

Using Quality Control Circle to Optimise Hospital Pharmacy Inventory Management Processes-A Case Study of a Medical Center in Taiwan

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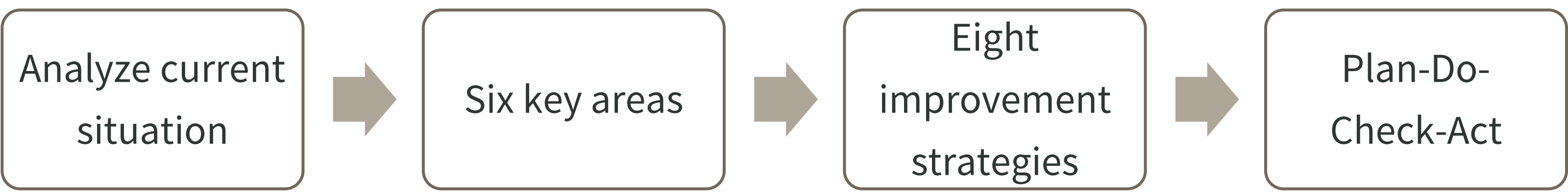
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Introduction

- In hospitals, pharmacy inventory management is crucial as it directly impacts healthcare services and patient safety.
- In an era of labor shortages, improving management efficiency and reducing manpower needs are key challenges.
- This quality control circle (QCC) brought together pharmacists, clerks, and IT professionals to implement improvements.
- By introducing information and communication technology (ICT) equipment, we aim to achieve improvements in pharmacy inventory management.

Methods

Task Oriented QC Story



Improvement Goals

- Improve operational efficiency by at least 10%
- Enhancement of operational accuracy
- Paperless
- Reduce workplace injuries

8 Improvement Strategy

- Establishment of fixed shelves, with a redesigned workflow layout.



Fig. 1 Fixed shelves and sufficiently wide aisles to reduce occupational injuries.

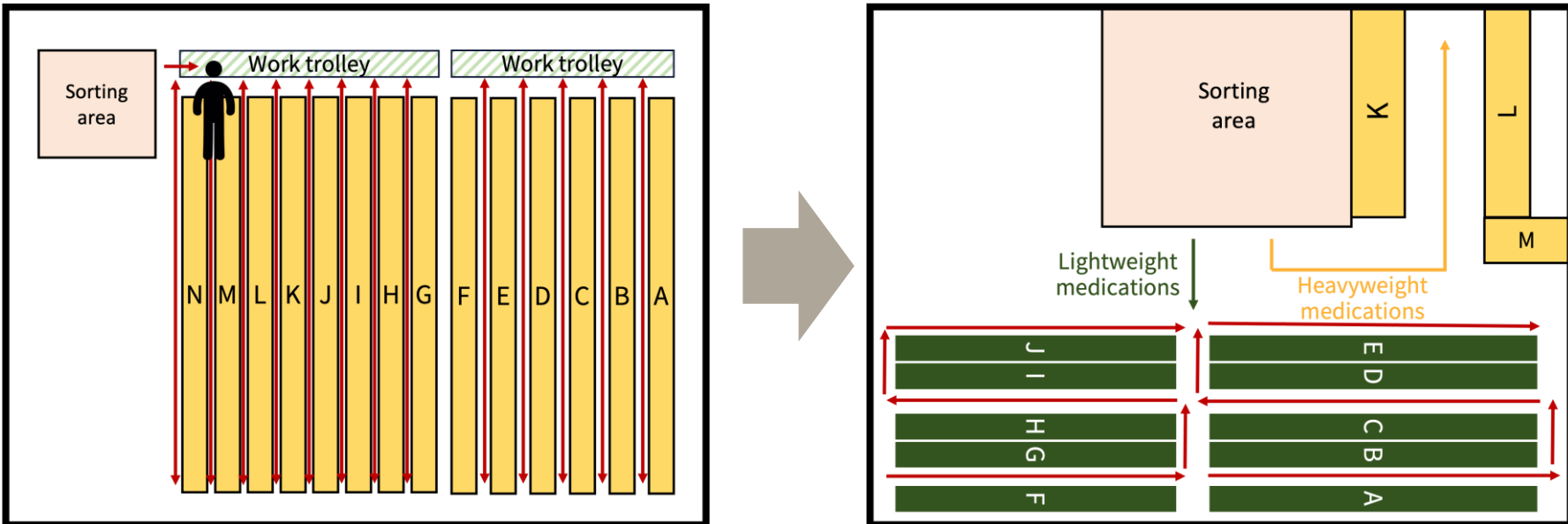


Fig. 2 Redesign the workflow, categorize storage locations based on medication weight to reduce workplace injuries.

- Suppliers upload shipping information in a specified format, achieving electrification of shipping data.

廠商編號	廠商名稱	訂單編號	批號	效期	包裝數	發貨日期	
000292	生 化學	C2022	0001	TP060432	250314	A24208	1110503
000292	生 化學	U2022	0001	IG030813	250224	A24208	1110503
000292	生 化學	C2022	0001	TM050836	240117	A24208	1110503
000292	生 化學	C2022	0002	L5090350	250314	A24208	1110503
000292	生 化學	C2022	0015	T0070607	240126	A24208	1110504
000292	生 化學	C2022	0016	LC091145	250315	A24208	1110503
000292	生 化學	U2022	0008	H506137	240121	A24208	1110504
000292	生 化學	C2022	0001	LA031539	230508	A24208	1110505
000292	生 化學	U2022	0005	K73-0050	231105	A24208	1110505
000292	生 化學	C2022	0001	L010435	240214	A24208	1110509
000292	生 化學	C2022	0002	TS020770	230818	A24208	1110509

訂單總數:10829	上傳總數:9970	上傳百分比: 92%	廠商總數: 165	下載檔案
廠商編號	廠商名稱	訂單總筆數	上傳總筆數	百分比
000292	生 化學	59	59	100%
01B029	台 字	11	10	91%
81A011	平 貴業	5	5	100%

Fig. 3 Suppliers can upload shipping information through a dedicated website.

- Establish a system to track batch numbers, expiry dates and quantities, which can be used for expiration control.

ID.	Name	Lot	Exp.	QTY
129759	Busulfan,60mg/10mL/vial(Busulfex)	01036ASA	230331	16
504053	Kanamycin TB二線,1000 mg/amp(Kanamycin)	1951	230331	27
406751	Golimumab_恩慈,50mg/0.5mL/syrng(Simpson)	LD502ML	230331	25
207850	COVID-19 Vaccine_雙價疫苗(原病毒株/Omicron)	016J22A	230410	19
465951	Influenza Vaccine_公費四價_六個月以上,0.5mL	W3E084	230430	8
465951	Influenza Vaccine_公費四價_六個月以上,0.5mL	W3D851	230430	5

Fig. 4 The warehouse management system can track information such as medication batch numbers, expiration dates, and quantities.

- Implement electronic labels and light-guided system, integrated with PDAs, to provide real-time guidance to medication storage locations.



Fig. 5 When clerks perform shelving and picking, electronic labels and light-guided system will indicate the location of the medications.

- Establish a closed-loop system for verification, shelving, and picking to ensure compliance with the first-in, first-out (FIFO) principle.
- The system automatically assigns picking tasks to each clerk's PDA.

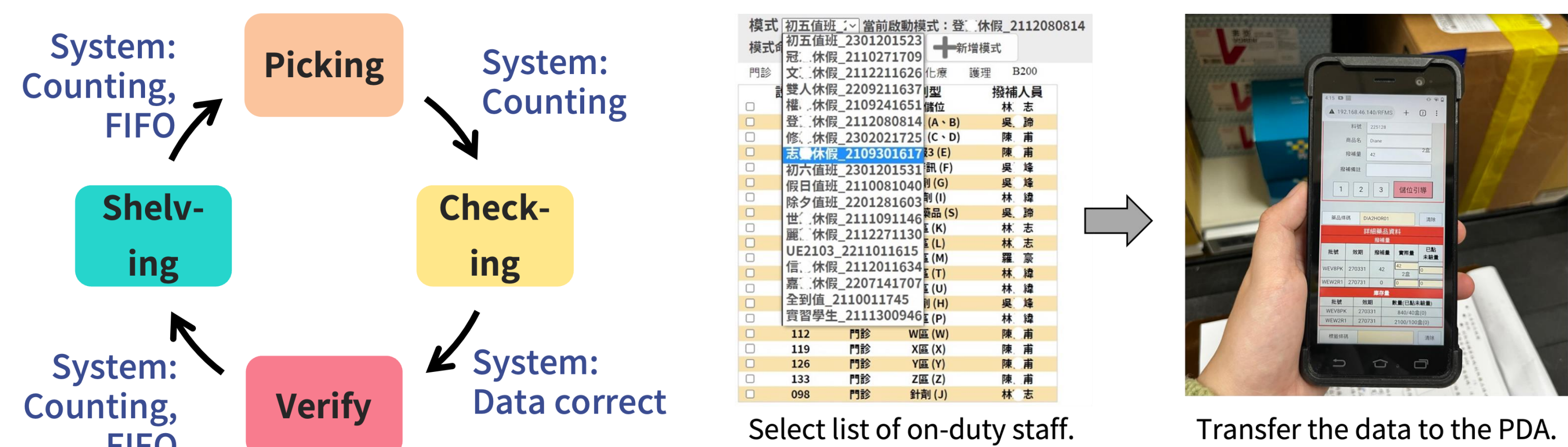


Fig. 6 Close-loop system.

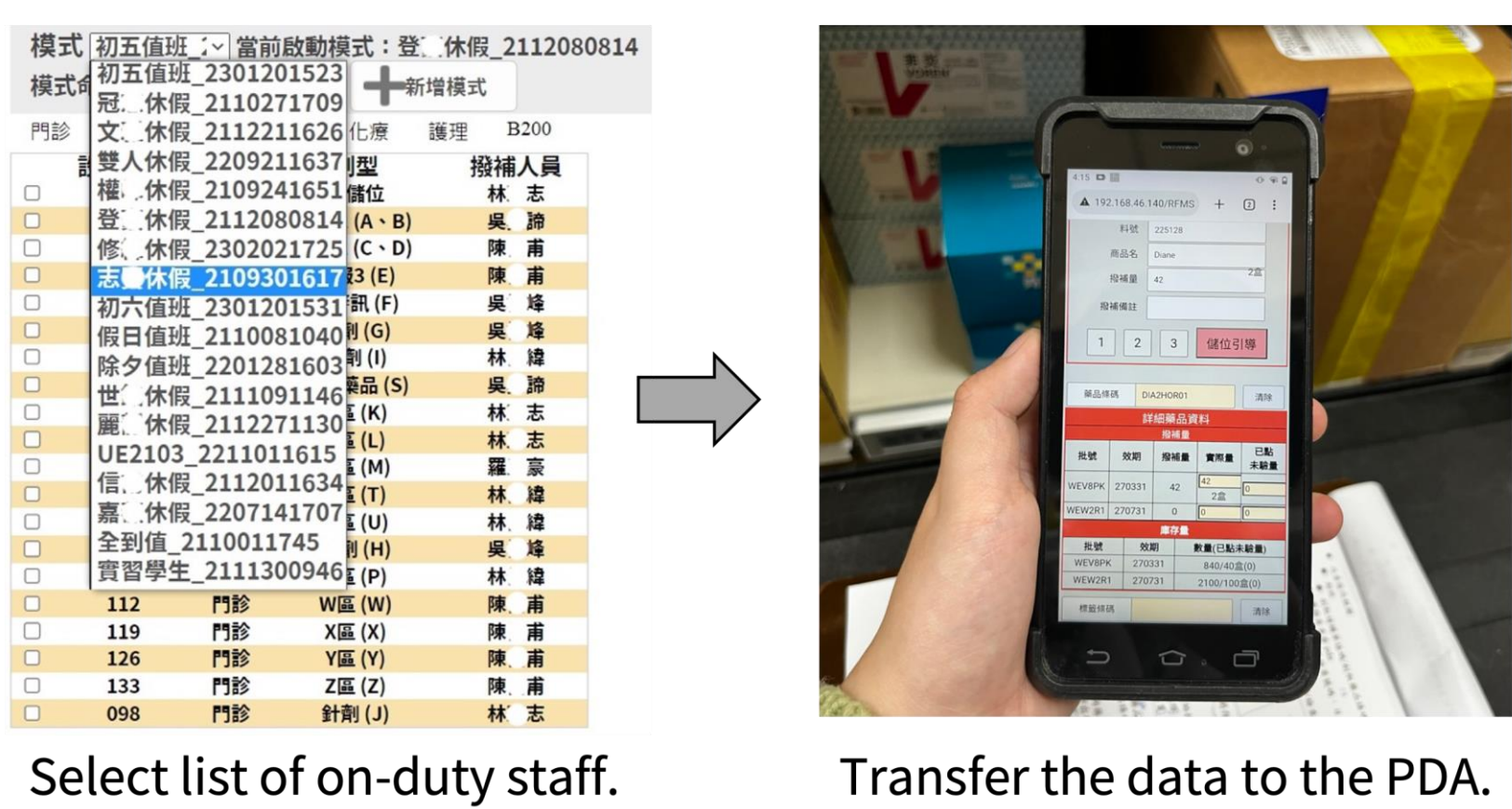


Fig. 7 Assign picking tasks

8 Improvement Strategy (continued)

- Create a cold store with fixed shelving to increase the storage capacity.

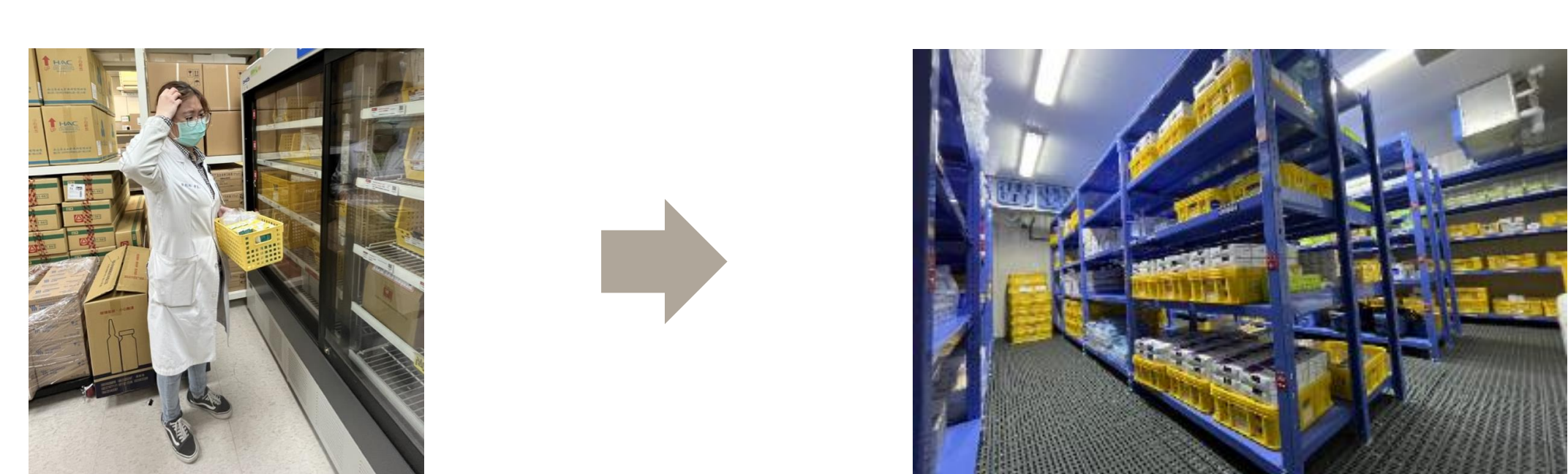


Fig. 8 The cold store can accommodate a large quantity of refrigerated medications.

- Design training programs based on job roles and conduct Direct Observation of Procedural Skills (DOPS) assessments to evaluate operational skills.

Results

Primary Outcome

- Reduce daily work time from 1200 minutes to 705 minutes, achieving a 41% decrease. Six months and one year after the improvements, performance was tracked again, with operational time reduced by an additional 185 minutes.

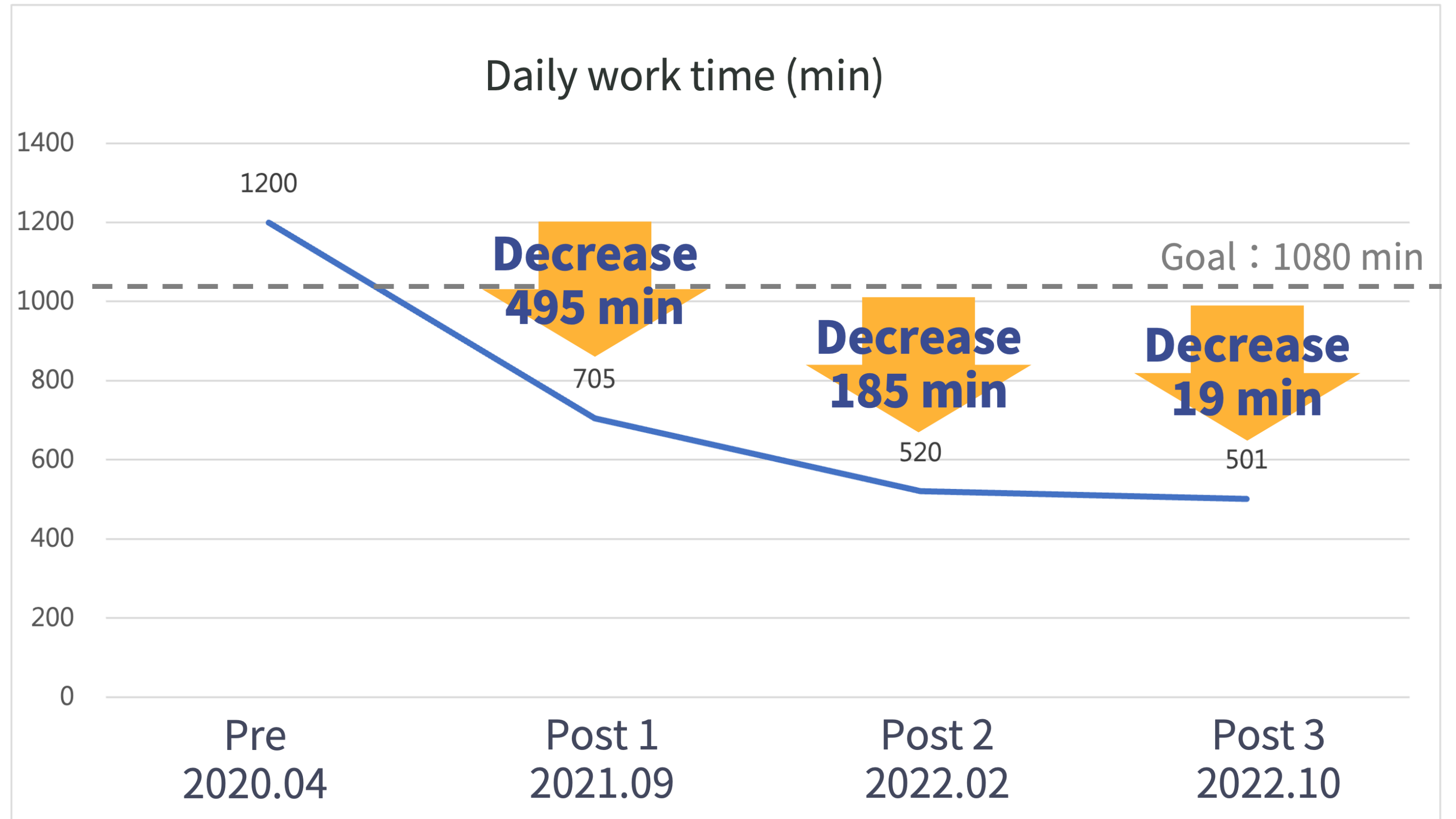


Fig. 9 Primary outcome: daily work time.

Secondary Outcomes

- The reduction in labor operation time and the shift to paperless operations result in annual savings of approximately \$12,960 USD.



Fig. 10 Cost of saving.

- Reduction in drug search time from 115.0 seconds to 47.5 seconds per transaction (**59% reduction**).
- The time taken to search for expired products per month has been reduced from 12 hours to 0 hours (**100% reduction**).
- The time taken to enter the half-yearly inventory data was reduced from 4 hours to 0 hours (**100% reduction**).
- The production time for medication labels was reduced from 130.9 seconds to 10.0 seconds per label (**92% reduction**).
- The accuracy of the acceptance data increased from 96.0% to 99.9% (**4% increase**).
- Picking accuracy increased from 88.0% to 99.7% (**12.5% increase**).

Conclusion

Processes are standardized and incorporated into the pharmacy management operations manual. This improvement initiative can be extended to internal sub-warehouses within the hospital, ensuring accurate medication management throughout the entire facility.