Using Portable Data Terminal (PDT) to improve efficiency of drug ordering at Singapore General Hospital (SGH) Emergency Pharmacy

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BACKGROUND

SGH Emergency Pharmacy orders an average of 100 drug items for stock replenishment during each weekly ordering day.

When ordering, the staff calculated the order quantity by subtracting the balance quantity in the drug bin from the recommended full stock level. Order quantities were recorded onto a hardcopy order form for submission to the main Outpatient Pharmacy staff the next morning. Outpatient Pharmacy staff keyed in the required drugs on the handwritten order form to post out the required drugs in the electronic inventory system. A separate file is also entered for drugs to be supplied from the Main Store Pharmacy. This is followed by printing of the drug pick list, drug picking and delivery of drugs to Emergency Pharmacy. The process was time-consuming and error-prone.

OBJECTIVES

Primary objective: **To redesign a more efficient ordering workflow, and reduce the overall time spent on ordering and processing of SGH Emergency Pharmacy drug orders by 50% in 6 months.**

Secondary objective: **To improve the legibility and accuracy of drug orders.**

METHODOLOGY

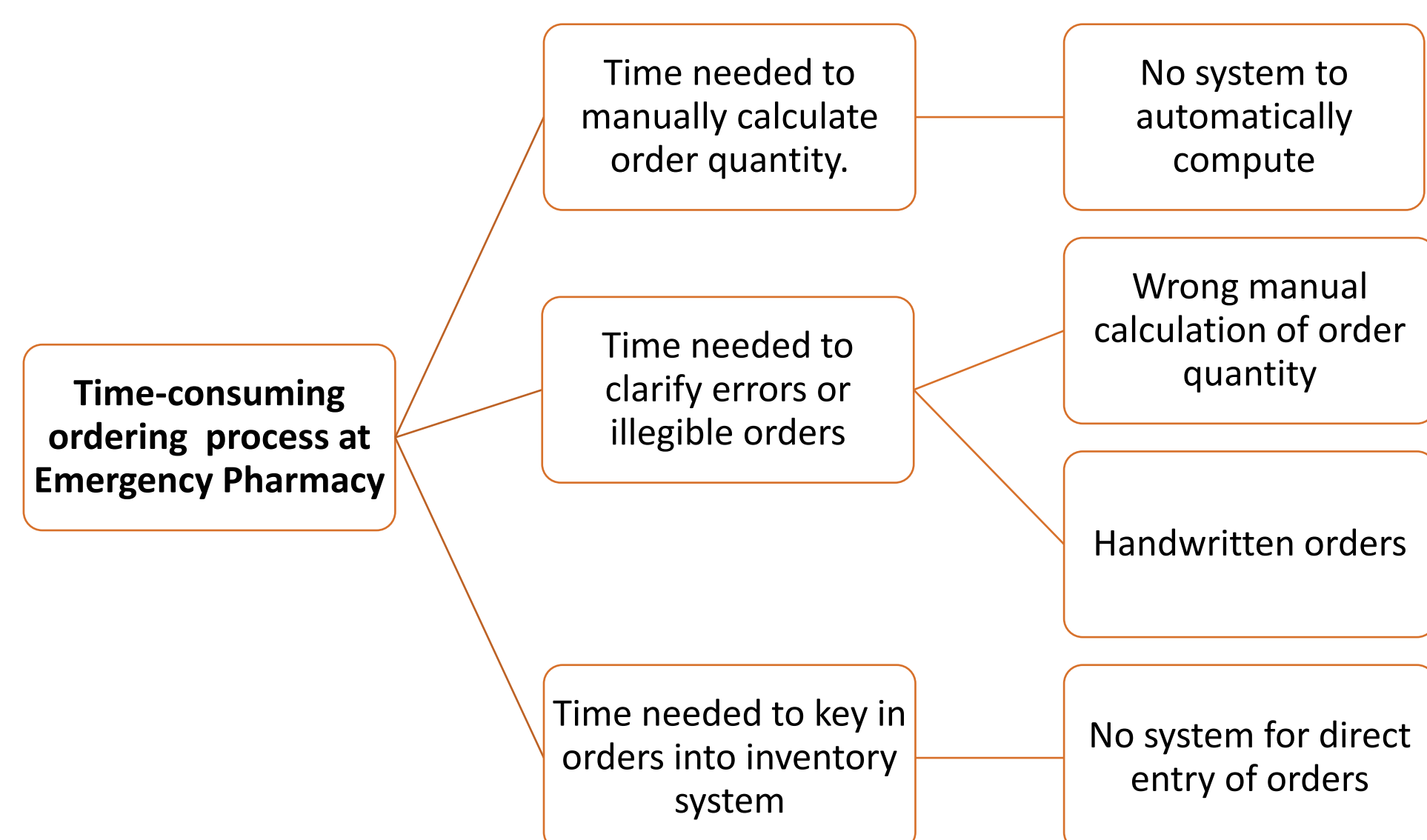Root causes for time-consumption for ordering and processing drug orders were analysed using *5-whys* [Figure 1].

Figure 1. Root Cause Analysis

Team members brainstormed for possible solutions. "**Manual Calculation of Order Quantity**", "**Recording on Order Form**" and "**Entry of Order Quantity into Electronic System**" were workflow steps identified as areas for improvement [Figure 2 – Marked in yellow].
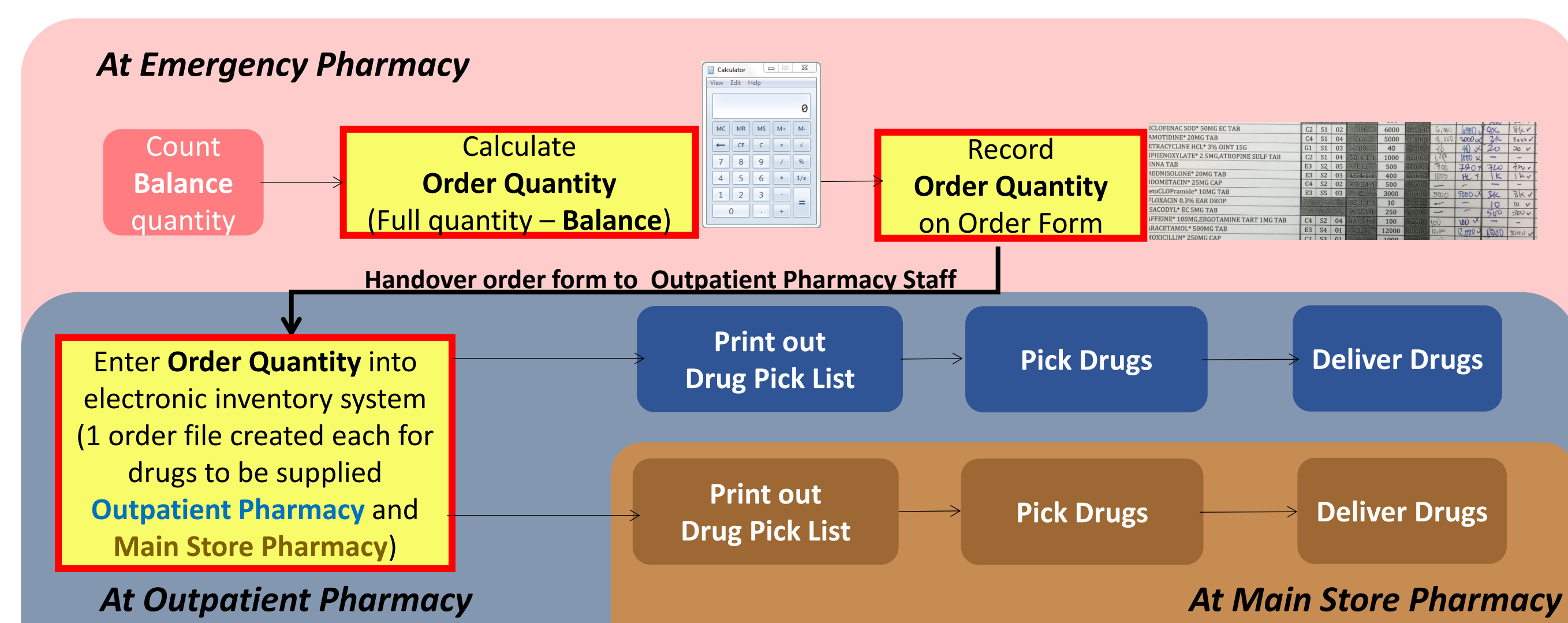

Figure 2. Ordering Workflow (Before Implementation of PDT)

INITIATIVES

"**Use of Portable Data Terminal (PDT) for Direct Entry of Ordering Data**" was selected as the solution through *multi-voting*. The new system of ordering with PDT was implemented as follows:

1) The drug bin labels were redesigned to bear the drug item barcode for scanning using the PDT to enter the drug for ordering. The "Order Trigger Point" (OTP) quantity information is also included on the bin label [Figure 3]. Only drug items with balance quantity below the OTP value will be scanned and ordered.
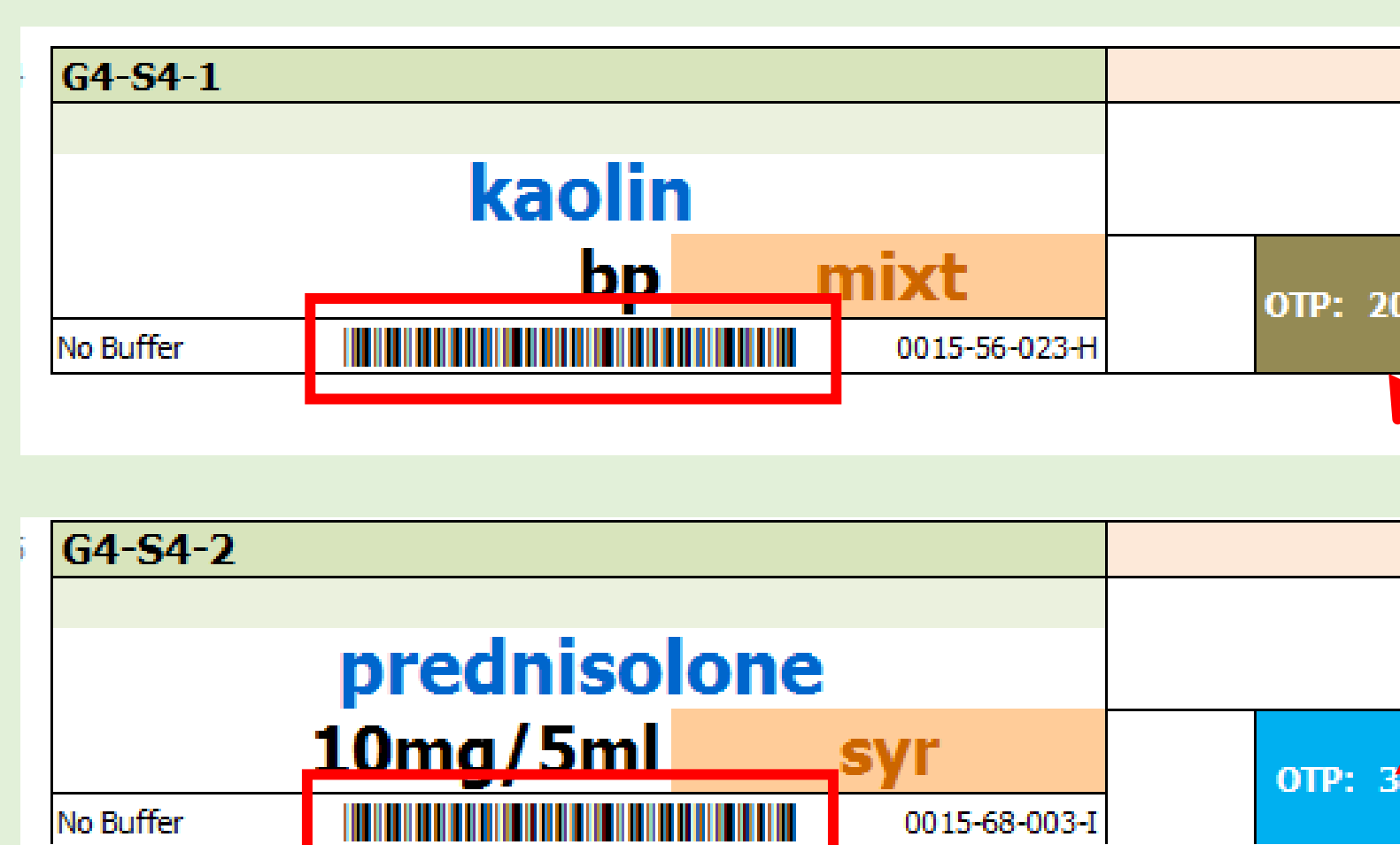
OTP (Order Trigger Point) : Provides quick reference. Only drugs with stock level below OTP value needs to be ordered for replenishment.

Colour coding of OTP in **brown** and **blue**. **Brown** refers to items to be ordered from Main Store Pharmacy.

Blue refers to items to be ordered from Outpatient Pharmacy (Sub-store).

Figure 3. Re-designed Drug Bin Label with item barcode and Order Trigger Point value.

2) Separate files would be saved for drugs supplied by Outpatient Pharmacy and Main Store Pharmacy for transmitting to respective pharmacies separately. Drug bin labels were colour-coded to indicate the items to be ordered from Outpatient Pharmacy (**Blue**) and Main Store Pharmacy (**Brown**) [Figure 3].

3) The full top-up quantity for each drug was set up in the system. Now, staff can simply scan the drug barcode, and then enter the balance quantity into the PDT. System will automatically compute order quantity by subtracting the balance quantity from the pre-set full top-up quantity in the system, eliminating the step for manual calculations.
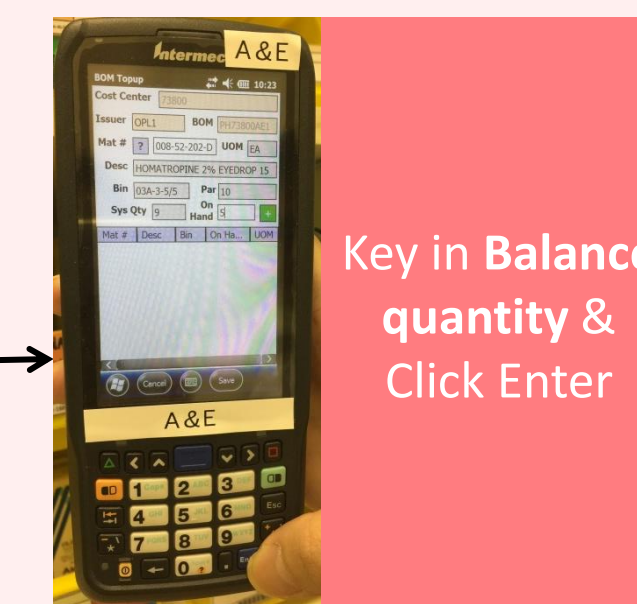

Figure 4. Revised Ordering Workflow (After implementation of PDT)

RESULTS
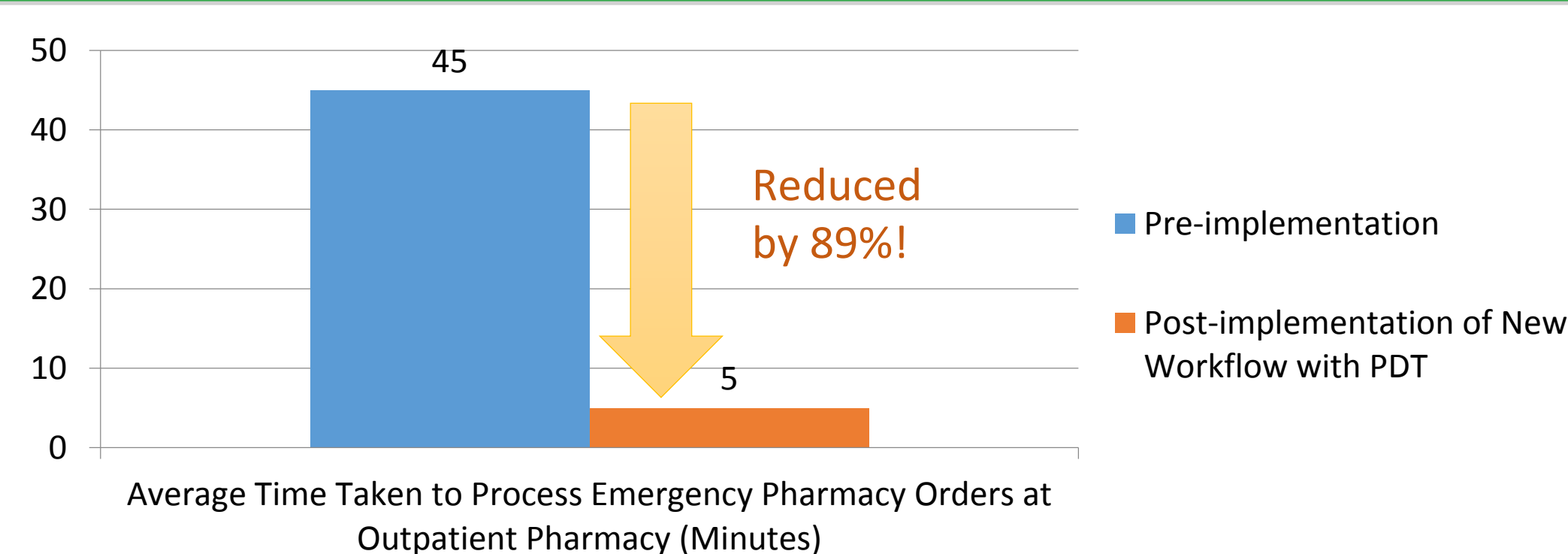
Effectiveness of the system was evaluated by comparing average time-taken to order and process orders pre- and post- implementation. Average processing time was reduced from 45 minutes to 5 minutes after implementation.

Time spent for data keying into inventory system was reduced by 89%, potentially saving 35 man-hours a year.

In addition, use of direct electronic entry removed the transcribing step and the accompanying errors and illegibility issues.

CONCLUSION

Use of PDT for direct order entry has effectively reduced time used to process SGH Emergency Pharmacy weekly drug replenishments. Direct entry also eliminated transcribing errors of entering handwritten information into the inventory system. The time and manpower saved is now channelled towards other pharmacy operational tasks, improving efficiency through the streamlined drug replenishment process.