The effect of a prescriber training intervention on the prevalence of prescribing errors generated by an electronic prescribing system

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St James's Hospital, Dublin

- Ireland's second largest teaching hospital
- ~940 beds
- Cerner EPR currently in use.
- Examples of current EPR use:
  - Lab/Radiology Orders and Results
  - Discharge Summaries
  - Allied Health Documentation
  - Electronic prescribing currently only used in one outpatient setting - GUIDE Clinic (Genito Urinary Medicine and Infectious Diseases)
Project Oak currently in progress
  - Physician and Nursing Documentation
  - Electronic Prescribing and Medication Administration

Aim is to launch EPMA early 2018.

EPMA pharmacy team in place since December 2016.
The effect of a prescriber training intervention on the prevalence of prescribing errors generated by an electronic prescribing system
Motivation

- ePrescribing to be rolled out next year
- Many factors will need to be considered including training requirements
- Potentially new prescribers every three months learning how to use the system
- Demand on resources for training
Motivation

- Literature refers to the importance of ongoing support and training
- Lack of evidence or published literature to highlight why this is so important
- Make a case for resources for staff training
ePrescribing systems can introduce new types of errors.

Training and education is key for successful implementation and ongoing use.

Regardless of the quality of initial training, it is unlikely that users will have full appreciation of all functionalities within a system.
Identify requirements for additional training through staff feedback or ongoing monitoring of system data

Ongoing training includes:
- Training in new features
- Ongoing refresher training
- Training of new staff
- Opportunistic training.
Type and extent of training required is a topic of debate.

Benefits of ongoing training include:
- Consolidation of understanding of system functionalities
- Prevention of workarounds
- Building confidence
- Disclosing user concerns
- Identifying issues with the system
Research Setting

- GUM and ID outpatient clinic
- Consultants, GUM specialists, registrars, GP trainees and nurse prescribers
- Electronic prescriptions dispensed on site by GUIDE pharmacy
- ~200 different medications prescribed
- Mostly oral medications
  - HIV
  - Hepatitis C
  - STI
1. Pre-training intervention prescription audit
2. Clinician questionnaire and observations
3. Analysis of findings
4. Design and delivery of targeted classroom-based training intervention
5. Post-training intervention prescription audit
6. Analysis and comparison of findings
Defining Errors

- Difficult to find a universal definition of a prescription error
- Dean et al. (2000) definition:
  “A clinically meaningful prescribing error occurs when, as a result of a prescribing decision or prescription writing process, there is an unintentional significant
  (1) reduction in the probability of treatment being timely and effective or
  (2) increase in the risk of harm when compared with generally accepted practice”.
Defining Errors

- System-related errors (Westbrook et al., 2013):
  
  “Errors where there was a high probability that the functionality or design of the e-PS (electronic prescribing system) contributed to the error and there was little possibility that another cause, such as lack of knowledge about the drug, produced the error.”
Defining Errors

For this study:

“Traditional” prescribing errors

+ 

System-related errors

+ 

Legal errors (as per Irish Statute Books)
Results - Proportion of medications prescribed which contained one or more errors

Number of medications prescribed = 567
- No Errors: 71.4%
- One or More Errors: 28.6%

Number of medications prescribed = 542
- No Errors: 90.8%
- One or More Errors: 9.2%
Results – Types of Errors

Distribution of Errors

2a = “Dispensed" status repeated from previous prescription not removed
Prevalence of Error Type 2a

Pre Intevention

- Occurred: 82.5%
- Did not occur: 17.5%

Post Intevention

- Occurred: 96.5%
- Did not occur: 3.5%
Review of Error Types – “2a”

Order 26/01/2016 11:27
Entered and electronically signed by [signature] on 26/01/2016 at 11:27.

Status
Order Status: Ordered

Details
Strength Dose: 400
Strength Dose Unit: mg
Route of Administration: Oral
Frequency: twice a day
As required: No
Requested Start Date/Time: 26/01/2016 11:27
Duration: 4
Duration Unit: month(s)
Stop Type: Physician Stop
Constant Indicator: No
Dispense status: Dispensed

Drug Name & Strength
Raltegravir 400mg BD PO 4/12

Comments (e.g. discontinued medicines)

Dispensed 4/12, FN

St James’s Hospital Pharmacy Department
26/01/16

GUIDE Clinic

Joe Bloggs
1234567
Test House
Test Street
12 4 67

Dr Bloggs
NKDA

Dr Bloggs
12345
867

26 1 16

Dr Bloggs

GUIDE Clinic

NKDA

GUIDE Clinic

Review of Error Types – “2a”
Review of Error Types – “2a”

- **Legal Error**
  - Legal requirement to remove the word dispensed as no further medications can be given to patients from a “dispensed” prescription
  - Survey Feedback: 41% were not aware of the legal requirement to remove the word “dispensed” from the "dispensing status" field of copied prescriptions

- **System Error**
  - “there (is) little possibility that another cause….produced the error”

- **Traditional Error**
  - “An ambiguous medication order” - it can lead to confusion as to whether the prescription has already been dispensed or not.
Results – Types of Errors

Distribution of Errors

2b = Details in “order comments” or “special instructions” field repeated from previous prescription that are no longer valid/appropriate
Prevalence of Error Type 2b

Pre Intervention

- Occurred: 5.5%
- Did not occur: 94.5%

Post Intervention

- Occurred: 3.9%
- Did not occur: 96.1%
Review of Error Types – “2b”

- Comment originally entered and valid only for prescription 6 months ago
Review of Error Types – “2b”

- System Error
  - “there (is) little possibility that another cause....produced the error”

- Traditional Error
  - “An ambiguous medication order” - it can lead to confusion as to whether the comment refers to the current prescription on not.
Results – Types of Errors

Distribution of Errors

1e = Incorrect Frequency/Administration Details
Prevalence of Error Type 1e

Pre Intervention
- Occurred: 4.9%
- Did not occur: 95.1%

Post Intervention
- Occurred: 2.0%
- Did not occur: 98.0%
Review of Error Types – “1e”
Review of Error Types – “1e”

Co-amoxiclav (Augmentin tablets)

<table>
<thead>
<tr>
<th>Order</th>
<th>26/01/2016 15:04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entered and electronically signed by</td>
<td></td>
</tr>
<tr>
<td>on 26/01/2016 at 15:04.</td>
<td></td>
</tr>
</tbody>
</table>

**Status**
- Order Status: Ordered

**Details**
- Strength Dose: 625
- Strength Dose Unit: mg
- Route of Administration: Oral
- Frequency: three times a day
- Duration: 5
- Duration Unit: week(s)
- Requested Start Date/Time: 26/01/2016 15:04
- Stop Date/Time: 01/03/2016 15:03
- Stop Type: Physician Stop
- Constant Indicator: No
Review of Error Types – “1e”

- System Error
  - “there (is) little possibility that another cause....produced the error” – drop down menu selection

- Traditional Error
  - “writing an ambiguous medication order” – e.g. as directed/as required
  - “prescribing a dose that is not that intended” – incorrect duration of treatment/incorrect daily dose
Limitations and Considerations

- Different distribution for two of the prescriber types studied was found between the two audits.

- A formal assessment of the clinical significance of the errors found was outside the scope of the study.
  - Professional judgement would suggest most not clinically significant
The prevalence of prescribing errors was significantly reduced following the training intervention.

Mostly system related errors

Training targeting users interaction with the system effective in reducing errors
Analysis and Outcomes

- Analysing errors flags

1. Areas where training is important and where human-computer interaction is failing

2. Flaws in system/workflow design – why they may be occurring
GUIDE pharmacy staff reported the reduction in errors results in:

- Improved workflow
- Time saving
- More accurate prescribing in GUIDE clinic.

Research methods used could be reused in future
Analysis and Outcomes

- Study provides information on the types and prevalence of prescribing errors occurring in the GUIDE clinic.

- Study supports and gives evidence for ongoing training and the need to provide adequate training resources.

- Study contributes to bridging the gap in the literature that was identified.
Thank You

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References


Questions?