

COMPUTERIZED PHYSICIAN ORDER ENTRY (CPOE): A DIGITAL TRANSFORMATION INITIATIVE TO IMPROVE SAFETY, QUALITY AND EFFICIENCY

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Background & Objective

Our healthcare landscape is undergoing a digital transformative shift, with widespread innovations and integration of technology aiming to improve patient safety, quality of care and operational efficiency. Computerized Physician Order Entry (CPOE) is an electronic approach which establishes the foundation for realizing closed-loop medication management system (CLMMS) and has been widely promoted as the most promising approach for improving medication safety across all clinical settings. This study aims at describing the process, experience and impact after implementation of computerized physician order entry (CPOE) system in outpatient setting.

Methods

Hospital stakeholders from key departments such as Medical Affairs, Pharmacy, Nursing and Information Technology formed a working team and initiated multiple discussions with the Hospital Information System (HIS) vendor to discuss workflow and medication-related gaps where pharmacy was instrumental in working with the vendor for enhancements. Examples of enhancements included integrating a clinical decision support system (CDSS), fine-tuning the appropriate order entry strategy, and improving system navigation and visual aspects. In preparation for go-live, pharmacists provided comprehensive training sessions to both prescribers and pharmacy staff to ensure users are competent in using the new system and understanding the workflow changes associated with this digital transition.

In January 2025, the outpatient setting implemented CPOE. A robust working team consisting of pharmacists, Medical Affairs, nurses, Finance, and the HIS vendors was formed to manage enquiries and provide ongoing assistance. Additionally, pharmacy team created infographics highlighting specific features and enhancement to facilitate the new prescribing process in CPOE that were regularly shared at the townhall sessions and communication platforms. The following data were analysed to measure the impact of CPOE in the outpatient setting:

- 1 Average prescription error intervention rate pre- and post-CPOE implementation
- 2 Average prescription processing time
- 3 Patient's waiting time pre- and post-CPOE implementation

Results

Figure 1 showed a remarkable 50% reduction in the average prescription error intervention rate achieved following CPOE implementation, dropping from 1.0% to 0.5%. As illustrated in figure 2, this drop is largely contributed by a significant reduction of 95.4% on intervention required for 'Incomplete Prescription' whereby CPOE ensured the mandatory drug, dose, frequency, duration and physician's authorization fields were filled before finalizing a prescription. In addition, an overall reduction of 90.6% is observed on intervention due to illegible handwriting and use of abbreviations. During the transition period, there were still manual prescriptions in use, hence those accounted for prescription interventions in the 'Incomplete Prescription' and 'Miscellaneous' category.

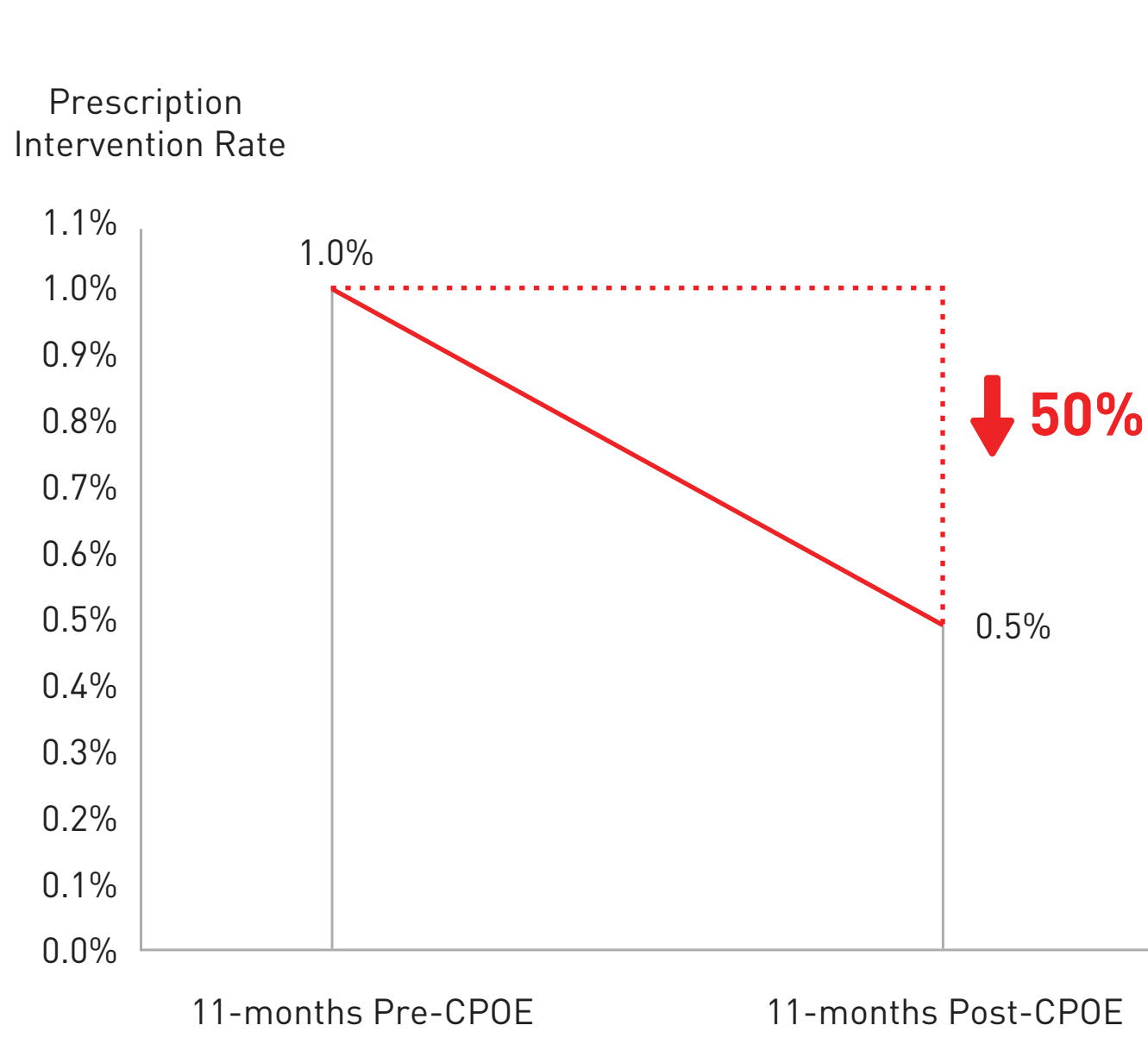


Figure 1: Average Prescription Error Intervention Rate Pre- and Post-CPOE Implementation

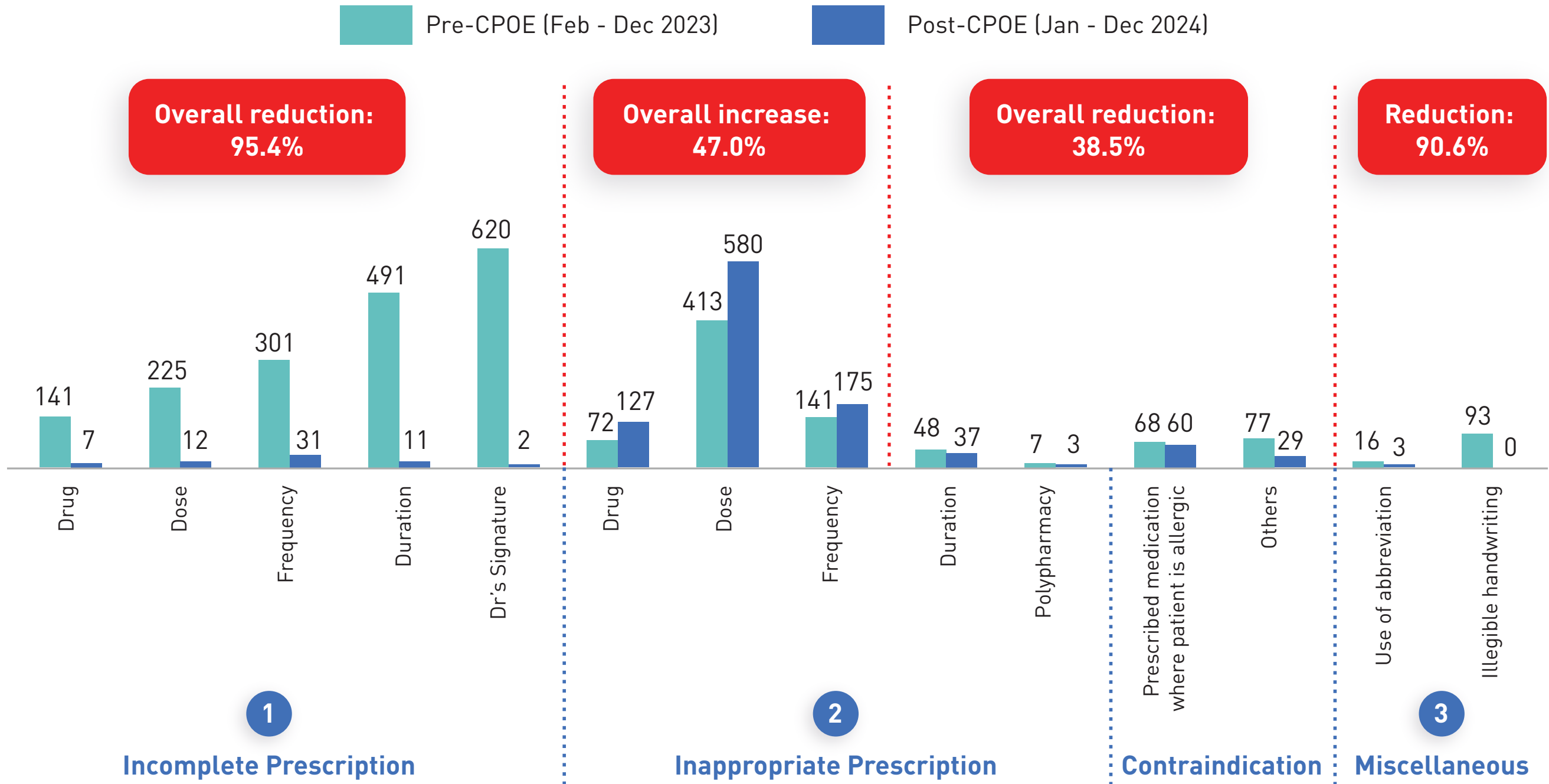


Figure 2: Comparison of Prescription Intervention Types: Pre- and Post-CPOE Implementation. These are categorized into (1) Incomplete Prescription, (2) Inappropriate Prescription, and (3) Miscellaneous.

The CPOE system has also improved the operational efficiency by reducing the patient's average waiting time by approximately 50% (figure 3). The reduction in waiting times is largely attributed to the enhanced efficiency brought about by the CPOE system whereby prior to CPOE implementation, majority of time was spent on transcribing prescriptions, kick-starting the prescription processing activity upon receiving hard copy prescriptions, and calling prescriber to clarify the incomplete prescriptions, illegible handwriting and unapproved abbreviations. The overall results clearly showed that the CPOE system has positively impacted the quality of care and operational efficiency in the facility.

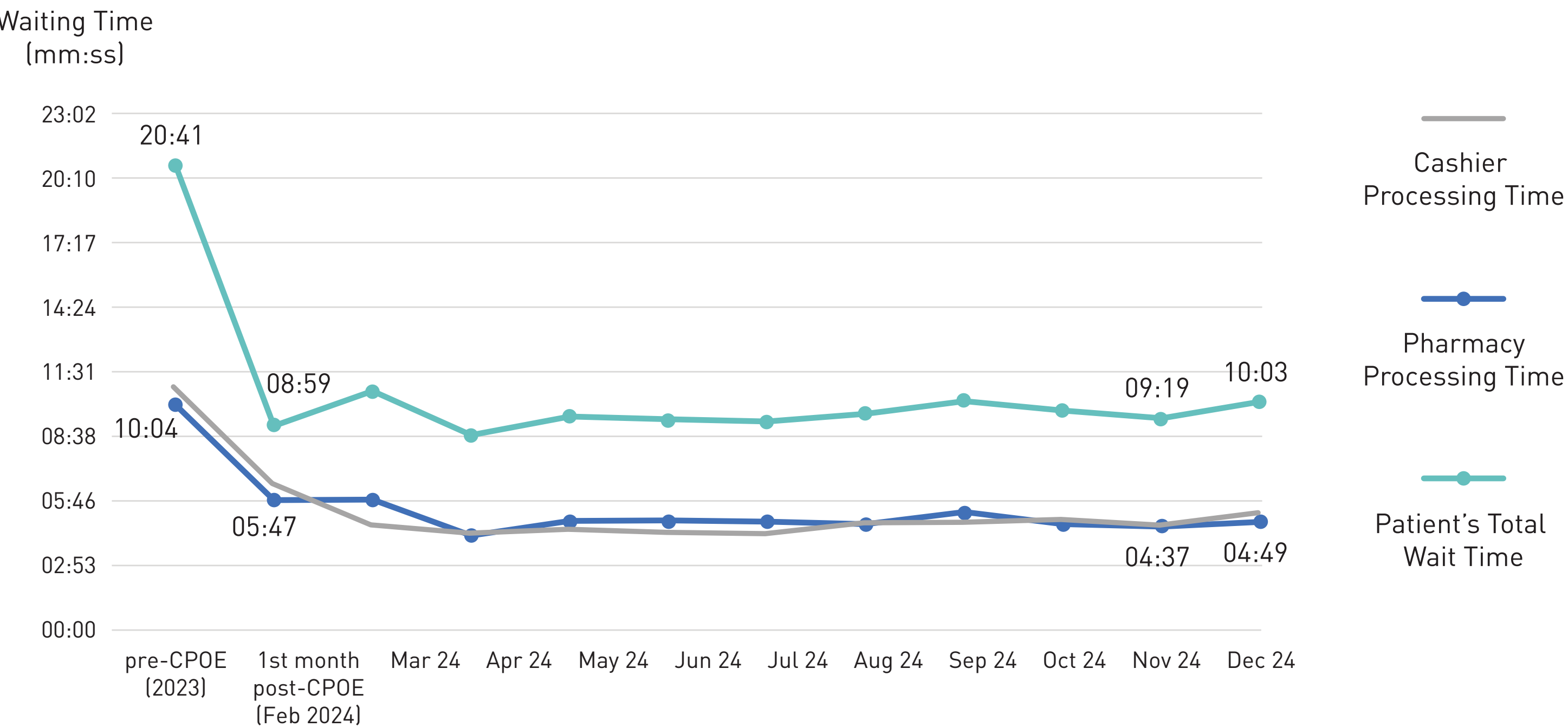


Figure 3: Average Prescription Processing Time and Patient's Wait Time Pre- and Post-CPOE Implementation. The average patient's total wait time includes the average pharmacy and cashier processing time.

Conclusion

The transition from manual to digital prescription management has effectively addressed the limitations in paper-based workflows, resulting in a substantial decrease in the overall prescribing error rate and improve patient's average waiting time.