

THE RATES AND TYPES OF PRESCRIBING ERRORS IN ELECTRONIC CHEMOTHERAPY PRESCRIPTIONS FOR AMBULATORY PATIENTS

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Background and Objectives:

Chemotherapy is a field where any kind of error represents higher risk because of higher vulnerability of patients, complex treatment regimens, narrow therapeutic index of drugs and intravenous administration of drugs. Electronic prescribing systems have been recognised as successful in reducing prescribing errors in chemotherapy prescriptions. However, electronic prescriptions are unlikely to prevent all errors and new types of errors may emerge.

The main objectives of this study were to:

- Assess prescribing error **RATES**
- Identify new prescribing error **TYPES**
- Identify the system-related **CAUSES** for prescribing errors ... after the implementation of a cancer electronic prescribing system for ambulatory patients at a London Cancer Centre.

Materials and methods:

A quantitative service evaluation was conducted in two parts, covering two different strategies for interception of prescribing errors –
 a) Prospective review of prescribing errors, as identified by cancer services pharmacists, over a 2-week period.
 b) Retrospective analysis of information recorded by the pharmacy telephone helpline service to support users with using the system, over a 41-week period.

Descriptive statistics were used to analyse the data. Prescribing errors were classified into two categories – FIELD (related to a specific part of the prescription e.g. patient demographics, drug dose, chemotherapy regimen, approval / prescriber's signature) and TYPE (related to whether the error was specific to the electronic prescribing system [e-specific] or not [non e-specific]).

Results:

The overall error rate was estimated to be 6%. In the prospective part, 32 errors were identified from the 571 electronic chemotherapy prescriptions reviewed by the cancer services pharmacists. Most common errors identified were errors related to wrong drug dose adjustments (41%, n = 13) and weight omissions (34%, n = 11). In the retrospective part, 141 errors were recognised from the 276 registered contacts recorded by the pharmacy telephone helpline service. See Table 1 for the breakdown of errors in the retrospective and prospective analysis. 43% (n = 60) of prescribing errors were related to chemotherapy sequencing (scheduling) e.g. wrong date for cycles and missing days within cycles.

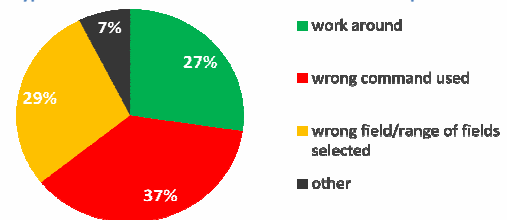
Table 1: Breakdown of errors for the retrospective and prospective analysis

FIELD	Retrospective analysis N = 276	Prospective analysis N = 571
	Frequency (%)	Frequency (%)
Regimen/part of regimen schedule	60 (43)	2 (6)
Supportive drug choice	16 (11)	2 (6)
Approval of cycles/dates	14 (10)	-
Chemotherapy drug dose	13 (9)	13 (41)
Regimen choice	11 (8)	-
Patient's weight	4 (3)	11 (34)
Supportive drug schedule	3 (2)	2 (6)
Other fields	20 (14)	2 (6)

In the retrospective analysis 97 errors (69%) were e-specific, compared to 5 (16%) for the prospective analysis. E-specific errors were further classified into various e-selection errors (e.g. 'work-arounds' [using a tool,

function or pathway not as agreed], 'wrong command or sequence of commands used' or 'wrong field or range of fields selected, as illustrated in Figure 1), missing referral form and errors when the electronic prescription could not be completed according to a clinical decision. In the retrospective analysis non e-specific errors included missing information (5%), information inserted in the wrong place (2%), inappropriate information / adjustment (21%), omission (1%) and duplication (2%). In the prospective analysis non e-specific errors included missing information (34%), inappropriate dose banding / rounding (22%), inappropriate information / adjustment (19%) and omission (9%).

Figure 1: Types and rates of e-selection errors in the retrospective analysis



E-system weaknesses were recognised in 4 of 32 cases (13%) in the prospective part of the study and in 89 of 141 cases (63%) in the retrospective part. Identified weaknesses included:

- Inappropriate option available
- Appropriate option not available
- Different fields for entering same information
- Inappropriate default option suggested
- Automatic link missing
- No 'undo' function
- Complicated process

Discussion:

RATES

Overall rate of prescribing errors (5.8%) is comparable to results from previous studies (1 to 13%). However, no direct comparison should be made due to different definitions of prescribing errors and methodologies.

The retrospective part of the study demonstrated that:

- Pharmacist interventions do not reveal all prescribing errors.
- Telephone helpline service prevents 50% of e-specific errors.

CAUSES

- Majority of scheduling errors were related to electronic prescribing system.
- Generally, any kind of adjustment processes are more prone to errors in electronic prescribing systems.

TYPES

- Using more than one method of analysing prescribing errors increased the number of different types of identified errors.
- High rates of dosage-related errors were observed.
- A variety of e-selection errors were identified, such as using work-arounds, wrong commands and wrong fields.

SOLUTIONS

Two types of solutions that would help to prevent commission of recognised errors were suggested:

- technical solutions to be built in electronic prescribing system
- additional education/training course on electronic prescribing system for prescribers

It was asserted that with these solutions implemented, approximately 85% of prescribing errors would be prevented.

Conclusions:

- Overall error rate in electronic chemotherapy prescriptions was estimated at 6%.
- A number of errors, specific to electronic prescribing systems, such as various e-selection errors, were identified.
- The electronic system appeared to be impractical when certain adjustments had to be made, particularly in the scheduling fields.
- Future studies assessing error rates with electronic prescribing systems should make a direct comparison with the previous rates for the same setting.

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