Monitoring of Personalized Therapies Dispensed through Automated Unit Dose Drug Dispensing Systems

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BACKGROUND AND IMPORTANCE

Medication errors are any preventable events that may cause or lead to inappropriate medication use or patient harm. They **represent one of the leading causes of morbidity and mortality in hospital settings, significantly contributing to increased healthcare costs and prolonging patients' hospital stays.** Although they can occur during the entire drug therapy management process, **a higher incidence rate has been detected during the prescribing, dispensing and drug administration steps.**

Innovative approaches to mitigate medication errors are centered on **Closed Loop Medication Management Systems (CLMMS)**, incorporating **automated Unit Dose Distribution Systems (UDDS)**, drug cabinets and barcode labeling for bedside scanning (**Figure 1**). Nevertheless, Europe lacks a unified approach to hospital medication management. Collaborative efforts are underway, but regulatory and operational barriers hinder widespread implementation.

Figure 1. Automated UDDS producing individually packaged (**A**) and labelled (**B**) drugs for inpatients. **C**) Information reported on each single unit dose. **D**) Personalized daily patient unit doses therapy.
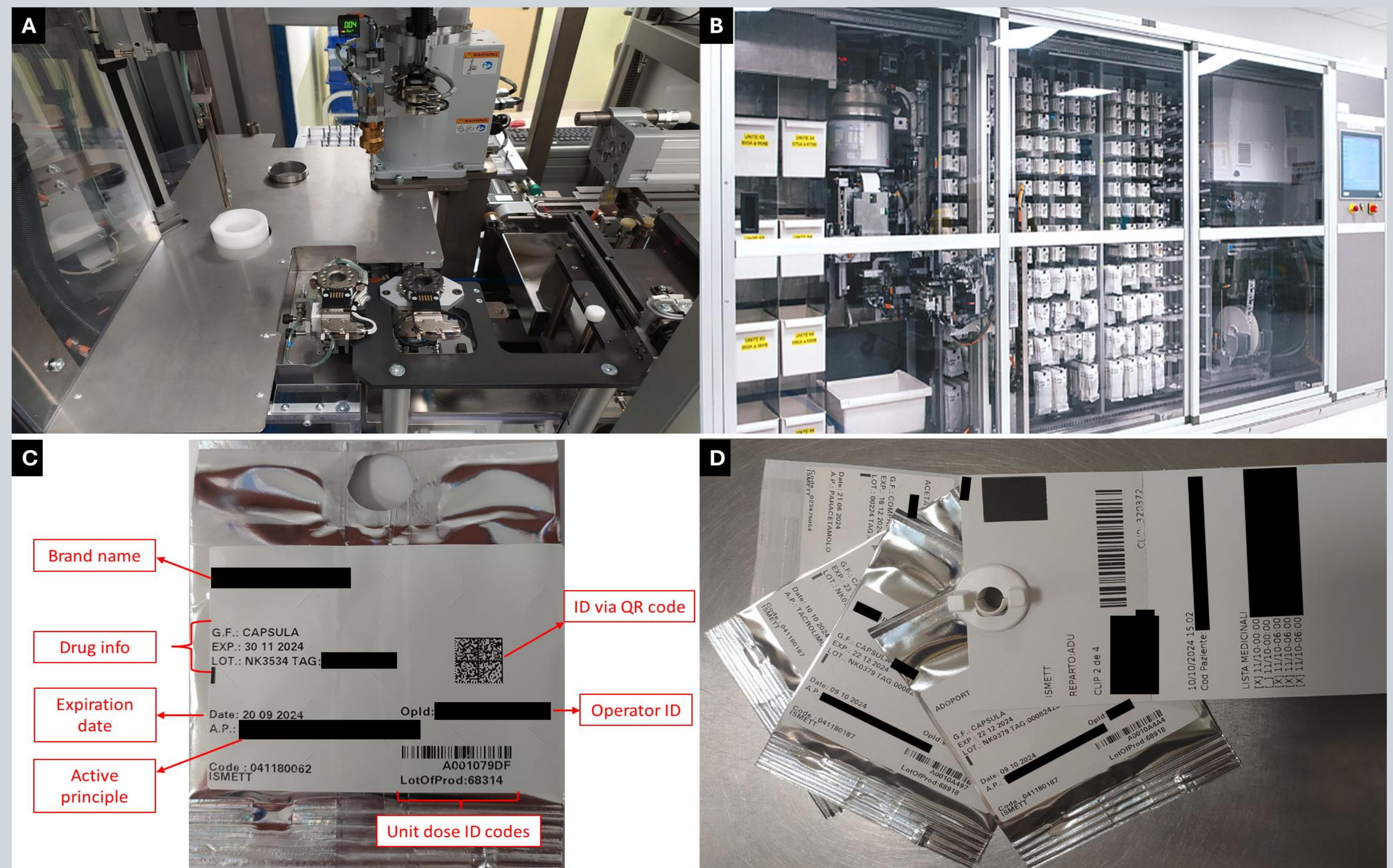
MATERIALS AND METHODS

Quantitative and qualitative analysis of the non-conformities in single unit dose packages produced between January 1st and December 31st, 2024, were conducted. The analysis was carried out using daily production reports and checklists (**Figure 2**).

Figure 2. Daily production report for each labelled single unit dose produced.

AIM AND OBJECTIVES

The present study seeks to monitor the non-conformities of single unit dose packages produced in a hospital pharmacy. The aim is to **improve patients' safety and enhance the quality standard of the Institute's Clinical Pharmacy Service.**
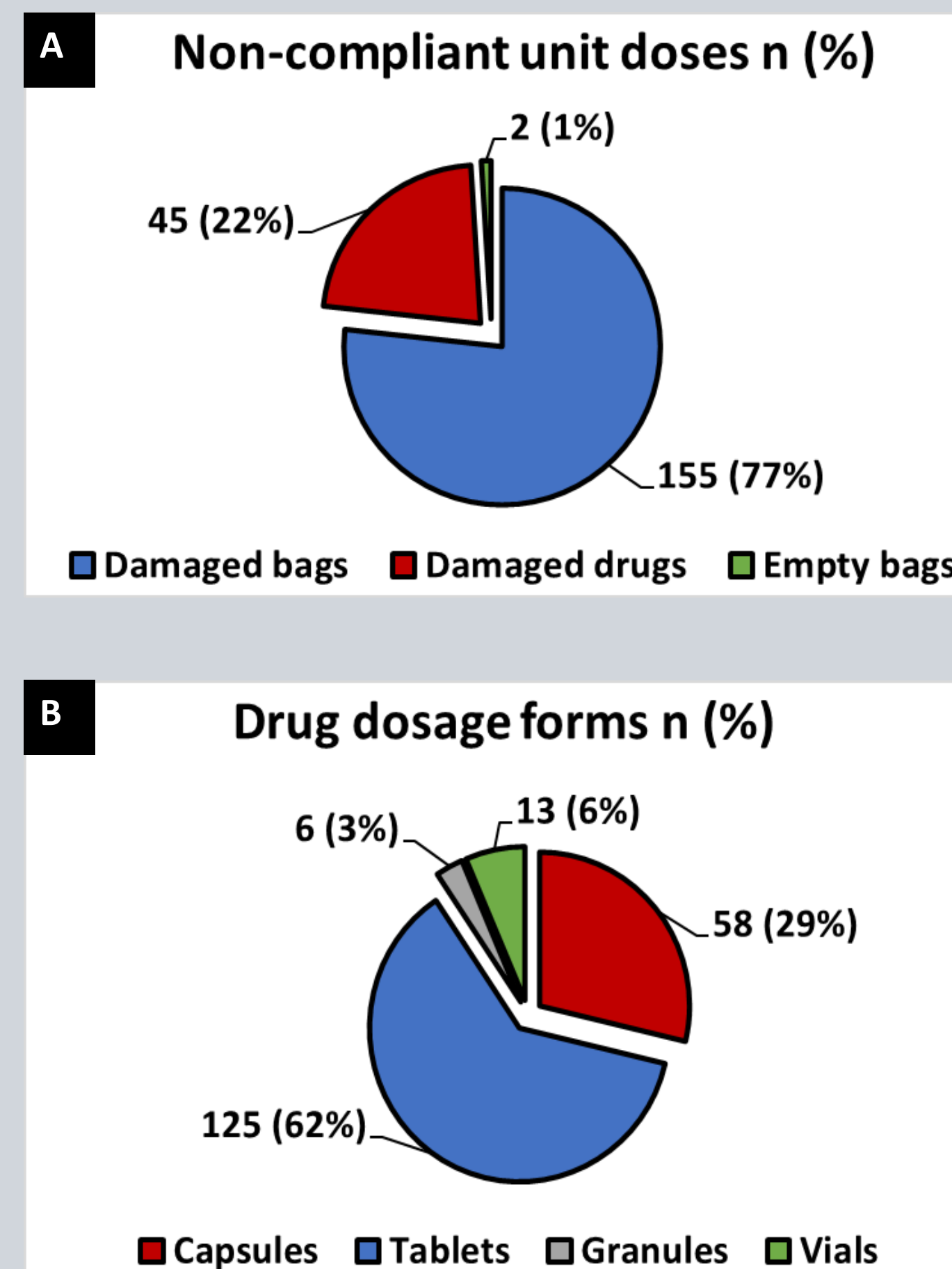
RESULTS

Non-compliant unit doses n (%)
- Damaged bags: 155 (77%)
- Damaged drugs: 45 (22%)
- Empty bags: 2 (1%)

Drug dosage forms n (%)
- Capsules: 58 (29%)
- Tablets: 125 (62%)
- Granules: 6 (3%)
- Vials: 13 (6%)

Figure 3. Types of discrepancies detected (**A**) and the drug dosage forms involved (**B**).

Month	Not compliant/total n. unit doses (%)
January	0,07
February	0,05
March	0,14
April	0,15
May	0,08
June	0,03
July	0,10
August	0,09
September	0,11
October	0,21
November	0,11
December	0,08
Total	0,10

Table 1. Non-compliant/total n. unit doses (%) per month in the study period (2024).

RESULTS

The total number of unit dose packages produced during the study period was 196,656, with an average of 16,388 per month. While the total number of non-conformities found was 202 (0.10%), with an average of 17 per month (**Figure 3 and 4**). The ratio between the number of non-compliant unit doses and the total number of doses produced in the study period remained below the expected annual target (<1%) in each month, as shown in **Table 1**.

Figure 4. A) Total number (**A**) and number of non-compliant (**B**) unit doses produced per month during the study period (2024).
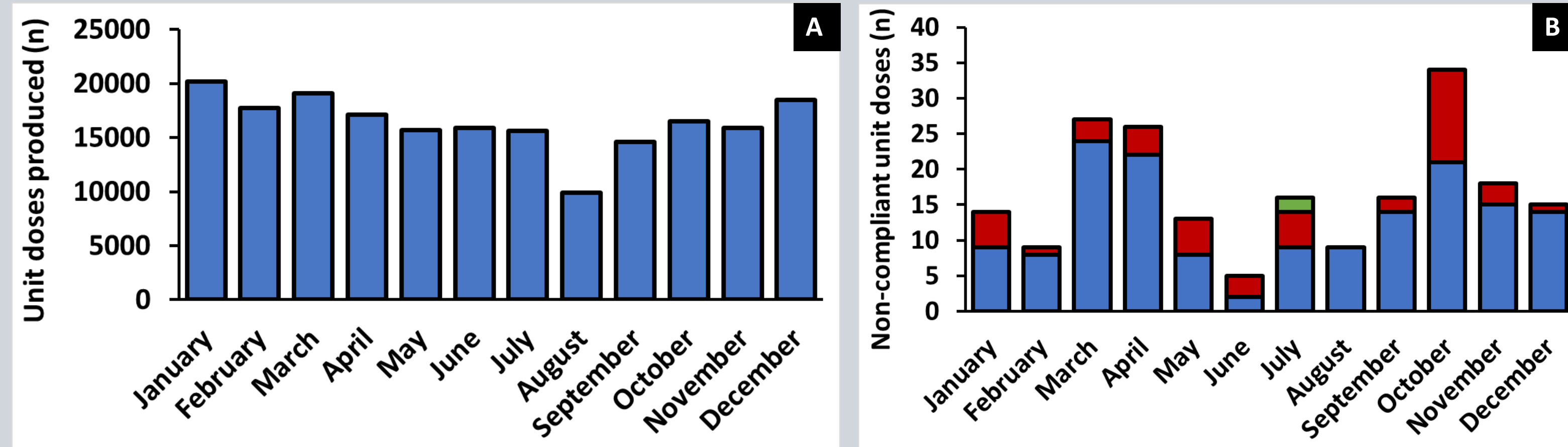
CONCLUSION AND RELEVANCE

The number of non-compliant unit doses analyzed was in line with the predetermined annual target (<1%). No potentially harmful discrepancies, such as mismatches between the labels on the unit dose packages and their contents or production reports, were found.

Implementation of an automated UDDS in hospital settings proved to be a useful tool to improve all stages of medication processes and to significantly reduce medical errors rate, lowering harmful errors and overall errors, while enhancing patient safety. Future integration with barcoding, AI-driven error prevention tools and real-time tracking could further optimize its functionality and benefits.

REFERENCES

- Gallina M, Testagrossa M, Provenzani A Unit dose drug dispensing systems in hospitals: a systematic review of medication error reduction and cost-effectiveness. *Eur J Hosp Pharm* Published Online First: 26 February 2025. doi: 10.1136/ejhpharm-2024-004444.
- The European Statements of Hospital Pharmacy, *Eur J Hosp Pharm* 2014;21:256–258. doi:10.1136/ejhpharm-2014-000526.