STUDY SUMMARY

Cost Determination Study of Closed System Transfer Devices (CSTD)

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PURPOSE

The purpose of this cost determination analysis is to appraise the direct and indirect costs of using a closed system transfer device (CSTD) to prevent occupational exposure to hazardous drugs.

INTRODUCTION

Organizations such as the National Institute for Occupational Safety and Health (NIOSH) and the United States Pharmacopeia (USP ‹797›) have recommended the use of specialized IV equipment called CSTDs to reduce patient and clinician exposure to hazardous drugs.[1,2]

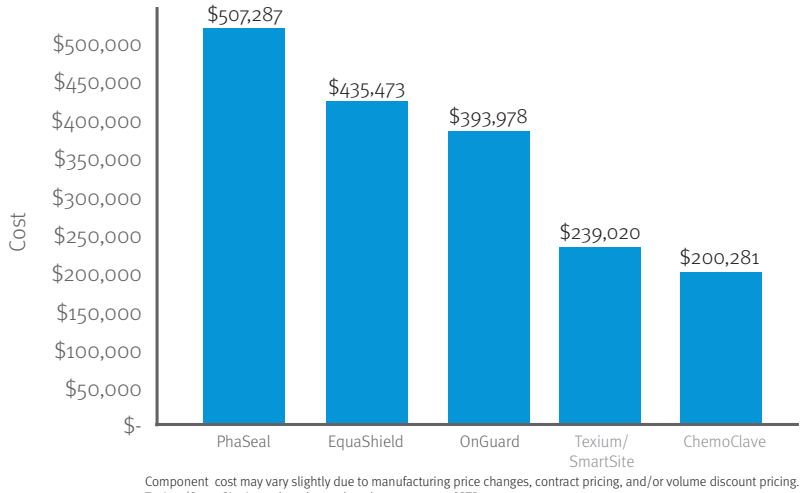
At the time of this study, there were five commercially available CSTDs in the U.S. market. To date, there has been no definitive comparison study to determine product efficacy in safely eliminating exposure to hazardous drugs. Additionally, the cost implications and environmental impact are important variables of implementing CSTDs, which have yet to be systematically studied.

MATERIALS AND METHODS

Five CSTD systems were evaluated in this study: the ChemoClave™ by ICU Medical, Inc.; EquaShield® by EquaShield Medical, Ltd.; OnGuard™ by B. Braun Medical, Inc.; PhaSeal® by BD (Becton, Dickinson and Company); and Texium®/SmartSite® by CareFusion Corp. The actual number of component parts needed for the closed system secondary infusion was determined based on compounding techniques and intravenous administration set configuration in compliance with the institutional policies and practice guidelines of the University of California, San Diego Medical Center.

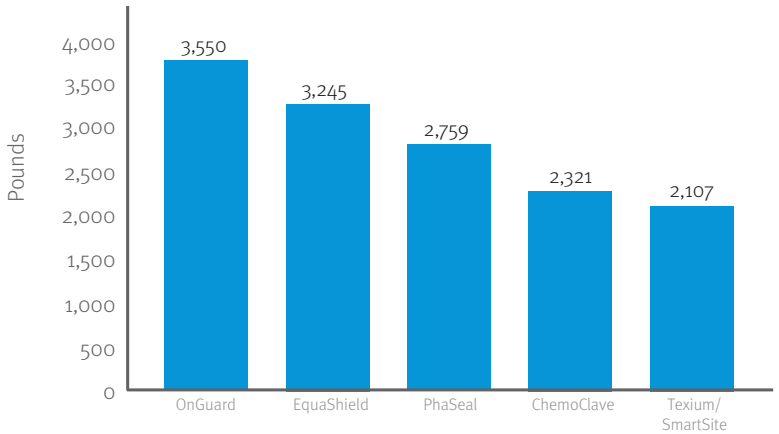
For direct cost determination, the advertised cost for each product at the time the study was conducted was used. The cost of each individual component necessary to effectively compound and administer a hazardous drug via a secondary infusion set for each CSTD

Chart 1: Total Annual Costs Associated with Implementing Competing CSTDs



Component cost may vary slightly due to manufacturing price changes, contract pricing, and/or volume discount pricing. Texium/SmartSite is marketed as a closed system, not a CSTD.

Chart 2: Total Annual Biohazardous Waste Generated by Competing CSTDs



Calculations are based on an average of 1,276 monthly infusions over 12 months for a total of 15,312 infusions annually. Texium/SmartSite is marketed as a closed system, not a CSTD.

was added together to generate a total cost for each system. Then, each total cost was multiplied by 15,312 infusions to generate an annual acquisition cost per system (average of 1,276 monthly infusions).

For indirect cost determination, the amount of waste generated by each system was evaluated. The weight of each individual component in each CSTD was obtained using a calibrated digital scale. Then, the total weight for each CSTD was multiplied by 15,312 to achieve the annual amount of waste generated in pounds (lbs).

RESULTS

An average of 1,276 monthly infusions of hazardous drugs, including common antineoplastic regimens and investigational agents, was prepared and administered from July 2010 to December 2010. Of the five evaluated CSTDs, the least expensive system was determined to be ChemoClave, which generated an annual cost of $200,281, followed by Texium/SmartSite with $239,020, OnGuard with $393,978, EquaShield with $435,473, and PhaSeal with $507,287 (Chart 1). The acquisition cost difference between the most expensive system studied (PhaSeal) and the least expensive system (ChemoClave) was calculated to be $307,005, a difference of 253.3 percent. When evaluating waste generated, the system generating the least amount of waste annually was determined to be Texium/SmartSite with 2,107 lbs of waste, followed by ChemoClave with 2,321 lbs, PhaSeal with 2,759 lbs, Equashield with 3,245 lbs, and OnGuard with 3,550 lbs as the largest waste generating system. The annual waste difference between Texium/SmartSite and OnGuard is 1,443 lbs, a difference of 168.5 percent (Chart 2).

CONCLUSION

As economic pressures increase, procurement decisions can no longer rely solely on clinical efficacy studies that fail to also assess cost-effectiveness. Limiting waste volume generation to the lowest practical amount is also a major objective for facilities due to its toxicity and adverse implications to the environment. In the absence of current, reliable comparative data on commercially available CSTDs, this evaluation of costs and waste may be used to guide organizations in the implementation of a CSTD.

References
1. National Institute for Occupational Safety and Health (US). Prevention of Occupational Exposure to Antineoplastics and Other Hazardous Drugs in Healthcare Settings. Sep-2004.
2. United States Pharmecopia (USP) 797. Pharmaceutical Compounding, Sterile Preparations. 2006.