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Common infection control practices in the emergency department: A literature review



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Background: Health care-associated infections (HAIs) are a major health concern, despite being largely avoidable. The emergency department (ED) is an essential component of the health care system and subject to workflow challenges, which may hinder ED personnel adherence to guideline-based infection prevention practices.

Methods: The purpose of this review was to examine published literature regarding adherence rates among ED personnel to selected infection control practices, including hand hygiene (HH) and aseptic technique during the placement of central venous catheters and urinary catheters. We also reviewed studies reporting rates of ED equipment contamination. PubMed was searched for studies that included adherence rates among ED personnel to HH during routine patient care, aseptic technique during the placement of central venous catheters and urinary catheters, and rates of equipment contamination.

Results: In total, 853 studies were screened, and 589 abstracts were reviewed. The full texts of 36 papers were examined, and 23 articles were identified as meeting inclusion criteria. Eight studies used various scales to measure HH compliance, which ranged from 7.7% to 89.7%. Seven articles examined central venous catheters inserted in the ED or by emergency medicine residents. Detail of aseptic technique practices during urinary catheterization was lacking. Four papers described equipment contamination in the ED.

Conclusion: Standardized methods and definitions of compliance monitoring are needed to compare results across settings.

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Health care-associated infections (HAIs) are a significant public health concern. Despite being largely preventable, these infections are a significant contributor to patient mortality and morbidity and are expensive to health care systems.^{1,2} It is estimated that up to 70% of some types of HAIs are preventable through improved infection control practices among health care providers.³ Whereas a large proportion of preventable HAIs can be attributed to invasive procedures and devices such as urinary and central venous catheters,¹ cross contamination may also occur through person-to-person spread after handling of contaminated equipment or other fomites.⁴

The emergency department (ED) is an essential component of the health care system, and its potential impact continues to grow as more individuals seek care and are admitted to the hospital through the ED.⁵ Invasive procedures such as central lines are placed with increased frequency in certain EDs, but adherence to best practices (eg maximum barrier precautions) varies.^{6,7} ED clinicians also face numerous workflow challenges that may foster the spread of infections including crowding,⁸ frequent interruptions to care delivery,⁹ use of nontraditional care areas such as hallways and conference rooms,¹⁰ and close proximity of patients, who are often separated only by curtains.¹¹ Given that many of these barriers have been identified as infection prevention threats,^{12,13} it is critical to understand the infection prevention practices of ED providers and their potential role in the risk of HAIs.

We conducted a literature review to examine adherence rates among ED personnel to selected infection control practices: hand hygiene (HH) and aseptic technique during the placement of

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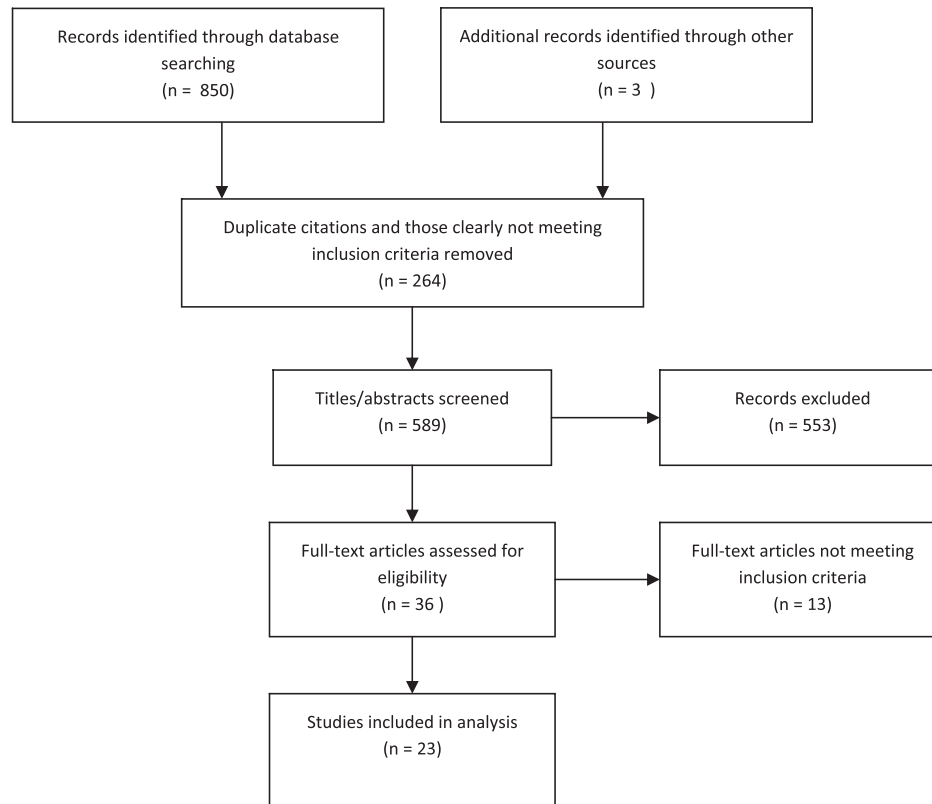


Fig 1. Flowchart of study selection.

central venous catheters and urinary catheters, as well as the use of appropriate decision criteria for the insertion of a urinary catheter. We also examined rates of equipment contamination in the ED.

METHODS

In collaboration with a research librarian, we searched the PubMed electronic database for studies that were published between June 1, 2002, and June 1, 2012. Using a Boolean combination of keywords and medical subject headings (Appendix 1), we conducted separate searches to capture adherence rates of HH during routine patient care, adherence rates of aseptic technique during the placement of central venous catheters and urinary catheters, adherence rates to urinary catheter insertion guidelines, and rates of equipment contamination. We selected these procedures because they are more likely to increase the risk of infection when compared with less invasive procedures such as peripheral intravenous catheter insertion. Articles were excluded if they concerned the contamination of cultures; described self-reported compliance; did not separate ED data from other areas under study; were review articles; and were commentaries, editorials, or discussions of the issue (ie, not data based). We also excluded studies that examined compliance during outbreaks or pandemics such as severe acute respiratory syndrome or emergency situations because we were interested in standard practices during routine care.

Using the same terms and time frame, we also electronically searched the tables of contents of the following journals: *Academic Emergency Medicine*, *Emergency Medicine Journal*, *Emergency Medicine*, *Journal of Emergency Nursing*, *Annals of Emergency Medicine*, *European Journal of Emergency Medicine*, *American Journal of Infection Control*, *Journal of Hospital Infection*, and *Infection Control and Hospital Epidemiology*. Finally, we hand searched the reference

sections of pertinent review articles that were identified in the PubMed search.

One researcher initially screened study titles and abstracts for overall relevance. The 3 authors then independently reviewed remaining study titles and abstracts. Collectively, study authors discussed the rationale for remaining articles based on the aforementioned inclusion and exclusion criteria. Disagreements were resolved through discussion and consensus. Articles that appeared to meet the inclusion criteria were reviewed in full text.

RESULTS

As depicted in Figure 1, at the initial screening phase, 853 articles were identified (850 from the original PubMed search; 3 through supplemental means). After removing duplicate citations and limiting articles to those published in English with available abstracts, 589 abstracts were screened. An additional 553 studies were excluded because they did not meet our inclusion criteria, primarily because they were self-reports of practices, did not report ED data separately, and/or observations of the placement of devices were made during emergency procedures. The full texts of 36 papers were reviewed, and 23 articles were identified as meeting study inclusion. These are summarized below.

Adherence to HH

HH was the most commonly observed infection prevention practice in studies reviewed, and adherence rates varied widely. In 6 major Kuwaiti hospitals, rates of HH were reported to be only 14.7% (57/387) using a rating scale published in 1974 to identify “dirty contacts.”^{14,15} This contrasts with a rate of 89.7% (5,261/5,865) reported in an academic ED in New England that observed HH compliance using a modified version of the World Health

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