

Final Report

Include the following six components using these headings:

1. **Structured Abstract**

(maximum of 250 words.)

Purpose:

Scope:

Methods:

Results:

Key Words:

2. **Purpose** (Objectives of Study).

The Developmental Center for Evaluation and Research in Patient Safety (DCERPS) in University of Maryland and hospitals of University of Maryland Medical Systems has the following objectives:

- (1) To build a multi-disciplinary team to conduct fundamental research on patient safety.
- (2) To establish ties between research identities and healthcare delivery systems for research and demonstrations to enhance patient safety.
- (3) To develop educational programs on the importance of patient safety and evidenced based mechanisms to improve it.
- (4) To develop a research proposal for a pilot study on infections in central intravenous line placement.

3. **Scope** (Background, Context, Settings, Participants, Incidence, Prevalence).

4. **Methods** (Study Design, Data Sources/Collection, Interventions, Measures, Limitations).

Methods

Using the same data set of video-records of CVC insertions, additional analysis was carried out. Based on videotape analysis, the number of operators for each CVC was recorded as well as physician utilization of maximum barrier precautions (cap, mask, sterile gown, gloves, and full surgical drape). The primary operators were comprised of surgical and emergency medicine residents; trauma surgery and anesthesiology attending physicians performed several lines without assistance. The secondary operators were senior surgical residents and trauma/critical care fellows. Activity of the secondary operator was examined for breaks in recommended sterile practices.

5. **Results** (Principal Findings, Outcomes, Discussion, Conclusions, Significance, Implications).

Preliminary Findings: Secondary Operators in Central Venous Catheter Insertions

Results:

We analyzed 140 central venous catheter (CVC) insertions. A single, secondary operator assisted in 58 CVC insertions. Overall compliance with full barrier precautions (cap, mask, sterile gloves, gown, and full surgical drape) was 90% and 66% for primary and secondary operators, respectively ($p=0.001$). When stratified by level of urgency of a particular CVC insertion, secondary operators maintained maximum barrier precautions in 34 of 47 (72%) elective, 3 of 9 semi-emergent (33%), and 1 of 2 (50%) emergent CVC insertions. Overall, for elective CVC insertions, 99 of 113 (88%) primary operators observed maximum barrier precautions as compared to 34 of 47 (72%) secondary operators ($p=0.025$).

Frank contamination during CVC insertion was also assessed during videotape review. Of the 47 elective CVCs inserted with assistance from a secondary operator, contamination was observed in 4 (9%). These incidents consisted of an ungloved or non-sterile gloved hand coming into contact with patient skin in the sterile field (2) and operators without sterile gown contacting sterile field with elbows (2). In each of these incidents, the contamination occurred by a secondary operator.

Implications:

Central venous catheterizations are usually performed by a trainee physician as a primary operator and assisted by a secondary operator who is usually a senior physician. The senior physicians should embrace maximum barrier protection during line placement. We have shown a deficiency of usual teaching paradigm at the studied institution through the use of videotape analysis of central line placement in a trauma resuscitation unit.

6. **List of Publications and Products** (Bibliography of Published Works and Electronic Resources from Study)

Publications

1: Seagull FJ, Xiao Y, & Plasters C. Information Accuracy and Sampling Effort: A Field Study of Surgical Scheduling Coordination. *IEEE Transactions on Systems, Man, and Cybernetics, Part A: Systems and Humans*. 2004. 24(6), 764-771.

2: Xiao Y, & Mackenzie CF. Introduction to the special issue on Video-based research in high risk settings: methodology and experience. *Cognition, Technology & Work*. 2004. (6) 127-130.

3: Xiao Y, Seagull FJ, Nieves-Khouw F, et al. Organizational-Historical Analysis of the "Failure to Respond to Alarm" Problem. *IEEE Transactions on Systems, Man, and Cybernetics, Part A: Systems and Humans*. 2004. 34(6), 772-778.

Abstracts

1: Guzzo JL, et al. Multiple Operators During Central Line Placement in the Trauma Resuscitation Unit: Videotape Review of Maximum Barrier Precautions [abstract]. In: *Surgical Infections*. Mar 2005. 6(1), 121-176.

Presentations

1: Seagull FJ. Video-Based Training for Patient Safety in Central Line Placement Making the Health Care System Safer. AHRQ's Second Patient Safety Research Conference; 2003 March 2 – 4; Arlington, VA.

2: Bochicchio GV. Improving sterile practices in central venous catheterization. American College of Surgeons Congress. 2004 October 10-14; Chicago, IL.

3: Guzzo JL. The power of showing mistakes: using examples of poor sterile practice in an online training course to impact compliance. First Annual Patient Safety Conference. 2005 March 31; Baltimore, Maryland.

4: Guzzo JL, et al. Secondary Operators Increase Violations in Sterile Technique. A Prospective Study of Central Line Placement [poster]. Surgical Infection Society Annual Meeting. 2005 May 5-7; Miami, Florida.

5: Guzzo JL, et al. Secondary Operators Increase Violations in Sterile Technique. A Prospective Study of Central Line Placement. American College of Surgeons, Committee on Trauma, 83rd Annual Meeting. 2005 March 3; Washington, DC.