



Evaluating the Cost-Benefit of Automated Dispensing Cabinets in Long-Term Care and Closed-Door Pharmacies

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BACKGROUND

- Automated dispensing cabinets (ADCs) have been shown to improve medication safety, operational efficiency, and economic outcomes inpatient and outpatient settings.¹⁻³
- Their uptake in long-term care (LTC) facilities remains limited, with many LTCs relying on manual emergency-kits (E-Kits) for medication dispensing.⁴
- A recently published pre-post study of ADCs in LTC and closed-door pharmacy settings found that their implementation helped improve operational efficiency while reducing STAT delivery costs and standing inventory.⁴
- With over 15,000 LTCs in the U.S. serving more than 1.5-million patients, there is a substantial opportunity to enhance medication delivery systems.

OBJECTIVE

- To evaluate the cost-benefit of ADC implementation for closed-door pharmacies (CDPs) and LTCs.

METHODS

Study Design

- A cost-benefit analysis was performed to assess the financial and operational impacts of ADC adoption.
- A 7-year time-horizon was used in the model.
- The base-case scenario considered a closed-door pharmacy deploying one ADC in two different LTC facilities, replacing manual E-Kits.
- The baseline and incremental inputs assessing the impact of ADCs in these settings were derived from a pre-post study assessing the impact of implementing ADCs in closed-door pharmacies and LTCs.⁴
- Hypothetical investment cost of \$80,000, which consists of hardware costs, software costs, implementation costs, and maintenance and support fees.

Hourly wages were derived from the U.S. BSL.⁵

Model Inputs

- 84% reduction in unscheduled deliveries from local retail or closed-door pharmacies.⁴
- 80% reduction in pharmacy technician refilling and billing time.⁴
- 20% reduction in pharmacist time to check refills.⁴
- 84% reduction in nurse medication retrieval access time.⁴

RESULTS

FIGURE 1: Impact of ADC Implementation on Unscheduled Deliveries During 7-Year Time-Horizon

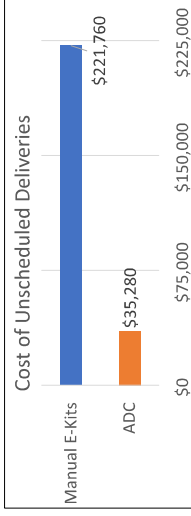
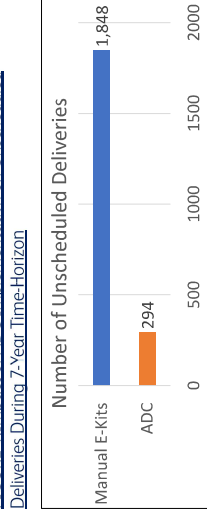


FIGURE 2: Cost of On-Hand Inventory

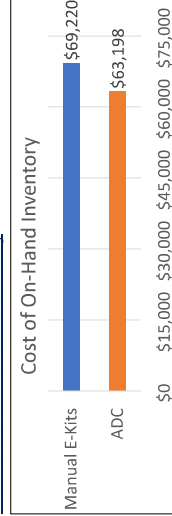


FIGURE 3: Labor Hours During 7-Year Time-Horizon

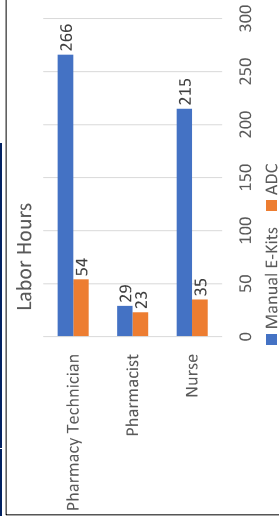


TABLE 1: Incremental Impact on Unscheduled Deliveries

Model Parameter	Incremental Difference
Annual	222
7-Year Time-Horizon	1,554
Reduction in Cost of Unscheduled Deliveries	
Annual	\$26,640
7-Year Time-Horizon	\$186,480

TABLE 2: Incremental Impact On-Hand Inventory

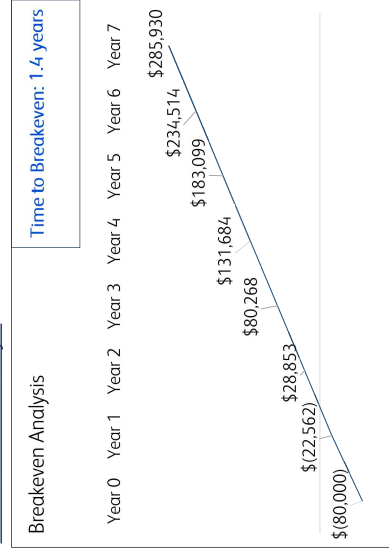
Model Parameter	Incremental Difference
Reduction in On-Hand Inventory	
On-Hand Inventory	\$6,022

*Inventory management is a one-time conversion impact for the hypothetical institution. This value represents a savings associated with a reduction of the carrying cost, opportunity benefit cost, and inventory-related expense costs.

TABLE 3: Incremental Impact on Labor Optimization

Model Parameter	Incremental Difference
Annual Labor Reduction (Hours)	
Pharmacy Technician	30
Pharmacist	1
Nurse	26
7-Year Labor Reduction (Hours)	
Pharmacy Technician	212
Pharmacist	6
Nurse	180
Annual Labor Cost Reallocation	
Pharmacy Technician	\$13,177
Pharmacist	\$359
Nurse	\$11,240
7-Year Labor Cost Reallocation	
Pharmacy Technician	\$92,238
Pharmacist	\$2,510
Nurse	\$78,680

FIGURE 4: Breakeven Analysis



- The implementation of ADCs in two LTC facilities resulted in a break-even period of 1.4 years
- The total net financial impact of \$286,946 in cost savings was seen over the 7-year time horizon.
- STAT deliveries were reduced by 84%, yielding annual savings of \$26,640 (\$186,480 over 7 years).
- On-hand inventory reductions generated a one-time cost savings in year 1 of \$6,022.
- Approximately 57 staff hours per year (398 hours over 7 years) were reallocated to higher-value activities.

CONCLUSION

- ADC implementation in LTCs and CDPs is cost saving, achieving a break-even within 1.4 years.
- Modeled benefits include significant reductions in STAT delivery costs, lower on-hand inventory levels, and improved labor efficiency, supporting the value and broader adoption of ADCs in LTC/CDP settings.

REFERENCES

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4. Borrelli EP, et al. The impact of automated dispensing cabinets on medication safety in a long-term care facility. *J Am Pharm Assoc*. 2023;63(4):443-448.