# Use of Electrolytically-Produced Sodium Hypochlorite Reduces Infections in Dialysis Facilities

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## INTRODUCTION

- The United States Renal Data System (USRDS) estimates that 30% of dialysis patients receive antibiotics during any 6-month period.
- Central venous catheters (CVCs) have the highest rate of access-related bloodstream infections.
- Sodium hypochlorite solution is an effective topical disinfectant and is used prophylactically to reduce the risk of bacterial contamination and skin infections with CVCs for dialysis.
- To identify best practices in preventing CVC-related infections in patients with end-stage renal disease (ESRD), we surveyed dialysis facilities and used antibiotic administration as a measure of infection control to compare the effectiveness of:
  - Topical disinfection with electrolytically-produced sodium hypochlorite (ESH) solution
  - The use of iodine for skin site preparation

## METHODOLOGY

- 227 facilities (n≥20 patients each) responded to the survey about exit-site skin preparation prior to dialysis and recorded:
  - The CVC-preparation procedure (ESH vs. iodine-based solution)
  - Episodes of antibiotic use during a 6-month window (5/09 through 10/09)
- The all-type infection rate was defined as the number of uses of antibiotic in the study period divided by the number of individuals at risk.
- We compared the results by use or non-use of ESH.
- Through direct matching we ensured groups were comparable by matching ESH- and iodine-using facilities on census, a composite quality index measure, and % CVC use. This resulted in no differences between the groups on any of these measures. Thus we inferred the groups were comparable.

## RESULTS

**Table 1. Patient Demographics from Facilities Completing the Survey**

| Category | Result |
|---|---|
| N | 7212 |
| Age (yr) | 61.3 ± 15.7 |
| % Male | 51.9% |
| *Race and Ethnicity* | |
| % African American | 31.4% |
| % Hispanic | 11.9% |
| % Asian, Pacific Islander | 2.7% |
| % Native American | 0.8% |
| % Other | 0.2% |
| % Diabetic | 71.5% |
| Vintage (yr) | 1.9 ± 3.2 |
| BMI | 28.1 ± 8.0 |

## LIMITATIONS

- Exit-site infections could not be identified directly.
- A difference in exit-site infections was inferred from systematic differences in antibiotic use between ESH- and iodine-using facilities that were otherwise similar.

**Table 3. Facilities Compared by Disinfectant Type**

| | Facilities Using ESH | Facilities Not Using ESH |
|---|---|---|
| Facilities | 180 | 46 |
| Facility Census | 65.4 ± 35.3 | 52.8 ± 28.6 |
| % CVC | 24% | 25% |
| Facility Quality Index | 60.4 ± 7.3 | 60.6 ± 7.1 |
| Overall Infection Rate (episodes/ 1000 pt days) | 7.21 ± 0.12 | 7.57 ± 0.26 |

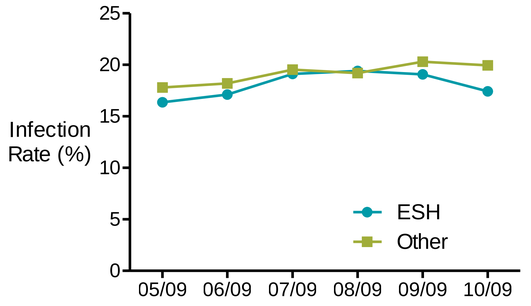


**Figure 1. Facility Infection Rate by Disinfectant Type**

## SUMMARY of RESULTS

- Of the facilities, 78.4% reported use of ESH.
- The facility size, CVC rate, and facility quality index were comparable for ESH- and iodine-using facilities. Therefore, any differences in infection rate are unlikely to be related to these factors (Table 2).
- Antibiotic use over the 6 months surveyed was observed in 18.1% of ESH facilities and 19.2% in iodine facilities (Figure 1). This difference was suggestive but not significant ($P = 0.09$).
  - The observed rate of antibiotic use was lower in surveyed DaVita facilities than the expected use of 30% reported by the USRDS.
- Use of antibiotics from May to October 2009 showed no significant differences for any month, although in almost all months the observed percentage of infections was lower in facilities using ESH (Figure 1).
- The overall infection rate (inferred from antibiotic use) among patients with CVCs did not differ between ESH- and iodine-using facilities.

## KEY FINDINGS

- ✓ ESH use for CVC preparation was higher than expected.
- ✓ The observed use of antibiotics was lower than that expected from USRDS estimates.
- ✓ While the observed proportion of antibiotic use (and all-type infections) was lower in ESH facilities in 5 of 6 months, this difference was not statistically significant.
- ✓ Despite observed equivalence on a number of facility characteristics, unobserved confounding factors may still exist in this retrospective sample.
- ✓ A prospective examination of the relationship between ESH use and access-related infection is planned.

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