# CSTDs vs Closed Systems

Safe Handling of Hazardous Drugs

## Closed system drug-transfer devices (CSTDs) are required for administration of hazardous drugs AND globally recommended for medication preparation[1]

**CSTDs:** Drug transfer devices that mechanically prohibit the transfer of environmental contaminants into the system and the escape of hazardous drug or vapor concentrations outside the system.[2]

CSTDs are categorized as supplemental engineering controls, where the development is based not only on construction criterion but also must meet defined performance standards applicable to sterile practice, drug containment, and personnel protection.[3]

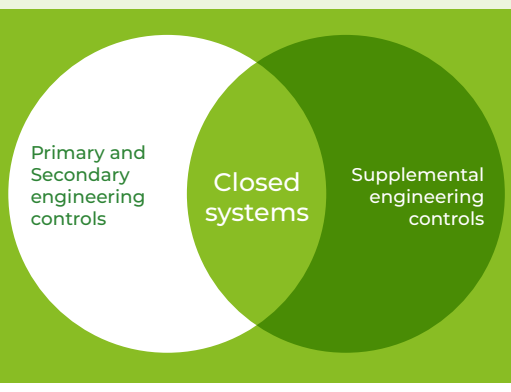
- Protects user and environment by preventing drips, leaks, and vapor exchange
- Chamber or filter equalises pressure between syringe and containers[4]

**Closed Systems:** Medical devices based on construction criterion only to contain, at the best of their ability, air or fluid leakage. No performance standards are in place to validate successful elimination of environmental hazards.

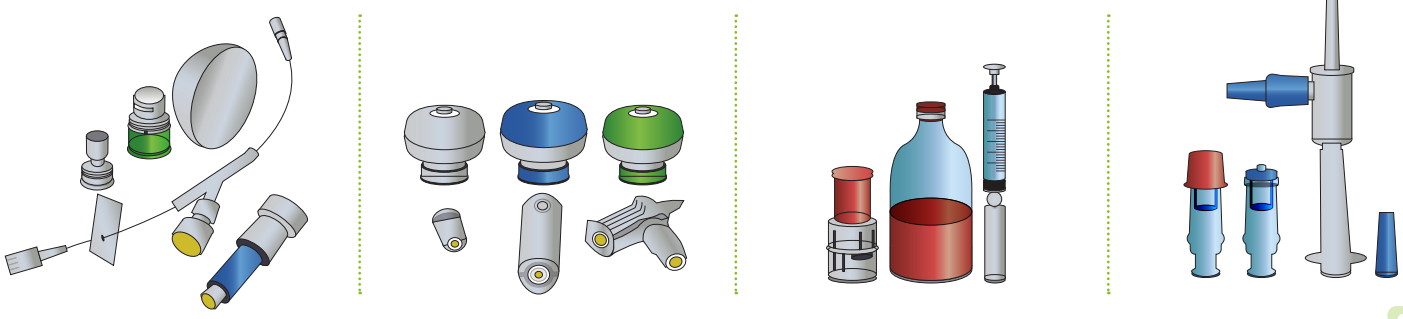
**Engineering Controls:** Primary and Secondary[3]

- Biological safety cabinets (BSCs) (primary) and cleanrooms (secondary)
- Contain a HEPA filter to decontaminate exhaust air

**All CSTDs are closed systems, but not all closed systems are CSTDs**




## CSTDs come in all shapes and sizes

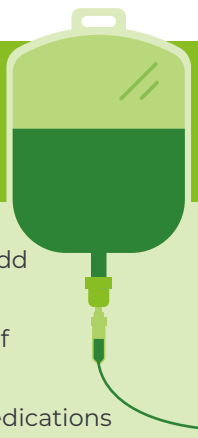


### Primary and Secondary engineering controls are:[3]

- Used for compounding of medications
- Designed to protect the user, environment and the medication

### CSTDs are:[2]

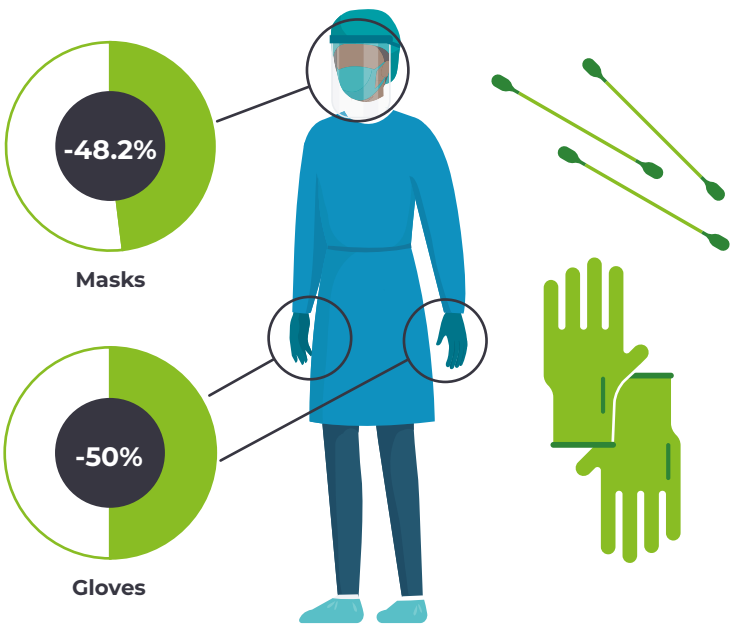
- Used alongside closed systems to add additional protection
- Recommended for compounding of medications
- Mandatory for administration of medications



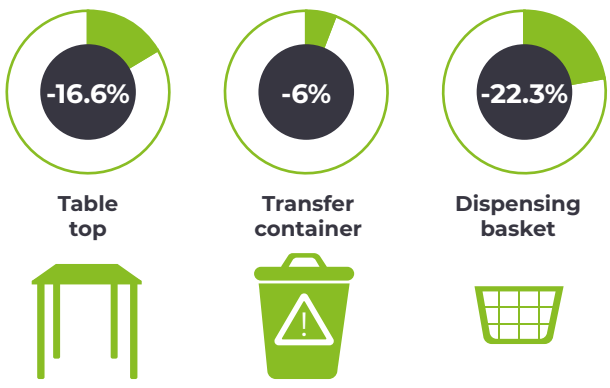
## How much do CSTDs reduce HD exposure?

A study in 2022 compared the exposure of different surfaces and protective equipment to HDs when preparation took place under traditional needle and syringe techniques or CSTDs.[5]

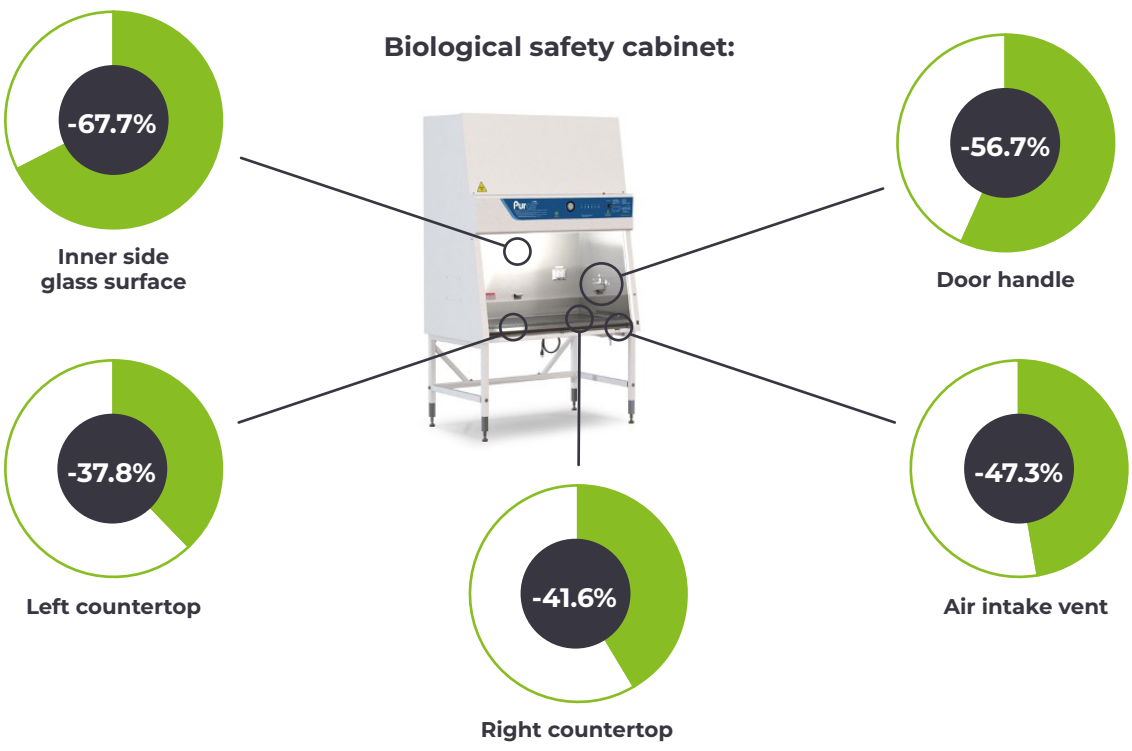
**Pharmacist:**




**Drug dispensing table:**




**Biological safety cabinet:**




**References:**

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2. NIOSH. Preventing Occupational Exposures to Antineoplastic and Other Hazardous Drugs in Health Care Settings. (2004) Available at: https://www.cdc.gov/niosh/docs/2004-165/pdfs/2004-165.pdf.

3. United States Pharmacopoeia. General Chapter <800> Hazardous Drugs – Handling in Healthcare Settings. 2017. Available at: https://www.usp.org/sites/default/files/usp/document/our-work/healthcare-quality-safety/general-chapter-800.pdf

4. Amichay M, Shimon O, Raveh E. Prevention of coronavirus contamination from the environment using an air-cleaning closed system drug-transfer device. Pharm Pract (Granada). 2021 Oct-Dec;19(4):2576.

5. Tang Y, Che X, Wang YL, Ye X, Cao WL, Wang Y. Evaluation of Closed System Transfer Devices in Preventing Chemotherapy Agents Contamination During Compounding Process-A Single and Comparative Study in China. Front Public Health. 2022 Apr 18;10:827835.