

# Is it safer? Comparison of medication prescribing practices following the implementation of an electronic prescribing system.

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## Background

While electronic prescribing software are implemented in a large number of hospitals across the developed world to improve medication safety, few studies have reviewed the benefits of electronic prescribing compared to traditional practice.

An Electronic Prescribing and Medication Administration (EPMA) system, was implemented at Caboolture Hospital in July 2018. This system is used as a replacement of the National Inpatient Medication Chart in medical, surgical, and mental health wards as well as operating theatres. Paper charts are still used hospital wide for intravenous drugs and fluids, insulin and heparin. This study aimed to determine the effect of EPMA on compliance with safe medication prescribing practices and to inform quality and safety initiatives around prescribing by providing up-to-date feedback to stakeholders as part of change management.

## Aim

The aims of this research were to:

- Determine the proportion of medication orders with one or more medication errors
- Determine the prescribing errors across different subcategories of error (dosing error, administration errors, therapeutic errors)
- Support site in the change management process by providing regular feedback on project

## Method

The study was conducted across four medical wards at Caboolture Hospital. Direct observation of medication orders occurred pre- (Jan-April 2018) and post- (Oct 2018 – Mar 2019) EPMA implementation. Errors were classified into four overarching categories:

- **Therapeutic:** Errors related to drug-drug interactions, contraindications, incorrect monotherapy, duplicate therapy or errors in monitoring
- **Procedural:** Errors related to readability, patient data, ward and prescriber data, drug name, dosage form, or route of administration
- **Dosing:** Errors related to medication strength, frequency, dosage, length of therapy, and direction of use
- **System:** Errors related to EPMA system functionality or design (post-only)

After data collection a panel of experts risk stratified the errors. Results were analysed using a segmented linear regression and key stakeholders at Caboolture Hospital were consulted as results came to hand.

## Results

| Orders reviewed  | Number of errors | Types of errors                      |                                 |
|------------------|------------------|--------------------------------------|---------------------------------|
| <b>Pre-EPMA</b>  | 7474             | 611 therapeutic<br>(1 per 17 orders) | 3482 dosing<br>(1 per 3 orders) |
| 10,535           |                  | 3381 procedural<br>(1 per 3 orders)  |                                 |
| <b>Post-EPMA</b> | 5097             | 248 therapeutic<br>(1 per 56 orders) | 2467 dosing<br>(1 per 6 orders) |
| 13,841           |                  | 2203 procedural<br>(1 per 6 orders)  | 179 system<br>(1 per 77 orders) |

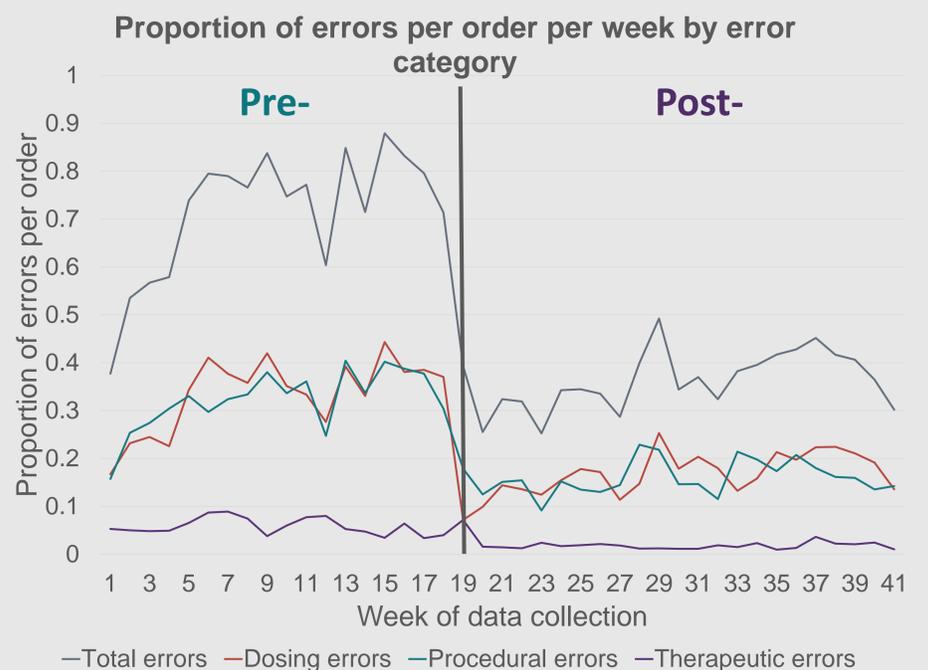
## Results continued

Pre-EPMA implementation 10,535 orders were reviewed for errors. Of these 4859 (46.1%) orders contained at least one error. Post-EPMA implementation 13,841 orders were reviewed for errors. Of these 3737 (27%) orders contained at least one error.

Segmented linear regression was conducted to determine if the proportion of **orders with an error** changed pre- and post-EPMA



Segmented linear regression was conducted to determine if the proportion of **errors per order** changed by error category pre- and post-EPMA



## Conclusion and key learnings

- The introduction of EPMA was associated with a reduction in prescribing errors across all error categories: dosing, therapeutic, and procedural
- Medication Safety Committees will need to further interpret findings and establish a plan to target highest areas of concern
- Changes to software configuration and the inclusion of clinical decision support tools may further improve impact of EPMA
- Despite the introduction of EPMA, fostering a culture emphasising Medication Safety will always be necessary to improve patient safety