized or infected patients.

Because traditional infection control activities often meet with limited success,<sup>2</sup> we evaluated an adjunctive approach: source control—reducing the microbial density of bacteria on patients' skin by cleansing them with 2% chlorhexidine gluconate. In an intensive care unit (ICU) population, we evaluated the effect of source control on patients' skin colonization by vancomycin-resistant enterococci (VRE), measured the effect on VRE contamination of environmental surfaces and health care workers' hands, and assessed all patients for VRE acquisition.

We chose chlorhexidine as the antiseptic because of its low toxicity,<sup>3</sup> proven efficacy over several decades against a broad range of pathogens,<sup>4</sup> prolonged residual effect,<sup>5</sup> and known value for other infection control applications.<sup>6-9</sup> We chose VRE as the marker organism because it is a problem in hospitals, especially in ICUs, and has been well documented to colonize patients' skin and contaminate environmental surfaces and health care workers' hands, resulting in dissemination to other patients.<sup>10,11</sup>