



# Optimization of Medication Management in Ambulatory Surgery Settings

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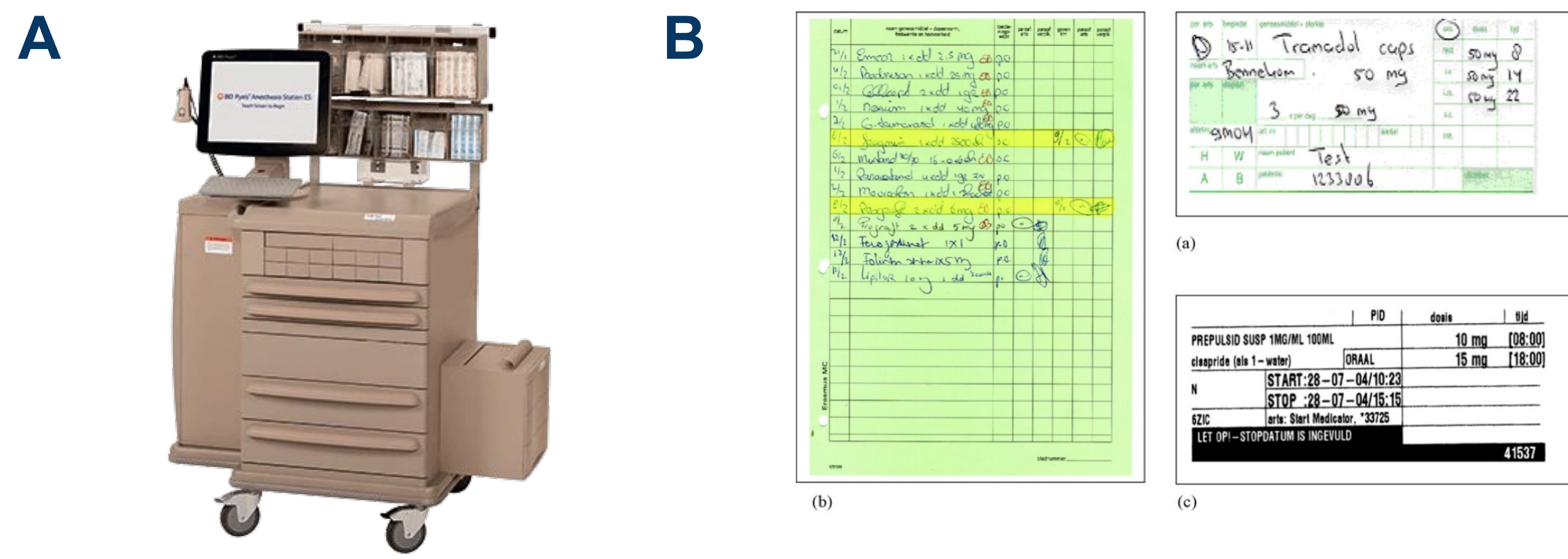


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## Problem/Identified Need

- Ambulatory Surgery Centers (ASCs) are a growing market as they provide reliable and inexpensive outpatient services
  - 300% increase in ASC visits from 1996 to 2006 [1]
  - 50% decrease in out-of-pocket cost for patients when comparing ASCs and hospitals [2]
- ASCs lack the resources and space hospitals have [3]

### Hospital VS ASC Current Medication Management Methods



**Figure 1.** Electronic VS Paper-based Method of Medication Management **a)** Current Electronic Pyxis System used in hospital OR [4] **b)** Example of Slips used for Paper-Based Medication Management in ASCs [5]

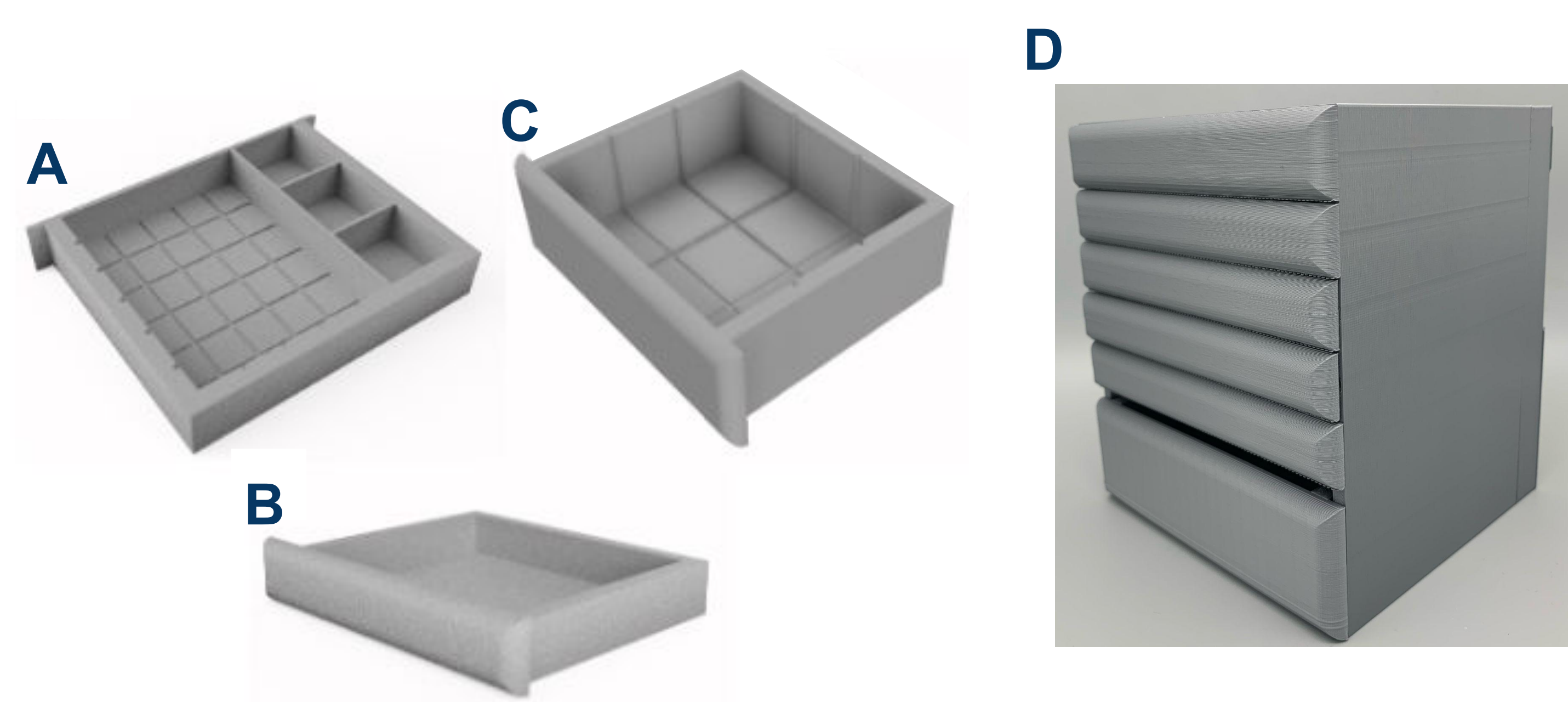
### Needs Statement

Ambulatory Surgery Centers (ASCs) are in need of a secure medication management system to provide safe monitoring of controlled substances, zero errors/zero waste efforts, and patient centricity.

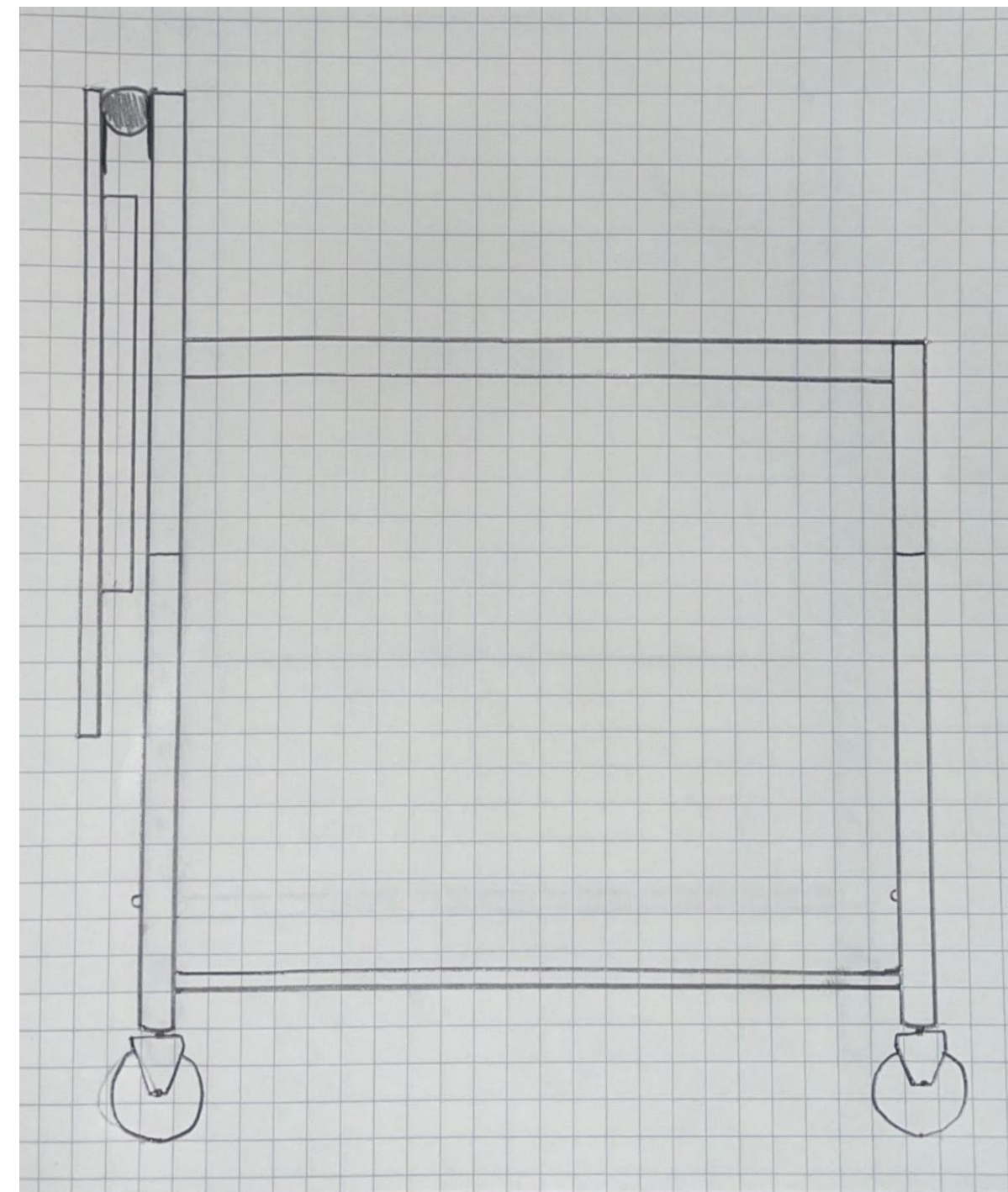
## Design Criteria

Need	Design Requirement
Efficacy	Reduce time during and between medication management workflows while maintaining the security of controlled substances.
Cost	ASC Medication Management system should be cost effective to fit the financial constraints of ASCs .
Safety	Maintain close monitoring of controlled substances through a quantitative and electronic system in order to reduce diversion and allow for reconciliation.
Usability	The system should be easily configurable to all Orthopedic ASCs based on the different medications and supplies used for different procedures.

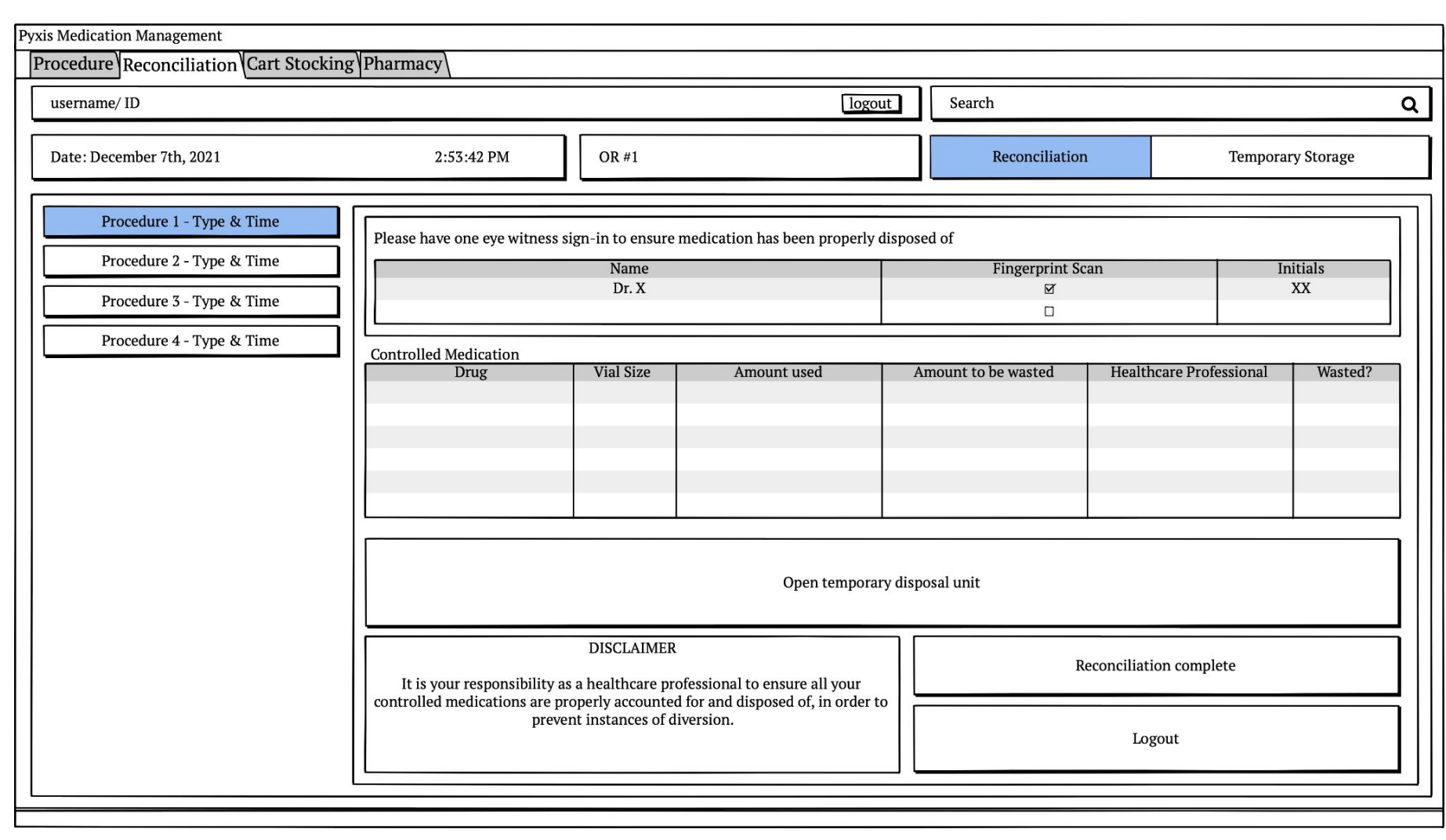
## Prototype



**Figure 2.** Cabinet drawer layout and features. **a)** Procedure specific drawer at 3 inches deep with matrix organization and space for interim controlled medication storage. **b)** Controlled substance drawer at 3 inches deep will hold a scaled down version of the Pyxis Cubie locking storage boxes, these will be able to hold controlled medication in a single dose format. **c)** Anaesthetic supplies drawer is a total of 6 inches deep and is meant to hold single-use supplies like breathing tubes, IV bags, tools, and other supplies an anaesthesiologist might need during a procedure. **d)** Drawers are laid out in the cabinet with the single controlled substance drawer on top, followed by 4 procedure specific drawers, and then on the bottom is the supplies drawer.



**Figure 3.** Scale drawing of system cart with workstation. The cabinet shown in figure 2 will rest atop this cart which contains a folding workstation, barcode scanner, keyboard, thumb print scanner, and room for storing waste baskets and glove boxes.



**Figure 4.** Medication management software UI/UX. This figure shows the UI/UX wireframe in the reconciliation tab. There are 4 tabs in the prototype: patient/procedure, reconciliation, stocking and pharmacy. The system can only be accessed by a secure login or thumbprint.

## Standards

Standard	Relevance
ASTM E2180-18	Quantitative test of microbial activity on antimicrobial agent coatings to prevent infection in OR
ASTM STP800	Labelling standards for drug packaging to prevent medication errors
ASTM JFS10512J	List of medications considered controlled vs uncontrolled at state & federal levels so drugs can be appropriately stored in the cart
ANSI/HFES 100-2007	Standard workspace and drawer heights for comfortable use of cabinet system

## Testing Plan

- Determine system cost using breakdown cost of current Pyxis system and comparison of functionality
- Propose system to primary stakeholders to receive feedback on potential bottlenecks and pain points

## Future Direction

- Visit an orthopedic ASC to compare our workflow with currently utilized workflows (paper-based and electronic)
- Build a to-scale lofi prototype using foam materials
- Investigate alternative solutions for single-dose allotment of controlled substances by studying competitor products

## Acknowledgements

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## References

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[4] "BD Pyxis MedStation ES." <https://www.bd.com/en-us/offerings/capabilities/medication-and-supply-management/medication-and-supply-management-technologies/pyxis-medication-technologies/pyxis-medstation-es-system> (accessed Oct. 05, 2021).  
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