

*Clostridium difficile* infection (CDI) by Louh et al.<sup>1</sup> In this article, the authors reviewed 4 studies that assessed the impact of hand-hygiene campaigns to reduce CDI. Based on these papers, the authors did not recommend any hand-hygiene interventions to reduce CDI.

In their discussion section, Louh et al stated, “Although older studies have shown a significant reduction in nosocomial infections by observing good hand hygiene, further benefit from promoting hand hygiene is unlikely, as the margin for improvement diminishes. Therefore, if any institution has adequate hand-hygiene processes, incremental efforts to improve hand hygiene may not be as beneficial as other interventions.” We have 2 concerns with this statement and their conclusion. First, the authors did not define a level of “adequate hand hygiene.” Second, their conclusion that moving from high to very high levels of hand-hygiene compliance offer diminishing benefits is not supported by the literature. We have previously demonstrated that an improvement in hand-hygiene compliance from a high baseline level (>80%) to an even higher level (>95%) led to a significantly decreased healthcare-associated infection rate ( $P=.0066$ ).<sup>2</sup> Based on our data, we believe that achieving very high levels of hand-hygiene compliance is both feasible and worthwhile to reduce healthcare-associated infections.

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## Role of Ethanol Locks in Reducing Bloodstream Infections in Adults on Parenteral Nutrition

*To the Editor*—Central-line-associated bloodstream infections (CLABSIs) are one of the leading complications in patients receiving home parenteral nutrition (PN).<sup>1</sup> Parenteral nutrition is generally administered through intravenous catheters for prolonged periods of time, particularly in patients with chronic illnesses such as intestinal failure. Each CLABSI puts patients at greater risk of complications including: sepsis, endocarditis, multidrug-resistant (MDR) bacteria, thrombosis and malnutrition which may lead to more hospital stays, increased costs of care, and decreased quality of life.<sup>2,3</sup> Additionally, most bloodstream infections require catheter replacement for optimal management.<sup>4</sup> Ethanol lock therapy (ELT) is a proposed method to reduce CLABSIs requiring hospitalizations and associated line replacements by preventing catheters from becoming colonized.

Ethanol provides benefits over traditional antibiotic locks due to its ability to kill a broad spectrum of organisms, including MDR bacteria and fungi, with minimal side effects. Trials in the adult population have included patients with long-term central venous catheters, such as dialysis, oncology, and PN patients, and have shown variable results.<sup>5–8</sup>

The goal of this study was to further evaluate benefits of adding prophylactic ELT to all patients with silicone-based tunneled catheters in adult patients on home PN for an advanced form of intestinal failure (type 2 or type 3) as defined by the European Society for Clinical Nutrition and Metabolism (ESPEN).<sup>9</sup> The primary outcomes evaluated were the rates of CLABSI and resulting hospitalizations in patients before and after the initiation of the ELT protocol. Secondary outcomes included type of bacteria, number of line replacements, and number of hospital days.

This retrospective cohort study compared CLABSI rates and hospitalization days before and after ELT therapy protocol initiation in a 1,550-bed, tertiary-care, university-affiliated Hospital in Miami, Florida. Following institutional review board approval, all patients >18 years old receiving PN on the surgical nutrition service between April 1, 2009, and April 30, 2015, were identified using a web-based clinical surveillance software system, VigiLanz (VigiLanz, Minneapolis, MN), which utilizes data from electronic health records. Patients were assigned to the preimplementation group if they received PN between April 1, 2009, and March 30, 2012, or the postimplementation group if they received parenteral nutrition between May 1, 2012, and April 30, 2015. If the dates of PN administration spanned both groups, catheter days and hospitalizations were separated based on the study period.

The ELT protocol requires a 70% ethanol solution to dwell in the Hickman catheter for at least 4 hours, 3 days per week. Ethanol lock therapy may only be administered to patients with silicone-based tunneled catheters, such as Hickman

TABLE 1. Events per 1000 Catheter Days

	Pre-ELT Protocol Events per 1,000 Catheter Days Median (IQR)	Post-ELT Protocol Events per 1,000 Catheter Days Median (IQR)	P Value <sup>a</sup>
CLABSIs	12.7 (6.70–16.39)	2.4 (0.60–7.42)	.004
Admissions for Bacteremia	12.7 (6.0–19.1)	2.4 (0–8.2)	.004
Catheter removals	12.7 (6.7–22.2)	2.4 (0–8.2)	.004
Hospital days	289 (84.2–390)	23 (0–104)	.005

NOTE. ELT, ethanol lock therapy; IQR, interquartile ratio; CLABSI, central-line-associated bloodstream infection.

<sup>a</sup>Calculated using a Kruskal-Wallis 1-way analysis of variance (ANOVA) test.

catheters, because ethanol may damage polyurethane-based catheters.<sup>10</sup> Once the ELT protocol was approved in April 2012, all patients on the surgical nutrition service who were receiving PN through a Hickman catheter were prescribed ELT therapy for both inpatient and outpatient care. Prior to that time, no patients had been prescribed ELT. Patients were excluded if they had a long-term catheter for an alternative therapy (eg, dialysis or chemotherapy), received PN through a line incompatible with ELT (eg, peripherally inserted central catheters), history of transplant, or documented noncompliance with ELT.

CLABSIs were determined by positive blood culture and/or physician documentation in the electronic health record. Positive blood cultures were excluded if patients had bacteremia with an alternative documented focus of infection other than the catheter. Hospitalizations were determined as associated with CLABSI if the blood cultures were positive within 48 hours of admission and had no other reason for hospitalization documented. Statistical analyses used NCSS 11 statistical software (NCSS, Kaysville, UT). For continuous nonparametric data, we used a Kruskal-Wallis 1-way analysis of variance (ANOVA) test. A *P* value < .05 was considered significant.

Of 98 PN patients identified in the study period, 24 patients met study inclusion and exclusion criteria. The most common reason for study exclusion was PN administration through a line incompatible with ELT. There were 9 patients identified in the preimplementation period, 11 in the postimplementation period, and 4 patients who overlapped groups. In the pre- and post-ELT groups, 3,052 and 5,435 catheter days were documented, respectively. Organisms isolated from blood cultures were 25% vs 17% *Candida* spp, 29% vs 18% gram negative, 29% vs 47% gram positive, and 17% vs 18% polymicrobial in the pre- and post-ELT groups, respectively.

A statistically significant decrease was observed in CLABSIs, admissions for bacteremia, hospital days, and catheter removals per 1,000 catheter days in the post-ELT group compared with the pre-ELT group (Table 1), with an 81% relative risk reduction in CLABSI and hospital admissions for bacteremia (*P* = .004). No adverse events to ELT were documented.

This study showed a statistically significant decrease in incidence of CLABSIs, admissions for bacteremia, catheter removals, and hospital days with use of ELT. Strengths of this study include that the same physician provided care for all study subjects, regardless of the study period. Additionally, no patients had diabetes, received immunosuppressive

medications, or had other types of catheter for alternative uses that limited confounding. The limitations of this study included its retrospective design and small patient population.

Our results, combined with the fact that no adverse events associated with ELT were noted, support the continued use of prophylactic ELT in all adult intestinal failure with Hickman catheters regardless of past infection history. Because ELT is a relatively inexpensive therapy, its use would increase cost efficiency considerably given the high cost of hospitalization. With this information, physicians providing care to patients with intestinal failure should consider ELT to promote less CLABSI-related hospitalization, line removals, and hospital days.

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## What’s In A Name? A “Cluster” Of Hospital Epidemiologists

*To the Editor*—To paraphrase an African proverb, it takes a village to successfully reduce a healthcare facility’s rate of healthcare-associated infections.<sup>1</sup> Most people are aware of terms used for common groups of animals such as a “pack” of dogs, “school” of fish, “flock” of birds, and “herd” of horses.<sup>2,3</sup> Less common terms include a “scourge” of mosquitoes, a “parliament” of owls, a “crash” of rhinoceroses, a “dazzle” of zebras, a “murder” of crows, and a “tower” of giraffes.<sup>2,3</sup> Collective terms for groups of humans have also been used such as a “hastiness” of cooks, a “stalk” of foresters, a “bevy” of ladies, and a “pity” of prisoners.<sup>4</sup>

Because infection prevention is a collective activity, we decided that such groups require specific names. Thus, we

propose the following: a “cluster” of hospital epidemiologists, a “trust” of infection preventionists, a “colony” of microbiologists, an “intellect” of infectious disease specialists, and a “capsule” of pharmacists. Given that a group of nightingales is a “watch” and the importance of Florence Nightingale in the development of the nursing profession, we propose that a group of nurses be termed a “watch.” Alternatively, one could use the term a “devotion” of nurses. Although we should probably not publicize the following group names, we thought the following appropriate: an “irritant” of regulators, a “parsimony” of chief financial officers, a “pestilence” of vaccine deniers, and a “complexity” of EMR programmers.

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